



EU TECHNICAL EXPERT GROUP ON
SUSTAINABLE FINANCE

FINANCING A SUSTAINABLE
EUROPEAN ECONOMY



A nighttime satellite image of Europe, showing city lights and coastlines. Overlaid on the map are twelve yellow five-pointed stars, arranged in the circular pattern of the European Union flag. The stars are positioned to highlight various parts of the continent, including the Iberian Peninsula, the British Isles, Scandinavia, Central Europe, and the Balkans.

Taxonomy Report:
**TECHNICAL
ANNEX**

Updated methodology & Updated Technical Screening Criteria

March 2020

About this report

This document includes an updated Part B: Methodology from the June 2019 report and an updated Part F: Full list of technical screening criteria. The other original sections from the June 2019 report can be found as labelled in the June 2019 report.

PART A	Explanation of the Taxonomy approach. This section sets out the role and importance of sustainable finance in Europe from a policy and investment perspective, the rationale for the development of an EU Taxonomy, the draft regulation and the mandate of the TEG.
PART B	Methodology. This explains the methodologies for developing technical screening criteria for climate change mitigation objectives, adaptation objectives and ‘do no significant harm’ to other environmental objectives in the legislative proposal. This has been updated since 2019.
PART C	Taxonomy user and use case analysis. This section provides practical guidance to potential users of the Taxonomy, including case studies.
PART D	Economic impacts of the Taxonomy. This section provides the TEG’s analysis of the likely economic impacts of establishing an EU Taxonomy.
PART E	Next steps for the Taxonomy. This section elaborates on unresolved issues and potential ways forward for the Taxonomy and the technical work of the Platform on Sustainable Finance.
PART F	Full list of technical screening criteria. This annex sets out the sector- and economic activity-specific technical screening criteria and rationale for the TEG’s analysis. These have been updated since 2019.

Disclaimer

This report represents the overall view of the members of the Technical Expert Group, and although it represents such a consensus, it may not necessarily, on all details, represent the individual views of member institutions or experts. The views reflected in this Report are the views of the experts only. This report does not reflect the views of the European Commission or its services.

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Methodology statements

1. SUBSTANTIAL CONTRIBUTION TO CLIMATE CHANGE MITIGATION

1.1 Work process – conceptual approach

In the June 2019 report, the TEG explained the process used to assess and select economic activities for inclusion in the Taxonomy. (Shown in Figure 1). The Taxonomy Regulation has not materially changed the TEG's thinking on methodology for selecting sectors. Further, the TR takes up the TEG's recommended approach to identify enabling activities as a type of activity.

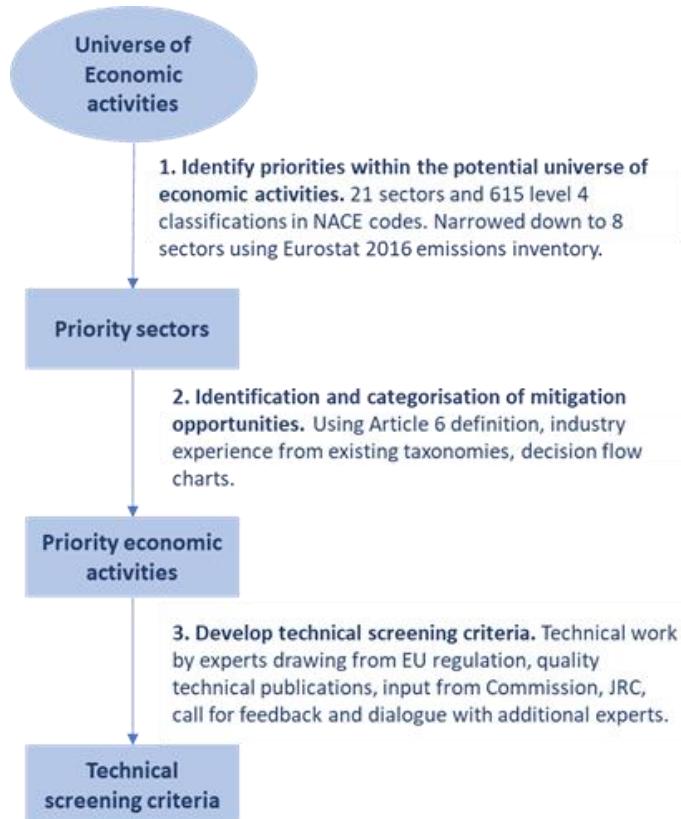


Figure 1 Work process for technical screening criteria development

Identifying priorities within the potential universe of economic activities.

The universe of economic activities is described using NACE codes. NACE codes cover 21 broad sectors, with four levels of sub-codes. At the fourth level, 615 classes of economic activity are identified.

Not all of these sectors, or economic activities, have high emissions¹. Some sectors may have insubstantial emissions. Others can enable emitting activities to transition to a low carbon economy.

The TEG also recognises that some important activities are not captured by the NACE codes. For example: urban and regional planning for low carbon development including avoided journeys, support for lower carbon personal choices such as vegetarian diets, and investments to maintain public natural capital such as natural forests and wetlands. Further work is needed to include these in the Taxonomy in future.

The first group of sectors included by the TEG were those with high climate change mitigation need and potential, on the basis of scope 1 emissions data². In addition, the TEG considered aspects of B – Mining and Quarrying to the extent these supported activities in C – Manufacturing. However, a full evaluation of the mining and quarrying sector was not undertaken.

TEG initially used Eurostat emissions inventory data from 2016. More recent emissions data is now available; however, this does not change the findings of the TEG as the sector profile of Europe's emissions was broadly the same in 2016 and 2018.

In addition, the TEG recognised that failure to address the carbon performance of buildings, which alone contribute 36% of CO₂e emissions in the EU²⁸³, would risk causing harm to climate objectives. Buildings are not a single economic activity under the NACE system. The TEG's buildings criteria are designed to be cross-cutting and apply across the economy, with the exception of explicitly excluded sectors (dedicated storage of fossil fuels). For presentation purposes, the TEG has aligned the building criteria with NACE codes for construction and real estate activities. However, the buildings criteria are not limited to these NACE codes and can be applied across other sectors and economic activities.

The TEG also considered sectors that could enable a substantial contribution in one of the other selected sectors. J - Information and Communication and M - Professional, Scientific Technical activities and due to their potential to be enabling activities. See Table X for a description of enabling activities.

The selected macro-sectors represent a minimum of 93.5% of NACE-based scope 1 emissions in the EU (based on 2018 data), although this figure is likely to be an underestimate as it does not consider buildings emissions in all sectors.

¹ Although they may have substantial impacts on other environmental objectives.

² TEG's analysis is based on Scope 1 emissions data as Scope 2 and 3 data by NACE code was not available. However, the Taxonomy recognises energy efficiency improvements consistent with the requirements of the Taxonomy Regulation.

³ See <https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings>. Note that emissions from buildings are considered across NACE codes. Emissions from domestic buildings are typically excluded from NACE codes as domestic occupation is not considered an economic activity. Nonetheless, activities to reduce emissions from the residential sector should be considered in the Taxonomy.

Table 1 Types of economic activity contribution

Consideration	Explanation
(1) High-emitting NACE macro sectors, with substantial contribution potential	Quantitative data on Scope 1 CO ₂ e emissions by NACE code in the EU. At the time of the analysis, the latest available data was from 2016.
(2) Enabling sectors	Where economic activities have the potential to enable substantial GHG emissions reductions in other sectors, these should also be included (assuming the life cycle emissions of the activity do not undermine mitigation objectives).

The TEG has identified priority activities within each sector. The name of each macro-sector is drawn directly from the NACE classification system and may refer to activities that were not covered (e.g. the TEG has developed technical screening criteria for agriculture and forestry, but not fishing).

Key:

Colour code	Description
Selected based on emissions, fully considered	This sector was selected because of its emissions profile. The TEG has identified the main economic activities likely to substantially contribute to climate change mitigation in this sector.
Selected based on emissions, partially considered.	This sector was selected because of its emissions profile. The TEG has identified some important economic activities likely to substantially contribute to climate change mitigation in this sector, but further analysis should be undertaken.
Selected based on enabling, fully considered	This sector was selected because it may be able to enable substantive emissions reductions in other sectors. The TEG has identified the main economic activities likely to substantially contribute to climate change mitigation in this sector.
Selected based on enabling, partially considered	This sector was selected because it may be able to enable substantive emissions reductions in other sectors. The TEG has identified some important economic activities likely to substantially contribute to climate change mitigation in this sector, but further analysis should be undertaken.
Not considered	The TEG has not selected this sector on the basis of emissions or enabling potential.

Table 2 Sectors considered in this report

NACE Macro-sector code	(Scope 1) Tonnes CO ₂ e (2018)
D - Electricity, gas, steam and air conditioning supply	1,021,327,916.14
C – Manufacturing	836,131,368.27
H - Transportation and storage	543,990,599.69
A - Agriculture, forestry and fishing	526,387,217.14
E - Water supply; sewerage, waste management and remediation activities	161,962,114.37
B - Mining and quarrying	81,201,552.02
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	79,399,182.95
F – Construction ⁴	64,791,686.40
Q - Human health and social work activities	32,512,530.55
O - Public administration and defence; compulsory social security	29,297,099.74
N - Administrative and support service activities	21,424,859.33
I - Accommodation and food service activities	17,333,105.86
P – Education	17,273,274.20
M - Professional, scientific and technical activities	17,056,511.88
K - Financial and insurance activities	10,837,435.09
S - Other service activities	9,816,300.62
J - Information and communication ⁵	8,780,514.69
R - Arts, entertainment and recreation	8,298,587.66
L - Real estate activities ⁶	5,726,208.34
T - Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	234,573.70
U - Activities of extraterritorial organisations and bodies	26.68

4 For presentation purposes, the TEG has aligned the building criteria with NACE codes for construction and real estate activities. However, the buildings criteria are not limited to these NACE codes and can be applied across other sectors and economic activities.

5 TEG's methodology was based on Scope 1 emissions, but we recognise that Information and Communication activities may also have substantial Scope 2 emissions. This is reflected in the technical screening criteria for Information and Communications.

6 See note on construction.

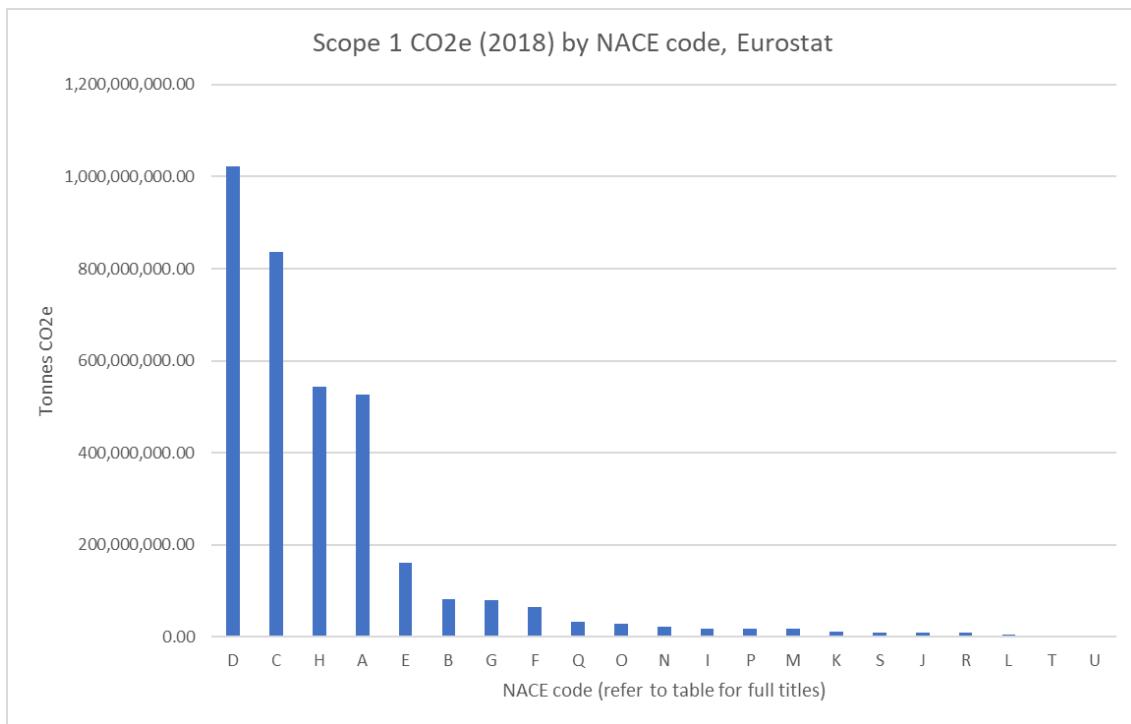


Figure 2 CO2e (2018) by NACE Macro-Sector. Source: Eurostat

Developing criteria

For each of the activities selected, technical screening criteria have been developed. The format of the technical screening criteria has been updated since the June 2019 report to incorporate:

- Principles:** The underlying rationale for how the activity will result in a substantial contribution and/or avoidance of significant harm to the environmental objective in question.
- Criteria:** including both metrics and thresholds: The method(s) by which the environmental performance of the economic activity will be measured, including defining the boundary for this measurement and the qualitative or quantitative conditions which must be met to enable the performance of the activity in a way that is considered environmentally sustainable.

1.2 Defining substantial contribution to climate change mitigation

The Taxonomy Regulation establishes a framework for understanding substantial contributions to climate change mitigation objectives:

Article 6

Substantial contribution to climate change mitigation

1. An economic activity shall be considered to contribute substantially to climate change mitigation where that activity substantially contributes to the stabilization of greenhouse gas concentrations in the atmosphere at a level which prevents dangerous anthropogenic interference with the climate system by avoiding or reducing greenhouse gas emissions or enhancing greenhouse gas removals through any of the following means, including through process or product innovation, consistent with the long term temperature goal of the Paris Agreement:

- (a) generating, transmitting, storing, distributing or using renewable energy in line with Directive (EU) 2018/2001, including through using innovative technology with a potential for significant future savings or through necessary reinforcement or extension of the grid;
- (b) improving energy efficiency except for power generation activities that are referred to in Article 14(2a);
- (c) increasing clean or climate-neutral mobility;
- (d) switching to the use of sustainably sourced renewable materials;
- (e) increasing the use of environmentally safe carbon capture and utilisation (CCU) and carbon capture and storage (CCS) technologies that deliver a net reduction in greenhouse gas emissions;
- (fa) strengthening land carbon sinks, including through avoided deforestation and forest degradation, restoration of forests, sustainable management and restoration of croplands, grasslands and wetlands, afforestation, and regenerative agriculture;
- (g) establishing energy infrastructure required for enabling the decarbonisation of energy systems;
- (h) producing clean and efficient fuels from renewable or carbon-neutral sources;
- (i) enabling any of the above in accordance with Article 11a.

1a. For the purposes of paragraph 1, an economic activity for which there is no technologically and economically feasible low carbon alternative, shall be considered to contribute substantially to climate change mitigation as it supports the transition to a climate-neutral economy consistent with a pathway to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels including by phasing out greenhouse gas emissions, in particular from solid fossil fuels, where that activity:

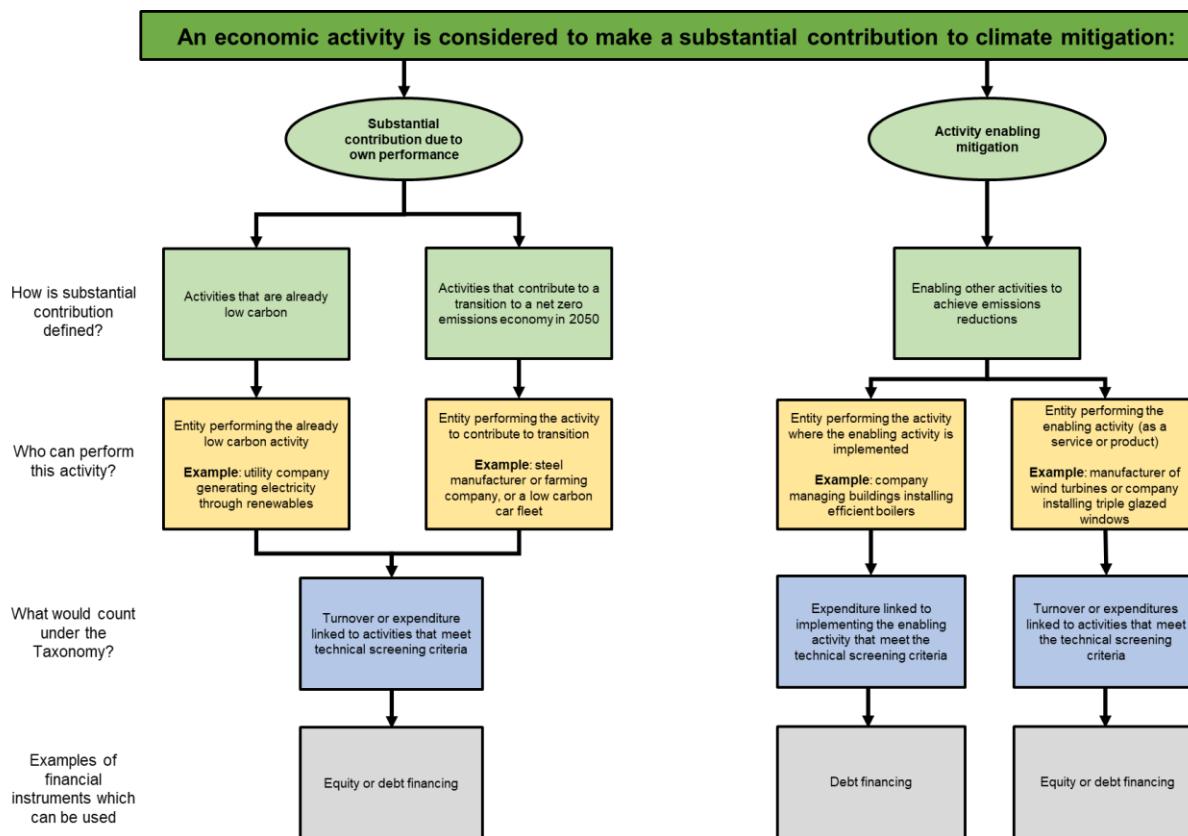
- I. has greenhouse gas emission levels that correspond to the best performance in the sector or industry;
- II. does not hamper the development and deployment of low-carbon alternatives; and
- III. does not lead to a lock-in in carbon-intensive assets considering the economic lifetime of those assets.

In addition, the EU has brought forward a proposal for a Climate Law requiring a climate neutral economy by 2050, as well as proposals for interim GHG emissions reductions targets of 50% - 55% by 2030. TEG's recommendations are aligned with these goals.

1.3 Eligibility of finance for activities contributing substantially to mitigation

The following table has been updated since the June 2019 report to show how to consider different types of investment and finance as Taxonomy eligible. The update is to more clearly align with the Taxonomy Regulation which clearly identifies enabling activities, reflecting the TEG recommendation. We now refer to the two activity types as either: An activity which has a substantial contribution due to its own performance – referring to the operations within the activity, reflecting the activity boundary for the technical screening criteria; or an Activity Enabling Mitigation in another economic activity.

This table also demonstrates how activities that contribute to transition (Transition Activities in the Taxonomy Regulation) are still expected to substantially contribute to climate mitigation objectives and meet Taxonomy thresholds. This was identified as the third activity type in the June 2019 TEG report.



1.4 Further development

The sectors identified using this methodology are the critical sectors which need to decarbonise to achieve the EU's 2030 and 2050 climate goals. They represent the overwhelming majority of European

emissions⁷. They are consistent with a broader global consensus and reflect the priority sectors identified for real-economy reform under the European Green Deal⁸.

On this basis, the TEG recommends that the Platform on Sustainable Finance prioritise full evaluation of existing sectors selected rather than the immediate expansion of the sectors covered. However, the Platform on Sustainable Finance should continue to monitor sectoral emissions in case of material changes in the underlying data.

The TEG also recognises that some important activities are not captured by the NACE codes. For example: urban and regional planning for low carbon development including avoided journeys, support for lower carbon personal choices such as vegetarian diets, and investments to maintain public natural capital such as natural forests and wetlands. Further work is needed to include these in the Taxonomy in future.

The activities identified by the TEG using this methodology reflect the majority – but not all – of the economic activities which can avoid significant harm or substantially contribute to climate change mitigation. In some cases, the TEG was not able to fully evaluate the potential contribution of a sub-sector with the resources available, in the timeframe available. The TEG therefore recommends that the Platform on Sustainable Finance undertake further evaluation of activities within the existing sectors, with a particular focus on:

- Manufacturing – additional high emitting activities
- Transport - including maritime and aviation

TEG also recommends that the Platform on Sustainable Finance continues the work on inclusion of enabling activities within other sectors in the Taxonomy. Recognition of enabling activities is an important way to encourage research, development, innovation and resulting substantial GHG reductions in economic activities and encourage flows of finance to these activities.

⁷ A minimum of 93%, though the true figure is likely to be higher as buildings do not feature as a separate NACE code and constitute 36% of EU emissions.

⁸ https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

2. SUBSTANTIAL CONTRIBUTION TO CLIMATE CHANGE ADAPTATION

The methodology for identifying activities that provide a substantial contribution to adaptation has not changed since the publication of the taxonomy report in June 2019. The substantial contribution criteria for adaptation have not changed in nature but have been made consistent with the final regulation proposals of December 2019.

2.1 Work process – conceptual approach

The proposed approach for an adaptation taxonomy recognises that adaptation is context- and location-specific and requires the use of a process-based approach to determine if an activity contributes to adaptation and broader system's climate resilience. The following two-step process aims to demonstrate that an activity contributes to a substantial reduction of the negative effects of climate change:

- a. Assessing the expected negative physical effects of climate change on the underlying economic activity that is the focus of resilience-building efforts, drawing on robust evidence and leveraging appropriate climate information;
- b. Demonstrating how the economic activity will address the identified negative physical effects of climate change or will prevent an increase or shifting of these negative physical effects.

The assessment of the contribution of the activity will vary based on its scope (asset, corporate, sector or market), as well as spatial and temporal scale. Moreover, the proposed approach recognises that an adaptation activity may target an entity (e.g. a corporation or a city) and/or a market, sector, or region.

Activity-level adaptation aims at strengthening an asset or economic activity to withstand identified physical climate risks over its lifetime, such as considering sea-level rise in the design of a bridge. Systemic adaptation aims to actively reduce vulnerability and build resilience of a wider system, or systems, such as a community, ecosystem, or city.

The TEG recognises that climate change will affect all sectors of an economy and all sectors must adapt to its impacts globally. As a result, the adaptation taxonomy is a set of guiding principles and qualitative screening criteria, which can be applied in any economic activity in any location. It is, therefore, the view of the TEG that these criteria are globally relevant.

Differences between climate change adaptation and mitigation

The context-specific nature of adaptation means that it is not possible to produce a stand-alone and exhaustive list of activities that could be viewed as contributing to adaptation under all circumstances. Instead of a list of adaptation activities, a set of guiding principles and screening criteria is used to assess the potential contribution of an economic activity to adapt to climate change and increase climate resilience. To aid users of the Taxonomy, the TEG has also developed an indicative framework for classification of climate-related hazards and a climate sensitivity matrix for specific economic activities (see [Classification of climate-related hazards](#) and [Sectoral climate sensitivity matrices](#)).

There are fundamental differences between climate change adaptation activities and mitigation activities. For mitigation activities, a one-tonne reduction of CO₂ emissions has the same impact regardless of where the mitigation activity takes place. It is therefore possible to define lists of activities that are

deemed to support climate change mitigation. Adaptation responds to physical climate risks that are mostly location and context specific. For example, there are in principle several engineering and non-engineering options available to a coastal city to respond to the risk resulting from increased sea level. Responses will vary according to where the city is located, its size, the institutional and financial capacity of the city administration to deal with climate risk, the technical and engineering expertise available, the priority of the city, the perception of the citizens, and other factors. The adaptation responses will benefit the city that adopts them and possibly the systems that depend or interact with the city.

Type of technical screening criteria

The proposed approach is based on qualitative screening to identify activities that contribute to adaptation. Qualitative screening criteria allow for a structured process-based approach to determine if an economic activity contributes to adaptation. As measured baselines or accepted metrics for adaptation have not yet been developed, an established methodology for defining quantitative screening criteria for adaptation and defined adaptation targets at the national, sectoral, or subnational level do not exist. Even with the availability of methodologies, targets or baselines, quantitative screening criteria could exclude small-scale activities that may deliver significant climate-resilience benefits in specific contexts.

The interaction of climate exposure, resources and socioeconomic characteristics related to a specific economic activity will determine the nature and scale of adaptation that would be appropriate.

Scope of the Adaptation Taxonomy

The Adaptation Taxonomy covers 68 economic activities, which were originally selected for their potential to deliver a substantial contribution to climate change mitigation. The application of the adaptation taxonomy beyond these activities is only constrained by the lack of availability of DNSH criteria for the other five environmental objectives covered by the Taxonomy.

A number of economic activities that might be important for climate adaptation are not yet included in the economic activities currently addressed in the Taxonomy. The application of the taxonomy will be expanded to more economic activities as criteria for DNSH to other environmental objectives are developed.

In that respect, the TEG recommends that the economic activities listed in the table below be prioritised for further work on DNSH criteria to the other environmental objectives because of their high potential for a substantial contribution to adaptation.

The TEG gave close consideration to the inclusion of two of these economic activities into the Taxonomy for this report: namely, research & development and Telecommunications, computer programming and information. The TEG's analysis on these issues can be found in the section titled "*Additional adaptation activities for further consideration*". However, on due reflection the view was taken that further consideration of the DNSH criteria for these activities would be needed before this could be done.

The TEG also recommends that the platform review the proposed DNSH criteria for Non-Life Insurance (65.12) and Engineering Activities and Related Technical Consultancy Dedicated to Adaptation to Climate Change (71.12) as a matter of priority. These criteria are conservative in that they recognise service provision only to activities themselves eligible under the Taxonomy. It may be preferable to simplify the criteria to increase coverage and enhance usability.

Sector	Specific NACE codes
Water supply, Sewerage, Waste Management and Remediation activities	All other water NACE codes not covered to date (36-39) Construction of water projects (42.21 and 42.91) Desalination (no specific NACE code characterises this activity)
Transport infrastructure	Roads (Construction of roads 42.11)
Telecoms	Telecommunications, computer programming and information (61, 62 and 63)
Finance & insurance services	Finance (64)
Professional & scientific	Management consultancy activities (70.2-70.22) Scientific Research (72) Research and development (natural sciences and engineering) (72.1)
Public administration	Emergency services (84.25)
Education	Education (development of curriculum, provision of teaching) (85)
Health	Hospital activities (86.1)
Ecosystem restoration	Noting that Conservation Forestry is now included in the Taxonomy, but other landscape or marine restoration activities are not covered. New NACE code(s) required.

2.2 Defining substantial contribution to climate change adaptation

Interpreting the regulation in respect of climate change adaptation

The proposed regulation establishes a framework for understanding substantial contributions to climate change adaptation objectives. This definition is broadly consistent with that provided by the Intergovernmental Panel on Climate Change.⁹

⁹ The IPCC provides the following definition of adaptation in their 5th Assessment Report: 'The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects'. IPCC (2014), 'Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change', Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.), Cambridge University Press: Cambridge, UK and New York, NY, USA.

Article 7

Substantial contribution to climate change adaptation

1. An economic activity shall be considered to contribute substantially to climate change adaptation where:
 - a. that economic activity includes adaptation solutions that either substantially reduce the risk of adverse impact or substantially reduces the adverse impact of the current and expected future climate on that economic activity itself without increasing the risk of an adverse impact on other people, nature and assets; or where
 - b. that economic activity provides adaptation solutions that, in addition to the conditions laid down in Article 11a, contribute substantially to preventing or reducing the risk of adverse impact or substantially reduces the adverse impact of the current and expected future climate on other people, nature or assets, without increasing the risk of an adverse impact on other people, nature and assets.

1.a The adaptation solutions referred to in point (a) of paragraph 1 shall be assessed and prioritised using the best available climate projections and shall, as a minimum, prevent or reduce:

- (a) The location-specific and context-specific adverse impact of climate change on the economic activity; or
- (b) The adverse impact that climate change may have on the environment within which the economic activity takes place

The adverse impact of climate change considered for the development of the taxonomy include impact resulting from both chronic or slow onset climate-related hazards (such as average temperature increase and sea level rise) and rapid or acute climate related hazards (such as extreme rainfall, storm surges, flooding, and heat waves).

In this report, material physical climate risk is the risk of (financial and non-financial) losses occurring due to performance failures, performance delays or incomplete performance of an economic activity resulting from climate-related hazards.

With that in mind, the adaptation taxonomy comprises two types of substantial contribution to adaptation objectives:

1. Adapted activities: an economic activity is adapted to all material physical climate risks identified for the economic activity to the extent possible and on a best effort basis; and/or
2. Activities enabling adaptation of an economic activity: the activity reduces material physical climate risk in other economic activities and/or addresses systemic barriers to adaptation, and is itself also adapted to physical climate risks.

Both types of activities must also meet the criteria for Do No Significant Harm to other environmental objectives and comply with minimum social safeguards established for the Taxonomy. Activities adapted to climate change and activities enabling adaptation of other economic activities provide a positive environmental impact by meeting a set of technical criteria for substantial contribution to adaptation and a

set of criteria for doing no harm to other environmental objectives, whilst avoiding adverse impacts to people, asset and nature and preventing a lock-in in activities that undermine long-term environmental goals.

Figure 3 shows the decision tree to identify substantial contribution to adaptation objectives.¹⁰

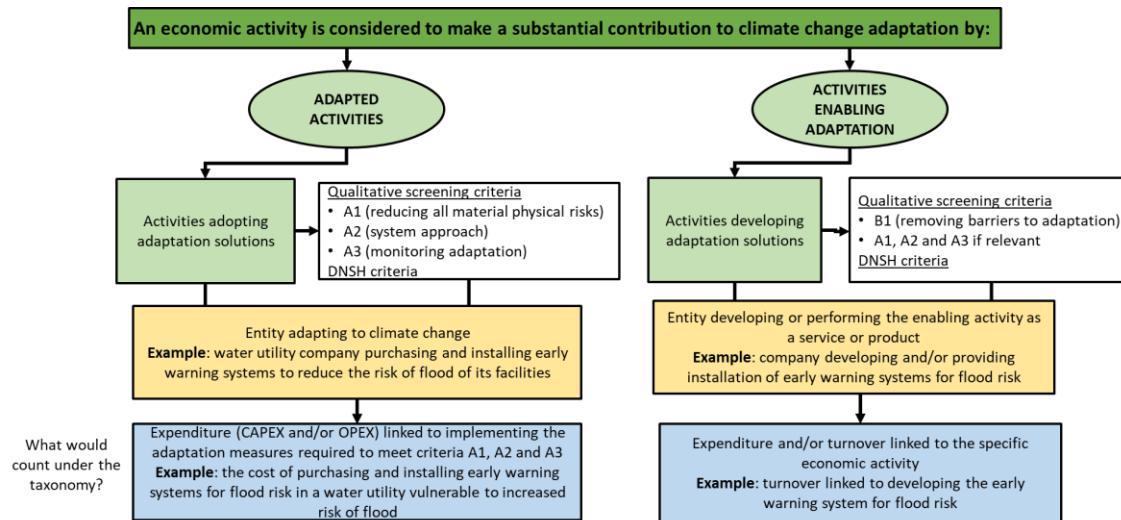


Figure 3 Decision tree for substantial contribution to climate change adaptation

This is consistent with the approach taken when identifying economic activities that substantially contribute to climate change mitigation in terms of “mitigated activity” and “activity enabling mitigation”.

The first set of economic activities contribute to adaptation via adopting solutions that ensure that the economic activity can perform well under a changing climate. This contribution to adaptation usually occurs in economic activities that have a primary objective other than climate change adaptation. For example, a transmission line for the distribution of electricity to an urban area is made more climate resilient to the expected increase in temperature by installing conductors with operating limits at higher temperature thresholds. Efforts to identify and reduce physical climate risks to an economic activity should be based on a best effort basis, recognising that it is not possible to reduce physical climate risk to zero. The characteristics of risks to an economic activity are increasingly difficult to predict over long time-horizons because of the uncertainties associated with future changes in the climate. As a result, adaptation of an economic activity requires a proportionate, flexible and an iterative risk management approach that can be adjusted over time.

The second set of economic activities contribute to adaptation via enabling the adaptation of other economic activities. For example, the construction of a flood protection system is performed to reduce the risk of flood for a facility or a city and the economic activities that take place in it. Similarly, the research,

¹⁰ In this report, adaptation solutions describe the set of all possible measures, actions, adjustments, changes, applications, products, services, etc. that contribute to adapt to a changing climate.

development and commercialisation of drought-resistant crop varieties will help ensure crop production yields despite increased risk of droughts.

Solutions that support adapted activities and economic activities enabling adaptation are clearly linked and may overlap. However, the distinction between these two types of adaptation activities can guide different user types. Adapting an economic activity captures the solutions required by actors to increase their own resilience, whilst enabling activities capture the research, development, marketing, and installation of solutions that will help other entities to adapt. For example, a water utility vulnerable to increased risk of floods may adopt early warning systems to reduce this risk, and this would count as part of the programme of solutions that entity is taking to ensure their activity is adapted to climate change, i.e. part of their response to adapting that economic activity. However, a small or medium-sized enterprise (SME) developing the technology for flood early warning systems to support adaptation of other sectors, including by the water utility company. This activity of the technology developer is therefore counted as ‘enabling adaptation’. This example is illustrated in Figure 8 below.

Taxonomy users	Economic activities	Types of adaptation
Products & services	SME develops early warning systems for flood risk	Economic activity enabling adaptation
Corporate	Water utility deploys early warning system to reduce risk of flood	Adapted economic activity
Examples of financial flows¹¹		
<ul style="list-style-type: none"> Investors hold shares in SME developing products for adaptation Banks loan money to utility to finance the deployment of early warning system Investors holds shares in utility with more climate resilient operations 		

Figure 4 – Example of different types of adaptation activities and Taxonomy users

Some of the economic activities currently addressed in the Taxonomy might often fall under the category of ‘adapted activities’, others might be ‘activities enabling adaptation’. There will be activities that can be either type depending on their purpose and the context within which the activity takes place. What is key is the primary objective of the actor engaged in that activity. For this reason, the economic activities are not a priori categorised into ‘Adapted activity’ and/or ‘Activity enabling adaptation’, this is left to the discretion of the user.

¹¹ See section 2.4 for eligibilities of finance to be counted as climate change adaptation.

For example, Conservation Forestry could be deemed to be an activity enabling adaptation if the primary objective of the conservation activity is to support the adaptation of other economic activities or actors e.g. to prevent soil erosion damaging agricultural production or threatening local settlements or water supplies. Conversely, Conservation Forestry where the primary purpose is to promote biodiversity may be treated as an ‘adapted activity’ if they are at the same time ensuring that those forests are resilient to climate change risks. This is a difficult line to draw given the inter-relationships and co-benefits between these objectives. In such cases, users are asked to identify and justify whether their activity should be viewed as an ‘adapted activity’ or an ‘activity enabling adaptation of other economic activities’ and meet the appropriate criteria accordingly.

Alternatively, construction of a new building (NACE code F41 or F43) could be deemed to be an ‘activity enabling adaptation’ if the building is specifically purposed for adaptation and resilience, e.g. shelters or safe buildings for evacuation from flooding/typhoons. (This is not unusual in countries like Bangladesh and the Philippines, though not common practice in Europe). But where not specifically purposed, construction of a new building would only make a substantial contribution to adaptation via becoming an ‘adapted activity’.

Guiding principles for substantial contributions to climate change adaptation

The TEG proposes the following guiding principles to identify an economic activity that substantially contributes to climate change adaptation:

Principle 1: The economic activity reduces all material physical climate risks to the extent possible and on a best effort basis.

- In the case of an adapted economic activity, the activity integrates measures aimed at reducing all material physical climate risks to that activity as identified through an assessment of risks posed by both current weather variability and expected future climate change. The assessment should take into account chronic and acute climate-related hazards and associated physical climate risks across a range of scenarios, and account for uncertainty. It should consider geographic and temporal scales that are appropriate for the economic activity.
- In the case of ‘an economic activity enabling adaptation, the activity reduces material risks to other economic activities and/or addresses systemic barriers to adaptation, for example through a dedicated asset, technology, service or product, and itself integrates measures aimed at reducing material risks where applicable (e.g. in the case of a dedicated asset).

Principle 2: The economic activity does not adversely affect adaptation efforts by others.

- Economic activities and the measures taken to address the material climate risks facing those activities should be consistent with adaptation needs in the applicable sector or region, considering opportunities to build resilience outside of the premises of a single activity. Those measures should also not increase the risk of an adverse impact on other people, nature and assets in terms of hindering adaptation efforts by others for example by shifting impacts faced by others

Principle 3: The economic activity has adaptation-related outcomes that can be defined and measured using adequate indicators.

- When possible, the outcomes of adaptation activities should be monitored and measured against defined indicators for adaptation results. If possible, updated assessments of physical climate risks should be undertaken at the appropriate frequency (e.g. every five or ten years) depending on the risks, the context and the availability of new information, technologies or approaches or policies and regulations.

2.3 Screening criteria for activities making a substantial contribution to adaptation

While the principles describe the foundations and qualities underpinning economic activities that contribute to climate change adaptation, the screening criteria are specific characteristics that can be used to determine whether an economic activity provides a substantial contribution to adaptation. These screening criteria vary between ‘adapted’ activities and activities that enable adaptation. These criteria have been updated since the June 2019 report.

Screening criteria for ‘adapted activities’ an economic activity

Table 3 Screening criteria for substantial contribution: adapted activities

Criterion	Description
A1: Reducing material physical climate risks	The economic activity must reduce all material physical climate risks to that activity to the extent possible and on a best effort basis.
A1.1	The economic activity integrates physical and non-physical measures aimed at reducing - to the extent possible and on a best effort basis - all material physical climate risks to that activity, which have been identified through a risk assessment.
A1.2	<p>The above-mentioned assessment has the following characteristics:</p> <ul style="list-style-type: none"> considers both current weather variability and future climate change, including uncertainty; is based on robust analysis of available climate data and projections across a range of future scenarios; is consistent with the expected lifetime of the activity.
A2: Supporting system adaptation	The economic activity and its adaptation measures do not adversely affect the adaptation efforts of other people, nature and assets.
A2.1	The economic activity and its adaptation measures do not increase the risks of an adverse climate impact on other people, nature and

	assets, or hamper adaptation elsewhere. Consideration should be given to the viability of 'green' or 'nature-based-solutions' over 'grey' measures to address adaptation.
A2.3	The economic activity and its adaptation measures are consistent with sectoral, regional, and/or national adaptation efforts.
A3: Monitoring adaptation results	The reduction of physical climate risks can be measured.
A3.1	Adaptation results can be monitored and measured against defined indicators. Recognising that risk evolves over time, updated assessments of physical climate risks should be undertaken at the appropriate frequency where possible.

Screening criteria for an activity enabling adaptation

The table below describes the screening criteria for economic activities enabling adaptation.

Table 4 Screening criteria for substantial contribution: economic activities enabling adaptation

Criterion	Description
B1. Supporting adaptation of other economic activities	<p>The economic activity reduces material physical climate risk in other economic activities and/or addresses systemic barriers to adaptation. Activities enabling adaptation include, but are not limited to, activities that:</p> <ul style="list-style-type: none"> a) Promote a technology, product, practice, governance process or innovative uses of existing technologies, products or practices (including those related to natural infrastructure); or, b) Remove information, financial, technological and capacity barriers to adaptation by others.
B1.1	<p>The economic activity reduces or facilitates adaptation to physical climate risks beyond the boundaries of the activity itself. The activity will need to demonstrate how it supports adaptation of others through:</p> <ul style="list-style-type: none"> • an assessment of the risks resulting from both current weather variability and future climate change, including uncertainty, that the economic activity will contribute to address based on robust climate data;

	<ul style="list-style-type: none"> • an assessment of the effectiveness of the contribution of the economic activity to reducing those risks, taking into account the scale of exposure and the vulnerability to them
B1.2	In the case of infrastructure linked to an activity enabling adaptation, that infrastructure must also meet the screening criteria A1, A2 and A3.

The TEG recommends that the Platform, as a matter of priority, develops technical guidance on climate risk assessment, use of climate data and information, making decisions under uncertainties and evaluation of different adaptation options to aid the implementation of the taxonomy.

2.4 Eligibility of finance for activities contributing substantially to adaptation

In the case of an economic activity enabling adaptation, the revenue and/or expenditure associated with the economic activity that meets the relevant screening criteria is considered as eligible.

In the case of an adapted economic activity, at this time, only the costs of adaptation can be counted, not the revenues and/ or expenditure associated with the whole activity. This is because adaptation of an economic activity is delivered in activities that have primary objectives other than adaptation (for example adaptation of an electricity transmission line to increased risk of flood). When those activities are adapted to cope with physical climate risk, they contribute to the climate resilience of the entire, highly integrated and interconnected economic system and as a result, deliver a global benefit through aggregated adaptation in all sectors of an economy. However, methodologies, tools and metrics to measure these climate resilience benefits remain under development. These technical limitations mean that counting only the costs of adaptation of the economic activity is the most viable, conservative option today.

In some circumstances, investments required to adapt an economy activity may be large and implemented in phases as part of an adaptation plan, which has been developed in response to a climate risk assessment. In these circumstances, investments in measures included in a full programme of actions that collectively reduce the material physical climate risks to the economic activity can be counted in phases, even if the whole adaptation plan has not been executed. It is expected that the full programme of measures would be executed over a period of time no longer than 5 years.

It is proposed that, as a matter of priority, the Platform undertake further work to develop approaches for measuring the climate resilience benefits of adapted economic activities. This is a key step in moving towards recognising all revenue and/or expenditure associated with an economic activity that is adapted to cope with physical climate risk and yields high climate resilience benefits.

2.5 Classification of climate-related hazards

The TEG has developed a classification of climate-related hazards. When developing the Taxonomy, the climate-related hazards considered are limited to the potential occurrence of a weather and climate-related natural physical event or trend¹².

The climate-related hazard classification comprises four major hazard groups, with hazards related to water, temperature, wind, and mass-movements. All groups include acute (extreme) and chronic (slow-onset) hazards, as adaptation must account for both rapid as well as gradual changes in the weather and climate to take the appropriate adaptation measures and avoid maladaptation.¹³

This analysis focusses on the most important or significant hazards and is designed to guide the user to consider the most salient physical risks when mapping the sensitivities of a given sector.

All secondary hazards¹⁴ resulting from climate-related hazards (including but not limited to chemical, biological, ecological and epidemiological hazards) are excluded. It is however advisable to assess the risk of such secondary hazards and consider measures to address them for each economic activity.

Table 5 - Classification of climate-related hazards

	Temperature-related	Wind-related	Water-related	Solid mass-related
Chronic	Changing temperature (air, freshwater, marine water)	Changing wind patterns	Changing precipitation patterns and types (rain, hail, snow/ice)	Coastal erosion
	Heat stress		Precipitation and/or hydrological variability	Soil degradation
	Temperature variability		Ocean acidification	Soil erosion
	Permafrost thawing		Saline intrusion	Solifluction
			Sea level rise	
			Water stress	

12 IPCC, 2014, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp (https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf, last visit 02/04/2019).

13 There are clearly linkages with disaster risk reduction in the effort of reducing physical climate risks resulting from extreme climate-related hazards. Geophysical and technological hazards are outside the domain of adaptation to climate change.

14 As an example, new biological pests or increased prevalence of existing pests can result from changing temperatures. Forests and agriculture are typically sensitive to warmer (minimum) temperatures and, in this example, their effects on pests. In this case, the changing prevalence of pests is a secondary hazard against which adaptation measures may be needed.

Acute	Heat wave	Cyclone, hurricane, typhoon	Drought	Avalanche
	Cold wave/frost	Storm (including blizzards, dust and sandstorms)	Heavy precipitation (rain, hail, snow/ice)	Landslide
	Wildfire	Tornado	Flood (coastal, fluvial, pluvial, ground water)	Subsidence
			Glacial lake outburst	

3. DO NO SIGNIFICANT HARM (DNSH)

3.1 DNSH to environmental objectives 3-6

Under the proposed Taxonomy regulation, economic activities making a substantial contribution to climate change mitigation or adaptation must be assessed to ensure they do not cause significant harm to all remaining environmental objectives. An activity contributing to climate change mitigation must avoid significant harm to climate change adaptation and the other four environmental objectives:

3. Sustainable use and protection of water and marine resources
4. Transition to a circular economy, waste prevention and recycling
5. Pollution prevention and control
6. Protection of healthy ecosystems

This assessment ensures that progress against some objectives are not made at the expense of others and recognises the reinforcing relationships between different environmental objectives. In its future development, the Taxonomy will also include activities that make a substantial contribution to the above objectives..

3.2 DNSH to climate change adaptation

Per Article 12 of the Taxonomy regulation, an economic activity shall be considered as significantly harming climate change adaptation “where that activity leads to an increased adverse impact of the current and expected climate, on itself or for other people, nature and assets”.

In terms of what constitutes or leads to an increased negative effect of climate by an economic activity for and beyond the environment within which that economy activity takes place, it is proposed that the DNSH to adaptation criteria should ensure that both:

- The services that economic activities/ vulnerable populations/ vulnerable ecosystems rely on need to be resilient to climate change. If they are not and those services are significantly curtailed due to climate change impacts, the resilience and ability to adapt of those activities/ populations/ ecosystems is weakened. This can be achieved by ensuring that all material risks to the economic activity itself have been reduced to the extent possible and on a best effort basis.

- Those services are not being delivered in a way that adversely affects the adaptation efforts of others.

Discussion was had on whether compliance with these requirements should be determined on a case-by-case basis through an activity and context specific assessment, or whether an a-priori activity only level assessment is needed. As discussed above, adaptation needs and impacts of activities on adaptation and resilience are context specific and therefore a context specific assessment is needed.

For these reasons, the two criteria described in Table 6 are proposed for “DNSH to adaptation” for all economic activities. In addition to these criteria, the TEG has considered where there are any examples of tools, methodology or other guidance that might be of use in applying these two criteria in the context of a specific economic activity. Where such examples have been identified, they have been noted in the DNSH to Adaptation section of the appropriate economic activity.

It is noted that for new economic activities, the following criteria must be met at the point of design and construction. For existing activities and associated assets, where addressing physical climate risks requires a retrofit of some kind, all material physical climate risks must be assessed and adaptation measures required to address them must be identified and programmed with a clear and time limited execution plan no longer than 5 years.

Table 6 – Do no significant harm to adaptation: ‘adapted economic activities’

Criterion	Description
Criterion A1: Reducing material physical climate risks	The economic activity must reduce all material physical climate risks to the activity to the extent possible and on a best effort basis.
A1.1	The activity integrates physical and non-physical measures aimed at reducing - to the extent possible and on a best effort basis - all material risks that have been identified through a climate risk assessment. For existing activities, the implementation of those physical and non-physical measures may be phased and executed over a period of time of up to 5 years. For new activities, implementation of these measures must be met at the time of design and construction.
A1.2	<p>The above-mentioned climate risk assessment has the following characteristics:</p> <ul style="list-style-type: none"> • considers both current weather variability and future climate change, including uncertainty; • is based on robust analysis of available climate data and projections across a range of future scenarios; • is consistent with the expected lifetime of the activity.

Criterion A2: Supporting system adaptation	The economic activity and its adaptation measures do not adversely affect the adaptation efforts of other people, nature and assets.
A2.1	The economic activity and its adaptation measures do not increase the risks of an adverse climate impact on other people, nature and assets or hamper adaptation elsewhere. Consideration should be given to the viability of 'green' or 'nature-based-solutions' over 'grey' measures to address adaptation.
A2.2	The activity is consistent with sectoral, regional, and/or national adaptation efforts.

3.3 DNSH to environmental objectives 3-6

In accordance with Article 14 of the Taxonomy proposal, the DNSH criteria aim to specify the minimum requirements to be met to avoid significant harm to environmental objectives relevant to each economic activity. Article 12 provides further details on what constitutes significant harm for each environmental objective:

Table 7 – Do no significant harm criteria: environmental objectives 3-6

Objective	Conditions for causing 'significant harm'
(3) Sustainable use and protection of water and marine resources	...where that activity is detrimental to the good status, or where relevant the good ecological potential, of water bodies, including surface waters and groundwaters, or to the good environmental status of marine waters;
(4) Circular economy including waste prevention and recycling	...where that activity leads to significant inefficiencies in the use of materials and the direct or indirect use of natural resources such as non-renewable energy sources, raw materials, water and land in one or more stages of the life-cycle of products, including in terms of durability, reparability, upgradability, reusability or recyclability of products; or where that activity leads to a significant increase in the generation, incineration or disposal of waste, with the exception of incineration of non-recyclable hazardous waste, or where the long term disposal of waste may cause significant and long-term harm to the environment;
(5) Pollution prevention and control	...where that activity leads to a significant increase in the emissions of pollutants into air, water or land, as compared to the situation before the activity started;

(6) Protection of healthy ecosystems	...where that activity is detrimental to a significant extent to the good condition and resilience of ecosystems or where that activity is detrimental to the conservation status of habitats and species, including those of Community interest.
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In addition, the regulation specifies that for all objectives: the environmental impacts of the activity itself, as well as of the products and services provided by that activity throughout their life cycle shall be taken into account, notably by considering their production, use and end-of life.

The technical screening criteria proposed by the TEG contain quantitative thresholds where possible. Where this is not possible, the criteria are qualitative, describing an action or set of actions to be demonstrated which avoid significant harm.

The baseline scenario for the economic activities is compliance with relevant EU environmental legislation. To this end, the criteria take into account existing EU legislation. The call for additional expertise to inform the TEG and the process described below enabled the establishment of criteria based on available scientific evidence. Where evidence was not conclusive, the precautionary principle enshrined in article 191 TFEU was taken into account, as required in Article 14 of the draft regulation.

To the extent possible, the screening criteria, whether qualitative or quantitative, were selected to facilitate the verification of compliance. In many instances, the proposed criteria are expressed in terms of compliance with relevant EU legislation and/or associated reference information, such as the best available techniques (BAT) reference documents (also known as 'BREFs').¹⁵

The technical screening criteria (TSC) process

Figure 9 presents an overview of the process for development of DNSH technical screening criteria against activities expected to make a substantial contribution to climate change mitigation. For each activity, the scope was reviewed to identify life cycle aspects and activity boundaries. Where linkages with other activities occurred (i.e. where life cycle aspects overlapped with other activities), this has been referenced in the analysis.

- 1. Initial screen for activities which could cause significant harm to each environmental objective.** This analysis was carried out within the scope defined for the economic activity as identified for substantial contribution to climate change mitigation objectives. In this analysis, TEG members and additional experts have considered all material life cycle stages of the performance of the economic activity within the scope of the mitigation screening criteria.

¹⁵ The BREF list of reference documents have been drawn (or are planned to be drawn) as part of the exchange of information carried out in the framework of Article 13(1) of the Industrial Emissions Directive (IED, 2010/75/EU) and other policy/legislative instruments. BREF are available at <http://eippcb.jrc.ec.europa.eu/reference/>.

2. **Life cycle thinking.** A life cycle approach was adopted to establish the technical screening criteria for DNSH in accordance with Article 14.1(f) of the Taxonomy proposal.¹⁶ This approach provided a robust way to avoid errors such as considering sustainable any economic activity that may have negative effects during its upstream or downstream stages. Questions asked and resolved included:
 - a. what would generate significant harm during the life cycle of the activity?

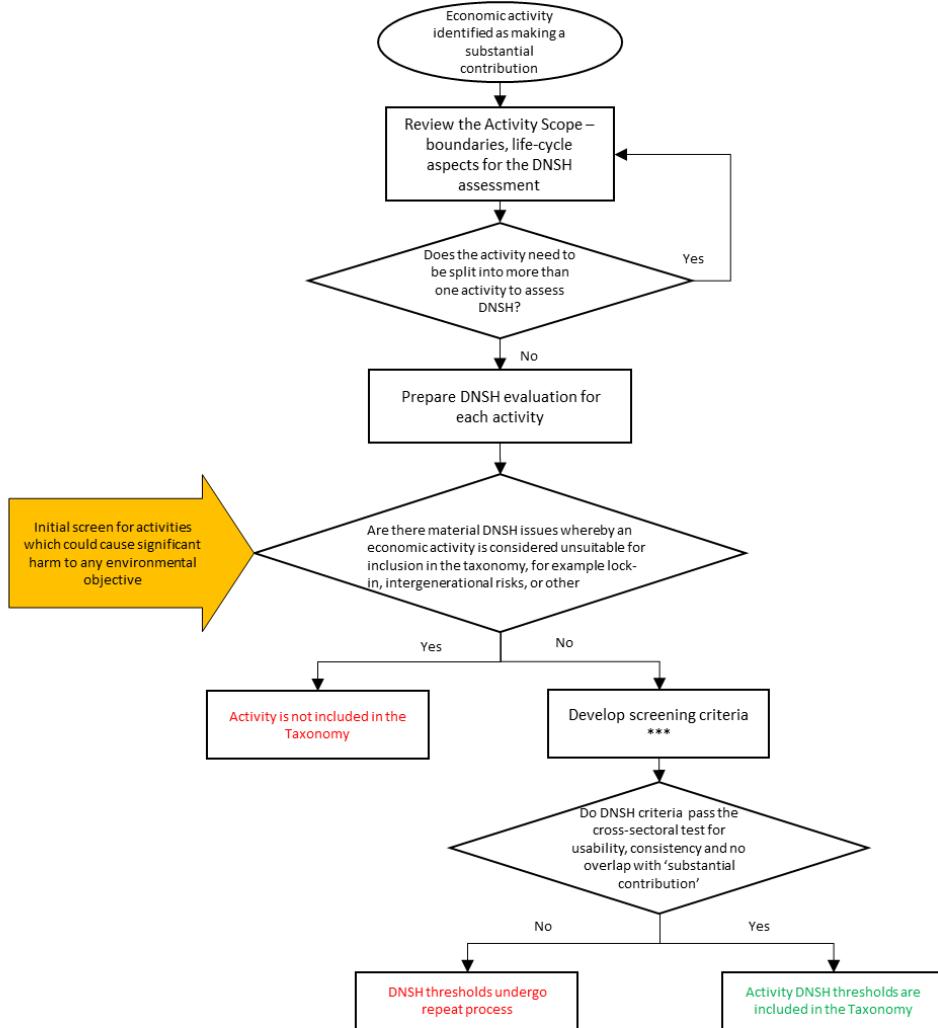
AND

 - b. can this risk be addressed by complying with EU legislation and best practices, international standards or guidelines?
3. **Sectoral activities with high mitigation potential not included in the Taxonomy.** Where 'significant harm' to one or more environmental objectives by the activity cannot be avoided through TEG requirements, the activity was not included in the Taxonomy. Material issues whereby an activity is considered unsuitable for inclusion in the Taxonomy may include but are not limited to: lack of empirical data for reasonable evaluation of DNSH (in line with the precautionary approach), lock-in and intergenerational risks.
4. **Evaluate and document key findings from relevant research and technical publications.** Authoritative publications were reviewed to gain a comprehensive understanding of potential environmental exposures, and to identify material exposures for further consideration which may not be captured in existing EU legislation, BEMP, BAT and BREF.
5. **EU environmental acquis.** Protection of the environmental objectives relating to water resources, circular economy, pollution prevention and the control and protection of ecosystems is advanced at the EU level with associated methodologies and thresholds, as contained in the existing body of EU environmental law (i.e. the environmental acquis).¹⁷ Existing EU legal requirements apply across the Taxonomy. Therefore, for an activity to be included, it must at minimum comply with EU legal requirements, as well as national legal requirements and requirements relating to the environmental permits needed for its operation. EU legal requirements were considered as minimum requirements and were in general not repeated in the DNSH evaluation. When an environmental impact was considered significant, the relevant EU legal requirements (including BREF) and/or national requirements were included in the DNSH criteria, unless more specific requirements were deemed necessary to avoid significant harm.
6. **Global Context.** The Taxonomy can potentially be used for economic activities outside of the EU. The technical screening criteria for DNSH provide necessary performance levels or thresholds for EU issued financial products.

¹⁶ Article 14.1(f) states: The technical screening criteria adopted in accordance with Articles 6(2), 7(2), 8(2), 9(2), 10(2) and 11(2) shall take into account the environmental impacts of the economic activity itself, as well as of the products and services provided by that economic activity, notably by considering their production, use and end-of-life.

¹⁷ Access to EU environmental legislative and policy summaries is available at <https://eur-lex.europa.eu/browse/summaries.html>.

7. **Splitting DNSH criteria.** The scope of activities taken into consideration for DNSH mirrors the mitigation scope of activities. However, for a small number of activities two or three differing sets of DNSH criteria were deemed necessary. As an example, within the manufacturing macro-sector, NACE code 20.13: Manufacture of other inorganic basic chemicals, there is one set of mitigation criteria and three sets of DNSH criteria divided into soda ash, carbon black and chlorine.
8. **Selection of technical screening criteria.** The 'do no significant harm' evaluation focussed only on the most significant aspects of concern and developed threshold screening criteria where:
 - a. avoiding significant harm requires criteria that differ from EU legislation
 - b. alignment with international standards, laws, conventions and the global SDGs was considered necessary
 - c. issues were identified as most significant in a global context, even if resolved at the European level
 - d. special care was needed to address local geographical/physical, climatological and/or hydrological conditions
 - e. other sectoral specific aspects concerning one or more of the DNSH objectives, as detailed in the rationale, were found



* Activities that are not classified could be assessed (and included) at a later stage.
 ** Related to the lifetime of the asset.
 *** In order to qualify as sustainable, the activity should not significantly harm other objectives and meet the minimum social safeguards.

Figure 5 – Do no significant harm decision tree

Eligible NACE Codes -

Points of Note

3.4 Use of NACE

This report uses NACE for industry classification and the TEG has developed screening criteria for priority sectors within NACE. Other activities may be also eligible, so long as the company or investor can demonstrate compliance with the substantial contribution criteria and that no significant harm has been done to any other environmental objective.

Examples of these include:

Manufacturing

For some corporates who manufacture as well as sell the end products, they may attribute revenue to the end product rather than to the manufacturing process. Technical screening criteria in this report lays out expectations of the manufacturing process. When aligning testing criteria to manufacturing, it may be necessary to review revenue classified to the sale of the end product by the same organisation, even though the eligible activity would be assessed within the manufacturing processes. This is not a supply chain assessment, the corporate needs to own the manufacturing process to qualify.

For example, technical screening criteria are provided under NACE code 23.51 – Manufacture of Cement. However revenue for these manufacturing processes may be attributed under:

Name	NACE	Name
Concrete Products	23.61	Manufacture of concrete products for construction purposes
Concrete Block & Brick	23.61	Manufacture of concrete products for construction purposes
Concrete Pipe	23.61	Manufacture of concrete products for construction purposes
Other Concrete Products	23.61	Manufacture of concrete products for construction purposes

Similarly for non-ferrous metals, the production process should meet the testing criteria but the revenue may be attributed under the final product.

Name	NACE	Description
Iron & Steel Forging	25.50	Hot, warm and cold forge both iron and steel.
Metal Containers & Packaging	25.92	Manufacture metal containers used in packaging applications. Includes metal cans and aluminium foil.

When considering an activity that does not align with the provided NACE codes, it may be possible that the activities of that corporate can still make a substantial contribution to one or more of the environmental objectives. This activity can be considered eligible, so long as the testing criteria that exist within the report are satisfied.

Construction

Activities of main and secondary building contractors can be found within NACE 43, with additional sub-sectors under NACE 42. The activities of these companies could be considered eligible (as enabling activities) if they contribute to construction activities that comply with the taxonomy criteria set under 'New Constructions and Renovations'. Eligibility would need to be assessed on a project-by-project basis, as a contractor would have different projects within their portfolio of work, some complying with the taxonomy and others not.

Activities of manufacturers of building products and machinery (sub-sectors within NACE 16, 23 and 28) could be considered eligible (as enabling activities) if they produce low carbon technologies for buildings (for example, efficient windows, insulation etc.) and comply with the criteria set out within the manufacturing section of this report.

Real estate brokers and agencies (NACE 68.31) activities could be considered eligible (as Enabling Activities) if they support the acquisition of properties that comply with the criteria set for "calculated performance" in acquisition & ownership, but this would have to be assessed and disclosed on an acquisition-by-acquisition basis.

Property management (NACE 68.32) - Activities of these companies could be considered eligible (as Enabling Activities) if they satisfy the criteria for "measured performance" set in Acquisition & Ownership; compliance would have to be assessed on a property-by-property basis.

3.5 Assessing the Taxonomy criteria for Green Debt and Loans

Green debt or lending activities may be allocated a NACE or equivalent industry classification code. Where financial instruments are allocated a NACE listed in this report, the substantial contribution and significant harm tests can be applied as listed. However, there may be some examples where the activity may be suitable to test, even if the industry or sector of the overall business may not be listed within this report. Such examples include:

Multi-sector eligibility

Where the proceeds of a bond or loan are allocated to a project, and the project is allocated across more than one sector (e.g. solar, hydro and wind investments), then each of the projects or assets shall meet the specific eligibility criteria provided within this taxonomy report (Production of Electricity from Hydropower, Solar PV or Wind Power). If the capital allocation to the projects was split evenly across the three activities and only one of the projects satisfied the technical screening criteria, then only 33% of the investment would qualify.

Sector alignment

Where the proceeds of a bond or loan are allocated to a project or asset that sits outside of the normal industry classification of the asset owner (e.g. Agricultural upgrade of farming vehicles to electric vehicles), then the nature of the project or asset needs to be assessed in line with the appropriate taxonomy testing criteria. In this example, the assets (electric vehicles) would qualify under Transport (< 50g CO₂/Km) even though the bond or loan may be classified under Agriculture.

Where a corporate in an industry not covered within this report wishes to invest in new infrastructure that would enable more energy efficiency in their process, and those projects allow the corporate to meet the technical screening criteria, then they would qualify. Demonstration of the technical screening criteria met would be required in the associated prospectus.

Technical screening

criteria: substantial contribution to climate change mitigation

1. FORESTRY

Why forestry is included in the Taxonomy

The Taxonomy defines forest in accordance with the definitions of the UN Food and Agriculture Organization.¹⁸ In this context, a forest is considered as “Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.” (UNFAO, 2019)¹⁹. In the context of the Taxonomy, plantations forests are specifically excluded. Plantations are defined by the FAO as “Planted Forest that is intensively managed and meet ALL the following criteria at planting and stand maturity: one or two species, even age class, and regular spacing. 1. Specifically includes: short rotation plantation for wood, fibre and energy; 2 Specifically excludes: forest planted for protection or ecosystem restoration; 3. Specifically excludes: Forest established through planting or seeding which at stand maturity resembles or will resemble naturally regenerating forest. Recognising that countries or country groups may set specific definitions of forest to represent specific regional conditions, the Taxonomy allows for the use of forest definitions developed under regional processes, such as Forest Europe, and various agreements, such as the International Tropical Timber Agreement etc., providing that these are aligned with the FAO definition. When applying to be Taxonomy aligned, the specific definition (if different from FAO) should be set out and the alignment with FAO definition demonstrated clearly.

For the purposes of the Taxonomy, significant mitigation achievement for Forestry is judged through improvement in activities’ own performance, with a focus on the maintenance of forest carbon stocks and sinks and increase of sequestration potential within the sector. Forests cover around 30% of the global landmass (in Europe this figure is higher at ~40-45%) and absorb roughly 2 billion tons of carbon dioxide each year.²⁰ Forests regulate ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods and can help drive sustainable growth. EU forests already account for more than 20% of the global forest carbon sink, and yet an increase in carbon sequestration from forests is essential to the achievement of a net-zero target by 2050 in Europe and globally.²¹

Given the necessity to maintain the existing forest carbon sink, conservation finance is enabled within the forest sector, i.e. finance that supports the maintenance and protection of forest areas, regardless of whether they are used for economic production. The introduction of conservation forests that may have no productive function, into the Taxonomy should aid in the alignment of the Taxonomy as it develops to include substantial contribution to other environmental objectives.

18 FAO FRA 2020.

19 UN FAO (2019) Global forest resource assessment 2020: terms and definitions FRA. Forest resources assessment working paper 188.

20 <http://www.fao.org/state-of-forests/en/>.

21 European Forest Institute.

Approximately 48% (191 Mt) of the biomass produced from EU forests is consumed as energy, with the remaining 52% (209 Mt) used in its material form (Camia et al, 2018)²². It is important to recognise that these two figures are not mutually independent and that the energy end use of forest biomass seldom arise solely from whole trees harvested for that purpose. The Taxonomy recognises the principles put forward in the EU Forestry Strategy, advancing both the benefits of sustainable forest management and the multifunctional role of forests.²³

Despite this split between material and energy use, in the context of the bioeconomy the revenue and employment generated from the two uses is significantly different. 1.8% of the overall EU bioeconomy revenue is generated from the energetic use of biomass compared to 27% for material production. Forestry as an employment sector adds a further 2.2% (EEA, 2018)²⁴.

Forests are exposed to the effects of climate change such as changes in weather patterns (e.g. extreme heatwaves), and pest and diseases outbreaks. In Europe alone, more wildfires have been recorded in the first four months of 2019 than in the whole of 2018²⁵ and while in the EU the forest area is increasing; on the global scale deforestation remains the second-leading cause of climate change, after the burning of fossil fuels.²⁶ The United Nations Framework Convention on Climate Change (UNFCCC) estimates that an additional USD 14 billion in financial flows will be required to address climate impacts in agriculture, forestry and fisheries globally in 2030.²⁷ That includes the implementation of mitigation projects, but also ensuring the resilience of forests to climatic changes, the pro-active protection of forest ecosystems, biodiversity, habitats and soil, as well as the sustainable provision of raw material for the forest-based industry. The Taxonomy recognises the impact of climate conditions and changing environments it includes a clause for force majeure that states that underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds - and will not result in non-compliance with the Taxonomy criteria²⁸.

The role of forests in the global greenhouse gas balance can be enhanced through the implementation of cost-effective mitigation options within the forestry sector (greening of), including: rehabilitation of degraded forests, reforestation, sustainable forest management, conservation and afforestation. The reduction of deforestation across the globe is also essential but caused often by factors outside of the

22 Camia A., Robert N., Jonsson R., Pilli R., García-Condado S., López-Lozano R., van der Velde M., Ronzon T., Gurría P., M'Barek R., Tamosiunas S., Fiore G., Araujo R., Hoepffner N., Marelli L., Giuntoli J.(2018) Biomass production, supply, uses and flows in the European Union. First results from an integrated assessment. JRC Scient for Policy report.

23 https://ec.europa.eu/agriculture/forest/strategy_en.

24 EEA (2018) The circular economy and the bioeconomy. Partners in sustainability. EEA Report No.8/2018

25 EC Joint Research Center's European Forest Fire Information System, 2019.

26 www.fao.org/state-of-forests/en/.

27 https://unfccc.int/files/cooperation_and_support/financial_mechanism/application/pdf/adaptation.pdf.

28 In the event of force majeure such as the loss of a forest stand from fire or wind-throw, the existing forest management NACE will move to the restoration NACE, and performance will be judged on the basis of the re-establishment of the forest stand and thus carbon stock development over a period of 20-years.

forest sector, such as agriculture or urban expansion.^{29,30} Forest based products can have climate mitigation benefits when used in other economic sectors (enabling), through the reduction of GHG emissions and substitution effects. Two forms of 'substitution' are foreseen. The substitution of GHG intensive materials with harvested wood products (HWP) (e.g. wood-based raw materials and products used in construction), and the substitution of fossil-based fuels. These two forms of substitution differ materially in their impact on GHG emissions and approach to Carbon reductions. **At this point, the forest Taxonomy focuses on 'greening of' activities, to protect and enhance forest carbon stocks and sinks. It is recommended that the Commission consider how "enabling" activities involving long-lived and harvested wood products could operate within the Taxonomy. A proposal for considerations for the Taxonomy set out in Annex F1.**

Subjects covered

The scope of the Taxonomy emphasizes carbon sequestration and carbon storage in forests through forest management activities that apply up to the forest gate. The selected activities represent interventions at different stages of a forest's economic life cycle and have been scoped under the NACE code A2 - Forestry and logging. They include:

- Afforestation (FAO FRA 2020 Definition): the establishment of forest through planting and/or deliberate seeding on land that, until then, was under a different land use, implies a transformation of land use from non-forest to forest.
- Reforestation (FAO FRA 2020 Definition): the re-establishment of forest through planting and/or deliberate seeding on land classified as forest. The FAO FRA definition of reforestation excludes natural regeneration. However, the Taxonomy recognises the importance of natural regeneration to the increased carbon sink and stock potential provided by forests in general. It is therefore included explicitly within this context in line with the FAO FRA definition of naturally regenerating forest³¹.
- Restoration/rehabilitation: any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state.
- Existing forest management: management of land that is reported as forest, in accordance with the Sustainable Forest Management principles. SFM is further defined by Forest Europe as: 'sustainable forest management' means using forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the

29 IPCC, 2014.

30 While the forest Taxonomy focuses on enhancing the mitigation potential of forestry activities, it reinforces the importance of reducing deforestation globally, and reiterates the importance of the international guiding principles against deforestation provided by the UNREDD.

31 Forest predominantly composed of trees established through natural regeneration.

Explanatory notes: 1. Includes forests for which it is not possible to distinguish whether planted or naturally regenerated. 2. Includes forests with a mix of naturally regenerated native tree species and planted/seeded trees, and where the naturally regenerated trees are expected to constitute the major part of the growing stock at stand maturity. 3. Includes coppice from trees originally established through natural regeneration. 4. Includes naturally regenerated trees of introduced species.

future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems³²

- Conservation forests: Conservation forests are defined here as those in which the 'primary designated management objective' (FAO FRA definition) is that of conservation. Specifically, those forests where the management objectives are 'conservation of biodiversity' or 'social services' based on the FAO FRA definitions (Box 1).

Box 1: FAO FRA definitions relating to conservation forests

1. **PRIMARY DESIGNATED MANAGEMENT OBJECTIVE:** The primary designated management objective assigned to a management unit. Explanatory notes:
 - a. In order to be considered primary, the management objective should be significantly more important than other management objectives.
 - b. Primary management objectives are exclusive, and area reported under one primary management objective should not be reported for any other primary management objectives.
 - c. Nation-wide general management objectives established in national legislation or policies (such as e.g. "all forest land should be managed for production, conservation and social purposes") should not be considered as management objectives in this context.
2. **CONSERVATION OF BIODIVERSITY:** Forest where the management objective is conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas. Explanatory note:
 - a. Includes wildlife reserves, High Conservation Values, key habitats and forest designated or managed for wildlife habitat protection.
3. **SOCIAL SERVICES:** Forest where the management objective is social services. Explanatory notes:
 - a. Includes services such as: recreation, tourism, education, research and/or conservation of cultural/spiritual sites.
 - b. Excludes areas for subsistence collection of wood and/or non-wood forest products.

Due to changes in practices in the category "afforestation" and "reforestation", which changes from practices connected with newly established forest to first tending operations, it is proposed to transfer these two categories to the NACE category "existing forest management" or "conservation forestry" (depending on the objective of the management) after the 20 years period, following the EU LULUCF

32 https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

accounting rule of 20 years. Similarly, if there is large-scale harvesting, the NACE category will move from existing forest management to that of reforestation. Within the EU, reforestation after harvesting is a requirement, yet this is not the situation globally. The Taxonomy adds value in this way in the global context. Conservation forests may arise in a variety of forms (such as designation, or voluntary conservation) and may be considered similar to the “existing forest management” NACE in the context of the Taxonomy. The relationship with the other forest NACE is as follows. Where conservation ceases to be the primary objective of the management of the stand, the NACE will move to “existing forest management”. Where there is a significant loss of forest (for example fire or storm damage), the NACE activity for ensuring substantial contribution to mitigation will become “reforestation” or “rehabilitation/restoration” until 20 years at which point the NACE will become “conservation forest” again or “existing forest management” – depending on the objective of the forest management at that time.

Harvesting practices, such as thinning, removals, final fellings, etc. will temporarily reduce the carbon stock and the potential to sequester carbon. However, such forest management activities should be eligible under Taxonomy, as long as SFM practices are in place; and that carbon sinks of above and below ground carbon are maintained or increased, over the rotation period of the forest; or where selective removal of trees is required as part of the forest conservation plan. The rotation period is here defined as the time from seeding, planting or natural regeneration through to the point of harvest.

Criteria and thresholds

Selected criteria build on existing EU legislation (e.g. the Renewable Energy Directive and its recast, EU LULUCF, EU Nature Directives, EU FLEGT, EU Timber Regulation, etc.), national forest legislation, international standards and best practices and international processes, such as the Ministerial Conference on the Protection of Forests in Europe (Forest Europe). The Taxonomy recognizes that, although the EU has a variety of forest-related policies, the Treaty on the Functioning of the European Union makes no reference to specific provisions for an EU forest policy, and that the responsibility for forests lies with the Member States within a defined framework of established ownership rights, which include a long history of long-term planning in national and regional regulations.

The Taxonomy sets out the following three qualitative and quantitative mitigation criteria to ensure sustainable management of forest areas; a measured baseline for progress towards substantial mitigation; and demonstration that this mitigation is cumulative (increasing) (and/or maintained in the case of existing forest management) and permanent. All three criteria are required to demonstrate sustainable and substantial mitigation. Specifically, they are:

1. Criterion 1: **Compliance with Sustainable Forest Management (SFM) requirements** in order to ensure forest carbon stocks are retained whilst supporting forest ecosystems and forest services. SFM is defined as ‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems’.³³ The SFM requirements set in the Taxonomy are mandatory, but allow flexibility for the adoption of

³³ https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

approaches that are regionally appropriate (providing that they are justified), and apply internationally (provided they can be verified via independent third-party schemes that are regularly audited), or under international agreements. This will allow investors and forest management companies to verify compliance with the criteria in Europe and globally.³⁴ The practices set out in Annex F2 represent a non-exhaustive list of activities that would, if implemented effectively, lead to the achievement of the objectives of the Taxonomy in the context of maintain and increase carbon stocks, and conservation of non-productive functions. The aim of the list is to provide support to operators and investors as to the types of practice that should be implemented. Recognising the different conditions and characteristics of regions and forests another practice could be applied and can be demonstrated ex-ante as leading to the same outcome.

Criterion 1 differs in the context of conservation forests as a result of those forests having a defined conservation objective and where timber production is not the primary objective. The Taxonomy recognises that its initial goal is to deliver substantial mitigation, and thus for conservation forests focusses on the maintenance of the forest carbon sink. A forest conservation plan is required in order to ensure that substantial mitigation is delivered (in this case maintenance and increase of carbon sinks) in line with wider conservation objectives. This differs from the requirements under the other forest NACE, in that there may be zero intervention requirements, and/or requires only those management activities listed under Category C in Annex F2. Any necessary harvesting (for example diseased trees) should be carried out in line with the conservation plan.

2. Criterion 2: **The establishment of a verified GHG balance baseline, based on growth-yield curves** in order to demonstrate that the forest carbon sink continues to increase and GHG emissions from the forest sectors decrease. This criterion implicitly considers all forest carbon pools (above and below-ground) but recognises the challenges of below-ground carbon measurement. Therefore, the specific criteria used in the fiches focuses on the measurement of above-ground carbon pools only.
3. Criterion 3: **The demonstration of permanence and steady progress** with respect to criteria 1 and 2 as reported through a forest management plan (or equivalent instruments) at 10-year intervals, to be subsequently reviewed by an independent third-party certifier and/or competent authorities. Carbon stocks shall increase above the carbon baseline over a period of 20 years for afforestation and reforestation projects and shall increase over the rotation period for restoration projects, and be maintained or increased in the case of existing forest management and conservation forests.

Progress in the forest carbon inventory and evolution of the forest increment is required relative to a verified baseline, over the rotation period of the forest, which reflects and adapts to the industry's levels of maturity, climate conditions, location features and market structures. The Taxonomy recognises the commercial function of forests and the importance of enabling a sustainable finance market in those

³⁴ FSC/PEFC estimate that about 54% of forests globally are productive and/or used for multiple purposes, of which 20% are certified by FSC and PEFC. See Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

forests. Therefore, a pragmatic view has been taken to the performance period which differs between forest NACE codes, as set out in Criterion 3 above. For afforestation and reforestation it is recognised that there will be a measurable increase in carbon stock as the forest stand develops and trees grow. For existing forest management, and restoration/rehabilitation the forest will include stands at varying stages of maturity, within the context of an established forest. From a substantial mitigation perspective, the view is taken that the maintenance of the carbon stock of the forest is important, and recognises that beyond a point, carbon stocks may reach a saturation point in the above-ground biomass. Respecting the commercial function of many forests, forests may be harvested before reaching full maturity or saturation. However, providing the harvesting follows SFM practices and remains below the level of net-annual increment, the overall forest carbon sink is expected to remain stable or increase over time.

In practical terms, for existing forest management and for rehabilitation/restoration of forests, the forest owner will be required to define the rotation period of a given forest whether at the stand level or landscape level. In order to comply with criterion 2 and 3 the forest owner will need to demonstrate, relative to the rotation period, that carbon stocks have been maintained (against baseline) or increased (from baseline). Importantly the performance/demonstration period is linked to the rotation period, but supported through 10-year reporting periods in order to show direction of travel, i.e. that carbon stocks are being maintained or increasing. In the event of force majeure such as the loss of a forest stand from fire or wind-throw, the existing forest management NACE will move to the restoration NACE, and performance will be judged on the basis of the re-establishment of the forest stand and thus carbon stock development over a period of 20-years.

Measurement and reporting shall not result in significant burden to small-scale operators that may benefit from private investment as the Taxonomy builds on EU legislation and existing national frameworks, and recognises the applicability of different scales of reporting through existing approaches to verification and assessment that apply above the individual holding level. These include approaches adopted at the national or sub-national/regional level, sourcing-area level (multiple holdings) or individual holding level. The Taxonomy does not specify which reporting framework is used, and thus allows flexibility to adapt to the national context, providing that the compliance with criteria and thresholds can be assessed for the holding level as appropriate for the investment.

Do no significant harm to mitigation

Mitigation activities in the forest Taxonomy focus on the maintenance and increase of the forest carbon sink, whilst reducing and avoiding the GHG emissions from activities. Primary producing sectors, such as forestry are particularly vulnerable to climate-related changes and shocks (e.g. changing weather patterns, heatwaves, etc.). Adaptation of forests is therefore essential if the carbon sinks are to be maintained, the stocks increased. Adaptation requirements should be framed so as to promote synergies with substantial mitigation where possible, and as a minimum lead to no significant harm.

The text of the proposed Taxonomy Regulation (Article 12(a)): For the purposes of Article 3(b), an economic activity shall be considered as significantly harming: (a) climate change mitigation, where that activity leads to significant greenhouse gas emissions;

Forests are an unusual economic sector in which they provide a substantial carbon sink, and that significant harm for forest climate change mitigation include where an (adaptation) activity leads to a significant long-term reduction of the carbon sink. It is therefore important to maintain the forest area and

thus forest carbon stocks and sink potential over the long-term. The principles for ensuring mitigation proofed adaptation activities are that adaptation responses should:

- Not undermine the long-term ability of the forests to sequester carbon
- Not undermine the long-term maintenance of existing forest carbon sinks, both above and below ground

A criterion by which the activity can be judged as Taxonomy compliant is as follows – in line with existing EU legislation:

- Adaptation responses shall comply with requirement set out in Article 29(7)b of the recast Renewable Energy Directive (EU/2018/2001) which determines the requirement for management systems to be in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term³⁵.

Impact of these proposals

Approximately 430,000 enterprises are active in wood-based industries across the EU, representing 20% of EU manufacturing enterprises and 7.5% of the gross value-added of the manufacturing industry in Europe.³⁶ The wood industry provides around 3.5 million jobs in the EU.³⁷ Around 60% of EU forests are privately owned, of which 2/3 have holdings of less than 3 hectares³⁸, many times fragmented into smaller plots. The structure of private forest ownership is specific and considerable variations exist from country to country, with properties sizes ranging from 0.5 hectares to more than 10,000 hectares, while the average size is around 13 hectares. Forest owners and managers with similar forest characteristics, under similar climate conditions and jurisdictions, are expected to be equally impacted.

Forestry operations that are FSC and PEFC certified are likely to meet the SFM and Do No Significant Harm criteria of the forest Taxonomy, with the exception of the Conversion criteria. This equates to 61.5% of total productive forests in the EU³⁹, and around 20% of productive forests globally.⁴⁰ Other forests/forest

35 Article 29 of the recast RED, sets out sustainability criteria for forests to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. This is explicitly defined in Article 29(7)b which requires "...management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term." This places the emphasis of the no significant harm requirement at a level more appropriate for the operation of the Taxonomy and/or investment, rather than relying on national level requirements.

36 In 2017. https://ec.europa.eu/eurostat/statistics-explained/index.php/Wood_products_-_production_and_trade

37 https://ec.europa.eu/info/events/forestry-conference-2019-apr-25_en

38 UNECE Geneva Timber And Forest Study Paper 26: Private Forest Ownership in Europe

39 Eurostat, 2017, and Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

40 Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

projects (i.e. non-certified) may also meet the criteria, but it is not possible to estimate this part of the market with certainty. Whilst FSC and PEFC may satisfy Criterion 1 (ex Conversion criteria) and the DNSH criteria, verification of compliance with all three of the Taxonomy criteria will be required (including carbon measurement and performance).

Progress and performance in relation to above-ground carbon sequestration is measured relative to the verified baseline, therefore any forest owner/manager is offered the opportunity to progress in accordance with its specific constraints and maturity level. It is unclear what proportion of the market already implements carbon sequestration measurements against a verified baseline, but examples of specific company progress assessments are available to demonstrate proof of concept.

From a reporting perspective the Taxonomy builds on EU legislation and national frameworks. The Taxonomy allows for performance-related information to either be reported and disclosed by the forest owner/forest management company directly, or through existing, integrated reporting mechanisms in place at the level of the jurisdiction (whether this is at the sourcing area level (multiple holdings)), regional or national level. The Taxonomy recognises the importance of landscape scale approaches i.e. multiple forest stands, in how the forest carbon inventory and evolution of the forest sink increment is managed and the economic lifetime of forest operations, within which the carbon stock may rise and fall within an overall upward trajectory. The current best-performers are expected to be able to comply with the Taxonomy criteria through their existing reporting and management requirements. It is also recognised that some will need more time and thus the Taxonomy provides an incentive to improve performance within the global forest sector.

Next steps (recommendations to the Platform)

The following issues have not been addressed in this version of the forest Taxonomy criteria. However, they may provide additional mitigation opportunities for the sector and therefore merit consideration by the Platform on Sustainable Finance:

- The forest Taxonomy sets out criteria and thresholds for forest management activities that apply up to the forest gate irrespective of the end-use of the forest products. This is for the pragmatic reason that many forest managers and owners do not know in which supply chains their products will arise. In principle however, the Taxonomy recognises the holistic mitigation potential of forests and wood beyond the forest gate both through the effect of substitution (replacing more GHG intensive materials) and through the long-term carbon sink potential of wood products. Furthermore, the forest Taxonomy deals with the production and supply of forest biomass, but not the demand or end use of that biomass. The relationship between the end use of biomass and its production, i.e. market pull, is an important component of the overall sustainable finance Taxonomy to consider when incentivising different NACE sectors towards substantial contribution to mitigation. At present climate benefits beyond the forest gate are expected to be captured through the construction/building, energy and manufacturing sector Taxonomies, and thus create an incentive for the use of wood in the economy, and thus the management of forests in compliance with the Taxonomy. The Platform should therefore improve the holistic consideration of forests' (and forest products) mitigation potential across their entire value chains, and across all sectors of the economy, including end of life. The following recommendations are made in the context of other NACE sectors:

- The buildings Taxonomy should consider the following:
 - The development of reliable thresholds for carbon emission embodied in buildings and construction activities utilising wood. These thresholds should be based on a wide and consistent set of data able to benchmark best practice across different building uses and typologies (i.e. houses, flats, offices, etc.). In parallel, the methodology to be used to assess embodied emissions should be defined in detail on the basis of widely-accepted LCA and CEN/TC350 standards, with particular care to ensure that the beneficial impact of carbon sequestration in timber products sourced from sustainably-managed forests is adequately recognised. This should include the end of life of wood and construction timber.
 - Making a subjective view that wood is a prime raw material with climate mitigation benefits, and should be considered with priority for construction (as a criteria for substantial contribution to mitigation). This would aid in incentivising the use of wood within the economy and for the long-term sequestration of carbon in timber products. In the current proposals,
 - DNSH for construction using timber is addressed through a requirement for FSC and PEFC certification. This is helpful in the short-term, but in the longer-term the platform should consider ensuring that wood used in construction comes from Taxonomy compliant forests.
- The manufacturing Taxonomy should systematically consider the substitution potential of wood as a manufacturing material. Progress has been made in this regard under current NACE 4.7 (Manufacture of other organic base chemicals). This approach is welcomed and should be expanded across other manufacturing NACE sectors. Specifically, it is suggested that the manufacturing Taxonomy includes NACE C16 (Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials) and C31 (Manufacture of furniture) and develop robust and verifiable substitution criteria (to ensure substantial mitigation) and DNSH criteria (see above proposal for buildings).
- When considering the development of Circular Economy principles into the Taxonomy, both as DNSH and as substantial contribution, the Platform should give specific consideration to the use of forest products throughout different economic sectors.
- The current proposal does not capture or address all possible sources of emissions taking place in the forest during the lifetime of a forest project or activity. For example, the Taxonomy does not account for fuel use by machinery within the forest sector (which is currently accounted for in the energy and transport sectors).
- The Platform should further explore broadening the current criteria to account for individual improvements, measures, to be eligible as individual investments towards meeting the overall forest activity criteria, i.e. the substantial mitigation objective.

- GHG measurement is required for above-ground carbon sequestration on the basis that below-ground carbon is technically more challenging to assess and measure overtime. Instead, below-ground carbon shall be maintained and/or increased through a proxy, i.e. the application of management practices, reflected through cumulative Sustainable Forest Management and Do No Significant Harm requirements. The Platform is advised to further explore below-ground carbon measurements and review existing impact assessment methodologies that might complement the current threshold for below-ground carbon measurements. It is further suggested that the Platform consider the approach to soil-carbon in the agriculture Taxonomy and whether there should be alignment also for the forest Taxonomy.
- It is the view of the TEG that these criteria are relevant internationally, provided compliance with the criteria can be informed by providing evidence for meeting compliance or applying verification approaches, such as forest certification using independent third-party schemes that are regularly audited. It is recommended that the Platform further develops guidance, including a more granular mapping of the Taxonomy criteria and thresholds, with existing internationally recognised and applicable forest certification schemes. This would provide support to investors and forest management companies and individuals when seeking compliance with the Taxonomy.
- In the context of interlinkages between Taxonomy sectors, the impact of deforestation is often a result of other-sector activities (such as agriculture or building development) rather than forestry. The Platform are invited to consider whether deforestation is sufficiently addressed in other Taxonomy sectors, in order to support substantial contribution in the forest sector and as a DNSH to mitigation in the forest sector as enabled through other Taxonomy sectors.
- The Platform should further explore potential end-user issues and opportunities for investors and financial institutions, including potential challenges that may arise in relation to associating capital expenditures or revenues that can be tagged or screened through the current criteria set for forest management/land use activities. For example, an investor may invest in a wood processing facility, which itself is not covered by the current forest Taxonomy sectors, but the operation of the facility will interact with the management of forests and the use of forest products. Clarity should be provided to investors on where and at what point in the value/supply chain they are expected to consider compliance with the Taxonomy – specifically for sectors upstream or downstream of the specific investment.
 - The Platform is invited to consider and develop further the performance period for the existing forest management NACE. With the proposed Taxonomy for existing forest management, a pragmatic view has been taken to align performance with the commercial rotation period of a forest – i.e. allowing for changes in carbon stock within a forest and providing flexibility given that different forests will be harvested at different periods. This implicitly recognises that the forest will remain forest and when managed under SFM, continue to sequester carbon. Importantly this means that the forest may be harvested at a commercial point determined by wood quality and quantity and not at a point where the forest has reached a carbon stock saturation point – which may be considerably longer. The Platform is therefore asked to consider if it is sufficient to have additionality provided through SFM and DNSH, but that for existing forest management substantial contribution can be judged as the maintenance of the forest carbon stock rather than its increase. Whilst the focus of this Taxonomy is on greening of activities, it may be relevant to consider the end use of the forest biomass when reflecting on this point – in that around

half of the biomass from EU forests is used for energy purposes, rather than material uses.

1.1 Afforestation

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Afforestation</p> <p>Afforestation is defined as the establishment of forest through planting and/or deliberate seeding on land that, until then, was under a different land use, implies a transformation of land use from non-forest to forest⁴¹.</p>
Mitigation criteria	
Principle	<p>Afforestation shall increase carbon sinks of above and below ground carbon in comparison to a counterfactual with no conversion to forest.</p> <p>All the Criteria are additive and shall apply together:</p> <ul style="list-style-type: none"> • Criterion 1: Mandatory application of the following Sustainable Forest Management (SFM) requirements: <ul style="list-style-type: none"> ○ Identify and apply forest management practices that increase existing carbon stocks, considering the non-exhaustive list of examples practices in the Annex F2, however allowing for application of other similar approaches, that recognise local specificities and conditions, while maintaining or improving soil quality, and biodiversity; ○ Maintain or improve the long-term capacity of the forest to deliver multiple services (e.g. ecosystem services, timber production, etc.); ○ Do not convert high carbon stock land (i.e. primary forest, peatlands, wetlands, and grasslands) which has this status in or after January 2008; ○ Carry out harvesting activities in compliance with laws in the country of origin⁴²; ○ Regenerate harvested forests. • Criterion 2: Establish a verified baseline GHG balance of relevant carbon pools at the beginning of the afforestation/reforestation activity; • Criterion 3: Demonstrate continued compliance with the Sustainable Forest Management requirements and increase of carbon sinks from above and below-ground carbon over time, supported by and disclosed

41 Source: FAO, Global Forest Resources Assessment, 2020

42 Where standards and requirements under national laws are equivalent or better in delivering substantial mitigation, than the SFM requirements of the Taxonomy.

	through a forest management plan (or equivalent) at 10-year intervals, that shall be reviewed by an independent third-party certifier and/or competent authorities.
Metric and Threshold	<ul style="list-style-type: none"> Continued compliance with the Sustainable Forest Management (SFM) requirements is demonstrated and disclosed at 10-year intervals through a forest management plan (or equivalent) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3). Verified GHG balance baseline⁴³ is calculated for above-ground carbon pools, based on growth-yield curves for species per m3/year/ha, carbon convertible. Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m3/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals 44/12 = 3.67 tons of carbon dioxide. Above ground Carbon stocks shall increase above carbon baseline over a period of 20 years⁴⁴. Changes in carbon stocks should be disclosed based on growth yield curves in 10 year intervals through a forest management plan (or equivalent instrument⁴⁵) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3)⁴⁶.
Rationale	
Forests cover around 30% of the global landmass (in Europe this figure is higher at ~40-45%) and absorb roughly 2 billion tons of carbon dioxide each year. ⁴⁷ Forests regulate ecosystems, protect biodiversity,	

43 Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of planting). The increment based on the growth-yield curves gives the approximate number of how many m3/year/ha is available for increment. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals 44/12 = 3.67 tons of carbon dioxide

44 20 years aligns with the measurement of carbon and under LULUCF regulation land that was afforested moves from category "afforestation" to "forest land" after 20 years

45 Landscape management level may be used to emphasize that the goal may be to perform at a scale above the single forest stand. Absence of landscape management access will in turn require disclosure at the single forest stand. The Forest Taxonomy leaves to forest owners and companies to explain, document on which level they report.

46 This threshold should apply considering the following force majeure clause: underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not result in non-compliance with the Taxonomy criteria.

47 <http://www.fao.org/state-of-forests/en/>.

play an integral part in the carbon cycle, support livelihoods and can help drive sustainable growth. EU forests already account for more than 20% of the global forest carbon sink, and yet an increase in carbon sequestration from forests is essential to the achievement of a net-zero target by 2050 in Europe and globally.⁴⁸

Forests can deliver substantial greenhouse gas (GHG) emission mitigation through sequestration of carbon during tree growth and in the accumulation of biomass in soils, vegetation, leaf litter and dead wood (up to forest gate). .

Afforestation activities can deliver substantial mitigation through:

- An increase in the forest capacity to sequester carbon from above ground and below ground carbon pools;
- Maintenance and/or increase of the soil quality, soil carbon and biodiversity.

The Taxonomy acknowledges a definitional change from ‘afforestation’ and ‘reforestation’ to ‘existing forest management’ according to the LULUCF Regulations 20-year accounting rule as per Art. 5(3).

The approach taken to determine metrics and thresholds rely on cumulative criteria. Selected criteria build on existing EU legislation and the Taxonomy recognizes that, although the EU has a variety of forest-related policies, the Treaty on the Functioning of the European Union makes no reference to specific provisions for an EU forest policy, and that the responsibility for forests lies with the Member States within a defined framework of established ownership rights, which include a long history of long-term planning in national and regional regulations.

The Taxonomy sets out the following three qualitative and quantitative mitigation criteria to ensure sustainable management of forest areas; a measured baseline for progress towards substantial mitigation; and demonstration that this mitigation is cumulative (increasing) and permanent. All three criteria are required to demonstrate sustainable and substantial mitigation. Specifically, they are:

1. **Criterion 1: Compliance with Sustainable Forest Management (SFM) requirements** in order to ensure forest carbon stocks are retained whilst supporting forest ecosystems and forest services. SFM is defined as ‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems’.⁴⁹ The SFM requirements set in the Taxonomy are mandatory, but allow flexibility for the adoption of approaches that are regionally appropriate (providing that they are justified), and apply internationally (provided they can be verified via independent third-party schemes that are regularly audited), or under international agreements. This will allow investors, forest

48 European Forest Institute.

49 https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

owners, buyers of timber and/or residues and forest management companies to verify compliance with the criteria in Europe and globally.⁵⁰

- SFM requirements use EU legislation as minimum baseline and build on the REDII, and existing industry best practice criteria e.g. Climate Bonds Initiative's Forestry criteria, the Forest Europe [general guidelines for sustainable forest management](#).
 - To help with application of the criteria, the Forest mitigation Taxonomy provides in Annex F2 a non-exhaustive list of activities that would, if implemented effectively, lead to the achievement of the objectives of the Taxonomy in the context of maintain and increase carbon stocks, and conservation of non-productive functions. The aim of the list is to provide support to operators and investors as to the types of practice that should be implemented. Recognising the different conditions and characteristics of regions and forests another practice could be applied and can be demonstrated ex-ante as leading to the same outcome.
 - SFM requirements include a no-conversion land requirement to preserve high carbon stock land areas that is consistent with the RED II, which defines 2008 as a base year for land use change. This base year has also been adopted by several global certification schemes (e.g. ISCC and RSPO RED).
 - Harvesting activities must be carried out in compliance with national laws in the country of origin, shall comply with EU Timber Regulation (EU/995/2010) and the EU Forest Law Enforcement Governance and Trade (FLEGT), where applicable.
 - Regeneration of forests after harvesting is covered under EU legislation and has been included as a requirement to ensure regeneration is taken into consideration for forest activities outside the EU.
 - SFM requirements should be considered in combination with the Do No Significant Harm criteria.
 - They can be informed by applying forest certification using independent third-party schemes that are regularly audited.
2. **Criterion 2: The establishment of a verified GHG balance baseline, based on growth-yield curves** in order to demonstrate that the forest carbon sink continues to increase and GHG emissions from the forest sectors decrease. This criterion implicitly considers all forest carbon pools (above and below-ground) as identified in LULUCF regulation Annex I section B. Specifically: (a) above-ground biomass; (b) below-ground biomass; (c) litter; (d) dead wood; (e) soil organic carbon, with the exclusion of (f) harvested wood products in the land accounting categories of afforested land and managed forest land, which is beyond the scope of this Taxonomy. However, it recognises the challenges of below-ground carbon measurement. Therefore, the specific criteria used in the fiches focuses on the measurement of above-ground carbon pools only.
- The forest Taxonomy acknowledges that setting a universal absolute threshold for carbon stocks is not a viable option given the variability of carbon sequestration is highly context specific. The Taxonomy therefore requires evidence of a positive direction of travel in terms of

⁵⁰ FSC/PEFC estimate that about 54% of forests globally are productive and/or used for multiple purposes, of which 20% are certified by FSC and PEFC. See Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

maintaining and/or increasing carbon stocks, specifically, the progressive increase of forest carbon stocks.

- Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m³/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals 44/12 = 3.67 tons of carbon dioxide.
3. **Criterion 3: The demonstration of permanence and steady progress** with respect to criteria 1 and 2 as reported through a forest management plan (or equivalent instruments) at 10-year intervals, to be subsequently reviewed by an independent third-party certifier and/or competent authorities. Carbon stocks shall increase above the carbon baseline over a period of 20 years for afforestation projects.
- In order for forests to achieve their full climate mitigation potential, it is essential the Taxonomy accounts for both a continuum of sustainable forest management practices, and the demonstration that the carbon stocks increment includes the impact from living, aboveground biomass, specifically in the case of afforestation and reforestation projects.
 - SFM requirements are essential to guarantee the maintenance in carbon sequestration from below-ground biomass, dead organic matter or soils: increase in carbon sequestration from below ground carbon pools is not included due to the high uncertainty in measuring it.
 - Sequestration levels shall be reported at a minimum every 10 years, and performance shall be demonstrated after 20 years of the afforestation/reforestation project. This aligns with the measurement of carbon and under LULUCF regulation where land that was afforested moves from category "afforestation" to "forest land" after 20 years. A 20-year period for maintaining carbon sinks and activities also follows the IPCC time frame of 20 years to saturation for soil carbon.
 - Measurement and reporting shall not result in significant burden to small-scale operators that may benefit from private investment as the taxonomy builds on EU legislation and national frameworks, and recognises the applicability of different scales of reporting through existing approaches to verification and assessment that apply above the individual holding level. These include approaches adopted at the national or sub-national/regional level, sourcing-area level (multiple holdings) or individual holding level. The Taxonomy does not specify which reporting framework is used, and thus allows flexibility to adapt to the national context, providing that the compliance with criteria and thresholds can be assessed for the holding level as appropriate for the investment.

International relevance of the forest Taxonomy

It is the view of the TEG that the proposed criteria are relevant internationally, provided compliance with the criteria can be informed by providing evidence for meeting compliance or applying verification approaches, such as forest certification using independent third-party schemes that are regularly

audited. Forestry operations that are FSC and PEFC certified are likely to meet the SFM and Do No Significant Harm criteria of the forest Taxonomy, with the exception of the Conversion criteria that varies across jurisdictions and forestry activities. This equates to 61.5% of total productive forests in the EU⁵¹, and around 20% of productive forests globally.⁵² Other forests/forest projects (i.e. non-certified) may also meet the criteria, but it is not possible to estimate this part of the market with certainty. Note: whilst FSC and PEFC may satisfy Criterion 1 (ex Conversion criteria) and the DNSH criteria, verification of compliance with all three of the Taxonomy criteria will be required (including carbon measurement and performance).

Alignment with existing legislation

In order to ensure compliance with the criteria set out in the Taxonomy, it is appropriate to consider alignment with existing EU legislative instruments and established agreements. The proposed criteria and DNSH requirements align with existing EU legislation in the context of forestry. It is important to recognise where legislation provides safeguards to ensure no harm to an objective and where legislation allows for more substantial contribution to those objectives. For example, Article 29 of the recast RED, sets out sustainability criteria for forests using a risk-based approach to minimise the risk of using forest biomass derived from unsustainable production, relying in Article 29(6) on national or sub-national laws or if such evidence is not available on supply level, and in Article 29(7) referring to the Paris agreement or if such evidence is not available it refers to management systems in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. These aims are to an extent consistent with that the criteria proposed in the Taxonomy, and some of the DNSH criteria. Where the existing recast RED differs is that Article 29 does not require an explicit ‘substantial contribution’ to GHG mitigation. Furthermore, the compliance mechanism by which the RED seeks to ensure that these aims are achieved, is risk-based, however through a verification process. A risk-based approach assumes that if national laws or management systems are in place, that the RED criteria are addressed. The Taxonomy seeks to establish specific and measurable criteria, metrics and thresholds by which substantial mitigation can be assessed at the project level or at the level of the forest holding.

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarized as follows:

- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

51 Eurostat, 2017, and Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

52 Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leeching of nutrients to waters. Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> Take measures to ensure sustained or improved long term conservation status at the landscape level⁵³ In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁵⁴

⁵³ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁵⁴ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

- Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided.
- Forests are monitored and protected to prevent illegal logging, in compliance with national laws
- Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations;
- Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.

1.2 Rehabilitation, Restoration

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Restoration & Rehabilitation</p> <p>The Taxonomy defines rehabilitation/restoration as any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state⁵⁵.</p>
Mitigation criteria	
Principle	<p>Restoration & Rehabilitation shall maintain and/or increase carbon sinks of above and below ground carbon.</p> <p>All the Criteria are additive and shall apply together:</p> <ul style="list-style-type: none"> • Criterion 1: Mandatory application of the following Sustainable Forest Management (SFM) requirements: <ul style="list-style-type: none"> ○ Identify and apply forest management practices that increase existing carbon stocks , considering the non-exhaustive list of examples practices in the Annex F2, however allowing for application of other similar approaches, that recognise local specificities and conditions, while maintaining or improving soil quality, and biodiversity; ○ Maintain or improve the long-term capacity of the forest to deliver multiple services (e.g. ecosystem services, timber production, etc.); ○ Do not convert high carbon stock land (i.e. primary forest, peatlands, wetlands, and grasslands) which has this status in or after January 2008; ○ Carry out harvesting activities in compliance with laws in the country of origin⁵⁶; ○ Regenerate harvested forests. • Criterion 2: Establish a verified baseline GHG balance of relevant carbon pools at the beginning of the rehabilitation and restoration activity;

⁵⁵ Source: FAO, Unasylva, Forest and landscape restoration (referencing the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, IPBES).

⁵⁶ Where standards and requirements under national laws are equivalent or better in delivering substantial mitigation, than the SFM requirements of the Taxonomy.

	<ul style="list-style-type: none"> Criterion 3: Demonstrate continued compliance with the Sustainable Forest Management requirements and increase of carbon from above and below-ground carbon over time, supported by and disclosed through a forest management plan (or equivalent) at 10-year intervals, that shall be reviewed by an independent third-party certifier and/or competent authorities.
Metric and Threshold	<ul style="list-style-type: none"> Continued compliance with the Sustainable Forest Management (SFM) requirements is demonstrated and continuously disclosed at 10 -year intervals through a forest management plan (or equivalent instrument) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3). Verified GHG balance baseline⁵⁷ is calculated for above-ground carbon pools, based on growth-yield curves for species per m3/year/ha, carbon convertible. Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m3/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide. Above ground Carbon stocks shall increase above carbon baseline over the rotation period of the forest⁵⁸. Changes in carbon stocks should be disclosed based on growth yield curves in 10 year intervals through a forest management plan (or equivalent instrument⁵⁹) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3)⁶⁰.
Rationale	

57 Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of planting). The increment based on the growth-yield curves gives the approximate number of how many m3/year/ha is available for increment. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide

58 The rotation period is here defined as the time from seeding, planting or natural regeneration through to the point of harvest.

59 Landscape management level may be used to emphasize that the goal may be to perform at a scale above the single forest stand. Absence of landscape management access will in turn require disclosure at the single forest stand. The Forest Taxonomy leaves to forest owners and companies to explain, document on which level they report.

60 This threshold should apply considering the following force majeure clause: underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not result in non-compliance with the Taxonomy criteria.

Forests cover around 30% of the global landmass (In Europe this figure is higher at ~40-45%) and absorb roughly 2 billion tons of carbon dioxide each year.⁶¹ Forests regulate ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods and can help drive sustainable growth. EU forests already account for more than 20% of the global forest carbon sink, and yet an increase in carbon sequestration from forests is essential to the achievement of a net-zero target by 2050 in Europe and globally.⁶²

Forests can deliver substantial greenhouse gas (GHG) emission mitigation through sequestration of carbon during tree growth and in the accumulation of biomass in soils, vegetation, leaf litter and dead wood (up to forest gate).

The forest restoration and forest rehabilitation activities can deliver substantial mitigation through:

- An increase in the forest capacity to sequester carbon from above ground and below ground carbon pools;
- Maintenance and/or increase of the soil quality, soil carbon and biodiversity.

The Taxonomy acknowledges a definitional change from ‘afforestation’ and ‘reforestation’ to ‘existing forest management’ and ‘rehabilitation’ according to the LULUCF Regulations 20-year accounting rule as per Art. 5(3).

The approach taken to determine metrics and thresholds rely on cumulative criteria. Selected criteria build on existing EU legislation and the Taxonomy recognizes that, although the EU has a variety of forest-related policies, the Treaty on the Functioning of the European Union makes no reference to specific provisions for an EU forest policy, and that the responsibility for forests lies with the Member States within a defined framework of established ownership rights, which include a long history of long-term planning in national and regional regulations.

The Taxonomy sets out the following three qualitative and quantitative mitigation criteria to ensure sustainable management of forest areas; a measured baseline for progress towards substantial mitigation; and demonstration that this mitigation is cumulative (increasing) and permanent. All three criteria are required to demonstrate sustainable and substantial mitigation. Specifically, they are:

1. **Criterion 1: Compliance with Sustainable Forest Management (SFM) requirements** in order to ensure forest carbon stocks are retained whilst supporting forest ecosystems and forest services. SFM is defined as ‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems’.⁶³ The SFM requirements set in the Taxonomy are mandatory, but allow flexibility for the adoption of approaches that are regionally appropriate (providing that they are justified),

⁶¹ <http://www.fao.org/state-of-forests/en/>.

⁶² European Forest Institute.

⁶³ https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

and apply internationally (provided they can be verified via independent third-party schemes that are regularly audited), or under international agreements. This will allow investors, forest owners, buyers of timber and/or residues and forest management companies to verify compliance with the criteria in Europe and globally.⁶⁴

- SFM requirements use EU legislation as minimum baseline and build on the REDII, and existing industry best practice criteria e.g. Climate Bonds Initiative's Forestry criteria, the Forest Europe general guidelines for sustainable forest management.
 - To help with application of the criteria, the Forest mitigation Taxonomy provides in Annex F2 a non-exhaustive list of activities that would, if implemented effectively, lead to the achievement of the objectives of the Taxonomy in the context of maintain and increase carbon stocks, and conservation of non-productive functions. The aim of the list is to provide support to operators and investors as to the types of practice that should be implemented. Recognising the different conditions and characteristics of regions and forests another practice could be applied and can be demonstrated ex-ante as leading to the same outcome.
 - SFM requirements include a no-conversion land requirement to preserve high carbon stock land areas that is consistent with the RED II, which defines 2008 as a base year for land use change. This base year has also been adopted by several global certification schemes (e.g. ISCC and RSPO RED).
 - Harvesting activities must be carried out in compliance with national laws in the country of origin, shall comply with EU Timber Regulation (EU/995/2010) and the EU Forest Law Enforcement Governance and Trade (FLEGT), where applicable.
 - Regeneration of forests after harvesting is covered under EU legislation and has been included as a requirement to ensure regeneration is taken into consideration for forest activities outside the EU.
 - SFM requirements should be considered in combination with the Do No Significant Harm criteria.
 - They can be informed by applying forest certification using independent third-party schemes that are regularly audited.
2. Criterion 2: **The establishment of a verified GHG balance baseline, based on growth-yield curves** in order to demonstrate that the forest carbon sink continues to increase and GHG emissions from the forest sectors decrease. This criterion implicitly considers all forest carbon pools (above and below-ground) as identified in LULUCF regulation Annex I section B. Specifically: (a) above-ground biomass; (b) below-ground biomass; (c) litter; (d) dead wood; (e) soil organic carbon, with the exclusion of (f) harvested wood products in the land accounting categories of afforested land and managed forest land, which is beyond the scope of this Taxonomy. However, it recognises the challenges of below-ground carbon measurement. Therefore, the specific criteria used in the tables focuses on the measurement of above-ground carbon pools only.

⁶⁴ FSC/PEFC estimate that about 54% of forests globally are productive and/or used for multiple purposes, of which 20% are certified by FSC and PEFC. See Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

- The forest Taxonomy acknowledges that setting a universal absolute threshold for carbon stocks is not a viable option given the variability of carbon sequestration is highly context specific. The Taxonomy therefore requires evidence of a positive direction of travel in terms of maintaining and/or increasing carbon stocks, specifically, the progressive increase of forest carbon stocks.
 - Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m³/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals 44/12 = 3.67 tons of carbon dioxide.
3. Criterion 3: **The demonstration of permanence and steady progress** with respect to criterion 1 and 2 as reported through a forest management plan (or equivalent instruments) at 10-year intervals, to be subsequently reviewed by an independent third-party certifier and/or competent authorities. Carbon stocks shall increase above the carbon baseline over the rotation period of the forest for restoration projects.
- In order for forests to achieve their full climate mitigation potential, it is essential the Taxonomy accounts for both a continuum of sustainable forest management practices, and the demonstration that the carbon stocks increment includes the impact from living, aboveground biomass, specifically in the case of afforestation and reforestation projects.
 - SFM requirements are essential to guarantee the maintenance in carbon sequestration from below-ground biomass, dead organic matter or soils: increase in carbon sequestration from below ground carbon pools is not included due to the high uncertainty in measuring it.
 - Sequestration levels shall be reported at a minimum every 10 years, and performance shall be demonstrated relative to the rotation period of the forest. Progress in the forest carbon inventory and evolution of the forest increment is required relative to a verified baseline, over the rotation period of the forest, which reflects and adapts to the industry's levels of maturity, climate conditions, location features and market structures. For restoration/rehabilitation the forest will include stands at varying stages of maturity, within the context of an established forest. From a substantial mitigation perspective, the view is taken that the maintenance of the carbon stock of the forest is important, and recognises that beyond a point, carbon stocks may reach a saturation point in the above-ground biomass. Respecting the commercial function of many forests, forests may be harvested before reaching full maturity or saturation. However, providing the harvesting follows SFM practices and remains below the level of net-annual increment, the overall forest carbon sink is expected to remain stable or increase over time. In practical terms, for rehabilitation/restoration of forests, the forest owner will be required to define the rotation period of a given forest whether at the stand level or landscape level. In order to comply with criterion 2 and 3 the forest owner will need to demonstrate, relative to the rotation period, that carbon stocks have been maintained (against baseline) or increased (from baseline). Importantly the performance/demonstration period is linked to the rotation period, but supported through 10-year reporting periods in order to show direction of travel, i.e. that carbon stocks are being maintained or increasing. In the event of force majeure such as the loss of a forest stand from fire or wind-throw, the existing forest management NACE will move to the

restoration NACE, and performance will be judged on the basis of the re-establishment of the forest stand and thus carbon stock development over a period of 20-years.

- Measurement and reporting shall not result in significant burden to small-scale operators that may benefit from private investment as the taxonomy builds on EU legislation and national frameworks, and recognises the applicability of different scales of reporting through existing approaches to verification and assessment that apply above the individual holding level. These include approaches adopted at the national or sub-national/regional level, sourcing-area level (multiple holdings) or individual holding level. The Taxonomy does not specify which reporting framework is used, and thus allows flexibility to adapt to the national context, providing that the compliance with criteria and thresholds can be assessed for the holding level as appropriate for the investment.

International relevance of the forest Taxonomy

It is the view of the TEG that the proposed criteria are relevant internationally, provided compliance with the criteria can be informed by providing evidence for meeting compliance or applying verification approaches, such as forest certification using independent third-party schemes that are regularly audited. Forestry operations that are FSC and PEFC certified are likely to meet the SFM and Do No Significant Harm criteria of the forest Taxonomy, with the exception of the Conversion criteria that varies across jurisdictions and forestry activities. This equates to 61.5% of total productive forests in the EU⁶⁵, and around 20% of productive forests globally.⁶⁶ Other forests/forest projects (i.e. non-certified) may also meet the criteria, but it is not possible to estimate this part of the market with certainty. Note: whilst FSC and PEFC may satisfy Criterion 1 (ex Conversion criteria) and the DNSH criteria, verification of compliance with all three of the Taxonomy criteria will be required (including carbon measurement and performance).

Alignment with existing legislation

In order to ensure compliance with the criteria set out in the Taxonomy, it is appropriate to consider alignment with existing EU legislative instruments. The proposed criteria and DNSH requirements align with existing EU legislation in the context of forestry. It is important to recognise where legislation provides safeguards to ensure no harm to an objectives and where legislation allows for more substantial contribution to those objectives. For example, Article 29 of the recast RED, sets out sustainability criteria for forests using a risk-based approach to minimise the risk of using forest biomass derived from unsustainable production, relying in Article 29(6) on national or sub-national laws or if such evidence is not available on supply level, and in Article 29(7) referring to the Paris agreement or if such evidence is not available it refers to management systems in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. These aims are to an extent consistent with that the criteria proposed in the Taxonomy, and some of the DNSH criteria. Where the existing recast RED differs is that Article

⁶⁵ Eurostat, 2017, and Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

⁶⁶ Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

29 does not require an explicit ‘substantial contribution’ to GHG mitigation. Furthermore, the compliance mechanism by which the RED seeks to ensure that these aims are achieved, is risk-based, however through a verification process. A risk-based approach assumes that if national laws or management systems are in place, that the RED criteria are addressed. The Taxonomy seeks to establish specific and measurable criteria, metrics and thresholds by which substantial mitigation can be assessed at the project level or at the level of the forest holding.

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarized as follows:

- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leeching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.

(6) Ecosystems	<ul style="list-style-type: none"> • Take measures to ensure sustained or improved long term conservation status at the landscape level⁶⁷ • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁶⁸ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.
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67 Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

68 This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

1.3 Reforestation

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Reforestation</p> <p>Reforestation is defined as the re-establishment of forest through planting and/or deliberate seeding on land classified as forest. It implies no change of land use, includes planting/seeding of temporarily un-stocked forest areas as well as planting/seeding of areas with forest cover. It includes coppice from trees that were originally planted or seeded⁶⁹. The FAO FRA definition of reforestation excludes natural regeneration. However, the Taxonomy recognises the importance of natural regeneration to the increased carbon sink and stock potential provided by forests in general. It is therefore included explicitly within this context in line with the FAO FRA definition of naturally regenerating forest⁷⁰.</p> <p>In the context of the Taxonomy, the category 'reforestation' applies in cases following extreme events (wind throws, fires etc.), and not as part of normal, legally binding obligation to reforest after harvesting.</p>
Mitigation criteria	
Principle	<p>Reforestation shall increase overall carbon sinks of above and below ground carbon.</p> <p>All the Criteria are additive and shall apply together:</p> <ul style="list-style-type: none"> • Criterion 1: Mandatory application of the following Sustainable Forest Management (SFM) requirements: <ul style="list-style-type: none"> ○ Identify and apply forest management practices that increase existing carbon stocks , considering the non-exhaustive list of examples practices in the Annex F2, however allowing for

69 Source: FAO, Global Forest Resources Assessment, 2020.

70 Forest predominantly composed of trees established through natural regeneration.

Explanatory notes: 1. Includes forests for which it is not possible to distinguish whether planted or naturally regenerated. 2. Includes forests with a mix of naturally regenerated native tree species and planted/seeded trees, and where the naturally regenerated trees are expected to constitute the major part of the growing stock at stand maturity. 3. Includes coppice from trees originally established through natural regeneration. 4. Includes naturally regenerated trees of introduced species.

	<p>application of other similar approaches, that recognise local specificities and conditions, while maintaining or improving soil quality, and biodiversity;</p> <ul style="list-style-type: none"> ○ Maintain or improve the long-term capacity of the forest to deliver multiple services (e.g. ecosystem services, timber production, etc.); ○ Do not convert high carbon stock land (i.e. primary forest, peatlands, wetlands, and grasslands) which has this status in or after January 2008; ○ Carry out harvesting activities in compliance with laws in the country of origin⁷¹; ○ Regenerate harvested forests. <ul style="list-style-type: none"> • Criterion 2: Establish a verified baseline GHG balance of relevant carbon pools at the beginning of the afforestation/reforestation activity; • Criterion 3: Demonstrate continued compliance with the Sustainable Forest Management requirements and increase of carbon stock from above and below-ground carbon over time, supported by and disclosed through a forest management plan (or equivalent) at 10-year intervals, that shall be reviewed by an independent third-party certifier and/or competent authorities.
Metric and Threshold	<ul style="list-style-type: none"> • Continued compliance with the Sustainable Forest Management (SFM) requirements is demonstrated and continuously disclosed at 10 -year intervals through a forest management plan (or equivalent instrument) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3). • Verified GHG balance baseline⁷² is calculated for above-ground carbon pools, based on growth-yield curves for species per m3/year/ha, carbon convertible. Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees. Using the growth-yield curves, information will be given on the annual increment in m3/year/ha, which can be used for the basis

71 Where standards and requirements under national laws are equivalent or better in delivering substantial mitigation, than the SFM requirements of the Taxonomy.

72 Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of planting). The increment based on the growth-yield curves gives the approximate number of how many m3/year/ha is available for increment. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals 44/12 = 3.67 tons of carbon dioxide

	<p>of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide.</p> <ul style="list-style-type: none"> • Above ground Carbon stocks shall increase above carbon baseline over a period of 20 years⁷³. Changes in carbon stocks should be disclosed based on growth yield curves in 10 year intervals through a forest management plan (or equivalent instrument⁷⁴) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3)⁷⁵.
Rationale	
<p>Forests cover around 30% of the global landmass (In Europe this figure is higher at ~40-45%) and absorb roughly 2 billion tons of carbon dioxide each year.⁷⁶ Forests regulate ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods and can help drive sustainable growth. EU forests already account for more than 20% of the global forest carbon sink, and yet an increase in carbon sequestration from forests is essential to the achievement of a net-zero target by 2050 in Europe and globally.⁷⁷</p> <p>Forests can deliver substantial greenhouse gas (GHG) emission mitigation through sequestration of carbon during tree growth and in the accumulation of biomass in soils, vegetation, leaf litter and dead wood (up to forest gate).</p> <p>Reforestation activities can deliver substantial mitigation through:</p> <ul style="list-style-type: none"> • An increase in the forest capacity to sequester carbon from above ground and below ground carbon pools; • Maintenance and/or increase of the soil quality, soil carbon and biodiversity. <p>The Taxonomy acknowledges a definitional change from ‘afforestation’ and ‘reforestation’ to ‘existing forest management’ according to the LULUCF Regulations 20-year accounting rule as per Art. 5(3).</p>	

⁷³ 20 years aligns with the measurement of carbon and under LULUCF regulation land that was afforested moves from category “afforestation” to “forest land” after 20 years

⁷⁴ Landscape management level may be used to emphasize that the goal may be to perform at a scale above the single forest stand. Absence of landscape management access will in turn require disclosure at the single forest stand. The Forest Taxonomy leaves to forest owners and companies to explain, document on which level they report.

⁷⁵ This threshold should apply considering the following force majeure clause: underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not result in non-compliance with the Taxonomy criteria.

⁷⁶ <http://www.fao.org/state-of-forests/en/>.

⁷⁷ European Forest Institute.

The approach taken to determine metrics and thresholds rely on cumulative criteria. Selected criteria build on existing EU legislation and the Taxonomy recognizes that, although the EU has a variety of forest-related policies, the Treaty on the Functioning of the European Union makes no reference to specific provisions for an EU forest policy, and that the responsibility for forests lies with the Member States within a defined framework of established ownership rights, which include a long history of long-term planning in national and regional regulations.

The Taxonomy sets out the following three qualitative and quantitative mitigation criteria to ensure sustainable management of forest areas; a measured baseline for progress towards substantial mitigation; and demonstration that this mitigation is cumulative (increasing) and permanent. All three criteria are required to demonstrate sustainable and substantial mitigation. Specifically, they are:

1. **Criterion 1: Compliance with Sustainable Forest Management (SFM) requirements** in order to ensure forest carbon stocks are retained whilst supporting forest ecosystems and forest services. SFM is defined as ‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems’.⁷⁸ The SFM requirements set in the Taxonomy are mandatory, but allow flexibility for the adoption of approaches that are regionally appropriate (providing that they are justified), and apply internationally (provided they can be verified via independent third-party schemes that are regularly audited), or under international agreements. This will allow investors, forest owners, buyers of timber and/or residues and forest management companies to verify compliance with the criteria in Europe and globally.⁷⁹
- SFM requirements use EU legislation as minimum baseline and build on the REDII, and existing industry best practice criteria e.g. Climate Bonds Initiative’s Forestry criteria, the Forest Europe [general guidelines for sustainable forest management](#).
- To help with application of the criteria, the Forest mitigation Taxonomy provides in Annex F2 a non-exhaustive list of activities that would, if implemented effectively, lead to the achievement of the objectives of the Taxonomy in the context of maintain and increase carbon stocks, and conservation of non-productive functions. The aim of the list is to provide support to operators and investors as to the types of practice that should be implemented. Recognising the different conditions and characteristics of regions and forests another practice could be applied and can be demonstrated ex-ante as leading to the same outcome.
- SFM requirements include a no-conversion land requirement to preserve high carbon stock land areas that is consistent with the RED II, which defines 2008 as a base year for land use change. This base year has also been adopted by several global certification schemes (e.g. ISCC and RSPO RED).

⁷⁸ https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

⁷⁹ FSC/PEFC estimate that about 54% of forests globally are productive and/or used for multiple purposes, of which 20% are certified by FSC and PEFC. See Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

- Harvesting activities must be carried out in compliance with national laws in the country of origin, shall comply with EU Timber Regulation (EU/995/2010) and the EU Forest Law Enforcement Governance and Trade (FLEGT), where applicable.
 - Regeneration of forests after harvesting is covered under EU legislation and has been included as a requirement to ensure regeneration is taken into consideration for forest activities outside the EU.
 - SFM requirements should be considered in combination with the Do No Significant Harm criteria.
 - They can be informed by applying forest certification using independent third-party schemes that are regularly audited.
2. Criterion 2: **The establishment of a verified GHG balance baseline, based on growth-yield curves** in order to demonstrate that the forest carbon sink continues to increase and GHG emissions from the forest sectors decrease. This criterion implicitly considers all forest carbon pools (above and below-ground) as identified in LULUCF regulation Annex I section B. Specifically: (a) above-ground biomass; (b) below-ground biomass; (c) litter; (d) dead wood; (e) soil organic carbon, with the exclusion of (f) harvested wood products in the land accounting categories of afforested land and managed forest land, which is beyond the scope of this Taxonomy. However, it recognises the challenges of below-ground carbon measurement. Therefore, the specific criteria used in the tables focuses on the measurement of above-ground carbon pools only.
- The forest Taxonomy acknowledges that setting a universal absolute threshold for carbon stocks is not a viable option given the variability of carbon sequestration is highly context specific. The Taxonomy therefore requires evidence of a positive direction of travel in terms of maintaining and/or increasing carbon stocks, specifically, the progressive increase of forest carbon stocks.
- Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m³/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide.
3. Criterion 3: **The demonstration of permanence and steady progress** with respect to criterion 1 and 2 as reported through a forest management plan (or equivalent instruments) at 10-year intervals, to be subsequently reviewed by an independent third-party certifier and/or competent authorities. Carbon stocks shall increase above the carbon baseline over a period of 20 years for reforestation projects.
- In order for forests to achieve their full climate mitigation potential, it is essential the Taxonomy accounts for both a continuum of sustainable forest management practices, and the demonstration that the carbon stocks increment includes the impact from living, aboveground biomass, specifically in the case of afforestation and reforestation projects.

- SFM requirements are essential to guarantee the maintenance in carbon sequestration from below-ground biomass, dead organic matter or soils: increase in carbon sequestration from below ground carbon pools is not included due to the high uncertainty in measuring it.
- Sequestration levels shall be reported at a minimum every 10 years, and performance shall be demonstrated after 20 years of the afforestation/reforestation project. This aligns with the measurement of carbon and under LULUCF regulation where land that was afforested moves from category “afforestation” to “forest land” after 20 years. A 20-year period for maintaining carbon sinks and activities also follows the IPCC time frame of 20 years to saturation for soil carbon.
- Measurement and reporting shall not result in significant burden to small-scale operators that may benefit from private investment as the taxonomy builds on EU legislation and national frameworks, and recognises the applicability of different scales of reporting through existing approaches to verification and assessment that apply above the individual holding level. These include approaches adopted at the national or sub-national/regional level, sourcing-area level (multiple holdings) or individual holding level. The Taxonomy does not specify which reporting framework is used, and thus allows flexibility to adapt to the national context, providing that the compliance with criteria and thresholds can be assessed for the holding level as appropriate for the investment.

International relevance of the forest Taxonomy

It is the view of the TEG that the proposed criteria are relevant internationally, provided compliance with the criteria can be informed by providing evidence for meeting compliance or applying verification approaches, such as forest certification using independent third-party schemes that are regularly audited. Forestry operations that are FSC and PEFC certified are likely to meet the SFM and Do No Significant Harm criteria of the forest Taxonomy, with the exception of the Conversion criteria that varies across jurisdictions and forestry activities. This equates to 61.5% of total productive forests in the EU⁸⁰, and around 20% of productive forests globally.⁸¹ Other forests/forest projects (i.e. non-certified) may also meet the criteria, but it is not possible to estimate this part of the market with certainty. Note: whilst FSC and PEFC may satisfy Criterion 1 (ex Conversion criteria) and the DNSH criteria, verification of compliance with all three of the Taxonomy criteria will be required (including carbon measurement and performance).

Alignment with existing legislation

In order to ensure compliance with the criteria set out in the Taxonomy, it is appropriate to consider alignment with existing EU legislative instruments. The proposed criteria and DNSH requirements align with existing EU legislation in the context of forestry. It is important to recognise where legislation

⁸⁰ Eurostat, 2017, and Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

⁸¹ Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

provides safeguards to ensure no harm to an objective and where legislation allows for more substantial contribution to those objectives. For example, Article 29 of the recast RED, sets out sustainability criteria for forests using a risk-based approach to minimise the risk of using forest biomass derived from unsustainable production, relying in Article 29(6) on national or sub-national laws or if such evidence is not available on supply level, and in Article 29(7) referring to the Paris agreement or if such evidence is not available it refers to management systems in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. These aims are to an extent consistent with that the criteria proposed in the Taxonomy, and some of the DNSH criteria. Where the existing recast RED differs is that Article 29 does not require an explicit ‘substantial contribution’ to GHG mitigation. Furthermore, the compliance mechanism by which the RED seeks to ensure that these aims are achieved, is risk-based, however through a verification process. A risk-based approach assumes that if national laws or management systems are in place, that the RED criteria are addressed. The Taxonomy seeks to establish specific and measurable criteria, metrics and thresholds by which substantial mitigation can be assessed at the project level or at the level of the forest holding.

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarized as follows:

- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leaching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the

	<p>Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard;</p> <ul style="list-style-type: none"> Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> Take measures to ensure sustained or improved long term conservation status at the landscape level⁸² In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁸³ Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. Forests are monitored and protected to prevent illegal logging, in compliance with national laws Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.

⁸² Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁸³ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

1.4 Existing forest management

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Existing Forest Management</p> <p>The Taxonomy defines forest management as management of the land which is reported as forest, in accordance with the Sustainable Forest Management principles. SFM is further defined by Forest Europe as: 'sustainable forest management' means using forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems⁸⁴.</p>
Mitigation criteria	
Principle	<p>Existing forest management shall maintain and/or increase carbon sinks of above and below ground carbon.</p> <p>All the Criteria are additive and shall apply together:</p> <ul style="list-style-type: none"> • Criterion 1: Mandatory application of the following Sustainable Forest Management (SFM) requirements: <ul style="list-style-type: none"> ○ Identify and apply forest management practices that increase existing carbon stocks , considering the non-exhaustive list of examples practices in the Annex F2, however allowing for application of other similar approaches, that recognise local specificities and conditions, while maintaining or improving soil quality, and biodiversity; ○ Maintain or improve the long-term capacity of the forest to deliver multiple services (e.g. ecosystem services, timber production, etc.); ○ Do not convert high carbon stock land (i.e. primary forest, peatlands, wetlands, and grasslands) which has this status in or after January 2008; ○ Carry out harvesting activities in compliance with laws in the country of origin⁸⁵; ○ Regenerate harvested forests.

⁸⁴ https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

⁸⁵ Where standards and requirements under national laws are equivalent or better in delivering substantial mitigation, than the SFM requirements of the Taxonomy.

	<ul style="list-style-type: none"> Criterion 2: Establish a verified baseline GHG balance of relevant carbon pools at the beginning of the afforestation/reforestation activity; Criterion 3: Demonstrate continued compliance with the Sustainable Forest Management requirements and maintain or increase of carbon sinks from above and below-ground carbon over time, supported by and disclosed through a forest management plan (or equivalent) at 10-year intervals, that shall be reviewed by an independent third-party certifier and/or competent authorities.
Metric and Threshold	<ul style="list-style-type: none"> Continued compliance with the Sustainable Forest Management (SFM) requirements is demonstrated and continuously disclosed at 10 -year intervals through a forest management plan (or equivalent instrument) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3). Verified GHG balance baseline⁸⁶ is calculated for above-ground carbon pools, based on growth-yield curves for species per m3/year/ha, carbon convertible. Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees. Using the growth-yield curves, information will be given on the annual increment in m3/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide. Above ground Carbon stocks shall be maintained or increased relative to the carbon baseline over the rotation period of the forest⁸⁷. Changes in carbon stocks should be disclosed based on growth yield curves in 10-year intervals⁸⁸ through a forest management plan (or equivalent instrument) that shall be reviewed by an independent

⁸⁶ Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of planting). The increment based on the growth-yield curves gives the approximate number of how many m3/year/ha is available for increment. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide

⁸⁷ The rotation period is here defined as the time from seeding, planting or natural regeneration through to the point of harvest.

⁸⁸ A description of above ground carbon state of play is required every 10 years to ensure steady and overall progress is aimed for and achieved. That aligns with management cycles time horizons performed in the European Union as well as National Forest Inventories.

	third-party certifier and/or competent authorities (as described in Criteria 3) ⁸⁹ .
Rationale	
<p>A substantial portion of forestry activities will fall under the bracket of existing forest management. It is therefore proposed that existing forest management is recognized in the Taxonomy, provided it can demonstrate maintenance of high carbon stocks in multiple pools and overall improvement in the forest carbon sink.</p> <p>Forests cover around 30% of the global landmass (In Europe this figure is higher at ~40-45%) and absorb roughly 2 billion tons of carbon dioxide each year.⁹⁰ Forests regulate ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods and can help drive sustainable growth. EU forests already account for more than 20% of the global forest carbon sink, and yet an increase in carbon sequestration from forests is essential to the achievement of a net-zero target by 2050 in Europe and globally.⁹¹</p> <p>Forests can deliver substantial greenhouse gas (GHG) emission mitigation through sequestration of carbon during tree growth and in the accumulation of biomass in soils, vegetation, leaf litter and dead wood (up to forest gate).</p> <p>The sustainable management of forests can deliver substantial mitigation through:</p> <ul style="list-style-type: none"> • An increase or maintenance in the forest capacity to sequester carbon from above ground and below ground carbon pools; • Maintenance and/or increase of the soil quality, soil carbon and biodiversity. <p>The Taxonomy acknowledges a definitional change from ‘afforestation’ and ‘reforestation’ to ‘existing forest management’ and ‘rehabilitation’ according to the LULUCF Regulations 20-year accounting rule as per Art. 5(3).</p> <p>The approach taken to determine metrics and thresholds rely on cumulative criteria. Selected criteria build on existing EU legislation and the Taxonomy recognizes that, although the EU has a variety of forest-related policies, the Treaty on the Functioning of the European Union makes no reference to specific provisions for an EU forest policy, and that the responsibility for forests lies with the Member States within a defined framework of established ownership rights, which include a long history of long-term planning in national and regional regulations.</p> <p>The Taxonomy sets out the following three qualitative and quantitative mitigation criteria to ensure sustainable management of forest areas; a measured baseline for progress towards substantial</p>	

⁸⁹ This threshold should apply considering the following force majeure clause: underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not result in non-compliance with the Taxonomy criteria.

⁹⁰ <http://www.fao.org/state-of-forests/en/>.

⁹¹ European Forest Institute.

mitigation; and demonstration that this mitigation is cumulative (increasing) and permanent. All three criteria are required to demonstrate sustainable and substantial mitigation. Specifically, they are:

1. **Criterion 1: Compliance with Sustainable Forest Management (SFM) requirements** in order to ensure forest carbon stocks are retained whilst supporting forest ecosystems and forest services. SFM is defined as ‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems’.⁹² The SFM requirements set in the Taxonomy are mandatory, but allow flexibility for the adoption of approaches that are regionally appropriate (providing that they are justified), and apply internationally (provided they can be verified via independent third-party schemes that are regularly audited), or under international agreements. This will allow investors, forest owners, buyers of timber and/or residues and forest management companies to verify compliance with the criteria in Europe and globally.⁹³
 - SFM requirements use EU legislation as minimum baseline and build on the REDII, and existing industry best practice criteria e.g. Climate Bonds Initiative’s Forestry criteria, the Forest Europe [general guidelines for sustainable forest management](#).
 - To help with application of the criteria, the Forest mitigation Taxonomy provides in Annex F2 a non-exhaustive list of activities that would, if implemented effectively, lead to the achievement of the objectives of the Taxonomy in the context of maintain and increase carbon stocks, and conservation of non-productive functions. The aim of the list is to provide support to operators and investors as to the types of practice that should be implemented. Recognising the different conditions and characteristics of regions and forests another practice could be applied and can be demonstrated ex-ante as leading to the same outcome.
 - SFM requirements include a no-conversion land requirement to preserve high carbon stock land areas that is consistent with the RED II, which defines 2008 as a base year for land use change. This base year has also been adopted by several global certification schemes (e.g. ISCC and RSPO RED).
 - Harvesting activities must be carried out in compliance with national laws in the country of origin, shall comply with EU Timber Regulation (EU/995/2010) and the EU Forest Law Enforcement Governance and Trade (FLEGT), where applicable.
 - Regeneration of forests after harvesting is covered under EU legislation and has been included as a requirement to ensure regeneration is taken into consideration for forest activities outside the EU.
 - SFM requirements should be considered in combination with the Do No Significant Harm criteria.
 - They can be informed by applying forest certification using independent third-party schemes that are regularly audited.

92 https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

93 FSC/PEFC estimate that about 54% of forests globally are productive and/or used for multiple purposes, of which 20% are certified by FSC and PEFC. See Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

2. Criterion 2: **The establishment of a verified GHG balance baseline, based on growth-yield curves** in order to demonstrate that the forest carbon sink continues to increase and GHG emissions from the forest sectors decrease. This criterion implicitly considers all forest carbon pools (above and below-ground) as identified in LULUCF regulation Annex I section B. Specifically: (a) above-ground biomass; (b) below-ground biomass; (c) litter; (d) dead wood; (e) soil organic carbon, with the exclusion of (f) harvested wood products in the land accounting categories of afforested land and managed forest land, which is beyond the scope of this Taxonomy. However, it recognises the challenges of below-ground carbon measurement. Therefore, the specific criteria used in the tables focuses on the measurement of above-ground carbon pools only.
- The forest Taxonomy acknowledges that setting a universal absolute threshold for carbon stocks is not a viable option given the variability of carbon sequestration is highly context specific. The Taxonomy therefore requires evidence of a positive direction of travel in terms of maintaining and/or increasing carbon stocks, specifically, the progressive increase of forest carbon stocks.
 - Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m³/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals 44/12 = 3.67 tons of carbon dioxide.
3. Criterion 3: **The demonstration of permanence and steady progress** with respect to criteria 1 and 2 as reported through a forest management plan (or equivalent instruments) at 10-year intervals, to be subsequently reviewed by an independent third-party certifier and/or competent authorities. A description of state of play is required every 10 years to ensure steady and overall progress is aimed for and achieved. That aligns with management cycles time horizons performed in the EU as well as National Forest Inventories, performed on a 10-year basis.
- In order for forests to achieve their full climate mitigation potential, it is essential the Taxonomy accounts for both a continuum of sustainable forest management practices, and the demonstration that the carbon stocks increment includes the impact from living, aboveground biomass, specifically in the case of afforestation and reforestation projects.
 - SFM requirements are essential to guarantee the maintenance in carbon sequestration from below-ground biomass, dead organic matter or soils: increase in carbon sequestration from below ground carbon pools is not included due to the high uncertainty in measuring it.
 - Sequestration levels shall be reported at a minimum every 10 years, and performance shall be demonstrated relative to the rotation period of the forest. Progress in the forest carbon inventory and evolution of the forest increment is required relative to a verified baseline, over the rotation period of the forest, which reflects and adapts to the industry's levels of maturity, climate conditions, location features and market structures. For restoration/rehabilitation the forest will include stands at varying stages of maturity, within the context of an established forest. From a substantial mitigation perspective, the view is taken that the maintenance of the

carbon stock of the forest is important, and recognises that beyond a point, carbon stocks may reach a saturation point in the above-ground biomass. Respecting the commercial function of many forests, forests may be harvested before reaching full maturity or saturation. However, providing the harvesting follows SFM practices and remains below the level of net-annual increment, the overall forest carbon sink is expected to remain stable or increase over time. In practical terms, for rehabilitation/restoration of forests, the forest owner will be required to define the rotation period of a given forest whether at the stand level or landscape level. In order to comply with criterion 2 and 3 the forest owner will need to demonstrate, relative to the rotation period, that carbon stocks have been maintained (against baseline) or increased (from baseline). Importantly the performance/demonstration period is linked to the rotation period, but supported through 10-year reporting periods in order to show direction of travel, i.e. that carbon stocks are being maintained or increasing. In the event of force majeure such as the loss of a forest stand from fire or wind-throw, the existing forest management NACE will move to the restoration NACE, and performance will be judged on the basis of the re-establishment of the forest stand and thus carbon stock development over a period of 20-years.

- Measurement and reporting shall not result in significant burden to small-scale operators that may benefit from private investment as the taxonomy builds on EU legislation and national frameworks, and recognises the applicability of different scales of reporting through existing approaches to verification and assessment that apply above the individual holding level. These include approaches adopted at the national or sub-national/regional level, sourcing-area level (multiple holdings) or individual holding level. The Taxonomy does not specify which reporting framework is used, and thus allows flexibility to adapt to the national context, providing that the compliance with criteria and thresholds can be assessed for the holding level as appropriate for the investment.
- Harvesting practices, such as thinning, removals, final fellings, etc. will temporarily reduce the carbon stock and the potential to sequester carbon. However, such forest management activities should be eligible under Taxonomy, as long as SFM practices are in place; and that carbon sinks of above and below ground carbon are maintained or increased, over the rotation period of the forest; or where selective removal of trees is required as part of the forest conservation plan. The rotation period is here defined as the time from seeding, planting or natural regeneration through to the point of harvest.

International relevance of the forest Taxonomy

It is the view of the TEG that the proposed criteria are relevant internationally, provided compliance with the criteria can be informed by providing evidence for meeting compliance or applying verification approaches, such as forest certification using independent third-party schemes that are regularly audited. Forestry operations that are FSC and PEFC certified are likely to meet the SFM and Do No Significant Harm criteria of the forest Taxonomy, with the exception of the Conversion criteria that varies across jurisdictions and forestry activities. This equates to 61.5% of total productive forests in the EU⁹⁴, and around 20% of productive forests globally.⁹⁵ Other forests/forest projects (i.e. non-

⁹⁴ Eurostat, 2017, and Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

⁹⁵ Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

certified) may also meet the criteria, but it is not possible to estimate this part of the market with certainty. Note: whilst FSC and PEFC may satisfy Criterion 1 (ex Conversion criteria) and the DNSH criteria, verification of compliance with all three of the Taxonomy criteria will be required (including carbon measurement and performance).

Alignment with existing legislation

In order to ensure compliance with the criteria set out in the Taxonomy, it is appropriate to consider alignment with existing EU legislative instruments. The proposed criteria and DNSH requirements align with existing EU legislation in the context of forestry. It is important to recognise where legislation provides safeguards to ensure no harm to an objective and where legislation allows for more substantial contribution to those objectives. For example, Article 29 of the recast RED, sets out sustainability criteria for forests using a risk-based approach to minimise the risk of using forest biomass derived from unsustainable production, relying in Article 29(6) on national or sub-national laws or if such evidence is not available on supply level, and in Article 29(7) referring to the Paris agreement or if such evidence is not available it refers to management systems in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. These aims are to an extent consistent with that the criteria proposed in the Taxonomy, and some of the DNSH criteria. Where the existing recast RED differs is that Article 29 does not require an explicit ‘substantial contribution’ to GHG mitigation. Furthermore, the compliance mechanism by which the RED seeks to ensure that these aims are achieved, is risk-based, however through a verification process. A risk-based approach assumes that if national laws or management systems are in place, that the RED criteria are addressed. The Taxonomy seeks to establish specific and measurable criteria, metrics and thresholds by which substantial mitigation can be assessed at the project level or at the level of the forest holding.

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarized as follows:

- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none">• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation

	<p>with relevant stakeholders, have been developed and implemented.</p> <ul style="list-style-type: none"> In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leaching of nutrients to waters. Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> Take measures to ensure sustained or improved long term conservation status at the landscape level⁹⁶ In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁹⁷ Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. Forests are monitored and protected to prevent illegal logging, in compliance with national laws

⁹⁶ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁹⁷ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

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| | <ul style="list-style-type: none">• Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations;• Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change. |
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1.5 Conservation forest

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Conservation forest</p> <p>That in which the '<u>primary designated management objective</u>' (FAO FRA definition) is that of conservation. Specifically, those forests where the management objectives are '<u>conservation of biodiversity</u>' or '<u>social services</u>' based on the FAO FRA definitions⁹⁸.</p>
Mitigation criteria	
Principle	<p>Conservation forests shall maintain or increase carbon sinks of above and below ground carbon.</p> <p>All the Criteria are additive and shall apply together:</p> <ul style="list-style-type: none"> • Criterion 1: Mandatory application of the following Sustainable Forest Management (SFM) requirements: <ul style="list-style-type: none"> ○ Develop and implement a forest conservation plan that identifies the conservation objectives of the site and the necessary conservation measures. These shall include practices that maintain or increase existing carbon stocks, considering the non-exhaustive list of examples practices under Category C in Annex F2. These should allow for application of other similar approaches, that recognise local specificities and conditions, while maintaining or improving soil quality, and biodiversity in line with conservation objectives; ○ Do not convert high carbon stock land (i.e. primary forest, peatlands, wetlands, and grasslands) which has this status in or after January 2008; ○ Harvesting carried out in line with the conservation plan should be undertaken in compliance with the laws in the country of origin⁹⁹; ○ Any harvested forest should be regenerated after harvesting and in line with the forest conservation plan. • Criterion 2: Establish a verified baseline GHG balance of relevant carbon pools at the beginning of the investment;

⁹⁸ Source: FAO, Global Forest Resources Assessment, 2020

⁹⁹ Where standards and requirements under national laws are equivalent or better in delivering substantial mitigation, than the SFM requirements of the Taxonomy.

	<ul style="list-style-type: none"> Criterion 3: Demonstrate continued maintenance and increase of carbon sinks from above-ground carbon over time, supported by and disclosed through a forest conservation plan (or equivalent) at 10-year intervals, that shall be reviewed by an independent third-party certifier and/or competent authorities.
Metric and Threshold	<ul style="list-style-type: none"> Continued compliance with the Sustainable Forest Management (SFM) requirements is demonstrated and continuously disclosed at 10 -year intervals through a forest conservation plan that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 3). The primary management objective of the forest should continue to be conservation – otherwise the forest will be subject to different NACE metrics and thresholds. Verified GHG balance baseline¹⁰⁰ is calculated for above-ground carbon pools, based on growth-yield curves for species per m3/year/ha, carbon convertible. Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees. Using the growth-yield curves, information will be given on the annual increment in m3/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide. Above ground Carbon stocks shall be maintained or increased above carbon baseline over time. Changes in carbon stocks should be disclosed based on growth yield curves in 10-year intervals through a forest conservation plan (or equivalent instrument¹⁰¹) that shall be reviewed by an independent third-party certifier and/or competent authorities (as described in Criteria 2)¹⁰².
Rationale	

100 Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of planting). The increment based on the growth-yield curves gives the approximate number of how many m3/year/ha is available for increment. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide

101 Landscape management level may be used to emphasize that the goal may be to perform at a scale above the single forest stand. Absence of landscape management access will in turn require disclosure at the single forest stand. The Forest Taxonomy leaves to forest owners and companies to explain, document on which level they report.

102 This threshold should apply considering the following force majeure clause: underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not result in non-compliance with the Taxonomy criteria.

Given the objectives of the Taxonomy, conservation finance should be enabled within the forest sector and conservation forest – which may have no productive value – recognised for their carbon sink role. It is therefore proposed that conservation forests are recognised in the Taxonomy, provided they can demonstrate maintenance of high carbon stocks in multiple pools and overall improvement in the forest carbon sink.

Conservation forests are those in which the 'primary designated management objective' (FAO FRA definition) is that of conservation. Specifically, those forests where the management objectives are 'conservation of biodiversity' or 'social services' based on the FAO FRA definitions¹⁰³.

Box 2: FAO FRA definitions relating to conservation forests

1. **PRIMARY DESIGNATED MANAGEMENT OBJECTIVE:** The primary designated management objective assigned to a management unit. Explanatory notes:
 - a. In order to be considered primary, the management objective should be significantly more important than other management objectives.
 - b. Primary management objectives are exclusive and area reported under one primary management objective should not be reported for any other primary management objectives.
 - c. Nation-wide general management objectives established in national legislation or policies (such as e.g. "all forest land should be managed for production, conservation and social purposes") should not be considered as management objectives in this context.
2. **CONSERVATION OF BIODIVERSITY:** Forest where the management objective is conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas. Explanatory note:
 - a. Includes wildlife reserves, High Conservation Values, key habitats and forest designated or managed for wildlife habitat protection.
3. **SOCIAL SERVICES:** Forest where the management objective is social services. Explanatory notes:
 - a. Includes services such as: recreation, tourism, education, research and/or conservation of cultural/spiritual sites.
 - b. Excludes areas for subsistence collection of wood and/or non-wood forest products.

103 Source: FAO, Global Forest Resources Assessment, 2020

Forests cover around 30% of the global landmass (In Europe this figure is higher at ~40-45%) and absorb roughly 2 billion tons of carbon dioxide each year.¹⁰⁴ Forests regulate ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods and can help drive sustainable growth. EU forests already account for more than 20% of the global forest carbon sink, and yet an increase in carbon sequestration from forests is essential to the achievement of a net-zero target by 2050 in Europe and globally.¹⁰⁵

Forests can deliver substantial greenhouse gas (GHG) emission mitigation through sequestration of carbon during tree growth and in the accumulation of biomass in soils, vegetation, leaf litter and dead wood (up to forest gate)..

Conservation forestry activities can deliver substantial mitigation through:

- An increase in the forest capacity to sequester carbon from above ground and below ground carbon pools;
- Maintenance and/or increase of the soil quality, soil carbon and biodiversity.

The Taxonomy acknowledges a definitional change from ‘conservation forest’ to ‘existing forest management’ if the objectives of the forest management change; or to ‘restoration/rehabilitation’ or ‘reforestation’ should there be the loss of forest from force majeure.

The approach taken to determine metrics and thresholds rely on cumulative criteria. Selected criteria build on existing EU legislation and the Taxonomy recognizes that, although the EU has a variety of forest-related policies, the Treaty on the Functioning of the European Union makes no reference to specific provisions for an EU forest policy, and that the responsibility for forests lies with the Member States within a defined framework of established ownership rights, which include a long history of long-term planning in national and regional regulations.

The Taxonomy sets out the following qualitative and quantitative mitigation criteria to ensure a measured baseline for progress towards substantial mitigation; and demonstration that this mitigation is cumulative (increasing) and permanent. All three criteria are required to demonstrate sustainable and substantial mitigation. Specifically, they are:

- **Criterion 1: Compliance with Sustainable Forest Management (SFM) requirements** in order to ensure forest carbon stocks are retained **whilst supporting forest conservation**. SFM is defined as ‘the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems’.¹⁰⁶ The SFM requirements set in the Taxonomy are mandatory, but allow flexibility for the adoption of approaches that are regionally appropriate (providing that they are justified), and

¹⁰⁴ <http://www.fao.org/state-of-forests/en/>.

¹⁰⁵ European Forest Institute.

¹⁰⁶ https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

apply internationally (provided they can be verified via independent third-party schemes that are regularly audited), or under international agreements. This will allow investors, forest owners, buyers of timber and/or residues and forest management companies to verify compliance with the criteria in Europe and globally.¹⁰⁷ For conservation forests, only the management activities listed under Category C in Annex F2 are required.

- **Criterion 2: The establishment of a verified GHG balance baseline, based on growth-yield curves** in order to demonstrate that the forest carbon sink continues to be maintained or increased and GHG emissions from the forest sectors decrease. This criterion implicitly considers all forest carbon pools (above and below-ground) as identified in LULUCF regulation Annex I section B. Specifically: (a) above-ground biomass; (b) below-ground biomass; (c) litter; (d) dead wood; (e) soil organic carbon, with the exclusion of (f) harvested wood products in the land accounting categories of afforested land and managed forest land, which is beyond the scope of this Taxonomy. However, it recognises the challenges of below-ground carbon measurement. Therefore, the specific criteria used in the fiche focuses on the measurement of above-ground carbon pools only.
 - The forest Taxonomy acknowledges that setting a universal absolute threshold for carbon stocks is not a viable option given the variability of carbon sequestration is highly context specific. The Taxonomy therefore requires evidence of a positive direction of travel in terms of maintaining and/or increasing carbon stocks, specifically, the progressive increase of forest carbon stocks.
 - Calculating the GHG balance baseline requires knowledge of the area, the species and number of trees (in case of afforestation and reforestation). Using the growth-yield curves, information will be given on the annual increment in m³/year/ha, which can be used for the basis of the GHG balance. The methodology is consistent with the approach in the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines), it recommends recalculation of the amount of carbon sequestered; 1 ton of biomass representing approximately 0,5 ton of carbon. Further one ton of carbon equals $44/12 = 3.67$ tons of carbon dioxide.
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- **Criterion 3: The demonstration of permanence and steady progress** with respect to criterion 1 as reported through a forest conservation plan (or equivalent instruments) at 10-year intervals, to be subsequently reviewed by an independent third-party certifier and/or competent authorities.
 - Sequestration levels shall be reported at a minimum every 10 years, and performance shall be demonstrated over the duration of the investment
 - Measurement and reporting shall not result in significant burden to small-scale operators that may benefit from private investment as the taxonomy builds on EU legislation and national frameworks, and recognises the applicability of different scales of reporting through existing approaches to verification and assessment that apply above the individual holding level. These include approaches adopted at the national or sub-national/regional level, sourcing

¹⁰⁷ FSC/PEFC estimate that about 54% of forests globally are productive and/or used for multiple purposes, of which 20% are certified by FSC and PEFC. See Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

area level (multiple holdings) or individual holding level. The Taxonomy does not specify which reporting framework is used, and thus allows flexibility to adapt to the national context, providing that the compliance with criteria and thresholds can be assessed for the holding level as appropriate for the investment.

- Considering the impact of climate conditions and changing environments the Taxonomy includes a clause for force majeure that states that underperformance resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds - and will not result in non-compliance with the Taxonomy criteria.

International relevance of the forest Taxonomy

It is the view of the TEG that the proposed criteria are relevant internationally, provided compliance with the criteria can be informed by providing evidence for meeting compliance or applying verification approaches, such as forest certification using independent third-party schemes that are regularly audited. Forestry operations that are FSC and PEFC certified are likely to meet the SFM and Do No Significant Harm criteria of the forest Taxonomy, with the exception of the Conversion criteria that varies across jurisdictions and forestry activities. This equates to 61.5% of total productive forests in the EU¹⁰⁸, and around 20% of productive forests globally.¹⁰⁹ Other forests/forest projects (i.e. non-certified) may also meet the criteria, but it is not possible to estimate this part of the market with certainty. Note: whilst FSC and PEFC may satisfy Criterion 1 (ex Conversion criteria) and the DNSH criteria, verification of compliance with all three of the Taxonomy criteria will be required (including carbon measurement and performance).

Alignment with existing legislation

In order to ensure compliance with the criteria set out in the Taxonomy, it is appropriate to consider alignment with existing EU legislative instruments. The proposed criteria and DNSH requirements align with existing EU legislation in the context of forestry. It is important to recognise where legislation provides safeguards to ensure no harm to an objective and where legislation allows for more substantial contribution to those objectives. For example, Article 29 of the recast RED, sets out sustainability criteria for forests using a risk-based approach to minimise the risk of using forest biomass derived from unsustainable production, relying in Article 29(6) on national or sub-national laws or if such evidence is not available on supply level, and in Article 29(7) referring to the Paris agreement or if such evidence is not available it refers to management systems in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. These aims are to an extent consistent with that the criteria proposed in the Taxonomy, and some of the DNSH criteria. Where the existing recast RED differs is that Article 29 does not require an explicit 'substantial contribution' to GHG mitigation. Furthermore, the compliance mechanism by which the RED seeks to ensure that these aims are achieved, is risk-based, however through a verification process. A risk-based approach assumes that if national laws

¹⁰⁸ Eurostat, 2017, and Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

¹⁰⁹ Data about Share Forest Certification (FSC+PEFC) in Forest Management, John Hontelez, FSC International, 30 April 2019.

or management systems are in place, that the RED criteria are addressed. The Taxonomy seeks to establish specific and measurable criteria, metrics and thresholds by which substantial mitigation can be assessed at the project level or at the level of the forest holding.

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarized as follows:

- ability of forests to adapt to a changing climate;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leaching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.

(6) Ecosystems	<ul style="list-style-type: none"> • Take measures to ensure sustained or improved long term conservation status at the landscape level¹¹⁰ • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity¹¹¹ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.
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¹¹⁰ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

¹¹¹ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

Forestry annexes

ANNEX F1 Initial analysis and proposal to the Platform for the operation of the forest Taxonomy from an 'enabling' perspective

The following text is a proposal for identifying what enabling activities for the Forest NACE sectors would look like and identifies questions regarding the operation of such a proposal in the context of the Taxonomy. Enabling activities are defined in the Taxonomy Political Agreement Article 11(a) of December 2019 as "...An economic activity shall be considered to contribute substantially to one or more of the environmental objectives set out in Article 5 by directly enabling other activities to make a substantial contribution to one or more of those objectives, and where that activity:

- (a) does not lead to a lock-in in assets that undermine long-term environmental goals, considering the economic lifetime of those assets; (b) has a substantial positive environmental impact on the basis of lifecycle considerations."

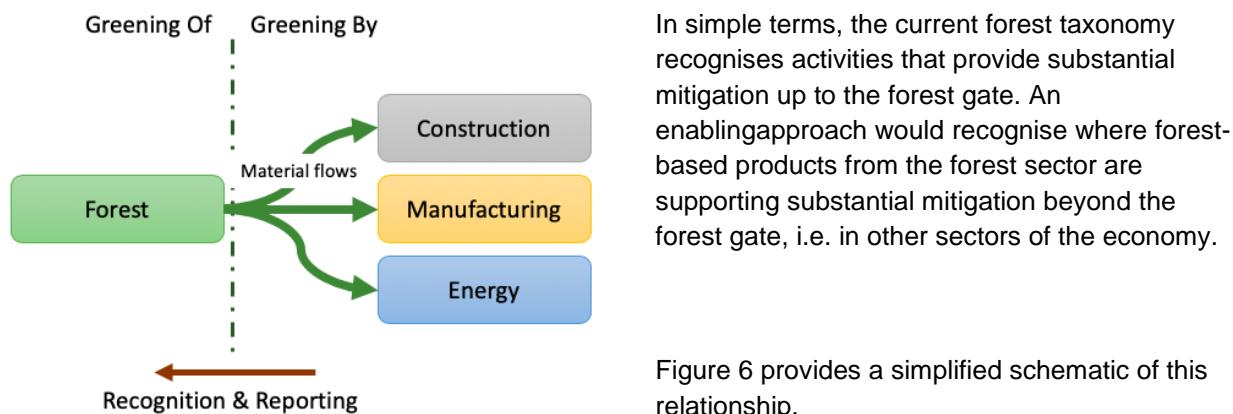


Figure 6 provides a simplified schematic of this relationship.

Figure 6: Schematic of greening of & by i.e. enabling in the Forestry Taxonomy

Rationale for forestry as an enabling activity

- Forestry provides a range of services to society, such as material, non-material (barriers), renewable energy and environmental services – the bioeconomy
- The replacement of GHG intensive materials and energy in the wider economy relies on other sectors to provide fibre for substitution, which implicates demand and response from the forest sector, which currently has only limited recognition in current accounting frameworks (e.g. LULUCF Regulation).
- Further recognising the role of forest-based products in the wider process of transitioning to the green economy could incentivise the sector in a positive way – generating demand for Taxonomy compliant forestry – and thus deliver cross sector incentives for substantial contribution to mitigation.

- Exploring the way to introduce an enabling approach could also help ensure that private sector financing of the use of forest-based products is driving towards the use of more sustainable products and production and, importantly, more sustainable end uses.

Key challenges

Valorisation of the forest-based products contribution in the down-stream sector. The principles of the circular economy look towards the designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. Therefore, forest-based products that have already been used within an economic sector other than forestry should become part of the circular economy and contribute in another sector – with the aim to keep the wood in its material form for as long as possible before disposal and/or energy recovery. This follows the principle of resource efficiency (EU Forest Strategy described it as: using forest resources in a way that minimises the impact on the environment and climate, and prioritising the forest outputs that have higher added-value, create more jobs and contribute to a better carbon balance). This raises a key question as to the point at which the forest-based sector would be recognised for the initial material production (as a means of substantial contribution), and to contribute to substitution in multiple sectors (where the same wood is used) for their decarbonisation.

Different Forest NACE. The current proposal for a Forest Taxonomy includes five NACE sector distinctions, Afforestation, Reforestation, Rehabilitation/restoration, Existing Forest Management and Conservation Forests. Would it be necessary to establish a link between the use of wood products in another economy NACE and a specific forest sector NACE? If so, which one as all form part of the forest management system? How would this be done, and what if a product is used in multiple NACE categories (how to count the multiple substitution).

Trans NACE reporting, traceability and compliance. The use of forest-based products in one sector of the economy may be supported through a separate investor (say for building regeneration) who is not investing in the forest sector. The forest sector producers, especially the owners mostly do not always know the end-use of the wood products passing beyond the forest gate. However, there would need to be in place some form of traceability and chain of custody to ensure compliance, for example exploring how information from the HWP category in the LULUCF Regulation could be used.

Enabling and supply. Do enabling activities by default need to arise from a sector/supply that is taxonomy eligible/compliant in the context of significant contribution? For example, if wood used in construction of a building is recognised as “enabling”, the source of the wood would need to be taxonomy aligned within the forest sector.

GHG emissions. Regarding enabling activities within the manufacturing sector, no criteria on the GHG emissions from manufacturing are given because the benefits these lead to are considered to outweigh their emissions. For Forestry, this would be consistent with the current IPCC Guidelines (Emissions are attributed at the point of harvest and thus in the forest sector). However, the large-scale adoption of wood energy or wood material use could lead to an increased drain on the existing forest carbon sink – and may thus warrant safeguards.

Multiple enablers. The end use of wood is highly varied, with both different fractions of the wood used in different resource streams, and different products or end uses generated at different stages (Figure 7). How and at what point in the wood flow would “greening by” be defined, or it should be counted at each point when it substitutes non-renewable resources?

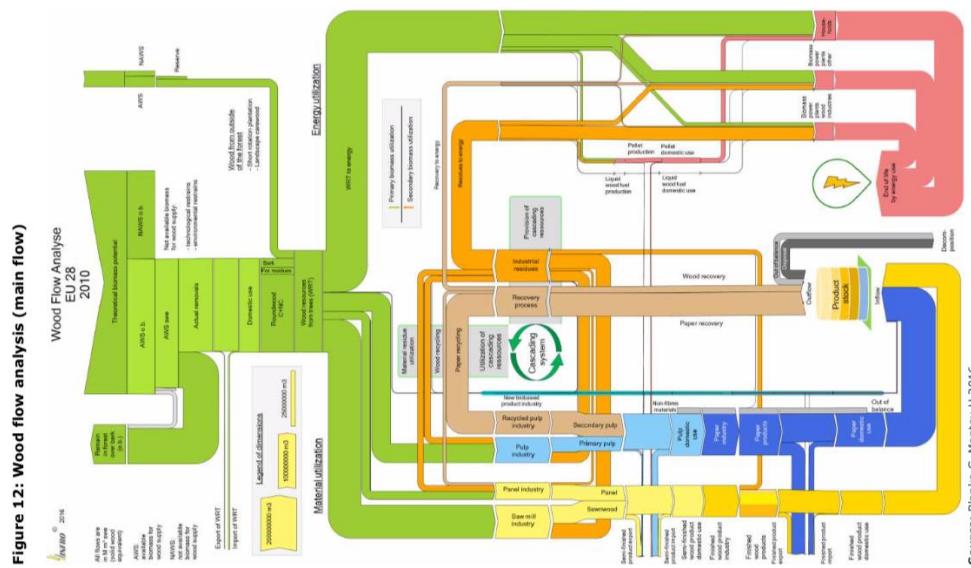


Figure 7: Sankey diagram of main wood flows in the EU. Blanke & Mantau 2016

Opportunities from existing practice

Despite the potential challenges to the Taxonomy for including a more holistic approach to the use of wood products in the wider economy, there are a number of cases where operators have been able to develop approaches to tracking or estimating the substitution effects and benefits of forest products in the wider economy. These demonstrate proof of concept for a wider applicability of the forest Taxonomy than focussing only on the management of forests up to the forest gate.

The TEG has received various documents in this regard, including information provided by Stora Enso and SCA (a Swedish publicly listed forest products company) – both demonstrate the added value (in climate terms) of forest products in the overall economy through substitution effects. The point of contention within the forest sector is that the EU's accounting of the climate benefits from forestry are not

fully attributed in the EU's GHG accounts to forestry as a sector. i.e. the substitution effects are not attributed to the sector, only the emissions of logging. They do however point out that in the UNFCCC accounts, all the benefits are recognised, but that substitution would be recognised in a separate sector than forestry. They go on in the report to demonstrate a feasible calculation approach for substitution benefits that could be applied by businesses that are collecting the necessary information. Some elements of this approach would need to be further validated, such as the specific calculation of the substitution effect itself – as this is based on a conversion factor for three product groups. These may be accurate, conservative or inaccurate – but what is clear is that they are not a direct measurement, but an assumed substitution level. This may be ok, but worth recognising.

Overall therefore it would seem possible for the forest industry or specific businesses to be able to calculate the substitution effect of forest products arising in the forest sector (as defined in the Taxonomy) but delivering substitution benefits in other economy sectors. The question still remains to which NACE sector the benefits arising from the use of wood should be attributed? The logic of the taxonomy overall suggests that this should still be in the sector that takes the raw material and processes it into something which will deliver substitution, or utilises that material (or energy) in substitute for another. It would seem inappropriate to recognise the felling of trees, i.e. the provision of the raw material as an enabling activity per se. It is recognised, however, that forest-products arise from a renewable resource, rather than the finite resources of the extractive industries.

Ideas on a possible enabling approach

Within the manufacturing TEG, the Taxonomy already recognises enabling activities. These are recognised on the basis of the principle of “The manufacture of low carbon technologies that result in substantial GHG emission reductions in other sectors of the economy (including private households) is eligible.” It is therefore the production of something that would lead to **substantial GHG emission reductions in other sectors**. In this context, components of renewable energy infrastructure are cited, amongst others. The line between the manufacture of an essential product for decarbonisation and substantial mitigation, is clear. Forest products are slightly different. Wood materials and energy are not necessarily essential components of low-carbon technology, in that a house or furniture is not necessarily low-carbon if it is made from wood. The key identifying feature for wood products is one of substitution, whether another low(er)-carbon product could be used or whether there are other forms of energy (or demand reduction) that would be more carbon beneficial. Therefore, the logical link for ‘greening by’ of the forest sector would need to be able to demonstrate something like the following criteria:

- The product that has been substituted was essential to the low-carbon performance of the sector in which it is used
- The product that has been substituted was of a higher GHG/carbon intensity than the substitute woody biomass [Thresholds could be proposed]
- That primary manufacturing was necessary and could not have been substituted from the recovery and re-use or recycling of existing products, including wood-based products.

- That alternative forms of renewable energy, such as Solar PV or Wind could not have been utilised instead / or have been subverted through the use of woody biomass.

In light of the design of the overall Taxonomy (activity based) and the fact that the substitution effect can only be judged in an end-use sector (i.e. at the product level) it is challenging to produce a 'greening by' approach that can be implemented through the forest Taxonomy alone. As such, it is proposed that the 'greening of' through the use of forest products, is addressed through those sectors that utilise those forest products (i.e. end use or intermediary sectors), such as manufacturing or buildings. Specific recommendations to other Taxonomy sectors (Buildings and Manufacturing) are made in the preamble to the forest Taxonomy, and not repeated here. These can be summarised as follows:

- The development of reliable thresholds for carbon emission embodied in activities utilising wood. This should include the end of life of wood and construction timber.
- The development of robust and verifiable substitution criteria to determine when wood use makes a substantial contribution to mitigation, and when not.
- Sectors using long-lived wood products should make a subjective view that wood is a prime raw material with climate mitigation benefits, and should be considered with priority for use in the economy. This must be accompanied by robust DNSH criteria to ensure that the demand for forest products does not lead to impacts on the forest resources. The future Taxonomy should ensure that wood used in other sectors to deliver substantial contribution to mitigation, is also compliant with the forest Taxonomy.
- When considering the development of Circular Economy principles into the Taxonomy, both as DNSH and as substantial contribution, specific consideration should be made to the use of forest products throughout different economic sectors.

ANNEX F2 indicative and recommended forest management practices that maintain and/or increase carbon stores or carbon sinks of above and below ground carbon (as per Criterion 1 of the Forest Taxonomy)

Category	<p>Indicative examples of types of practices that could be considered for all the relevant carbon pools¹¹².</p> <p>Applicability per activity¹¹³ (AF, RE, FR, MF), if not specifically mentioned, practice applies to all.</p>
<p>A. Practices that <u>maintain</u> existing carbon stocks above and below ground, considering relevant carbon pools¹¹⁴, while maintaining or improving the soil quality, soil carbon and biodiversity.</p>	<p>In above-ground biomass</p> <p>Rationale: Enhance structural stability against disturbances due to optimal crown and stem architecture that minimizes the impact of disturbances (storms, pest outbreaks) and associated carbon losses.</p> <ul style="list-style-type: none"> • Ensure long-term balance between increment and harvesting in each management unit¹¹⁵ (MF). <p>In soil</p> <p>Rationale: Minimize carbon losses in soil due to management and maintain the natural carbon stock in soils. Minimize or no nitrogen release.</p> <ul style="list-style-type: none"> • Use harvesting methods that minimise impacts on soils; • Maintain soil organic carbon pool and soil health through continuous cover that contribute to soil moisture and biodiversity. Leave appropriate vegetation and other non-productive species. <p>In deadwood¹¹⁶</p> <p>Rationale: Maintain quantity of deadwood.</p> <ul style="list-style-type: none"> • Maintain standing and on the ground deadwood (RE, RF, MF) in adequate quantities¹¹⁷;

¹¹² This is a non-exhaustive list of practices that could be used, keeping in mind that all carbon pools identified here need to be addressed. Applicants can develop further practices, if meeting the requirements of the Category. Types of practices always have to be understood depending on the local conditions (temperature, rainfall, soil, altitude, species, etc.).

¹¹³ AF – Afforestation, RE – Restoration, RF – Reforestation, MF – Management of existing forest

¹¹⁴ According to LULUCF Regulation Annex I, part B, the carbon pools are: above-ground biomass, below-ground biomass, litter, dead wood, soil organic carbon.

¹¹⁵ Whole area or a compartment, depending on existing classifications of the forests in the country.

¹¹⁶ Subject to the local conditions and limitation in wildfires prone areas and outbreaks of pests and disease and other natural disturbances.

¹¹⁷ i.e. taking into account potential effect on health and stability of ecosystems, risks of forest fires, etc.

	<ul style="list-style-type: none"> • Retains trees with microhabitat, distribution and arrangement, tree species, size of retained wood, stage of decay¹¹⁸ (RE, RF, MF). <p>In litter</p> <p>Rationale: Maintain the amount of litter.</p> <ul style="list-style-type: none"> • Release forest residues on the ground when the ecological conditions are suitable in order not to increase inflammable material in forest fires prone sites.
B. Practices that <u>increase</u> carbon sinks and potentially subsequent existing carbon stocks above and below ground.	<p>In above ground biomass¹¹⁹</p> <p>Rationale: Enhance structural stability against disturbances due to optimal crown and stem architecture that minimize the impact of disturbances (storms, pest outbreaks) disturbances damage and associated carbon losses. Support carbon stock and/or carbon sequestration increase, alone or in combination with forest resilience.</p> <ul style="list-style-type: none"> • Promote natural regeneration when in line with ecological conditions and stands requirements¹²⁰ and adopt artificial regeneration only in cases of proved unsuccessful site spread on natural regeneration (MF); • Reduce risk of bark beetles or other pest outbreaks through species diversification, support more spatially diverse management that increases tree regeneration speed enhancing of structure complexity; • Undertake continuous regeneration as an integral part of forest tending in even and uneven aged forests (RF, MF); • Enhance of the natural productivity and supporting forest species' composition similar to original or re-establishing the productivity; • Release / maintain mature old trees (incl. "crop tree") as part of ecosystems structure and complexity (MF);

118 On deadwood management in Europe. Vitkovà L. et al (2018) Deadwood management in Central European forests: Key considerations for practical implementation. Forest Ecology and Management.

119 Practices that increase carbon sequestration are linked only to above-ground and deadwood carbon pools where it is technically feasible to enhance, measure and monitor carbon sequestration

120 Subject to local conditions and legal obligations to control pest outbreaks

120 Subject to the local conditions and limitation in wildfires prone areas and outbreaks of pests and disease

	<ul style="list-style-type: none"> • Adjust the length of rotation age of stands when in line with trees and stands vitality (RF, MF); • Select native species or in exceptional circumstances, species, varieties, ecotypes of trees that adequately provide the best adaptation to the site and resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as to the potential invasive character of the species under local conditions, current and projected climate change. <p>In deadwood</p> <ul style="list-style-type: none"> • Increase the quantity and distribution of standing and ground deadwood (RE, RF, MF); • Retain trees with microhabitat, position and arrangement, tree species, size of retained wood, stage of decay¹²¹ (RE, RF, MF).
C. Practices that are associated with forest management approaches that target conservation or other non-productive functions of forests	<ul style="list-style-type: none"> • Reduce harvest, e.g. as part of non-intervention forest management approaches (where harvest is only possible for safety or phytosanitary reasons); • Maintain high carbon stocks in multiple pools while optimizing other non-productive ecosystems benefits (RE, MF); • Support species diversity, including ancillary species (AF, RE, RF, MF); • (Re-)establish the structure of forests, enhance the natural productivity and native species diversity (RE, RF, MF); • Enhance forest species' composition similar to original or re-establish the productivity and some or all of the species originally present/native species. <p>In deadwood</p> <p>Rationale: Increase the amount of standing and ground deadwood. Approaches such as limited or non-intervention management and conservation forestry are associated with high carbon stocks given that more biomass is left in the forest, rotation lengths are typically increased compared to conventional approaches while non-productive ecosystem services are optimized.</p> <ul style="list-style-type: none"> • Increase the quantity and distribution of standing and ground deadwood (RE, RF, MF);

121 On deadwood management in Europe. Vítková L. et al(2018) Deadwood management in Central European forests: Key considerations for practical implementation

	<ul style="list-style-type: none"> • Retain trees with microhabitat, position and arrangement, tree species, size of retained wood, stage of decay¹²² (RE, RF, MF); • No or minimal use of pesticides to control pest outbreaks¹²³ and instead favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticide.
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122 On deadwood management in Europe. Vítková L. et al(2018) Deadwood management in Central European forests: Key considerations for practical implementation

123 Subject to local conditions and legal obligations to control pest and disease outbreaks

2. AGRICULTURE

Why agriculture is addressed in the Taxonomy

Agriculture is the management of the natural environment, plants and animals to produce and process food, feed, fibre, fuel and other products. As a sector, it plays a central role in climate change, sustainable development and food security. It is projected that by 2050 the global population will increase to 10 billion, resulting in a 50% increase in the demand for food. However, even at present, the food supply chain contributes 19-29% of global greenhouse gas (GHG) emissions, the majority of which, for most supply chains, occurs at the farm level (80-90%). In the EU, 10% of GHG emissions are attributed to agriculture.¹²⁴ This alone presents opportunities for significant climate change mitigation. However, agriculture differs from other sectors when considering climate change mitigation as it can act as both a source and a sink for GHG emissions. Soil carbon and biomass (trees, shrubs and grasslands) are also relevant as major pools of carbon. For this reason, agriculture has the potential to be a net positive sector from an emissions perspective. At the same time, agricultural productivity is simultaneously vulnerable to climate change (including, but not limited to, heat stress, drought, flooding, changes in seasonality and extreme weather events) and central to supporting adaptation and resilience through its provision of ecosystem services and income for billions of households worldwide.

Subjects covered

The following economic activities are explicitly addressed in the Taxonomy:

- Growing of non-perennials: including cereals, rice, leguminous crops and oil seeds, vegetables, melons, roots and tubers, sugar cane and fibre crops;
- Growing of perennials: including grapes, tropical and sub-tropical fruits, citrus fruits, stone fruits, other tree and bush fruits and nuts, oleaginous fruits, beverage crops, spices, aromatics and drug and pharmaceutical crops, grass leys;
- Animal production: including dairy and other cattle and buffaloes, sheep, goats, pigs and poultry and the management of their waste (manure) and related grassland or pasture.

In addition, mixed farming, where combinations of the above activities are carried out on a farm holding, can be addressed via the application of the relevant thresholds and criteria from these same three activities. For the purpose of the Taxonomy, mixed farming involves any operation with both livestock and crop production. Crops grown in mixed farming can be grown either to feed livestock or for separate sale as a cash crop. In assessing mixed farming operations, cropland production should be screened using criteria for growing of non-perennials (e.g. if vineyards or orchards are included) or perennial crops (e.g. if a farm grows cereals). Livestock production should be assessed according to the animal production criteria. It is important to note that recoupling of crops and livestock can lead to greater resource efficiency and reduced reliance on synthetic inputs, thus improving climate and environmental

¹²⁴ 2015 figure taken from

https://www.ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:Agri_environmental_indicator_greenhouse_gas_emissions

performance¹²⁵. At the same time, if accompanied by productivity improvement on existing agricultural lands, mixed farming reduces the expansion pressures of agriculture into non cultivated/used land. The recoupling of crop and livestock production is a systemic change which is beneficial and feasible in many contexts, but it is not a mandatory requirement of the Taxonomy.

Setting criteria and thresholds

As noted above, agriculture can act as both a source and a sink for GHG emissions. However, it may not be possible to reach net negative emissions in every instance of agricultural activity or on every farm, particularly those that are specialised in nature and/or have low carbon stocking capacity. Therefore, the Taxonomy does not require the demonstration of net negative emissions at the activity or farm level, but instead requires that the following three criteria must all be met for agricultural activities to be recognised as delivering substantial contributions to mitigation:

1. Reduced emissions from ongoing land and animal management.
2. Increased removals of carbon from the atmosphere and storage in above- and below-ground biomass through ongoing land and animal management, up to the limit of saturation levels.
3. The agricultural activity is not being carried out on land that was previously deemed to be ‘of high carbon stock’.

The lack of deep GHG reporting datasets from which to establish best performance benchmarks, coupled with the lack of emissions budgets or sequestration targets for the agricultural sector at either the EU or global level, meant it was not possible to set robust absolute GHG thresholds for either criteria 1 or 2. Furthermore, given the high degree of heterogeneity across the agricultural sector (in terms of production system, crop or livestock type, farm size, environmental and biophysical conditions, etc.), it was felt to be inappropriate to do so.

However, requiring a relative GHG improvement compared to an ‘own-farm counterfactual’ is workable within this context of high heterogeneity. For criteria 1, emissions reductions targets as a percentage of that counterfactual have been established using studies of the emissions reductions needed across the agricultural sector as whole over time. For criteria 2, recognising that carbon stocking potential is highly variable across different land parcels, but that carbon sequestration represents a large mitigation potential available to the agriculture sector, a simpler requirement has been set – simply that carbon stocks are increased over a 20-year period – which recognises that preventing ongoing carbon losses and increasing sequestration is viable to make a substantial contribution in this case. It is noted, however, that the studies on emissions reduction paths are limited in number and therefore the criteria would benefit from greater clarity on the precise transition needed in the agriculture sector to contribute to a net-zero economy in 2050.

In addition, recognising that relative GHG improvement targets are a fairly blunt instrument and require farm level GHG accounting, which is not yet widespread, an additional, alternative approach is proposed. Namely, demonstration of the deployment of a specified bundle of land and, if appropriate, animal management practices across the production area. From a review of the scientific literature, these practices have been selected because they deliver substantial mitigation with relatively high certainty

¹²⁵ https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/fg16_mixed_farming_final-report_2017_en.pdf

across a range of biophysical and farming conditions. They should therefore be widely applicable and provide a more directly communicable approach to farmers, although this would benefit from testing with key stakeholders globally, including small- and large-scale farmers. It will, of course, be necessary to regularly review this list of practices to integrate new advances in scientific knowledge.

To maximise usability, it is left open to the user whether they demonstrate i) emissions reductions and increased sequestration directly or, alternatively, ii) the deployment of the specified bundle of practices that have been deemed to represent a substantial contribution to mitigation. Whichever approach is taken, three yearly audits are required to demonstrate ongoing compliance with the criteria and thresholds. This is to address the multi-year timeframes over which emissions reductions and carbon stocking can occur and acknowledges the risks to the permanence of carbon stocks. The establishment of a pool of proxy indicators for compliance with these Criteria (such as vetted and approved existing standards, certification schemes, carbon credit schemes and similar) would greatly facilitate uptake of and disclosure against the Criteria.

Recognising the potential for agricultural production to enable substantial mitigation in other sectors

It is noted that besides supplying food and feed, agriculture has the potential to (and increasingly does) supply biomass to be used as raw materials for the bioeconomy including textiles, biobased materials for industry, construction and packaging, and bioenergy. Biomaterials can have longer life-cycles than food and feed products, and therefore can contribute to longer-term removal and sequestration of carbon. Bioenergy can displace emissions from burning fossil fuels. Agricultural production can therefore enable mitigation through other economic activities.

The criteria presented here focus on the substantial mitigation that can be realised in the way these crops and resources are produced, regardless of their end use. They do not take into account any contribution that agricultural products can make to mitigation via the bioeconomy. The Platform is asked to consider this aspect further to determine whether and under what circumstances these or alternative criteria for (some) agricultural production or producers might be appropriate in light of potential substantial contributions they can enable in downstream economic activities that are part of the bioeconomy.

Aligning with regulations

For clarification, the recast Renewable Energy Directive (RED II) includes a number of sustainability requirements relating to the production of the feedstock used to produce bioenergy, and these agricultural criteria are consistent with those requirements which can be applied across agricultural producers for their production of food, bioenergy and biomaterials for various supply chains.

These criteria also take guidance from, and look to build on, the cross compliance measures of the Common Agricultural Policy (CAP), and in particular the current proposals for the post-2020 CAP per Annex III of COM(2018)392¹²⁶.

¹²⁶ https://eur-lex.europa.eu/resource.html?uri=cellar:aa85fa9a-65a0-11e8-ab9c-01aa75ed71a1.0003.02/DOC_2&format=PDF

As a general principle, the working group has aimed to ensure that the ‘do no significant harm’ criteria in particular are aligned with the conditionality requirements, that is, the criteria that farmers must meet to become eligible for CAP subsidies. The ‘substantial contribution’ criteria go beyond these requirements as this was felt to be necessary to meet the scale of impact required to count as a substantial contribution. The working group focussed on the post-2020 CAP rather than the current CAP to ‘future-proof’ as much as possible these criteria. Efforts have been made to cross reference these criteria to the post-2020 CAP but the working group is cognisant that the post-2020 CAP has not been adopted at this time, and the Commission and, subsequently the Platform on Sustainable Finance (“the Platform”), is requested to review the provisions of the post 2020 CAP when finalised and consider whether any changes would need to be made to these Criteria based on that.

Addressing synergies and potential co-benefits in agricultural production

The interrelated nature of land management decisions and the impact on soil, water, biodiversity and carbon cycles means that the management of agricultural land for one objective of the Taxonomy (e.g. climate mitigation) will have an impact on other objectives of the Taxonomy (e.g. protection of healthy ecosystems). The Taxonomy is set up to ensure that, for economic activities that are compliant with the Taxonomy, a substantial contribution to mitigation in the agriculture sector, does not come at the expense of significant harm to the other five environmental objectives. However, the interrelated nature of these environmental goals actually offers the opportunity to develop substantial mitigation approaches that not only do no harm to other Taxonomy objectives but also deliver or enable positive contributions to other Taxonomy objectives.

For these reasons, climate mitigation cannot, should not, and has not been, considered in isolation from the other five environmental objectives of the Taxonomy. Many of the measures included in the best-practice tables for substantial contribution to mitigation criteria are agro-ecological practices or nature-based land management activities (e.g. crop rotation, planting hedges), which are win-win or no-regret measures. While they contribute substantially to climate mitigation, they also have significant benefits for soil health, biodiversity, resource efficiency and water protection and thereby increase resilience against climatic extremes. In other cases, the synergies with other objectives need to be more carefully pursued and considerations made that are often context-specific. In particular with respect to livestock production, synergies with sustainability objectives has required careful consideration and balancing productivity / intensity of production with increasing biodiversity value and improving water quality.

The proposed criteria for agricultural production activities have been developed on the basis of enabling systemic transition over time. This has in part been pursued so as to prevent system lock-in whereby an immediate action for mitigation prevents or closes down future options for change that could deliver greater mitigation benefits in the sector. For example, the investment in activities that seek to improve the GHG performance of the livestock sector should not prevent more systemic changes in the sector through, for example, greater integration of livestock and crop production (mixed farming), or overall reduction in livestock production. Another example can be taken from the perspective of the use and production of biofuels for the transport sector. Whilst more sustainable liquid biofuels have allowed GHG emission reductions from transport energy, they perpetuate the use of internal combustion engines in a mitigation development trajectory that may seek more substantial changes, such as electrification of vehicles, or modal shift.

Brief overview of public consultation feedback

The TEG thanks all respondents who provided feedback to help improve the agriculture criteria for the Taxonomy. The working group has evaluated the feedback and used the feedback in developing this report. The following brief summary highlights the key feedback received and the response to it.

- Stakeholders raised the option of an alternative, more principles-based approach to setting criteria, based on for example agro-ecological principles. This approach was considered by the working group, but was felt to be too open-ended to enable a set of criteria to be applied consistently by all users, leading to a high risk of significant variation in levels of performance. However, it is the view of the TEG that the criteria (and specifically the best practices detailed here) align with those principles, and allow sufficient flexibility in their application to meet a variety of user circumstances, while at the same time requiring a consistent level of performance across users.
- A number of stakeholders noted the need for consistency with existing regulation. In response, efforts have been made to reference to existing EU regulation that aligns with these criteria where it exists. This is particularly the case for the 'do no significant harm' criteria. As noted above however, that a number of these criteria relating to 'a substantial contribution to mitigation' are consistent with, but go beyond, existing regulation.
- A large number of points of feedback were received on specific best practices. These have been reviewed and considered in depth and changes made to the criteria accordingly following expert consultation. This includes, but is not limited to, addressing emissions embedded in livestock feed, and reconsidering the best practice relating to tillage.
- Some stakeholders raised concerns around animal welfare and health status. These do not fall under the environmental goals of the Taxonomy at this time and therefore were not within the Agricultural Working Group's remit. However, a recommendation has been made to the Platform to integrate criteria addressing these factors at the earliest possible date.
- Lastly, a number of stakeholders raised concerns over the difficulty in demonstrating compliance with these criteria. This challenge is recognised by the working group. To assist in addressing this, the working group has requested that the Platform work with existing agricultural standards, certification schemes, carbon schemes and others to map consistency of requirements between those schemes and these criteria, with the aim of establishing a pool of proxy indicators that can be taken as evidence of compliance with these criteria.

Impact of these proposals¹²⁷

¹²⁷ All data relates to 2016, unless otherwise stated. Source: Eurostat - Agriculture, Forestry & Fisheries Statistics - 2018 edition, <https://ec.europa.eu/eurostat/documents/3217494/9455154/KSFK-18-001-EN-N.pdf/a9ddd7db-c40c-48c9-8ed5-a8a90f4faa3f>.

There are 10.5 million farms in the EU, using 173 million hectares (ha) of land for agricultural production (about 39% of the EU's total land area). In 2016 one quarter (25.1%) of these farms are specialist livestock farms and just over half (52.5%) are specialist crop farms, the rest are composed of mixed farming (21.1%)¹²⁸.

Most of these farms are small in nature, with two-thirds less than 5 ha in size. But the largest 3.3% of them (those over 100 ha in size) manage just over half (52.7%) of all farmland.

Agriculture contributed 1.2% to the EU's GDP in 2017, even without considering its importance as the key building block for the downstream food and beverages processing industry. It employs 9.7 million people, just over 4% of the working population, but these statistics vary significantly by country. In Romania, for example, nearly a quarter of the working population work in agriculture, and numbers are also high in Bulgaria, Greece and Poland.

The agricultural sector in the EU invested EUR 57.2 billion in 2017.

Global applicability

Given the heterogeneity of agriculture, it is challenging to establish a set of one size fits all criteria. This point was raised in the public consultation feedback. However, it is the view of the TEG that these criteria are globally relevant for low carbon agriculture and with the in-built flexibility on options for demonstrating compliance, they can be applied globally. To assist with this, the criteria are not tied to specific EU regulations, though cross-reference is made where appropriate to those regulations to assist EU users.

Next steps – recommendations to the Platform

1. Within and across these economic activities, the following are not (yet) addressed in this round of Taxonomy criteria but represent significant opportunities for emissions reductions across the agricultural sector as a whole. These opportunities would merit additional consideration by the Platform:
 - Taking land completely out of agricultural production for the purposes of restoring or re-establishing natural habitats, particularly peatland and other carbon rich landscapes, or integrating structural elements (such as hedges, buffer strips, woody landscape features) into agricultural land. There are a number of known benefits such practices, including increased carbon sequestration, reduced soil erosion and nutrient loss, and via its positive impact on biodiversity, support pollination and pest control. The challenge faced when considering whether a 'land out of production' and/or 'integration of structural elements' practice should be required is setting an ambitious but implementable target. Relevant questions are: what proportion of land should be covered, how should it be covered, how would this be balanced with other objectives (such as food production) and how could permanence be ensured. Further, given the high co-benefits and inter-relations of such practice across mitigation, biodiversity and general ecosystem health, it is also debatable whether such practices most appropriately fits under substantial contribution to mitigation or substantial contribution to healthy ecosystems. The

¹²⁸ Source: Eurostat (ef_m_farmleg)

Platform are therefore invited to consider how and by what criteria, land should be taken out of production and under what substantial contribution category this would best be classified.

- Switching from higher emitting activities to lower emitting activities. For example, reducing cattle numbers and increasing legume production as an alternative source of protein, with a corresponding consumption switch between agricultural commodities. At this time, while livestock production, and in particular ruminant livestock production (beef, lamb and dairy), is a significant source of emissions in the agriculture sector, it is included in the Taxonomy due to the significant short-term mitigation potential associated with reducing emissions intensity in livestock management, and because it is not yet clear what appropriate transition pathways are for livestock production. In the interim, it is appropriate to maximise the significant mitigation potential here, noting the point made above that the best practices for livestock production do not prevent or close down further opportunities that might deliver greater mitigation opportunities in the sector. However, it is noted that for absolute emissions from agriculture to continue decreasing beyond a certain point and to move towards net-zero targets by mid-century, reduced emissions intensity will need to be coupled as soon as possible with commensurate changes in consumption patterns and overall reduced per-capita consumption of livestock products, especially certain beef, lamb and dairy products.¹²⁹

This implies both societal changes in terms of changing diets and reducing food waste, as well as structural transformations in the agricultural sector. Significant and coordinated policy efforts will be required to manage both consumer behavioural changes and to incentivise and manage structural change in the agri-food supply chain. Future Taxonomy updates should, however, consider what rates of meat consumption and/or practices for production are compatible with a zero-carbon economy

- More granular actions can deliver significant mitigation, but not at a sufficient level to be recognised as making a substantial contribution to climate mitigation at the level of the economic activity as a whole. They can also be a significant portion of lending portfolios for some investors and so it is essential to develop appropriate criteria for them. These measures or actions might include addressing energy or resource efficiency or land management through:
 - Subsets of the bundle of management practices described below
 - Irrigation modernisation/ refurbishments (sometimes mitigation, sometimes adaptation)
 - Upgrades to water pumping and distribution systems
 - Use of renewable energy in greenhouses
 - Replacement/upgrades of agricultural machinery
 - Installation or upgrade of storage facilities
 - First processing of agricultural products for the primary market (e.g. relating to olive and grape processing) to the extent this is included under these NACE codes

¹²⁹ There is consensus in the scientific community that climate neutrality requires dietary shifts, which will also have significant public health benefits. For example, in the EU, energy and protein intake levels are higher than recommended – for protein by as high as 70% per capita compared to WHO guidelines.

The Platform is asked to consider how these and any other additional actions which deliver significant mitigation might be identified and evaluated, and how these can be incorporated into the Taxonomy. This includes determining a rule set to define what counts as significant mitigation from individual actions, which may be consistent with similar rule sets across other economic activities, or common across agricultural activities only, or specific to individual agricultural activities.

2. It is recommended that the Platform also look further into the addressing the complex interactions within agricultural production systems between the six environmental goals of the Taxonomy potential maximise synergies and co-benefits across the 6 environmental goals of the Taxonomy. Specifically:

- The proposed Taxonomy criteria and practices for agriculture have been developed on the basis of enabling systemic change, rather than focusing on individual 'fixes' to the mitigation challenge. The proposed practices consider implications beyond mitigation alone and seek, where possible to support contribution to the wider environmental and climate adaptation objectives of the Taxonomy Regulation. This work should be developed further. The Platform should draw on existing and emerging evidence to consider further not just how substantial mitigation can be pursued without causing significant harm to other objectives, but rather to pursue approaches that further optimize synergies and minimize trade-offs between significant contribution to mitigation, adaptation and biodiversity, water, and soil management. This also includes improved consideration of how the benefits of mixed farming systems can better be captured in the Taxonomy.
- In addition, livestock production comprises a broad range of practices, including intensive and landless operations, which can have particular environmental impacts beyond GHG emissions. There were insufficient resources to analyse the current evidence base in depth in order to allow for a differentiated treatment of different forms of livestock production from a DNSH angle and it is recommended that the Platform look into this further.

3. Regarding expanding the scope of the environmental goals of the Taxonomy:

- Although animal welfare and health status and the side-effects of antibiotic use in the livestock sector are currently not part of the DNSH criteria as they do not fall under the environmental goals prioritised at this time, the stakeholder consultation, as well as available research¹³⁰ shows that these are significant societal expectations associated with livestock production¹³¹. As such, a recommendation to the Platform is that criteria addressing animal welfare and health are integrated at the earliest possible date.

4. To address challenges around applying and demonstrating compliance with the criteria in the diversity of agricultural contexts, the Platform is asked to consider the following:

¹³⁰ E.g. http://www.risefoundation.eu/images/files/2018/2018_RISE_LIVESTOCK_FULL.pdf "Whatever level of EU livestock production, now and in the future, it is essential that continued progress is made on four fronts: improving resource efficiency, reducing leakages into the environment, increasing the health status and welfare of farmed animals, and minimising the use of antibiotics."

¹³¹ Special Eurobarometer 442 on attitudes of Europeans towards animal welfare (2016)

- What guidance would be necessary to support land managers in implementing the criteria and practices set out in the Taxonomy so as to realise synergies and avoid trade-offs between objectives. This would lay the ground-work for the Taxonomy as it evolves from DNSH to substantial contribution across all environmental objectives. The platform is asked to consider two elements in this regard:
 - How and whether it is appropriate to deliver country or regionally tailored advice regarding the applicability of each best practice listed in that localised context. Whilst most best practices are generic in nature and set out the main approaches to delivering a substantial contribution to mitigation in agriculture, the global reach of the Taxonomy naturally means that some practices in temperate regions may not be as applicable in sub-tropical areas, etc.;
 - To consider how and what guidance could be provided and by whom, to allow those implementing the practices for substantial mitigation to do so in a way that benefits other environmental objectives and/ or simultaneously ensures no significant harm to other environmental objectives. For example, the sowing of catch and cover crops is likely to deliver significant contribution to water quality objectives by stabilising soils in periods of high run-off, preventing silting and the movement of nutrients to water bodies. Advice could be framed around the location, within a farm, where such practices would deliver particular benefits to water quality, such as in high nutrient load areas, on slopes, and areas adjacent to water bodies. To assist with this, the TEG has included indicators in the best practice tables to identify which best practices have potential co-benefits with the other environmental goals of the Taxonomy.
- What can be done to support the development or adoption of tools and methodologies to assist in demonstrating compliance with these criteria. Specifically:
 - A large number of carbon audit tools are available at present, although there is variation in the coverage and robustness of these tools. A recent review¹³² conducted in Scotland identified three tools deemed technically very suitable for farm-level carbon audits in the Scottish context, enabling sufficient robustness, comprehensiveness and clarity of documentation: [Cool Farm Tool](#)¹³³, Scottish AgRE Calculator¹³⁴, and JRC Carbon calculator¹³⁵. At least the Cool Farm Tool and JRC Carbon Calculator are also more broadly applicable in the EU. The FAO-Ex-act tool might also be appropriate to use. It would be valuable if the Platform could provide guidance on appropriate tools for demonstrating compliance and support further development of the existing tools to address capacity building and compliance checking needs associated with a transition to low-carbon farming.

¹³² Leinonen, I., V. Eory, M. MacLeod, A. Sykes, K. Glenk and R. Rees (2019). "Comparative analysis of farm-based carbon audits." Report for ClimateXChange Scotland. <https://www.climateexchange.org.uk/media/3584/farm-based-carbon-audits-final.pdf>

¹³³ <http://www.coolfarmtool.org>

¹³⁴ <http://www.agrecalc.com/>

¹³⁵ https://solagro.com/images/imagesCK/files/publications/2016/Farm_Tool_Calculator_Carbon.pdf

- Similarly, the Platform is requested to consider whether and which existing sustainability standards, carbon credit schemes, standards, certification schemes or similar could be used as proxy indicators for compliance with these criteria and thresholds, subject to meeting the same performance outcomes. This includes engaging to align those standards or certification schemes if needed. The adoption of such proxy indicators would help substantially in the cost-effective demonstration of compliance with these criteria and thresholds.
- Likewise, efforts have been made to cross reference these criteria to the post-2020 CAP for EU users. This is a work in progress made complicated by the fact that the post-2020 CAP has not been adopted at this time. The Platform is, therefore, requested to review the provisions of the post 2020 CAP when finalised and consider whether any changes would need to be made to these Criteria based on that.
- The need or not to flex the criteria for different users in different circumstances. In particular:
 - As currently proposed, in the main, the Criteria apply equally to, and do not distinguish between, smaller and large scale farms. This seems appropriate in terms of seeking to address emissions reductions and sequestration in farms of all sizes to maximise aggregate impact, recognising that small farms can be some of the most inefficient and emitting, and large firms can be some of the most efficient per unit of output, and vice versa. However, the Platform is asked to consider whether differences should be made in terms of the requirements to demonstrate compliance, recognising the higher transaction cost impacts for smaller scale farmers.
 - As noted above, the TEG are of the view that these criteria and thresholds have global applicability, based on input from TEG members and expert advisers with global expertise and experience. However, additional global consultation will be needed to confirm the appropriateness of these proposals for crop and livestock production around the world.

5. To keep these criteria up-to-date, the Platform is asked to:

- Regularly review this list of practices to integrate new advances in understanding and scientific knowledge and any implications of amendments to the Common Agricultural Policy.
- 6. Lastly, as noted above, these criteria focus on the significant mitigation potential that can be realised in the way these crops and resources are produced, regardless of their end use. They do not take into account any contribution that agricultural products can make to mitigation via the bioeconomy. The Platform is asked to consider this aspect further to determine whether and under what circumstances alternative criteria for (some) agricultural production or producers might be appropriate in light of potential substantial contributions they can enable in downstream economic activities that are part of the bioeconomy.

2.1 Growing of perennial crops

Sector classification and activity											
Macro-Sector	A - Agriculture, forestry and fishing										
NACE Level	3										
Code	A1.2										
Description	Growing of perennial crops										
Mitigation criteria											
Principles	<p>Both of the principles set out here must be fulfilled:</p> <ol style="list-style-type: none"> Demonstrate substantial avoidance or reduction of GHG emissions from production and related practices; and Maintain existing sinks and increase sequestration (up to saturation point) in above- and below-ground carbon stocks. 										
Thresholds and metrics	<p>1) Avoid or reduce GHG emissions (including those from inputs used on the farm) through the application of appropriate management practices.</p> <p>This can be demonstrated in either of the following ways:</p> <ul style="list-style-type: none"> The essential management practices are deployed consistently over the applicable perennial crop production area each year <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> Reduction in GHG emissions (gCO₂e) in line with the following trajectory <table border="1"> <caption>Emissions reductions trajectory</caption> <thead> <tr> <th>Year</th> <th>Reduction (%)</th> </tr> </thead> <tbody> <tr> <td>2020</td> <td>0%</td> </tr> <tr> <td>2030</td> <td>20%</td> </tr> <tr> <td>2040</td> <td>30%</td> </tr> <tr> <td>2050</td> <td>40%</td> </tr> </tbody> </table> <p>For example, a 20% reduction in GHG emissions would be required by 2030 compared to emissions in 2020, and a 30% emissions reduction would be required by 2040 compared to 2020</p>	Year	Reduction (%)	2020	0%	2030	20%	2040	30%	2050	40%
Year	Reduction (%)										
2020	0%										
2030	20%										
2040	30%										
2050	40%										

2) Maintain and increase existing carbon stocks for a period equal to or greater than 20 years through the application of appropriate management practices.

This can be demonstrated in either of the following ways:

- The essential management practices[^] are deployed consistently over the applicable perennial crop area each year

OR

- Above and below ground carbon stocks (tC/ha) to be increased progressively over a minimum 20-year period*

* Noting the following exception: For soils specifically, where it can be demonstrated that saturation levels have been reached, no further increase in carbon content is expected. In this case, existing levels should be maintained

3) Production is not undertaken on land that had any of the following status in or after January 2008 and no longer has that status.¹³⁶

- a) Wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year;
- b) Continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ;
- c) Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ¹³⁷;
- d) Peatland, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

Methodological notes:

For those demonstrating compliance with the essential management practices:

¹³⁶ This requirement is taken from RED II, Article 29, paragraphs 4 and 5. It is to be applied to all perennial crop production, whether for biofuels, bioliquids or biomass, or for food or feed uses. The intention is per RED II, namely to ensure high carbon stock land is not converted for the purposes for agricultural production.

¹³⁷ Unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology of part C of Annex V of RED II is applied, the conditions laid down in paragraph 10 of Article 29 of RED II would be fulfilled.

	<ul style="list-style-type: none"> - The essential management practices are described in the table below. All essential practices will need to be deployed, except where particular practices can be demonstrated to be not applicable to that farm holding given the particular biophysical conditions at that farm holding. - In respect of the essential practice relating to the GHG assessment, this assessment should be done using tools that cover all relevant emissions on the farm associated with production, as well as emissions associated with energy and fuel use (see below for relevant GHG categories). If it can be demonstrated that no carbon assessment tool is currently accessible to farmers in a given location (either because of language or lack of access to farm advisory support), this practice may be omitted in the first instance. The assessment, however, becomes mandatory within a five year period. The assessment is a self-assessment using an appropriate tool, no independent audit or verification of the GHG assessment is required. - To demonstrate compliance with all other essential practices, it will be necessary to establish a farm sustainability management plan which describes the management practices being deployed - taking into account crop husbandry requirements, farm pedo-climatic conditions - and their coverage on the farm. To prepare the farm sustainability management plan a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. <p>For those demonstrating compliance with GHG thresholds:</p> <ul style="list-style-type: none"> - To demonstrate compliance with the quantitative GHG thresholds it will be necessary to establish a Carbon stock and GHG emission baseline for the farm (see below for relevant GHG categories). It will be against such baseline data that emission reductions of Carbon increases can be measured. A carbon audit is necessary in order to also assess where action is needed, and this must be accompanied by a carbon management plan to set out the management practices that will deliver the GHG emissions reduction/ carbon sequestration. This carbon management plan is part of the broader farm sustainability plan. - Where the (remaining) lifecycle of the crop production being financed is less than 20 years, to show broad compliance with the requirement for carbon stocks to increase progressively over a 20 year period, assurance should be sought on the likely replanting of crops to promote the permanence of carbon sequestration trends. It is recognised that uprooting old crops and replacing with new, younger
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	<p>stage crops with a potential fallow/ restoration period between will lead to a reduction in carbon stocks and some emissions. With this in mind, the objective is to ensure overall maintenance of carbon stocks and/ or upward trends in sequestration are sought over multiple rotations.</p> <p>For all users:</p> <ul style="list-style-type: none"> - Calculations of carbon stocks and GHG emissions levels should include the following, though it is recognised that in practice, the scope of GHG counted will be subject to the technical capabilities of the GHG accounting tools being used: <ul style="list-style-type: none"> o CO2 emissions and removals in above ground biomass o CO2 emissions and removals in below ground biomass and soils o N2O emissions from exposed soils, fertiliser application, and those embedded in fertiliser production and fertiliser application o CH4 emissions from livestock (enteric fermentation and manure management) and some soils (e.g. wetlands) o CO2 emissions from fuel and electricity use - Emissions, sinks and management practices are all to be audited at 3-year intervals to confirm ongoing compliance with these requirements. - In the case of force majeure: emissions resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not affect the application of these requirements or result in non-compliance with these criteria.
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Management category	Essential management practice	GHG ↓	C-Seq ↑	Co-benefits
Farm GHG assessment	Undertake a GHG assessment of sources of emissions and sinks on the farm. Existing and verified tools should be used. No auditing of the GHG assessment is required.	✓	✓	✓
Crop choice and cover (to	Sowing of cover/catch crops using a locally appropriate species mixture with at least 1 legume	✓	✓	✓

increase carbon sequestration in soil, reduce fertilizer need, and N₂O emissions)	and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.			
Soil management (in order to prevent soil erosion and carbon losses from soils)	Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; stock density should be reduced to avoid compaction, especially on wet soils).	√		√
	Management of carbon-rich soils <ul style="list-style-type: none"> • Avoiding deep ploughing on carbon-rich soils • Avoiding row crops • Maintaining a shallower water table – peat • Maintaining a shallower water table – arable 	√		√
	Avoid water logging and compaction where land is drained	√		
	Maintain permanent grassland ¹³⁸	√	√	√
	No burning of arable stubble except where authority has granted an exemption for plant health reasons. ¹³⁹	√		
Nutrient management (in order to reduce N₂O emissions)	Nutrient management plan to optimize fertilization and improve nitrogen use efficiency. The plan should be based on soil testing, estimating of crops nutrient requirements, recording of nutrient applications, considering field characteristics and soil type, estimating soil nitrogen supply, and	√	√	√

¹³⁸ Consistent with GAEC 1 of Annex III of COM(2018)392

¹³⁹ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

	<p>where applicable analysis of manure nutrient content prior to application.</p> <p>In addition, it is required that a low emission N-application technology is used (e.g. slurry injection, incorporating manure in the soil within 2 hours of spreading) and fertilizer spreaders which have low coefficient of variation (synthetic fertilizer and farmyard manure (e.g. placing N in the soil via injection), combined with calibration of spreaders.</p>			
Structural elements with mitigation benefit (in order to increase C sequestration)	Conversion of low productivity land (e.g. along field edges) into woodland to increase C sequestration and protect against soil erosion		√	√
Waste management	Minimize post-harvest loss	√		
Energy use	Where energy emissions represent greater than 20% of total emissions from non-perennial crop production activity, these emissions should be reduced appropriately for the term of the investment, in line with the trajectory outlined on P11 i.e. by at least 10% compared to a 2020 baseline for a 5 year investment period, 20% compared to a 2020 baseline for a 10 year investment period to 2030, and 30% compared to a 2020 baseline for a 20 year investment period – with pro-rata adjustments for investments of intermediate durations	√		
Rationale				
<p><u>Opportunities for substantial mitigation and contributions to a net zero carbon economy</u></p> <p>An overarching goal of the Taxonomy is to enable the screening of economic activities to determine whether or when they do or do not deliver substantial mitigation, consistent with the underlying goal of a net zero carbon economy by 2050.</p> <p>In the context of agriculture, Net-Zero is a means to ensure that even where GHG emissions cannot be reduced to zero, they can be compensated for through increased removals (through carbon sequestration) on farmed land. The discussion about the scale at which net-zero should (and could) be</p>				

met solely in agriculture remains open. It may not be possible to reach net-zero emissions on an individual farm holding in all cases. In other cases, it may be more feasible. At the aggregate level, it may be that some countries with concentrated production systems and small land areas, would struggle to reach net-zero emissions within the agriculture sector alone and within country. This raises the question as to the extent to which a given farm, or aggregation of farms, could reach net-zero and the extent to which these farms could appropriate negative emissions (sequestration) from other farms or other sectors.

Furthermore, one opportunity for emissions reductions in the agriculture sector as a whole is to switch from higher emitting activities to lower emitting activities (for example, by reducing cattle numbers and increasing legume production as an alternative source of protein), with a corresponding consumption switch between agricultural commodities. These criteria and thresholds, which focus specifically on emissions within the perennial crop production activity, cannot address this type of mitigation action.

The criteria and thresholds proposed therefore focus on ensuring that emissions are substantially reduced and removals substantially increased at the economic activity (NACE code) level.

There is significant potential to reduce emissions, maintain carbon sinks, and increase sequestration through good practices in perennial cropland management. Each of these needs to be addressed in order to ensure that agriculture as a whole delivers substantial mitigation and contributes its part to a net zero carbon economy. Doing so will ensure each instance of perennial cropland management maximises its contribution – this rationale drove the principles set out above.

Approach taken to setting thresholds for this economic activity

There continues to be a relative paucity of information and data to set absolute thresholds (e.g. gCO₂e/ha or gCO₂e/ unit of production) for agriculture that represent low carbon agriculture. Even if such information existed at the aggregate level, translating this to appropriate thresholds for implementation would remain challenging given the heterogeneity across farms and farming practice.

However, setting relative GHG thresholds (i.e. % change in gCO₂e) is possible, where these can be made relative to a counterfactual on the same farm or project. Whilst this provides some quantitative means of assessing mitigation performance, it is a relatively blunt mechanism as it does not take into account emissions reductions which might previously have been achieved and if the farm is already delivering significant mitigation. Therefore, it is harder for a farm that already performs relatively well to deliver an additional X% reduction in emissions than it is for a farm that currently performs relatively poorly. Furthermore, to determine compliance with such a GHG threshold, GHG accounting at farm level is necessary. However, this is not yet mainstream, despite the existence of a range of tools and approaches.

The proposals, therefore, allow for a different approach, namely the demonstration of the deployment of specific bundles of management practices, that are recognised as essential to delivering low carbon production in agriculture. This more qualitative approach is relatively simple to monitor, and there are existing mechanisms to do so, such as under the CAP. It also provides a more directly communicable approach to farmers and land managers who will implement such practices on the ground. As this approach is applicable for those who have already established such practices as well as those that will additional investment finance to do so, it also allows for the recognition of farms (and associated assets

and equity) that are already high performers in terms of a low GHG footprint. As such, it avoids the problems associated with the relative GHG threshold as described above.

Emission contributions from agriculture in the EU arise primarily from three sources: enteric fermentation (42.9%; 0.186 GtCO₂e); management of agricultural soils (38%; 0.165 GtCO₂e); and manure management (15.4%; 0.067 GtCO₂e) (2014 figures). Mitigation potential therefore predominantly involves reductions in non-CO₂ emissions as these form the majority of agriculture emissions in the EU, with CO₂ from on-farm energy use being a minor component (covering only 0.13% of total EU28+ISL agriculture emissions in 2014). The largest share of the EU's agricultural non-CO₂ GHG emissions comes from the more potent nitrous oxide (N₂O) and methane (CH₄). Nitrous oxide accounts for 58% of non-CO₂ emissions from agriculture (largely from fertiliser application and exposed soils, as well as grazing animals), with methane accounting for the remaining 42% (largely from livestock and rice cultivation). In some cases, GHG emission from energy (traction, heating, cooling, irrigation) can form a significant proportion of emissions arising from the farm. The proposed best practices therefore include a provision for when GHG emissions from energy are greater than 20% of farm emissions, these should be reduced by 20% through efficiency and energy source requirements.

In respect of perennial cropland production, key sources of emissions are emissions associated with soil management and the application of fertilisers, and emissions embedded in post-harvest waste.

Metrics and thresholds for this economic activity

On management practices that deliver substantial mitigation

Rationale for the selection of practices: Scientific literature identifies a wide range of possible mitigation practices available in the agricultural sector to address the different emissions and opportunities for sequestration in perennial cropland management.

For the purpose of establishing criteria and thresholds which identify when the economic activity of perennial cropland delivers substantial mitigation, individual management practices were identified for which: 1) there is sufficient existing scientific knowledge and consensus on the mitigation effects and interactions with other environmental and food security objectives; and 2) the scale, certainty and consistency of mitigation effects is sufficiently demonstrated (for example, Smith et al. 2008¹⁴⁰, Paustian et al. 2016¹⁴¹, Kay et al. 2019¹⁴²).

These management practices have been demonstrated to improve soil health and soil productivity so as to secure agricultural yields and thus reduce the emission intensity of crop production – outcomes critical for the delivery of substantial mitigation - and/ or reduce the carbon intensity of agriculture, and also do not risk leakage effects. They also do not risk negative ancillary effects nor are in conflict with legislation

¹⁴⁰ Smith, P. et al. (2008), "Greenhouse gas mitigation in agriculture", Philosophical Transactions of the Royal Society B, Vol. 363, Issue 1495, The Royal Society, London, 789-813.

¹⁴¹ Paustian K, Lehmann J, Ogle S, ReayD, RobertsonGP and Smith P 2016 "Climate-smart soils", Nature 532 49–57

¹⁴² Kay et al. (2019). "Agroforestry creates carbon sinks whilst enhancing the environment in agricultural landscapes in Europe", Land Use Policy 83 581-593.

in the EU. These practices deliver substantial mitigation with relatively high certainty across a range of biophysical and farming conditions.

Scientific literature provides insights on mitigation potential on categories of individual practices and also indicates that it is the combination of practices which are applied over large areas that leads to substantial mitigation, i.e. an approach is required where all feasible mitigation practices which are environmentally sustainable should be pursued (Paustian et al. 2016). The literature, however, provides limited guidance on how to translate sectoral or activity-based mitigation potential into individual farm-level mitigation potential, i.e. what combination of practices should be applied together as a minimum at farm level in different conditions to deliver substantial mitigation. Therefore, TEG expert input was used to determine the minimum combination of practices which should be applied together for perennial cropland management to deliver substantial mitigation at farm level.

The table below indicates the management practices selected as the bundle of essential practices that, deployed collectively, should deliver substantial mitigation at farm level. It is noted that given heterogeneity of farms, deployment of the same bundle of practices may result in different emissions impacts farm to farm, but overall it is expected that deployment of this bundle will deliver substantial mitigation in the majority of cases. The applicable area for management practices relates to where those practices could and should be deployed on a farm in order to meet their objectives. For example, buffer strips designed to prevent soil erosion and run-off are to be placed next to water courses and ditches, etc. Therefore, some practices may only be deployed on a small area of the farm where they add value.

One best practice, the requirement to undertake a GHG assessment does not directly lead to reduced emissions or increased sequestration. The rationale for including this practice is to raise awareness of where the main emission sources are on a farm holding, what opportunities exist to reduce those emissions and thus where greatest mitigation impact could be achieved, including through opportunities for carbon sinks, and thereby improve the targeting of mitigation action. In this spirit, no verification or audit of the assessment is required to fulfil this best practice requirement. This is different from the quantitative baseline assessment and carbon audit, both of which are necessary when demonstrating compliance with the quantitative GHG thresholds. The assessment should be done using tools that cover all relevant emissions on the farm associated with crop, livestock production, as well as emissions associated with energy and fuel use. If it can be demonstrated that no carbon assessment tool is currently accessible to farmers in a given location (either because of language or lack of access to farm advisory support), this practice may be omitted in the first instance. The assessment, however, becomes mandatory within a five year period,

On GHG emission reduction thresholds

Substantial, in the context of substantial mitigation, falls on a spectrum of mitigation potential from net - negative (where removals exceed emissions), net-zero (where removals balance with emissions) to varying degrees of emission reductions. With no EU or global baseline target for emission reductions from the agriculture sector as a whole or perennial crop production specifically the degree to which emission reductions and removals should be required becomes a question of ambition and need. It is also noted that the Taxonomy has a global reach, and thus any level of 'substantial' should be consistent in the global context.

A review by Wollenberg et al, 2016¹⁴³ suggests a total mitigation need from agriculture from between 0.9 – 1.4 GtCO₂e (in 2030) to meet the 2 °C target, 1 GtCO₂e (in 2030). This was selected as an approximate target. These figures relate primarily to non-CO₂ emissions and are “an annualized”, not cumulative, goal. The target assumes an allowable emissions budget of 6.15–7.78 GtCO₂e yr-1 for agriculture in 2030. The goal represents an 11–18% reduction relative to the scenarios’ respective 2030 business as usual baselines¹⁴⁴. As these figures represent non-CO₂ emissions, they implicitly do not recognise the role of potential carbon sequestration and its contribution to global mitigation goals. As such a GHG emissions reduction threshold of 20% over the 10 year period from 2020 to 2030 has been proposed as ‘significant contribution’ in the context of the Taxonomy. This is supported by work from Frank et al (2018)¹⁴⁵, and The IPCC’s fourth assessment report (Smith et al, 2007)¹⁴⁶.

In terms of establishing a declining emissions trajectory for agriculture, the work by Wollenberg et al (2016) calculates emission reduction needs based on a trajectory of emissions from 2010 through to 2100. The emissions curve (level of emissions over time) increases and decreases at different points, relative to existing efforts, projected changes in external factors, etc. The average reduction figure needed over this whole timeframe is 28% emission reductions compared to the baseline. As we move towards 2040 and 2050 the level of emission reductions needed increases, and this implications for any threshold set beyond the 2030 timeframe. The reduction figure in 2050 would be larger (approximately a doubling). Although in the study the level of emission reductions needed is not linear between the years, for simplicity a linear reduction is drawn between the two pegs of 20% reduction by 2030 and 40% reduction by 2050 as a linear trajectory of emission reductions also simplifies implementation and communication.

The study determined these reductions against a business as usual scenario for agriculture. However, establishing a BaU counterfactual level of emissions for each project or farm could limit implementation effectiveness, as the BaU emissions would need to be calculated assuming the mitigation action was not in place. For simplicity, the proposed approach is therefore to simplify the requirement to compare emissions at the start of period with those achieved in 10 years-time and assess this against the target reduction.

The threshold metric for emissions reduction is gCO₂e, and not an emissions intensity metric such as gCO₂e/ unit of production, as this enables the Taxonomy to be applied by those reducing emissions intensity (e.g. through energy or resource efficiency) while also requiring them to reduce emissions overall – the overall goal.

¹⁴³ Wollenberg, E., Richards, M., Smith, P., Havlík, P., Obersteiner, M., Tubiello, F. N., ... Campbell, B. M. (2016). Reducing emissions from agriculture to meet the 2°C target. *Global Change Biology*, 22, 3859–3864. doi:10.1111/gcb.13340

¹⁴⁴ idem

¹⁴⁵ Stefan Frank et al, Agricultural non-CO₂ emission reduction potential in the context of the 1.5 °C target, *Nature Climate Change* (2018). DOI: 10.1038/s41558-018-0358-8

¹⁴⁶ Smith, P. et al. (2007), “Agriculture”, in *Climate Change 2007: Mitigation, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, New York.

On setting Carbon stock thresholds

Setting a universal (or global) absolute threshold (in terms of tC/ ha) for carbon stocks is not a viable option given the variability of carbon sequestration and stocking potential – which is very context specific. Those with low carbon stock potential will not be able to deliver substantial sequestration in line with a universal, absolute threshold. Even setting an absolute threshold linked to local conditions (based on maximum carbon stocking potential at that site) is not possible as at present it is impractical to test and estimate the maximum sequestration potential (i.e. saturation point) of a specific area. Such calculations currently use default values based on soil type, and therefore are not truly context specific.

Furthermore, even defining a specific % of carbon increase required is more challenging than setting the relative threshold for reducing emissions. Reducing emissions is always proportional to the level of emissions at a given point, therefore a 20% reduction over 10 years for example can be expected to deliver a ‘substantial’ contribution from an underperforming farm (resulting in high overall emission reductions). However, the premise is different when looking to increase sequestration on agricultural land as there is relatively little evidence and few studies that suggest what level of Carbon stock increase would be needed on agricultural land in a 1.5 or 2°C climate stabilisation target scenario, as this is relative to the level of emissions from that same land (if one is pursuing a net-zero approach) or the level of carbon sequestration needed to offset other sectors of the economy. It is however, recognised that C sequestration represents the largest mitigation potential available to the agriculture sector at global scale, while emission savings of non-CO₂ emissions may be more important in the EU with a prevailing intensive production system. Smith et al (2007) estimate that 89% of the technical potential of emission reductions in the sector to 2030 and 2050 lies in soil carbon sequestration, i.e.in reducing net CO₂ emissions from farming practices and management, including cropland management, grazing land management, restoration of cultivated organic soils and restoration of degraded lands.

The proposal is therefore to require evidence of a positive direction of travel in terms of increasing carbon stocks, specifically, the progressive increase of carbon stocks over a 20-year period. A 20 year period for C stock saturation maintenance is proposed in line with the IPCC 20 year soil C saturation period. Where the (remaining) lifecycle of the crop production being financed is less than 20 years, assurance should be sought on the likely replanting of crops to promote the permanence of carbon sequestration trends. It is recognised that uprooting old crops and replacing with new, younger stage crops with a potential fallow/ restoration period between will lead to a reduction in carbon stocks and some emissions. With this in mind, the objective is to ensure overall maintenance of carbon stocks and/ or upward trends in sequestration are sought over multiple rotations.

On no conversion of high carbon stock land

A cut-off date of 2008 for no conversion of high carbon stock land is chosen to be consistent with the operation of the Renewable Energy Directive sustainability criteria relative to these land types. This provides a link with existing sustainability schemes through which compliance could be demonstrated for this criterion.

On demonstrating compliance with these criteria and thresholds

3-year compliance checking is proposed to ensure progress is being made and mitigation is being delivered in practice, and also to reduce the burden necessary on operators. This compliance checking is required for management practice checking, C stock change and GHG reductions.

To prepare the farm sustainability management plan a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. Advisory support will likely be required in the process of preparing the plan and may also be required to ensure adequate implementation of the plan..

Do no significant harm assessment

Key environmental aspects to be considered for investments in growing of perennial crops span across all other five objectives and are summarized as follows:

- ability of farming systems to adapt to a changing climate;
- impact on water quantity, water quality and water ecosystems;
- impacts on air quality;
- inefficiencies in the production system including nutrient management;
- pollutant and nutrient run-off and leaching;
- impacts on habitats and species, e.g. through conversion of areas, intensification of existing arable land, and invasive alien species.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

DNSH Objective	Thresholds and Metrics
(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Sustainable use and protection of water and marine resources	<ul style="list-style-type: none">• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.• In the EU, fulfil the requirements of EU water legislation.
(4) Circular economy and waste prevention and recycling	<ul style="list-style-type: none">• Activities should minimise raw material use per unit of output, including energy through increased resource use efficiency¹⁴⁷.• Activities should minimise the loss of nutrients (in particular nitrogen and phosphate) leaching out from the production system into the environment.¹⁴⁸

¹⁴⁷ The criterion refers to “unit of output” to allow for production efficiency increases where raw material use may not decline

¹⁴⁸ Consistent with GAEC 5 of Annex III of COM(2018)392. The aim is to provide farmers with a digital tool that helps them optimize the use of nutrients on their farm leading to environmental and agronomic benefits.

	<ul style="list-style-type: none"> Activities should use residues and by-products the production or harvesting of crops to reduce demand for primary resources, in line with good agricultural practice;¹⁴⁹
(5) Pollution prevention and control ¹⁵⁰	<ul style="list-style-type: none"> Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) and with appropriate equipment and techniques to <u>reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution)</u> and the loss of excess nutrients.¹⁵¹ The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment.¹⁵²
(6) Healthy Ecosystems	<ul style="list-style-type: none"> Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter.¹⁵³ Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetlands, forests, or other areas of high-biodiversity value¹⁵⁴. This includes highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. Activities should not¹⁵⁵:

149 It is noted that the EU Circular Economy Strategy and many of the actions from the corresponding actions plans have relevance to agriculture that may provide guidance here (e.g. proposing legislation setting minimum requirements for reused water for agricultural irrigation, new Fertiliser Regulation introducing harmonised rules for organic fertilisers manufactured from secondary raw materials such as agricultural by-products and bio-wastes).

150 See also National Emission Ceilings Directive (EU) 2016/2284 (notably Annex III, part 2), and the related provisions in the National Air Pollution Control Programme, established by each Member State under this Directive.

151 See Directive 2009/128/EC on sustainable use of pesticides and the Nitrates Directive. SMR 13 of CAP post 2020 will link the implementation of the pesticide directive with direct payments under cross compliance,

152 In the EU, this means the use of plant protection products that are categorised in groups 1, 2 or 3 as regard their hazard weighting under Directive (EU) 2019/782 (table1).

153 Consistent with GAECs 6 & 7 of Annex III of COM(2018)392

154 Areas of high-biodiversity-value can be defined as set out in Article 29(3) of the Directive EU(2018)2001

155 Consistent with Statutory Management Directive 3 and 4 of the post 2020 CAP and specifically Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7): Article 6(1) and (2) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7): Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)

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| | <ul style="list-style-type: none">○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern;○ contravene existing management plans or conservation objectives.● Where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and ongoing monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment. |
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2.3 Growing of non-perennial crops

Sector classification and activity											
Macro-Sector	A - Agriculture, forestry and fishing										
NACE Level	3										
Code	A1.1										
Description	Growing of non-perennial crops										
Mitigation criteria											
Principles	<p>Both of the principles set out here must be fulfilled:</p> <ol style="list-style-type: none"> 1. Demonstrate substantial avoidance or reduction of GHG emissions from production and related practices; and 2. Maintain existing sinks and increase sequestration (up to saturation point) in above- and below-ground carbon stocks. 										
Threshold & metrics	<p>1) Avoid or reduce GHG emissions (including those from inputs used on the farm) through the application of appropriate management practices.</p> <p>This can be demonstrated in either of the following ways:</p> <ul style="list-style-type: none"> - The essential management practices are deployed consistently over the applicable non-perennial crop production area each year OR - Reduction in GHG emissions (gCO₂e) for the area of non-perennial production, in line with the following trajectory: <table border="1"> <caption>Data points estimated from the Emissions reductions trajectory graph</caption> <thead> <tr> <th>Year</th> <th>Reduction (%)</th> </tr> </thead> <tbody> <tr> <td>2020</td> <td>0%</td> </tr> <tr> <td>2030</td> <td>~20%</td> </tr> <tr> <td>2040</td> <td>~30%</td> </tr> <tr> <td>2050</td> <td>~40%</td> </tr> </tbody> </table> <p>For example, over the 10 year period of 2020-2030, a 20% reduction in GHG emissions would be required. Over the 20 year period of 2020-2040, a 30% reduction in GHG emissions would be required.</p>	Year	Reduction (%)	2020	0%	2030	~20%	2040	~30%	2050	~40%
Year	Reduction (%)										
2020	0%										
2030	~20%										
2040	~30%										
2050	~40%										

2) Maintain and increase existing carbon stocks for a period equal to or greater than 20 years through the application of appropriate management practices.

This can be demonstrated in either of the following ways:

- The essential management practices are deployed consistently over the applicable non-perennial crop area each year
OR
- Above and below ground carbon stocks (tC/ha) to be increased progressively over a minimum 20-year period*

* Noting the following exception: For soils specifically, where it can be demonstrated that saturation levels have been reached, no further increase in carbon content is expected. In this case, existing levels should be maintained

3) Production is not undertaken on land that had any of the following status in or after January 2008 and no longer has that status.¹⁵⁶

- a) Wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year
- b) Continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ;
- c) Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ;¹⁵⁷
- d) Peatland, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.

Methodological notes:

For those demonstrating compliance with the essential management practices:

- The essential management practices are described in the table below. All essential practices will need to be deployed, except where particular

¹⁵⁶ This requirement is taken from RED II, Article 29, paragraphs 4 and 5. It is to be applied to all perennial crop production, whether for biofuels, bioliquids or biomass, or for food or feed uses. The intention is per RED II, namely, to ensure high carbon stock land is not converted for the purposes for agricultural production.

¹⁵⁷ Unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology of part C of Annex V of RED II is applied, the conditions laid down in paragraph 10 of Article 29 of RED II would be fulfilled.

	<p>practices can be demonstrated to be not applicable to that farm holding given the particular biophysical conditions at that farm holding.</p> <ul style="list-style-type: none"> - In respect of the essential practice relating to the GHG assessment, this assessment should be done using tools that cover all relevant emissions on the farm associated with production, as well as emissions associated with energy and fuel use (see below for relevant GHG categories). If it can be demonstrated that no carbon assessment tool is currently accessible to farmers in a given location (either because of language or lack of access to farm advisory support), this practice may be omitted in the first instance. The assessment, however, becomes mandatory within a five year period. The assessment is a self-assessment using an appropriate tool, no independent audit or verification of the GHG assessment is required. - To demonstrate compliance with all other essential practices, it will be necessary to establish a farm sustainability management plan which describes the management practices being deployed - taking into account crop husbandry requirements, farm pedo-climatic conditions - and their coverage on the farm. To prepare the farm sustainability management plan a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. - For those demonstrating compliance with GHG thresholds: - To demonstrate compliance with the quantitative GHG thresholds it will be necessary to establish a Carbon stock and GHG emission baseline for the farm (see below for relevant GHG categories). It will be against such baseline data that emission reductions of Carbon increases can be measured. A carbon audit is necessary in order to also assess where action is needed, and this must be accompanied by a carbon management plan to set out the management practices that will deliver the GHG emissions reduction/ carbon sequestration. This carbon management plan is part of the broader farm sustainability plan. - Where the (remaining) lifecycle of the crop production being financed is less than 20 years, to show broad compliance with the requirement for carbon stocks to increase progressively over a 20 year period, assurance should be sought on the likely replanting of crops to promote the permanence of carbon sequestration trends. It is recognised that uprooting old crops and replacing with new, younger stage crops with a potential fallow/ restoration period between will lead to a reduction in carbon stocks and some emissions. With this in mind, the objective is to ensure overall maintenance of carbon stocks and/ or upward trends in sequestration are sought over multiple rotations. - For all users: - Calculations of carbon stocks and GHG emissions levels should include the following, though it is recognised that in practice, the scope of GHG counted will be subject to the technical capabilities of the GHG accounting tools being used:
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	<ul style="list-style-type: none"> ○ CO₂ emissions and removals in above ground biomass ○ CO₂ emissions and removals in below ground biomass and soils ○ N₂O emissions from exposed soils, fertiliser application, and those embedded in fertiliser production and fertiliser application ○ CH₄ emissions from livestock (enteric fermentation and manure management) and some soils (e.g. wetlands) ○ CO₂ emissions from fuel and electricity use <p>- Emissions, sinks and management practices are all to be audited at 3-year intervals to confirm ongoing compliance with these requirements.</p> <p>- In the case of force majeure: emissions resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not affect the application of these requirements or result in non-compliance with these criteria.</p>			
Management category	Essential management practice	GHG ↓	C-Sq ↑	Co-benefits
Farm GHG assessment	Undertake a GHG assessment of sources of emissions and sinks on the farm. Existing and verified tools should be used. No auditing of the GHG assessment is required.	√	√	√
Crop choice and rotation (to increase carbon sequestration in soil, reduce fertilizer need, and N₂O emissions)	At least a 5 crop rotation, including at least one legume, where a multi-species cover crop between cash crops counts for 1	√	√	√
	Sowing of cover/catch crops using a locally appropriate species mixture with at least 1 legume and reducing bare soil to the point of having a living plant coverage index of at least 75% at farm level per year.	√	√	√
	Residue management	√		

Soil management (in order to prevent soil erosion and carbon losses from soils, and maintain soil health and agricultural productivity)	Prevent soil compaction (frequency and timing of field operations should be planned to avoid traffic on wet soil; tillage operation should be avoided or strongly reduced on wet soils; stock density should be reduced to avoid compaction, especially on wet soils; controlled traffic planning can be used). For best long-term results, drainage assessment and improvements needed to be carried out regularly).	√		√
	Management of carbon-rich soils <ul style="list-style-type: none"> • Avoiding deep ploughing on carbon-rich soils • Avoiding row crops and tubers • Maintaining a shallower water table – peat • Maintaining a shallower water table – arable 	√		√
	Avoid water-logging and compaction on drained soils	√		
	Maintain permanent grassland ¹⁵⁸	√	√	√
	No burning of arable stubble except where authority has granted an exemption for plant health reasons. ¹⁵⁹	√		
Nutrient management (in order to reduce N2O emissions)	Nutrient management plan to optimize fertilization and improve nitrogen use efficiency. The plan should be based on soil testing, estimating of crops nutrient requirements, recording of nutrient applications, considering field characteristics and soil type, estimating soil nitrogen supply, and where applicable analysis of manure nutrient content prior to application. In addition, it is required that a low emission N-application technology is used (e.g. slurry injection, incorporating manure in the soil within 2 hours of spreading) and fertilizer spreaders which have low coefficient of variation (synthetic fertilizer and	√	√	√

¹⁵⁸ Consistent with GAEC 1 of Annex III of COM(2018)392

¹⁵⁹ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

	farmyard manure (e.g. placing N in the soil via injection), combined with calibration of spreaders.			
Paddy Rice management	Shallow flooding	✓		
	Mid-season drying event	✓		
	Off-season straw	✓		
Structural elements with mitigation potential (in order to increase C sequestration)	Conversion of low productivity land (e.g. along field edges) into woodland to increase C sequestration and protect against soil erosion		✓	✓
Waste management	Minimize post-harvest loss	✓		
Energy use	Where energy emissions represent more than 20% of total emissions from non-perennial crop production activity, these emissions should be appropriately for the term of the investment, in line with the trajectory outlined on P11 i.e. by at least 10% compared to a 2020 baseline for a 5 year investment period, 20% compared to a 2020 baseline for a 10 year investment period to 2030, and 30% compared to a 2020 baseline for a 20 year investment period – with pro-rata adjustments for investments of intermediate durations.	✓		
Rationale				
<u>Opportunities for substantial mitigation and contributions to a net zero carbon economy</u>				
An overarching goal of the Taxonomy is to enable the screening of economic activities to determine whether or when they do or do not deliver substantial mitigation, consistent with the overarching goal of a net zero carbon economy by 2050.				
In the context of agriculture, Net-Zero is a means to ensure that even where GHG emissions cannot be reduced to zero, they can be compensated for through increased removals (through carbon sequestration) on farmed land. The discussion about the scale at which net-zero should (and could) be met solely in agriculture remains open. It may not be possible to reach net-zero emissions on an individual farm holding in all cases. In other cases, it may be more feasible. At the aggregate level, it				

may be that some countries with concentrated production systems and small land areas, would struggle to reach net-zero emissions within the agriculture sector alone and within country. This raises the question as to the extent to which a given farm, or aggregation of farms, could reach net-zero and the extent to which these farms could appropriate negative emissions (sequestration) from other farms or other sectors. Furthermore, one opportunity for emissions reductions in the agriculture sector as a whole is to switch from higher emitting activities to lower emitting activities (for example, by moving from conventional production using artificial fertiliser to organic farming), with a corresponding consumption switch between agricultural commodities. These criteria and thresholds, which focus specifically on emissions within the non-perennial crop production activity, cannot address this type of mitigation potential.

The criteria and thresholds proposed therefore focus on ensuring that emissions are substantially reduced and removals substantially increased at the economic activity (NACE code) level.

There is significant potential to reduce emissions, maintain carbon sinks, and increase sequestration through good practices in non-perennial cropland management. Each of these needs to be addressed in order to ensure that agriculture as a whole delivers substantial mitigation and contributes its part to a net-zero carbon economy. Doing so will ensure each instance of non-perennial cropland management maximises its contribution – this rationale drove the principles set out above.

Approach taken to setting thresholds for this economic activity

There continues to be a relative paucity of information and data to set absolute thresholds (e.g. gCO₂e/ha or gCO₂e/ unit of production) for agriculture that represent low carbon agriculture. Even if such information existed at the aggregate level, translating this to appropriate thresholds for implementation, would remain challenging given the heterogeneity across farms and farming practice implementation.

However, setting relative GHG thresholds (i.e. % change in gCO₂e/ ha or % change in gCO₂e/unit of production) is possible, where these can be made relative to a counterfactual on the same farm or project. Whilst this provides some quantitative means of assessing mitigation performance, it is a relatively blunt mechanism as it does not take into account emissions reductions which might previously have been achieved and if the farm is already delivering significant mitigation. Therefore, it is harder for a farm that already performs relatively well to deliver an additional X% reduction in emissions than it is for a farm that currently performs relatively poorly. Furthermore, to determine compliance with such a GHG threshold, GHG accounting at the farm level is necessary. However, this is not yet mainstream, despite the existence of a range of tools and approaches.

The proposals, therefore, allow for a different approach, namely the demonstration of the deployment of specific bundles of management practices, which are recognised as essential to delivering low carbon production in agriculture. This more qualitative approach is relatively simple to monitor, and there are existing mechanisms to do so, such as under the CAP. It also provides a more directly communicable approach to farmers and land managers who will implement such practices on the ground. As this approach is applicable for those who have already established such practices as well as those that will require additional investment finance to do so, it also allows for the recognition of farms (and associated assets and equity) that are already high performers in terms of a low GHG

footprint. As such, this approach avoids the problems associated with the relative GHG threshold as described above.

Emission contributions from agriculture in the EU arise primarily from three sources: enteric fermentation (42.9%; 0.186 GtCO₂e); management of agricultural soils (38%; 0.165 GtCO₂e); and manure management (15.4%; 0.067 GtCO₂e) (2014 figures). Mitigation potential therefore predominantly involves reductions in non-CO₂ emissions as these form the majority of agriculture emissions in the EU, with CO₂ from on-farm energy use being a minor component (covering only 0.13% of total EU28+ISL agriculture emissions in 2014). The largest share of the EU's agricultural non-CO₂ GHG emissions comes from the more potent nitrous oxide (N₂O) and methane (CH₄). Nitrous oxide accounts for 58% of non-CO₂ emissions from agriculture (largely from fertiliser application and exposed soils, as well as grazing animals), with methane accounting for the remaining 42% (largely from livestock and rice cultivation). In some cases, GHG emission from energy (traction, heating, cooling, irrigation) can form a significant proportion of emissions arising from the farm. The proposed best practices therefore include a provision for when GHG emissions from energy are greater than 20% of farm emissions, these should be reduced by 20% through efficiency and energy source requirements.

In respect of non-perennial cropland production, key sources of emissions are emissions associated with soil management and the application of fertilisers, methane emissions from rice cultivation, and avoided emissions embedded in crop waste.

Metrics and thresholds for this economic activity

On management practices that deliver substantial mitigation

Rationale for the selection of practices: Scientific literature identifies a wide range of possible management practices available in the agricultural sector to address the different emissions and opportunities for sequestration in non-perennial cropland management. For the purpose of establishing criteria and thresholds which identify when the economic activity of non-perennial cropland delivers substantial mitigation, individual management practices were identified for which: 1) there is sufficient existing scientific knowledge and consensus on the mitigation effects and interactions with other environmental and food security objectives; and 2) the scale, certainty and consistency of mitigation effects is sufficiently demonstrated (for example, Smith et al. 2008¹⁶⁰, Paustian et al. 2016¹⁶¹, Kay et al. 2019¹⁶²).

These management practices have been demonstrated to improve soil health and soil productivity so as to secure agricultural yields and thus reduce the emission intensity of crop production – outcomes critical for the delivery of substantial mitigation. The selected practices include reducing the carbon intensity of agriculture, and also do not risk leakage effects. They also do not risk negative ancillary

160 Smith, P. et al. (2008), "Greenhouse gas mitigation in agriculture", Philosophical Transactions of the Royal Society B, Vol. 363, Issue 1495, The Royal Society, London, 789-813.

161 Paustian K, Lehmann J, Ogle S, ReayD, RobertsonGP and Smith P 2016 "Climate-smart soils", Nature 532 49–57

162 Kay et al. (2019). "Agroforestry creates carbon sinks whilst enhancing the environment in agricultural landscapes in Europe", Land Use Policy 83 581-593.

effects nor are in conflict with legislation in the EU. These practices deliver substantial mitigation with relatively high certainty across a range of biophysical and farming conditions.

Scientific literature provides insights on mitigation potential on categories of individual practices and also indicates that it is the combination of practices which are applied over large areas that leads to substantial mitigation, i.e. an approach is required where all feasible mitigation practices which are environmentally sustainable should be pursued (Paustian et al. 2016). The literature, however, provides limited guidance on how to translate sectoral or activity-based mitigation potential into individual farm-level mitigation potential, i.e. what combination of practices should be applied together as a minimum at farm level in different conditions to deliver substantial mitigation. Therefore, TEG expert input was used to determine the minimum combination of practices which should be applied together for non-perennial cropland management to deliver substantial mitigation at farm level.

The table below indicates the management practices selected as the bundle of essential practices that, deployed collectively, should deliver substantial mitigation at farm level. It is noted that given heterogeneity of farms, deployment of the same bundle of practices may result in different emissions impacts farm to farm, but overall it is expected that deployment of this bundle will deliver substantial mitigation in the majority of cases.

The applicable area for management practices relates to where those practices could and should be deployed on a farm in order to meet their objectives. For example, buffer strips designed to prevent soil erosion and run-off are to be placed next to water courses and ditches, etc. Therefore, some practices may only be deployed on a small area of the farm where they add value.

One best practice, the requirement to undertake a GHG assessment does not directly lead to reduced emissions or increased sequestration. The rationale for including this practice is to raise awareness of where the main emission sources are on a farm holding, what opportunities exist and thus where greatest mitigation impact could be achieved, including through opportunities for carbon sinks, and thereby improve the targeting of mitigation action. In this spirit, no verification or audit of the assessment is required. This is different from the quantitative baseline assessment and carbon audit, both of which are necessary when demonstrating compliance with the quantitative GHG thresholds. The assessment should be done using tools that cover all relevant emissions on the farm associated with crop, livestock production, as well as emissions associated with energy and fuel use. If it can be demonstrated that no carbon assessment tool is currently accessible to farmers in a given location (either because of language or lack of access to farm advisory support), this practice may be omitted in the first instance. The assessment, however, becomes mandatory within a five year period,

On GHG emission reduction thresholds

Substantial, in the context of substantial mitigation, falls on a spectrum of mitigation potential from net-negative (where removals exceed emissions), net-zero (where removals balance with emissions) to varying degrees of emission reductions. With no EU or global baseline target for emission reductions from the agriculture sector as a whole or non-perennial crop production specifically, the degree to which emission reductions and removals should be required becomes a question of ambition and need. It is also noted that the Taxonomy has a global reach, and thus any level of 'substantial' should be consistent in the global context.

A review by Wollenberg et al, 2016¹⁶³ suggests a total mitigation need from agriculture from between 0.9 – 1.4 GtCO₂e (in 2030) to meet the 2 °C target, 1 GtCO₂e (in 2030). This was selected as an approximate target. These figures relate primarily to non-CO₂ emissions and are “an annualized”, not cumulative, goal. The target assumes an allowable emissions budget of 6.15–7.78 GtCO₂e yr-1 for agriculture in 2030. The goal represents an 11–18% reduction relative to the scenarios’ respective 2030 business as usual baselines”¹⁶⁴. As these figures represent non-CO₂ emissions, they implicitly do not recognise the role of potential carbon sequestration and its contribution to global mitigation goals. As such a GHG emissions reduction threshold of 20% over the 10 year period from 2020 to 2030 has been proposed as ‘significant contribution’ in the context of the Taxonomy. This is supported by work from Frank et al (2018)¹⁶⁵, and The IPCC’s fourth assessment report (Smith et al, 2007)¹⁶⁶.

In terms of establishing a declining emissions trajectory for agriculture, the work by Wollenberg et al (2016) calculates emission reduction needs based on a trajectory of emissions from 2010 through to 2100. The emissions curve (level of emissions over time) increases and decreases at different points, relative to existing efforts, projected changes in external factors, etc. The average reduction figure needed over this whole timeframe is 28% emission reductions compared to the baseline. As we move towards 2040 and 2050 the level of emission reductions needed increases, and this implications for any threshold set beyond the 2030 timeframe. The reduction figure in 2050 would be larger (approximately a doubling). Although in the study the level of emission reductions needed is not linear between the years, for simplicity a linear reduction is drawn between the two pegs of 20% reduction by 2030 and 40% reduction by 2050 as a linear trajectory of emission reductions also simplifies implementation and communication.

The study determined these reductions against a business as usual (BaU) scenario for agriculture. However, establishing a BaU counterfactual level of emissions for each project or farm could limit implementation effectiveness, as the BaU emissions would need to be calculated assuming the mitigation action was not in place. For simplicity, the proposed approach is therefore to simplify the requirement to compare emissions at the start of period with those achieved over the period and assess this against the target reduction for that period.

The threshold metric is gCO₂e, and not an intensity metric such as gCO₂e/ unit of production, as this enables the Taxonomy to be applied by both those reducing emission intensity (e.g. through efficiency) while also requiring them to reduce emissions overall – the overall goal.

On setting Carbon stock thresholds

163 Wollenberg, E., Richards, M., Smith, P., Havlík, P., Obersteiner, M., Tubiello, F. N., ... Campbell, B. M. (2016). Reducing emissions from agriculture to meet the 2°C target. *Global Change Biology*, 22, 3859–3864. doi:10.1111/gcb.13340

164 idem

165 Stefan Frank et al, Agricultural non-CO₂ emission reduction potential in the context of the 1.5 °C target, *Nature Climate Change* (2018). DOI: 10.1038/s41558-018-0358-8

166 Smith, P. et al. (2007), “Agriculture”, in *Climate Change 2007: Mitigation, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, New York.

Setting a universal (or global) absolute threshold (in terms of tC/ ha) for carbon stocks is not a viable option given the variability of carbon sequestration and stocking potential – which is very context specific. Those with low carbon stock potential will not be able to deliver substantial sequestration in line with a universal, absolute threshold. Even setting an absolute threshold linked to local conditions (based on maximum carbon stocking potential at that site) is not possible as at present it is impractical to test and estimate the maximum sequestration potential (i.e. saturation point) of a specific area. Such calculations currently use default values based on soil type, and therefore are not truly context specific.

Furthermore, even defining a specific % of carbon increase required is more challenging than setting the relative threshold for reducing emissions. Reducing emissions is always proportional to the level of emissions at a given point, therefore a 20% reduction can be expected to deliver a ‘substantial’ contribution from an underperforming farm (resulting in high overall emission reductions). However, the premise is different when looking to increase sequestration on agricultural land as there is relatively little evidence and few studies that suggest what level of Carbon stock increase would be needed on agricultural land in a 1.5 or 2°C climate stabilisation target scenario, as this is relative to the level of emissions from that same land (if one is pursuing a net-zero approach) or the level of carbon sequestration needed to offset other sectors of the economy. It is however, recognised that C sequestration represents the largest mitigation potential available to the agriculture sector at global scale, while emission savings of non-CO₂ emissions may be more important in the EU with a prevailing intensive production system. Smith et al (2007) estimate that 89% of the technical potential of emission reductions in the sector to 2030 and 2050 lies in soil carbon sequestration, i.e. in reducing **net** CO₂ emissions from farming practices and management, including cropland management, grazing land management, restoration of cultivated organic soils and restoration of degraded lands.

The proposal is therefore to require evidence of a positive direction of travel in terms of increasing carbon stocks, specifically, the progressive increase of carbon stocks over a 20-year period. A 20 year period for C stock saturation maintenance is proposed in line with the IPCC 20 year soil C saturation period. Where the (remaining) lifecycle of the crop production being financed is less than 20 years, assurance should be sought on the likely replanting of crops to promote the permanence of carbon sequestration trends. It is recognised that uprooting old crops and replacing with new, younger stage crops with a potential fallow/ restoration period between will lead to a reduction in carbon stocks and some emissions. With this in mind, the objective is to ensure overall maintenance of carbon stocks and/ or upward trends in sequestration are sought over multiple rotations.

On no conversion of high carbon stock land

A cut-off date of 2008 for no conversion of high carbon stock land is chosen to be consistent with the operation of the Renewable Energy Directive sustainability criteria relative to these land types. This provides a link with existing sustainability schemes through which compliance could be demonstrated for this criterion.

On demonstrating compliance with these criteria and thresholds

3-year compliance checking is proposed to ensure progress is being made and mitigation is being delivered in practice, and also to reduce the burden necessary on operators. This compliance checking is required for management practice checking, C stock change and GHG reductions.

To prepare the farm sustainability management plan a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. Advisory support will likely be required in the process of preparing the plan and may also be required to ensure adequate implementation of the plan..

Do no significant harm assessment

Key environmental aspects to be considered for investments in growing of non-perennial crops span across all other five objectives and are summarized as follows:

- ability of farming systems to adapt to a changing climate;
- impact on water quantity, water quality and water ecosystems;
- impacts on air quality;
- inefficiencies in the production system including nutrient management;
- pollutant and nutrient run-off and leaching;
- impacts on habitats and species, e.g. through conversion of areas, intensification of existing arable land, and invasive alien species.

Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

DNSH Objective	Thresholds and Metrics
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Sustainable use and protection of water and marine resources	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation..
(4) Circular economy and waste prevention and recycling	<ul style="list-style-type: none"> • Activities should minimise raw material use per unit of output, including energy through increased resource use efficiency¹⁶⁷. • Activities should minimise the loss of nutrients (in particular nitrogen and phosphate) leaching out from the production system into the environment. ¹⁶⁸

¹⁶⁷ The criterion refers to “unit of output” to allow for production efficiency increases where raw material use may not decline

¹⁶⁸ Consistent with GAEC 5 of Annex III of COM(2018)392. The aim is to provide farmers with a digital tool that helps them optimize the use of nutrients on their farm leading to environmental and agronomic benefits.

	<ul style="list-style-type: none"> Activities should use residues and by-products the production or harvesting of crops to reduce demand for primary resources, in line with good agricultural practice.¹⁶⁹
(5) Pollution prevention and control	<ul style="list-style-type: none"> Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) and with appropriate equipment and techniques to <u>reduce risk and impacts of pesticide use on human health and the environment</u> (e.g. water and air pollution) and the loss of excess nutrients.¹⁷⁰ The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment.¹⁷¹
(6) Healthy Ecosystems	<ul style="list-style-type: none"> Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter. Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value farmland, wetlands, forests, or other areas of high-biodiversity value¹⁷². This includes highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. Activities should not¹⁷³: <ul style="list-style-type: none"> result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern;

169 It is noted that the EU Circular Economy Strategy and many of the actions from the corresponding actions plans have relevance to agriculture that may provide guidance here (e.g. proposing legislation setting minimum requirements for reused water for agricultural irrigation, new Fertiliser Regulation introducing harmonised rules for organic fertilisers manufactured from secondary raw materials such as agricultural by-products and bio-wastes).

170 See Directive 2009/128/EC on sustainable use of pesticides and the Nitrates Directive. SMR 13 of CAP post 2020 will link the implementation of the pesticide directive with direct payments under cross compliance,

171 In the EU, this means the use of plant protection products that are categorised in groups 1, 2 or 3 as regard their hazard weighting under Directive (EU) 2019/782 (table1).

172 Areas of high-biodiversity-value can be defined as set out in Article 29(3) of the Directive EU(2018)2001

173 Consistent with Statutory Management Directive 3 and 4 of the post 2020 CAP and specifically Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7); Article 6(1) and (2) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7); Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)

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| | <ul style="list-style-type: none">○ contravene existing management plans or conservation objectives.• Where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and on-going monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment. |
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2.4 Livestock production

Sector classification and activity	
Macro-Sector	A - Agriculture, forestry and fishing
NACE Level	3
Code	A1.4
Description	Livestock production
Mitigation criteria	
Principles	<p>1. Demonstrate substantial avoidance or reduction of GHG emissions from livestock production (including animal management, storage and processing of manure and slurry, and management of permanent grasslands)</p> <p>2. Maintain existing sinks and increase sequestration (up to saturation point) of carbon in permanent grassland.</p> <p>Where livestock production does not include permanent grassland, only principle 1 applies.</p> <p>Permanent grassland is land used to grow grasses or other herbaceous forage, either naturally (self-seeded including 'rough grazing') or through cultivation (sown), and which is more than five years old.</p>
Threshold & metrics	<p>1) Avoid or reduce GHG emissions (including those from inputs used on the farm) through the application of appropriate management practices.</p> <p>This can be demonstrated in either of the following ways:</p> <ul style="list-style-type: none"> - The essential management practices are deployed consistently over the applicable livestock operation each year <p style="text-align: center;">OR</p>

	<ul style="list-style-type: none"> - Reduction in GHG emissions (gCO₂e) in line with the following trajectory <div style="text-align: center; margin-top: 10px;"> <p>Emissions reductions trajectory</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Reduction (%)</th> </tr> </thead> <tbody> <tr> <td>2020</td> <td>0%</td> </tr> <tr> <td>2030</td> <td>20%</td> </tr> <tr> <td>2040</td> <td>30%</td> </tr> <tr> <td>2050</td> <td>40%</td> </tr> </tbody> </table> </div> <p>For example, over the 10 year period of 2020-2030, a 20% reduction in GHG emissions would be required. Over the 20 year period of 2020-2040, a 30% reduction in GHG emissions would be required.</p> <p>2) Maintain and increase existing carbon stocks for a period equal to or greater than 20 years through the application of appropriate management practices.</p> <p>This can be demonstrated in either of the following ways:</p> <ul style="list-style-type: none"> - The essential management practices are consistently deployed over the applicable permanent grassland area each year <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> - Above and below ground carbon stocks shall increase progressively over a 20-year period* <p>* Noting the following exception: For soils specifically, where it can be demonstrated that saturation levels have been reached, no further increase in carbon content is expected. In this case, existing levels should be maintained</p> <p>3) Production is not undertaken on land that had any of the following status in or after January 2008 and no longer has that status.¹⁷⁴</p> <ul style="list-style-type: none"> a) Wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year; 	Year	Reduction (%)	2020	0%	2030	20%	2040	30%	2050	40%
Year	Reduction (%)										
2020	0%										
2030	20%										
2040	30%										
2050	40%										

¹⁷⁴ This requirement is taken from RED II, Article 29, paragraphs 4 and 5. It is to be applied to all perennial crop production, whether for biofuels, bioliquids or biomass, or for food or feed uses. The intention is per RED II, namely, to ensure high carbon stock land is not converted for the purposes for agricultural production.

	<p>b) Continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ;</p> <p>c) Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ;¹⁷⁵</p> <p>d) Peatland, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.</p>
	<p>Methodological notes:</p> <p>For those demonstrating compliance with the essential management practices:</p> <ul style="list-style-type: none"> - The essential management practices are described in the table below. All essential practices will need to be deployed, except where particular practices can be demonstrated to be not applicable to that farm holding given the particular biophysical conditions at that farm holding. - In respect of the essential practice relating to the GHG assessment, this assessment should be done using tools that cover all relevant emissions on the farm associated with production, as well as emissions associated with energy and fuel use (see below for relevant GHG categories). If it can be demonstrated that no carbon assessment tool is currently accessible to farmers in a given location (either because of language or lack of access to farm advisory support), this practice may be omitted in the first instance. The assessment, however, becomes mandatory within a five year period. The assessment is a self-assessment using an appropriate tool, no independent audit or verification of the GHG assessment is required. - To demonstrate compliance with all other essential practices, it will be necessary to establish a farm sustainability management plan which describes the management practices being deployed - taking into account crop husbandry requirements, farm pedo-climatic conditions - and their coverage on the farm. To prepare the farm sustainability management plan a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. <p>For those demonstrating compliance with GHG thresholds:</p>

¹⁷⁵ Unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology of part C of Annex V of RED II is applied, the conditions laid down in paragraph 10 of Article 29 of RED II would be fulfilled.

	<ul style="list-style-type: none"> - To demonstrate compliance with the quantitative GHG thresholds it will be necessary to establish a Carbon stock and GHG emission baseline for the farm (see below for relevant GHG categories). It will be against such baseline data that emission reductions of Carbon increases can be measured. A carbon audit is necessary in order to also assess where action is needed, and this must be accompanied by a carbon management plan to set out the management practices that will deliver the GHG emissions reduction/ carbon sequestration. This carbon management plan is part of the broader farm sustainability plan. <p>For all users:</p> <ul style="list-style-type: none"> - Calculations of carbon stocks and GHG emissions levels should include the following, though it is recognised that in practice, the scope of GHG counted will be subject to the technical capabilities of the GHG accounting tools being used: <ul style="list-style-type: none"> o CO₂ emissions and removals in above ground biomass o CO₂ emissions and removals in below ground biomass and soils o N₂O emissions from exposed soils, fertiliser application, and those embedded in fertiliser production and fertiliser application o CH₄ emissions from livestock (enteric fermentation and manure management) and some soils (e.g. wetlands) o CO₂ emissions from fuel and electricity use - Emissions, sinks and management practices are all to be audited at 3-year intervals to confirm ongoing compliance with these requirements. - In the case of force majeure: emissions resulting from natural disturbance can be excluded from impacting on the achievement of the thresholds and will not affect the application of these requirements or result in non-compliance with these criteria.
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Management category	Essential management practice	GHG ↓	C- Seq ↑	Co-benefits
Farm GHG assessment	Undertake a GHG assessment of sources of emissions and sinks on the farm. Existing and verified tools should be used. No auditing of the GHG assessment is required.	√	√	√

Animal Health Planning	Better health planning and management (develop a health management plan, improve hygiene & supervision at parturition, improve maternal nutrition in late gestation to increase offspring survival, improve fertility management, selection for improving both methane and ammonia emission efficiency).	√		
Animal Feeding	Feed additives: certain compounds, such as dietary fats, nitrate, 3-NOP, can reduce enteric CH ₄ emissions of ruminants. They need to be administered by mixed into the feed, and the dosage needs to be set accurately in order to avoid some potential negative health effects on the livestock. It is usually not feasible to apply these for the periods when the livestock is grazing.	√		
	Precision and multi-phase feeding techniques, where the nutrient requirements of groups of animals (or individual animals) are targeted in feed formulation. This can reduce nitrogen excretion and subsequent N ₂ O emissions from manure, and also increase feed efficiency in general (reducing the feed related upstream emissions).	√		
	Feed imported to the farm must be sourced responsibly and must demonstrate that the production of feed did not take place in deforested areas with high carbon stock or high biodiversity value. ¹⁷⁶	√*	√*	
Manure Management	Cooling of liquid manure. CH ₄ emissions from liquid manure increase with temperature. The slurry can be stored at a lower (ambient) temperature by using animal houses where the manure is collected in an outside pit rather than in the house.	√		

¹⁷⁶ This would require that where imported or 'bought-in' from outside the region, that it is drawn from certified feed supply chains. For example, the Round Table on Responsible Soy (RTRS) provides certification for production and for chain of custody (traceability through the supply chain). Other certification for other crops/ feedstocks standards exists.

	Note: Bundle all manure storage measures with low emission spreading			
	Covering and sealing slurry and farm-yard manure storage to reduce gaseous losses of ammonia (and related indirect N ₂ O) and also CH ₄ emissions. A wide choice of technological solutions is available from short lifetime plastic film covers to retrofitted or purpose built rigid covers.	√		√
	Separating solids from slurry: via mechanical or chemical ways the liquid part (rich in N) of the slurry (and also digestate from AD) can be separated from the solid part (rich in phosphorous and volatile solids).	√		
	Composting and applying solid manure	√	√	
	Slurry acidification is achieved by adding strong acids to the slurry to achieve a pH of 4.5-6.8 – this reduces CH ₄ and NH ₃ emissions considerably. There are three main types of technology based on the stage at which the acid is added to the slurry: in the livestock house, in the storage tank, or before field application. The slurry tank and the spreading equipment needs to be designed to withstand the acidic liquid, and precautions particularly while handling the strong acids are needed to minimize the risk of accidents. A better monitoring of the storage is also advisable to reduce the risk of slurry spillage to a minimum.	√		
	Apply low-emission application technology for slurry and manure	√	√	
Permanent grassland management	Pasture renovation (when productivity declines, reseed the pasture)	√	√	
	Remove animals from very wet fields to reduce compaction	√		√

	Maintain permanent grassland ¹⁷⁷	√	√	√
	No ploughing of permanent grassland	√	√	√
Soil management	No burning of arable stubble except where authority has granted an exemption for plant health reasons. ¹⁷⁸	√		
Energy use	Where energy emissions represent more than 20% of total emissions from livestock production activity, these emissions should be reduced appropriately for the term of the investment, in line with the trajectory outlined on P11 i.e. by at least 10% compared to a 2020 baseline for a 5 year investment period, 20% compared to a 2020 baseline for a 10 year investment period to 2030, and 30% compared to a 2020 baseline for a 20 year investment period – with pro-rata adjustments for investments of intermediate durations.	√		

Note: * benefits also delivered to other sectors, e.g. forest where deforestation has been avoided.

Rationale

Opportunities for substantial mitigation and contributions to a net zero carbon economy

An overarching goal of the Taxonomy is to enable the screening of economic activities to determine whether or when they do or do not deliver substantial mitigation, consistent with the underlying goal of a net zero carbon economy by 2050.

In the context of agriculture, Net-Zero is a means to ensure that even where GHG emissions cannot be reduced to zero, they can be compensated for through increased removals (through carbon sequestration) on farmed land. The discussion about the scale at which net-zero should (and could) be met solely in agriculture remains open. It may not be possible to reach net-zero emissions on an individual farm holding in all cases. In other cases, it may be more feasible. At the aggregate level, it may be that some countries with concentrated production systems and small land areas, would struggle to reach net-zero emissions within the agriculture sector alone and within country. This raises the question as to the extent to which a given farm, or aggregation of farms, could reach net-zero and

¹⁷⁷ Consistent with GAEC 1 of Annex III of COM(2018)392

¹⁷⁸ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

the extent to which these farms could appropriate negative emissions (sequestration) from other farms or other sectors.

The criteria proposed in the Taxonomy do not attempt to address this question directly and instead focus on ensuring that emissions are reduced and that removals increase at the economic activity (NACE code) level.

While livestock production, and in particular ruminant livestock production (beef, lamb, dairy), is a significant source of emissions in the agriculture sector it is included in the Taxonomy due to the significant short-term mitigation potential associated with reducing emissions intensity in livestock management, and in particular long-lived greenhouse gases (N₂O, CO₂), through good practices on the farm. In the short term, emission reductions associated with improved nitrogen use efficiency and manure management are substantial, with overall positive impacts on farm level economics. Each of these needs to be addressed in order to ensure that agriculture as a whole delivers substantial mitigation and contributes its part to a net zero carbon economy. Doing so ensures each instance of livestock management maximises its contribution – this rationale drove the principles set out above.

However, it is important to note that for absolute emissions from agriculture to continue decreasing beyond a certain point and to move towards net-zero targets by mid-century, reduced emissions intensity will need to be coupled as soon as possible with commensurate changes in consumption patterns and overall reduced per-capita consumption of livestock products, especially beef, lamb and dairy products. This implies both societal changes in terms of changing diets and reducing food waste, as well as structural transformations in the agricultural sector. Significant and coordinated policy efforts will be required to manage both behavioural changes on the side of consumers and to incentivise and manage structural change in the agri-food supply chain. At this point, the Taxonomy cannot address such shifts, but can only point to significant short-term potential associated with efficiency gains. Future Taxonomy updates should, however, consider these aspects.

Approach taken to setting thresholds for livestock production

There continues to be a relative paucity of information and data to set absolute thresholds (e.g. gCO₂e/ha or gCO₂e/ unit of production) for agriculture that represent low carbon agriculture. Even if such information existed at the aggregate level, translating this to appropriate thresholds would remain challenging given the heterogeneity across farms and farming practice implementation.

However, setting relative GHG thresholds (i.e. % change in gCO₂e/ ha or % change in gCO₂e/unit of production) is possible, where these can be made relative to a counterfactual on the same farm or project. Whilst this provides some quantitative means of assessing mitigation performance, it is a relatively blunt mechanism as it does not take into account emissions reductions which might previously have been achieved and farm is already delivering significant mitigation. Therefore, is harder for a farm that already performs relatively well to deliver an additional X% reduction in emissions than it is for a farm that currently performs relatively poorly. Furthermore, to determine compliance with such a GHG threshold, GHG accounting at farm level is necessary. But this is not yet mainstream, despite the existence of a range of tools and approaches.

The proposals, therefore, allow for a different approach, namely the demonstration of the deployment of specific bundles of management practices, practices that are recognised as essential to delivering low carbon production in different types of agriculture. This qualitative approach is relatively simple to monitor, and there are existing mechanisms to do so, such as under the CAP. It also provides a more directly communicable approach to farmers and land managers who will implement such practices on the ground. As this approach is applicable for those who have already established such practices as well as those that will additional investment finance to do so, it also allows for the recognition of farms (and associated assets and equity) that are already high performers in terms of a low GHG footprint, so avoids the problems associated with the relative GHG threshold as described above.

Emission contributions from agriculture in the EU arise primarily from three sources: enteric fermentation (42.9%; 0.186 GtCO₂e); management of agricultural soils (38%; 0.165 GtCO₂e); and manure management (15.4%; 0.067 GtCO₂e). And they are predominantly from reductions in non-CO₂ emissions as these form the majority of agriculture emissions in the EU, with CO₂ from on-farm energy use being a minor component (covering only 0.13% of total EU28+ISL agriculture emissions in 2014). The largest share of the EU's agricultural non-CO₂ GHG emissions comes from the more potent nitrous oxide (N₂O) and methane (CH₄). Nitrous oxide accounts for 58% of non-CO₂ emissions from agriculture (largely from fertiliser application and exposed soils, as well as grazing animals), with methane accounting for the remaining 42% (largely from livestock and rice cultivation). In some cases, GHG emission from energy (traction, heating, cooling, irrigation) can form a significant proportion of emissions arising from the farm. The proposed best practices therefore include a provision for when GHG emissions from energy are greater than 20% of farm emissions, these should be reduced by 20% through efficiency and energy source requirements.

In relation to livestock management, mitigation potential derives from improved animal health planning, lower-emission feeding strategies, and reducing emissions from manure management and waste treatment (Buckley et al. 2015¹⁷⁹, Chadwick et al 2011¹⁸⁰, Miselbrook et al 2014¹⁸¹).

Metrics and thresholds

On management practices that deliver substantial mitigation

Rationale for the selection of practices: Scientific literature identifies a wide range of possible mitigation activities available in livestock production to address the different emissions and opportunities for sequestration.

¹⁷⁹ Buckley, C., Howley, P. and Jordan, P. (2015) The role of differing farming motivations on the adoption of nutrient management practices pp. 152-162.

¹⁸⁰ Chadwick, D., Sommer, S., Thorman, R., Fangueiro, D., Cardenas, L., Amon, B. and Misselbrook, T. (2011) Manure management: Implications for greenhouse gas emissions. Animal Feed Science and Technology 166-67, 514-531.

¹⁸¹ Misselbrook, T. H., Cardenas, L. M., Camp, V., Thorman, R. E., Williams, J. R., Rollett, A. J. and Chambers, B. J. (2014) An assessment of nitrification inhibitors to reduce nitrous oxide emissions from UK agriculture. Environmental Research Letters 9, 115006.

For the purpose of the Taxonomy, individual management practices were identified for which: 1) there is sufficient existing scientific knowledge and consensus on the mitigation effects and interactions with other environmental and food security objectives; and 2) the scale, certainty and consistency of mitigation effects is sufficiently demonstrated (for example, Smith et al. 2008¹⁸², Paustian et al. 2016¹⁸³, Kay et al. 2019¹⁸⁴).

The identified practices include activities that reduce the carbon intensity of agriculture and do not risk leakage effects, and also do not risk negative ancillary effects or are in conflict with legislation in the EU. These practices deliver substantial mitigation with relatively high certainty across a range of biophysical and farming conditions.

Scientific literature provides insights on mitigation potential on categories or individual practices and also indicates that it is the combination of practices which are applied over large areas that leads to substantial mitigation, i.e. an approach is required where all feasible mitigation practices which are environmentally sustainable should be pursued (Paustian et al. 2016). The literature, however, provides limited guidance on how to translate sectoral or activity-based mitigation potential into individual farm-level mitigation potential, i.e. what combination of practices should be applied together as a minimum at farm level in different conditions to deliver substantial mitigation. Therefore, TEG expert input was used to determine the minimum combination of practices which should be applied together for each NACE activity code to deliver substantial mitigation at farm level.

The table below indicates the management practices selected as the bundle of essential practices that, deployed collectively, should deliver substantial mitigation from livestock production at farm level. It is noted that given heterogeneity of farms, deployment of the same bundle of practices may result in different emissions impacts farm to farm, but overall it is expected that deployment of this bundle will deliver substantial mitigation in the majority of cases.

The applicable area for management practices relates to where those practices could and should be deployed on a farm in order to meet their objectives. For example, buffer strips designed to prevent soil erosion and run-off are to be placed next to water courses and ditches, etc. Therefore, some practices may only be deployed on a small area of the farm where they add value.

One best practice, the requirement to undertake a GHG assessment does not directly lead to reduced emissions or increased sequestration. The rationale for including this practice is to raise awareness of where the main emission sources are on a farm holding, what opportunities exist and thus where greatest mitigation impact could be achieved, including through opportunities for carbon sinks, and thereby improve the targeting of mitigation action. In this spirit, no verification or audit of the assessment is required. This is different from the quantitative baseline assessment and carbon audit, both of which are necessary when demonstrating compliance with the quantitative GHG thresholds. The assessment should be done using tools that cover all relevant emissions on the farm associated

¹⁸² Smith, P. et al. (2008), "Greenhouse gas mitigation in agriculture", Philosophical Transactions of the Royal Society B, Vol. 363, Issue 1495, The Royal Society, London, 789-813.

¹⁸³ Paustian K, Lehmann J, Ogle S, ReayD, RobertsonGP and Smith P 2016 "Climate-smart soils", Nature 532 49–57

¹⁸⁴ Kay et al. (2019). "Agroforestry creates carbon sinks whilst enhancing the environment in agricultural landscapes in Europe", Land Use Policy 83 581-593.

with crop, livestock production, as well as emissions associated with energy and fuel use. If it can be demonstrated that no carbon assessment tool is currently accessible to farmers in a given location (either because of language or lack of access to farm advisory support), this practice may be omitted in the first instance. The assessment, however, becomes mandatory within a five year period,

On GHG emission reduction thresholds

Substantial, in the context of substantial mitigation, falls on a spectrum of mitigation potential from net - negative (where removals exceed emissions), net-zero (where removals balance with emissions) to varying degrees of emission reductions. With no EU or global baseline target for emission reductions from the agriculture sector as a whole or non-perennial crop production specifically the degree to which emission reductions and removals should be required becomes a question of ambition and need. It is also noted that the Taxonomy has a global reach, and thus any level of 'substantial' should be consistent in the global context.

A review by Wollenberg et al, 2016¹⁸⁵ suggests a total mitigation need from agriculture from between 0.9 – 1.4 GtCO₂e (in 2030) to meet the 2 °C target, 1 GtCO₂e (in 2030). This was selected as an approximate target. These figures relate primarily to non-CO₂ emissions and are "an annualized", not cumulative, goal. The target assumes an allowable emissions budget of 6.15–7.78 GtCO₂e yr-1 for agriculture in 2030. The goal represents an 11–18% reduction relative to the scenarios' respective 2030 business as usual baselines¹⁸⁶. As these figures represent non-CO₂ emissions they implicitly do not recognise the role of potential carbon sequestration and its contribution to global mitigation goals. As such a GHG emissions reduction threshold of 20% over the 10 year period from 2020 to 2030 has been proposed as 'significant contribution' in the context of the Taxonomy. This is supported by work from Frank et al (2018)¹⁸⁷, and The IPCC's fourth assessment report (Smith et al, 2007)¹⁸⁸.

In terms of establishing a declining emissions trajectory for agriculture, the work by Wollenberg et al (2016) calculates emission reduction needs based on a trajectory of emissions from 2010 through to 2100. The emissions curve (level of emissions over time) increases and decreases at different points, relative to existing efforts, projected changes in external factors, etc. The average reduction figure needed over this whole timeframe is 28% emission reductions compared to the baseline. As we move towards 2040 and 2050 the level of emission reductions needed increases, and this implications for any threshold set beyond the 2030 timeframe. The reduction figure in 2050 would be larger (approximately a doubling). Although in the study the level of emission reductions needed is not linear between the years, for simplicity a linear reduction is drawn between the two pegs of 20% reduction by

¹⁸⁵ Wollenberg, E., Richards, M., Smith, P., Havlík, P., Obersteiner, M., Tubiello, F. N., ... Campbell, B. M. (2016). Reducing emissions from agriculture to meet the 2°C target. *Global Change Biology*, 22, 3859–3864. doi:10.1111/gcb.13340

¹⁸⁶ idem

¹⁸⁷ Stefan Frank et al, Agricultural non-CO₂ emission reduction potential in the context of the 1.5 °C target, *Nature Climate Change* (2018). DOI: 10.1038/s41558-018-0358-8

¹⁸⁸ Smith, P. et al. (2007), "Agriculture", in *Climate Change 2007: Mitigation, Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, New York.

2030 and 40% reduction by 2050 as a linear trajectory of emission reductions also simplifies implementation and communication.

The study determined these reductions against a business as usual scenario for agriculture. However, establishing a BaU counterfactual level of emissions for each project or farm could limit implementation effectiveness, as the BaU emissions would need to be calculated assuming the mitigation action was not in place. For simplicity, the proposed approach is therefore to simplify the requirement to compare emissions at the start of period with those achieved over the specified period and assess this against the target reduction.

The threshold metric is gCO₂e, and not an emissions intensity metric such as gCO₂e/ unit of production, as this enables the Taxonomy to be applied by those reducing emissions intensity (e.g. through efficiency improvements) while also requiring them to reduce emissions overall – the overall goal.

On setting Carbon stock thresholds

Setting a universal (or global) absolute threshold (in terms of tC/ ha) for carbon stocks is not a viable option given the variability of carbon sequestration and stocking potential – which is very context specific. Those with low carbon stock potential will not be able to deliver substantial sequestration in line with a universal, absolute threshold. Even setting an absolute threshold linked to local conditions (based on maximum carbon stocking potential at that site) is not possible as at present it is impractical to test and estimate the maximum sequestration potential (i.e. saturation point) of a specific area. Such calculations currently use default values based on soil type, and therefore are not truly context specific.

Furthermore, even defining a specific % of carbon increase required is more challenging than setting the relative threshold for reducing emissions. Reducing emissions is always proportional to the level of emissions at a given point, therefore a 20% reduction can be expected to deliver a 'substantial' contribution from an underperforming farm (resulting in high overall emission reductions). However, the premise is different when looking to increase sequestration on agricultural land as there is relatively little evidence and few studies that suggest what level of Carbon stock increase would be needed on agricultural land in a 1.5 or 2°C climate stabilisation target scenario, as this is relative to the level of emissions from that same land (if one is pursuing a net-zero approach) or the level of carbon sequestration needed to offset other sectors of the economy. It is however, recognised that C sequestration represents the largest mitigation potential available to the agriculture sector at global scale, while emission savings of non-CO₂ emissions may be more important in the EU with a prevailing intensive production system. Smith et al (2007) estimate that 89% of the technical potential of emission reductions in the sector to 2030 and 2050 lies in soil carbon sequestration, i.e. in reducing net CO₂ emissions from farming practices and management, including cropland management, grazing land management, restoration of cultivated organic soils and restoration of degraded lands.

The proposal therefore is to require evidence of a positive direction of travel in terms of increasing carbon stocks, specifically, the progressive increase of carbon stocks (confirmed at 3-year intervals) over a 20 year period.

On no conversion of high carbon stock land

A cut-off date of 2008 for no conversion of high carbon stock land is chosen to be consistent with the operation of the Renewable Energy Directive sustainability criteria relative to these land types. This provides a link with existing sustainability schemes through which compliance could be demonstrated for this criterion.

On demonstrating compliance with these criteria and thresholds

3-year compliance checking is proposed to ensure progress is being made and mitigation is being delivered in practice, and also to reduce the burden necessary on operators. This compliance checking is required for management practice checking, C stock change and GHG reductions.

To prepare the farm sustainability management plan a carbon calculator can be used, or the plan can also be prepared using other nutrient decision-support tools. Advisory support will likely be required in the process of preparing the plan and may also be required to ensure adequate implementation of the plan..

Do no significant harm assessment

The activity livestock production captures a distinct set of sub-activities that would include intensive and extensive forms of livestock rearing, as well as the management of permanent grassland. These come with different key environmental aspects that need to be considered for investments in this sector, summarised as follows:

- ability of farming systems to adapt to a changing climate;
- impact on water quantity, water quality and water ecosystems, incl. waste water treatment from intensive rearing;
- manure treatment;
- Emissions of pollutants (such as methane, ammonia, dust, odour, noise) to air, water and soil, in particular in the case of intensive rearing;
- impact on habitats and species.

To note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.

(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Sustainable use and protection of water and marine resources	<ul style="list-style-type: none">• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	<ul style="list-style-type: none"> In the EU, fulfil the requirements of EU water legislation.
(4) Circular economy and waste prevention and recycling	<ul style="list-style-type: none"> Activities should use residues and by-products and take any other measures to minimise primary raw material use per unit of output, including energy¹⁸⁹. Activities should minimise the loss of nutrients from the production system into the environment.
(5) Pollution prevention and control	<ul style="list-style-type: none"> Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) to <u>reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution)</u> and the loss of excess nutrients through leaching, volatilisation or oxidisation.¹⁹⁰ The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment.¹⁹¹ Ensure emissions to air, water and soil are within the BATAEL ranges / are prevented or reduced by using a combination of BAT techniques as set out in the BREF for the Intensive Rearing of Poultry or Pigs¹⁹², and by using similar emission reducing techniques for dairy farming; Ensure that mitigation and emission reduction techniques for feeding and housing of livestock and for manure storage and processing are applied, as recommended in the UNECE Framework Code for Good Agricultural Practice for Reducing Ammonia; Where manure is applied to the land, activities should comply with the limit of 170kg nitrogen application per hectare per year, or alternatively, the derogated threshold where one has been set in that member state¹⁹³.
(6) Healthy Ecosystems	<ul style="list-style-type: none"> Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter.

¹⁸⁹ The criterion refers to “unit of output” to allow for production efficiency increases where raw material use may not decline.

¹⁹⁰ See Directive 2009/128/EC on sustainable use of pesticides and the Nitrates Directive. SMR 13 of CAP post 2020 will link the implementation of the pesticide directive with direct payments under cross compliance,

¹⁹¹ In the EU, this means the use of plant protection products that are categorised in groups 1, 2 or 3 as regard their hazard weighting under Directive (EU) 2019/782 (table1).

¹⁹² <http://eippcb.jrc.ec.europa.eu/reference/irpp.html>

¹⁹³ This threshold derives from the provisions set out under the Nitrates Directive 91/676/EC [Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources]. In practice the threshold of 170kg/ha/year has been implemented by Member States by setting limits on livestock density between 1.7 - 2.0 livestock units / ha. Livestock unit is a reference unit which facilitates the aggregation of livestock from various species and age as per convention, via the use of specific coefficients established on the basis of the nutritional or feed requirement of each type of animal (see, for example, [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Livestock_unit_\(LSU\)](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Livestock_unit_(LSU)))

	<ul style="list-style-type: none"> • Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetland, forests or other areas of high-biodiversity value¹⁹⁴. This includes highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. • Activities should not¹⁹⁵: <ul style="list-style-type: none"> ○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; ○ contravene existing management plans or conservation objectives; ○ lead to overgrazing other forms of degradation of grasslands.
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¹⁹⁴ Areas of high-biodiversity-value can be defined as set out in Article 29(3) of the Directive EU(2018)2001

¹⁹⁵ Consistent with Statutory Management Directive 3 and 4 of the post 2020 CAP and specifically Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7); Article 6(1) and (2) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7); Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)

3. MANUFACTURING

Why manufacturing is included in the Taxonomy

Manufacturing is the second largest contributor to CO₂e emissions but is also able to produce the products and technologies that can contribute to GHG emissions reductions in other sectors of the economy and is thus a fundamental part of the low-carbon economy.

The manufacturing section of the Taxonomy therefore includes both the manufacturing of low-carbon technologies as well as energy intensive and hard-to-abate manufacturing sectors. It aims to give support to those economic activities that are low in carbon emissions and first movers who are engaging in a transformational shift.

Manufacturing coverage and thresholds

Which economic activities are included and why

The economic activities covered include sectors that account for a high share of industrial GHG emissions as a result of scope 1 and scope 2 emissions related to the manufacture of the products and therefore offer large potential for GHG emissions reduction. Specifically, this includes: the manufacturing of aluminium (NACE 24.42); the manufacturing of iron and steel (NACE 24.1, 24.2, 24.3); the manufacturing of cement (NACE 23.51); and the manufacturing of chemicals (NACE 20.13, 20.14, 20.15, 20.16).

Additionally, enabling activities are also included in manufacturing which covers both those activities included under “low carbon technologies” and also “mitigation measures” which when combined result in achievement of the thresholds.

- **Low carbon activities** refers to: the manufacturing of products, key components, equipment and machinery that are essential to a number of key renewable energy technologies (geothermal power, hydropower, concentrated solar power (CSP), solar photovoltaic (PV) technology, wind energy and ocean energy); the manufacturing of low-carbon transport vehicles, fleets and vessels; the manufacturing of energy efficiency equipment for buildings and other low-carbon technologies that result in substantial GHG emission reductions in further sectors of the economy (including private households).
- **Mitigation measures** are included as enabling activities since they are recognised as critical steps supporting the transition of economic activities in these high emitting manufacturing sectors towards reaching the defined thresholds.

The TEG acknowledges that many manufacturing activities are still not currently covered in the Taxonomy, and this must be addressed. It should be stated, however, that the TEG have not assumed that omitted activities are non-green or brown. Due to limited time, the TEG has focused its attention on those economic activities likely to play the biggest role in leading Europe down a low-carbon pathway to meet its Paris Agreement and 2050 climate neutrality goals. Therefore, the first round of sectors included in the manufacturing section of the Taxonomy are either those energy intensive and hard-to-abate sectors that emit the most greenhouse gas emissions or those enabling manufacturing sectors that are clearly necessary for Europe’s low-carbon economic transformation. This means that other manufacturing sectors (including other energy-intensive sectors) are not currently included even if they are significant in their impact.

Criteria, Metrics and Thresholds

The manufacturing activities addressed in this first draft of the mitigation Taxonomy are considered to make a substantial contribution to climate change mitigation if the specific thresholds set for each activity are reached (e.g. producing cement with GHG emissions lower than 0.498 tCO₂e/t of cement). The criteria focus instead on reducing the GHG emissions caused by manufacturing activities up to the levels of performance achieved by best performers. The criteria cover in general both scope 1 and 2 emissions. Additionally, in a number of sectors, the requirement to limit GHG emissions to the level set in the EU ETS benchmarks has been complemented by other thresholds (e.g. on the energy efficiency and carbon intensity of the electricity used) or by alternative qualitative criteria (e.g. making production of recycled aluminium eligible).

The EU ETS benchmarks have been the main reference for setting such thresholds, as they correspond to the level of performance achieved by the 10% best installations in the EU and are updated regularly. The platform is recommended to review whether additional requirements could be set for those economic activities where BAT-Associated Energy Efficiency Levels (BAT-AEELs) exist or are developed over time, based on such levels. The implications of this in terms of global applicability of the Taxonomy will need to be considered. A regular update is also needed to assess if alternative low carbon technologies have become market ready and commercially available. This may result in alternative threshold criteria for activities that currently have a threshold based on EU ETS benchmarks.

The thresholds for the manufacturing activities are predominantly tied to EU ETS benchmarks. That means that the thresholds reflect the average performance of the 10% most efficient installations in a particular sector. EU ETS benchmarks have been selected because they are the most robust benchmarks available and the data calculated according to the boundaries set are readily available for all installations within the EU that are part of the EU ETS scheme. Although performance data using such metrics are not necessarily readily available for non-EU installations, the methodologies can be followed and therefore can also be calculated univocally for non-EU installations. Additionally, the EU ETS benchmarks are periodically updated approximately every 5 years, meaning that the thresholds that refer to them will not be static over time but automatically continue to represent the performance of the 10% best performing plants.

The TEG recognizes that there are disadvantages to using the EU ETS benchmarks. The benchmarks are based on EU historic trends rather than global data. Moreover, EU ETS benchmarks do not consider the full lifecycle of a process or product but are focused on scope 1 and/or scope 2 GHG emissions. Therefore, EU ETS benchmarks do not directly support recycling or improvement in upstream emissions. Mindful of these limitations the TEG has actively looked for equally robust data sources but has to date not been able to identify equally robust data sources. **Where equally robust data can be provided these should be considered by the Platform.**

There are no explicit thresholds for those manufacturing activities listed under the **category “low carbon technologies”**. No criteria on the GHG emissions from manufacturing of listed products are specified since the mitigation benefits of these products, components, equipment and technology are considered to outweigh the emissions generated as a result of the manufacturing process to generate them. This uncomprehensive list is complemented by additional criteria that allow additional products, components, equipment or technologies to be considered eligible if the overall benefits in terms of GHG emissions

reductions are proven by life cycle carbon foot printing. (See low carbon technologies section in tables below).

Mitigation measures are eligible for inclusion under manufacturing when expenditures in energy efficiency measures, process improvements and all other mitigation measures in one of the eligible manufacturing activities support closing the gap between the current level of efficiency and the level considered 'substantially contributing to mitigation objectives' as defined by the thresholds. This has two implications for users of the Taxonomy:

- i. For private finance users of the Taxonomy, where revenues from Taxonomy eligible activities count, such as equities (the share of a corporation would be considered eligible based on the share of revenues from Taxonomy-eligible activities): only manufacturing activities complying with the activity threshold would be considered eligible.
- ii. For the uses of the Taxonomy where expenditures in Taxonomy-eligible measures count (such as for financing projects, green mortgages, the use of proceeds from green bonds or simply counting how much a corporation has invested in climate mitigation): all the investments needed to reach the activity threshold would be considered eligible. This means that measures are eligible once they are implemented entirely and the threshold is reached, as well as if individual investments in different measures are implemented over a defined time span as part of an overall investment plan (e.g. 5 or 10 years) and substantially support the activity achieving the thresholds.

Application of CCS in the Manufacturing Sector

In the manufacturing sector, certain processes are difficult to reduce to very low carbon levels, particularly in the metals, minerals and chemical sectors. In those cases, switching to renewable energy sources and energy efficient measures are not feasible options and very low carbon levels may only be achieved by either implementing an alternative manufacturing process, like switching to the production of alternative products, or due to the introduction of carbon capture and storage (CCS) technologies, which are addressed in another section of the Taxonomy. Additionally, if CCS enables an economic activity in the manufacturing sector to meet its screening criteria, the installation of CCS technology can be considered Taxonomy eligible once the screening criteria has been met. This also applies to overall economic activity. Carbon Capture and Utilisation (CCU), where the captured CO₂ is utilized as a feed stock (e.g. for a chemical process), may also qualify, if substantial mitigation impacts can be demonstrated by reducing emissions towards meeting the activity criteria (e.g. the use of CO₂ for enhanced oil extraction would not qualify).

Coherence with other sections of the Taxonomy

Due to the nature of manufacturing, and in order to undertake a proper systemic value chain approach in the Taxonomy, close linkages have been made with the energy, transport, agriculture and building sectors. Where possible, circularity considerations (in so far as they affect GHG emissions) and a broader value chain approach have been considered. Given the role of the manufacturing sector in supply chains, the future Platform will need to review the thresholds to assess whether changes will be necessary to accommodate the planned circular economy objectives of the Taxonomy. i.e. it is recommended that at the point in time when the Platform work to define threshold criteria for meeting substantial circular economy contributions the manufacturing thresholds currently defined with regard to mitigation and adaptation objectives are reviewed.

Stakeholder feedback

In June 2019 the TEG published its report on EU Taxonomy.¹⁹⁶ The manufacturing group were very pleased to receive the rich and insightful comments which have informed the TEG. It should be noted that some sectors submitted their comments collectively through an industry representative where as others submitted similar or identical text multiple times. What follows is an overview of how the TEG subgroup has worked to respond to the Call for Feedback to get feedback on the publications.

1. The most contentious aspect in manufacturing in terms of the highest number of disagreements was in relation to the list of low carbon technologies list. Most of the submissions, many of them identical, were requesting additional technologies to be included in the list. These were reviewed and appropriate amendments were made to the list in the light of these comments.
2. Stakeholders expressed concerns about the stringency of the thresholds for the manufacture of hydrogen given the need for green hydrogen to contribute to a 2050 zero future. As a result of feedback, the thresholds were amended.
3. There were multiple requests for a life-cycle analysis of steel to be taken into account in thresholds proposed to acknowledge that steel is a material that can fully be recycled and will continue to play a role in a low carbon economy. We acknowledge the role that steel may play in the supply chain efficiencies, but for practical reasons have limited the scope of thresholds proposed to the production of primary steel and steel recycling only. At this stage, circular economy criteria for steel are not proposed and need to be developed in a later stage. In this respect, the manufacturing of e.g. aluminium or cement is dealt with in a similar way.
4. It was noted that there were many submissions relating to different manufacturing activities, including cement were not purely of technical nature but were rather presented as a position. The TEG has worked to ensure that the thresholds applied promote low carbon production.
5. There was some considerable concern from stakeholders about the manufacture of plastics, particularly single source plastic production. Many of the submissions recommended a circular economic perspective be introduced. In response, the threshold has become more explicit in limiting eligibility to those plastic manufacturers where at least 90% of the final plastic is not used for single use consumer products and is not recycled. This needs to be confirmed needs to be confirmed from science-based research/studies etc.

Next steps and recommendations

1. The TEG recognizes that the scope of the manufacturing section of the Taxonomy should be extended to cover more manufacturing activities. Care must continue to be taken to review the context in which the Taxonomy is applied to ensure that it does not identify activities as green which have perverse incentives or a negative impact on other environmental objectives. From a manufacturing perspective, the TEG

¹⁹⁶ See, https://ec.europa.eu/info/publications/sustainable-finance-teg-taxonomy_en.

recommends that in the next round the future platform consider building on the work undertaken to establish thresholds for other manufacturing sectors that include at least in the near-term:

- **Further analysis of high polluting activities such as glass manufacturing, paper and pulp manufacturing, and textiles.** The manufacturing processes for these activities are complex, multiple and result in the production of an array of diverse products. The TEG recommends that the future platform address these manufacturing sectors, by prioritising those processes that contribute the most significant portion of emissions (e.g. steam generation in the paper and pulp sector) and work to establish thresholds for these specific processes.
- **Mining:** this is an important sector both in terms of avoiding bottlenecks in the deployment of low-carbon technologies by providing the critical materials needed for low-carbon technologies, as well as the value chain link with energy-intensive manufacturing sectors. Unfortunately, the TEG was not able to complete work for this sector due to time constraints and the complexity of the issues. The TEG recommends that the platform analyse the role the sector plays in terms of enhancing availability of the critical materials needed for current and future technologies to create a climate neutral, circular and resource efficient economy, while sourcing raw materials in a sustainable and responsible way, with a view to consider the enabling potential of the sector. The platform is recommended to ensure that a life cycle approach is applied when assessing the different phases of the value chain for mining is applied. The rational for applying life cycle analysis is that many metals are essential for low-carbon technologies. For example, Aluminium for lightweight cars; Copper for electrics and motors in electric vehicles, solar panels and wind turbines; Battery metals (Cobalt, Lead, Lithium, Manganese, and Nickel) for clean mobility and grid storage batteries; Zinc and Cobalt for protecting off-shore wind turbines; Silicon in solar panels; Precious metals for clean mobility and solar panels.
- **Further analysis for light manufacturing sectors** may also need to be considered by the platform as these sectors grow in impact. For these, the platform could either try to develop individual activity criteria for each (where feasible) or identify key improvement measures applicable across a number of these sectors and classify them as individual enabling activities.

2. Further criteria under DNSH could be analysed particular in regard to the following issues:

- **Red Mud:** A waste by product of the process for producing al oxide from the bauxite ore for aluminium, referred to as red mud contains toxic heavy metals and its high alkalinity makes it corrosive and damaging to soil and life forms, presenting potentially substantial impacts when disposed. Toxic dumps and settling pools are a feature alongside all bauxite/alumina plants worldwide, including across Europe, Russia, China, Guinea, Brazil, Jamaica and Australia. The global average of bauxite residue generated per tonne of alumina is between 1 and 1.5 tonnes; it is estimated that over 150 million tonnes of bauxite residue are produced annually – 5-6 million tonnes in Europe alone, and the majority of this waste is being landfilled. The platform is recommended to consider the impacts of red mud under minimum social and health safeguards and develop an approach to set up criteria to integrate this within the DNSH environmental impact.
- The platform is recommended to carry out a **risk-based assessment on the exposure scenarios for all chemicals/products/by-products** contained in the taxonomy. It is to be noted that other organic and inorganic chemicals/products/by-products included in the taxonomy are also potentially hazardous to human health and the environment depending upon the exposure scenarios, and therefore objective, scientifically robust, risk-based assessments should be carried out for all.

Furthermore, the platform should take into consideration the value chain and circular economy aspects of chemicals/products/by-products. For example, Chlorine and PVC are required for the production of PVC doors and windows, which are necessary for improved energy efficiency of the building sector. Such value chain and CE considerations would follow a similar logic applied to soda-ash in the current version of the Taxonomy, on the basis that it is required for glazing of double and triple glazed windows.

3. The platform is recommended to regularly update the thresholds paying particular attention to:

- Ensuring that the **thresholds are updated** in the light of EU ETS benchmark revisions.
- Review the thresholds in the light of **circular economy objectives** and takes into consideration the impact of applying an additional requirement that for those economic activities where BAT-Associated Energy Efficiency Levels (BAT-AEELs) exist, these must also be met. The implications of this in terms of global application of the Taxonomy will need to be considered.

4. Explore expansion of low carbon technologies list.

- Further analysis on the inclusion of factories or companies that produce the following technologies. For example, heat pumps, LED lighting, Hot water fittings (e.g. taps, showers) that are rated in the top class (dark green) of the European Water Label Scheme (<http://www.europeanwaterlabel.eu/>) may be produced by a factory or company but other things may also be produced.
- The TEG recommends that in future the platform consider:
 - manufacturing of charging points for electric vehicles.
 - How and under what conditions to include carbon capture and utilisation (CCU) technologies in different manufacturing sectors, as well as the manufacturing of such equipment.

5. Enhance existing thresholds to account for different applications of cement.

- The platform is recommended to consider developing specific thresholds for different applications of cement, e.g. concrete for specific building applications. The focus should be on the substitution of clinker by binders with a lower content of embedded CO₂. Cement is currently produced in many different qualities, which are sometimes used in different applications. As a result exchange between two qualities is not always possible. Therefore, on the way to a climate-neutral economy, it has to be determined which types of cement in which application areas can be replaced by those with a reduced clinker content, taking into account the availability of clinker substitutes. Within the decarbonisation of other industries, it may be possible that material flows used today (e.g. fly ash) will no longer be available in the future as a clinker substitute, while the suitability of other materials has not yet been proven. The cement types, which are absolutely necessary in a climate-neutral economy and cannot be replaced, must be produced in a climate-friendly way. For these types, it then should be examined to what extent the clinker ratio can be lowered, how energy efficiency can be increased, how electricity from renewable energies can be used, etc.

6. Consider how to enhance circular economy objectives for the sector.

- The mitigation thresholds proposed in the taxonomy for manufacturing specifically address the segment in the supply chain with the highest direct emissions (i.e. the scope 1 and 2 emissions related to the manufacturing of the product). Given the role of the manufacturing sector in supply chains, circular economy objectives are of particular relevance for this sector. Once threshold criteria for meeting substantial circular economy contributions are being developed, we recommend reviewing these in the context of the mitigation threshold criteria, which address a specific segment of the circular economy. For example, improving LCA within the manufacturing sector. For example, LCA consideration of products (steel/aluminium/cement).
- With regard to both data availability and value chain depth, it is recommended that further care be taken by the platform to address two issues: first, the possibility of looking at data complementary to the ETS benchmarks; and secondly to ensure that a more complete value chain analysis is undertaken, which will include resource efficiency, in order to match current legislative discussions around circularity and critical materials-use, including responsible sourcing

3.1 Manufacture of Low carbon technologies

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	
Code	No specific NACE code
Description	<p>Manufacture of low carbon technologies</p> <ul style="list-style-type: none"> • Manufacturing of products, key components, and machinery that are essential for eligible renewable energy technologies • Manufacture of eligible low carbon transport vehicles, fleets and vessels. • Manufacture of eligible energy efficiency equipment for buildings • Manufacture of other low carbon technologies that result in substantial GHG emission reductions in other sectors of the economy (including private households)
Mitigation criteria	
Principle	The manufacture of low carbon technologies that result in substantial GHG emission reductions in other sectors of the economy (including private households) is eligible provided that product related emissions are at least the level of best available techniques i.e. a factory that produces electric cars, but burns coal is not eligible).
Threshold	<p>1. Manufacture of products, key components and machinery that are essential for eligible renewable energy technologies (Geothermal Power, Hydropower, Concentrated Solar Power (CSP), Solar Photovoltaic (PV), solar thermal energy for district heat production, Wind energy, Ocean energy, bio energy technologies that meet the conversion efficiency requirements set in the Renewable Energy Directive (2018/2001/EU) and Green hydrogen and hydrogen electrolysis installation¹⁹⁷</p> <p>2. Manufacture of low carbon transport vehicles and their respective key components , fleets and vessels meeting the following criteria is eligible:</p> <p>Passenger cars, light commercial vehicles (CO2 Regulation for cars and vans (EU) 2019/631):</p> <ul style="list-style-type: none"> • Until 2025: vehicles with tailpipe emission intensity of max 50 g CO₂/km (WLTP). This also includes zero tailpipe emission vehicles (e.g. electric, hydrogen).

¹⁹⁷ Hydrogen electrolysis installation will be part of the taxonomy if it shows a considerable level of green electricity consumption and shows a pathway towards an increased share of green electricity over the years to come

	<ul style="list-style-type: none"> From 2026 onwards: only vehicles with emission intensity of 0g CO₂/km (WLTP). <p>For category L vehicles:</p> <ul style="list-style-type: none"> Zero tailpipe emission vehicles (incl. hydrogen, fuel cell, electric). <p>Heavy Duty Vehicles: N2 and N3 vehicles, as defined by (Heavy duty CO₂ Regulation (EU) 2019/1242):</p> <ul style="list-style-type: none"> Zero direct emission heavy-duty vehicles that emits less than 1g CO₂/kWh (or 1g CO₂/km for certain N2 vehicles); low-emission heavy-duty vehicles with specific direct CO₂emissions of less than 50% of the reference CO₂emissions of all vehicles in the same sub-group. <p>Rail Fleets:</p> <ul style="list-style-type: none"> Zero direct emissions trains <p>Urban, suburban and interurban passenger land transport fleets</p> <ul style="list-style-type: none"> Zero direct emissions land transport fleets (e.g. light rail transit, metro, tram, trolleybus, bus and rail) <p>Water transport</p> <ul style="list-style-type: none"> Zero direct emissions waterborne vessels. <p>3. Manufacture of the following products (with thresholds where appropriate) for energy efficient equipment for buildings and their key components is eligible:</p> <ul style="list-style-type: none"> Installation of Building Management Systems (BMS) High efficiency windows (U-value better than 0.7 W/m²K) High efficiency doors (U-value better than 1.2 W/m²K) Insulation products with low thermal conductivity (lambda lower or equal to 0.045 W/mK), external cladding with U-value lower than 0.5 W/m²K and roofing systems with U-value lower than 0.3 W/m²K) Hot water fittings (e.g. taps, showers) that are rated in the top class (dark green) of the European Water Label Scheme (http://www.europeanwaterlabel.eu/) Household appliances (e.g. washing machines, dishwashers) rated in the top available class according to the EU Energy Label for each type of appliance High efficiency lighting appliances rated in the highest energy efficiency class that is significantly populated in the energy efficiency label (or higher classes) according to EU energy labelling regulations Presence and daylight controls for lighting systems
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	<ul style="list-style-type: none"> • Highly efficient space heating and domestic hot water systems rated in the highest energy efficiency class significantly populated in the energy efficiency label (or higher classes) according to EU energy labelling regulations • Highly efficient cooling and ventilation systems rated in the highest energy efficiency class significantly populated in the energy efficiency label or higher classes according to EU energy labelling regulations • Heat pumps compliant with the criteria for heat pumps given in the energy section of the taxonomy • Façade and roofing elements with a solar shading or solar control function, including those that support the growing of vegetation • Energy-efficient building automation and control systems for commercial buildings as defined according to the EN 15232 standard. • Zoned thermostats and devices for the smart monitoring of the main electricity loads for residential buildings, and sensoring equipment, e.g. motion control. <p>Products for heat metering and thermostatic controls for individual homes connected to district heating systems and individual flats connected to central heating systems serving a whole building.</p> <p>4. The manufacture of low carbon technologies and their key components that result in substantial GHG emission reductions in other sectors of the economy (including private households) is eligible if they demonstrate substantial higher net GHG emission reductions compared to the best performing alternative technology/ product/ solution available on the market on the basis of a recognised/standardised cradle-to-cradle carbon footprint assessment (e.g. ISO 14067, 14040, EPD or PEF) validated by a third party.</p>
Rationale	
<p>The list of specific eligible technologies is coherent with the eligible activities in other sections of the Taxonomy, namely energy, transport and buildings.</p> <p>However, in some cases, the list is less broad than the eligible activities in the corresponding section of the Taxonomy due to limited resources to explore in this phase the implications for use in other sectors of the same products, components, equipment and infrastructure. Further analysis is required to ensure no perverse incentives occur.</p> <p>For transport the manufacture is focused on the production of complete low carbon or zero carbon vehicles, fleets or vessels so that either revenue from sales of eligible vehicles or expenditure on investments in manufacturing capacity specifically relating to eligible vehicles can be identified.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the manufacture of low carbon technologies is associated with:</p>	

- the (potential) use of toxic substances and generation of toxic wastes (both at the manufacturing stage as well as at other stages of the product/equipment lifecycle); and
- the potential for polluting emissions to air, water and soil from the manufacturing process.

Depending on the product/equipment being manufactured, there may, also be issues with respect to the embodied carbon and the demand for certain metals and materials (e.g. rare earth metals) which are in limited supply and may have significant environmental impact issues associated with the mining phase.

	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(2) Adaptation	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(3) Water	<ul style="list-style-type: none"> • Embodied carbon emissions should represent less than 50% of the total carbon emissions saved by the use of the energy efficient equipment. Carbon emissions and savings at the end-of-life stage are not included in the assessment for this criteria (too uncertain).
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation (1272/2008/EC) and the RoHS (Restriction of Hazardous Substances) Regulation (2002/95/EC) or the equivalent for equipment manufactured and used outside the EU (n.b.: equipment manufactured outside of the EU but imported into the EU must comply with the REACH and RoHS Regulations).
(5) Pollution	<ul style="list-style-type: none"> • Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented. • For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:

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| | <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and <p>a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.</p> |
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3.2 Manufacture of Cement

Sector classification and activity	
Macro-Sector	C - Manufacturing
NACE Level	4
Code	C23.5.1
Description	Manufacture of cement
Mitigation criteria	
Principle	<p>The manufacturing of cement is associated with significant CO₂ emissions. Minimising process emissions through energy efficiency improvements and switch to alternative fuels, promoting the reduction of the clinker to cement ration and the use of alternative clinkers and binders can contribute to the mitigation objective.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions.</p>
Threshold	<p>Thresholds for cement Clinker (A) are applicable to plants that produce clinker only, and do not produce finished cement. All other plants need to meet the thresholds for cement or alternative binder</p> <p>(A) Cement clinker:</p> <p>Specific emissions (calculated according to the methodology used for EU-ETS benchmarks) associated to the clinker production processes are lower than the value of the related EU-ETS benchmark.</p> <p>As of February 2020, the EU-ETS benchmark value for cement clinker manufacturing is: 0.766 tCO₂e/t of clinker¹⁹⁸</p> <p>(B) Cement:</p> <p>Specific emissions associated to the clinker and cement production processes are lower than: 0.498 tCO₂e/t of cement or alternative binder¹⁹⁹</p>
Rationale	
<p>Cement production is responsible for more than 70% of the emissions under C.23 and concrete is the most significant application for the use of cement. Cement is the main constituent of concrete. The content of cement in the concrete and total GHG emissions can vary significantly based on the</p>	

¹⁹⁸ Based on the EU ETS benchmark for grey cement clinker (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0278&from=EN>). The threshold for cement clinker needs to be revised every time that there is an update in the EU ETS benchmark value for grey cement clinker.

¹⁹⁹ Threshold was derived taking into account the threshold for cement clinker and the threshold for clinker to cement ratio. It excludes emissions from electricity use that is mainly required for finish grinding, raw materials grinding and the exhaust fans (kiln/raw mill and cement mill).

specifications of the application that concrete will be used for. For this reason, manufacturing of concrete (Concrete - NACE C.23.6) is not covered by the sustainable Taxonomy.

Cement manufacture includes three main stages:

1. Raw materials preparation;
2. Clinker production;
3. Grinding of clinker with other components such as gypsum, fly ash, ground granulated blast furnace slag (GGBFS) and fine limestone to produce the finished cement.

Typically, 30-40% of direct CO₂ emissions comes from the combustion of fuels; the remaining 60-70% comes from the chemical reactions involved in converting limestone to calcium oxide²⁰⁰.

Reducing the emissions from the manufacturing process of cement can therefore positively contribute to the mitigation objective.

The absolute performance approach has been proposed in order to identify the maximum acceptable carbon intensity that the activity should comply with in order to be able to substantially contribute to the mitigation objective.

ETS product benchmarks have been selected as one of the thresholds for cement clinker production. They reflect the average performance of the 10% most efficient installations in a sector.

Within cement manufacture, the following activities were taken into account:

1. Process emissions: Emissions from the calcination process for the production of cement clinker
2. Fuel emissions: Energy required for the calcination process during the clinker production

The cement production facilities that meet the identified threshold are expected to achieve thermal energy intensity in the range of 2.9 – 3,4 GJ/t clinker.

Threshold calculations:

- Cement clinker: Specific emissions: 0.766 tCO₂e/t of clinker (EU-ETS)
- Clinker to cement ratio: 0.65²⁰¹
- Specific emissions: $0.766 \times 0.65 = 0.498$ tCO₂e/t of cement (or alternative binder)

Electricity: Indirect emissions from the use of electricity during the clinker and cement production

The main users of electricity in cement plants are the mills (grinding of cement, milling of raw materials) and the exhaust fans (kiln/raw mill and cement mill, which together account for more than 80% of the electrical energy usage. The electricity demand in cement plants ranges from 90 to 150 kWh/t cement²⁰².

200 <https://webstore.iea.org/technology-roadmap-low-carbon-transition-in-the-cement-industry>

201 As weighted average for the total production of the facility. Global average in 2014 was 0.65. EU around 0.75, and projected to 0.65 in 2030

202 <https://webstore.iea.org/technology-roadmap-low-carbon-transition-in-the-cement-industry>

A global average electric energy demand for cement manufacturing of 104 kWh/t cement was reported by Cement Sustainability Initiative (CSI) for the years 2012 to 2014²⁰³. The CSI data cover more than 900 plants worldwide, and all technologies and clinker and cement types. The variations in the data are significant: The 10% best in class show figures of 85 kWh/t cement and below, while the 90% percentile amounted to 129 kWh/t cement.

Taking into account that the decarbonisation of the cement sector will run in parallel with the decarbonisation of the energy sector, it is expected that the electricity required (as auxiliary power) for cement manufacture in the near future will come from renewable sources and thus a specific threshold for specific electricity consumption is not proposed. Based on the above-mentioned information and sources, it is expected that the best in class plants have specific electricity consumption of 85 kWh/t cement.

- **Improving energy efficiency:** Thermal energy intensity of clinker and the electric intensity of cement can be reduced by deploying existing state-of-the-art technologies in new cement plants and retrofitting existing facilities to improve energy performance levels when economically viable.
- **Switching to alternative fuels:** The carbon intensity of cement clinker can be reduced significantly by the use of biomass and waste materials as fuels in cement kilns. The clinker-burning process offers good conditions for using different types of waste materials replacing parts of the consumption of carbon-intensive fossil fuels. A wide range of different types of wastes can be used as fuels but as these can replace primary fuel in cement kilns, a consistent waste quality is essential (e.g. adequate calorific value, metal, halogen and ash content).
- **Reducing the clinker to cement ratio:** Increasing the use of blended materials and the market deployment of blended cements is very important for the decarbonisation of the sector and alignment with a low carbon pathway. This requires substitution of cement clinker by mineral additives such as fly ash, silica fume or blast-furnace slag. The amount of clinker substitute that can be blended in the cement depends on the type of substitute and the type of cement produced. Some mineral additives, e.g. GBFS, allow for substitution levels of over 70 per cent. Revision of the cement and concrete standards, building codes and public procurement regulations would be required in order to allow more widespread use of blended cements with very high substitution of clinker (e.g. >60%) while ensuring product reliability and durability at final application.
- **Alternative clinkers and binders:** Alternative clinker formulations (e.g. belite, CSA, BCSA, CACS, MOMS) and alternative binders (e.g. alkali-activated binders) could offer potential opportunities for CO₂ emissions reductions by using different mixes of raw materials or alternatives compared to Portland cement. Their commercial availability and applicability differ widely. Further efforts are required to support the demonstration, testing and earlier stage research for alternative clinkers and binders and to develop standards to facilitate market deployment. The specification of the benchmark based on ton of binder will allow investments in these types of novel alternative binders to be considered for eligibility under the EU Sustainable Taxonomy.
- **Renewable energy generation and use:** Electricity supplied from renewable energy sources could be explored as a measure to reduce carbon intensity of the final cement product. This can

²⁰³ https://docs.wbcsd.org/2017/06/CSI_ECRA_Technology_Papers_2017.pdf

be achieved through different strategies including implementing renewable-based captive power generation, power purchase agreements that ensure electricity imports are provided from renewable sources or demand-side response strategies that enable a flexible electricity demand (e.g. a flexible operating strategy of grinding plants throughout the day). Various renewable-based options are available for cement manufacturers including wind power, solar photovoltaic power, solar thermal power and small hydropower generation. Potential deployment of these technologies in cement plants is highly dependent on local conditions.

- **Transportation emissions:** The emissions from transportation are excluded as these represent only a small percentage of the total emissions of cement manufacture.

Additional information:

European Commission, Report. Competitiveness of the European Cement and Lime Sectors, December 2017

https://ec.europa.eu/growth/content/competitiveness-european-cement-and-lime-sectors_en

Provisions to determine the benchmarks in the period from 2021 to 2025 and for the period from 2026 to 2030 are included in Art. 10a, paragraphs 2(a) and 2(c) of the Directive 2003/87/EC.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20180408&qid=1547917622180&from=EN>

Do no significant harm assessment

The main potential significant harm to other environmental objectives from cement manufacturing is associated with:

- Polluting emissions to air associated to the consumption of fossil fuels and calcinations reaction in the cement kiln;
- Water consumption at production facilities located in water-stressed areas;
- Potential for soil and groundwater contamination associated with the handling and storage of (hazardous) wastes used as fuel substitute ('secondary' fuels) in the cement production process;

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Cement manufacturing plants accept alternative fuels such as SRF originating from waste, as well as secondary raw materials such as recycled concrete aggregates (RCA).</p> <p>For cement production sites using hazardous wastes as alternative fuels, ensure a waste management plan that meets EU standards (or equivalent for plants operated in non-EU countries) exists and is implemented.</p>

(5) Pollution	<p>Ensure emissions to air and water are within the BAT-AEL ranges set in the BREF for the Production of Cement, Lime and Magnesium Oxide¹</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p> <p>Ensure implementation of a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p> <p>Exclusion of refuse derived fuels for cement production. Co-incineration of waste has significant impacts on health and the environment due to the polluting nature of the associated emissions, and higher emissions ceiling for cement plants in comparison with dedicated waste incineration plants. Furthermore, promoting waste as eligible fuel source may undermine waste minimisation efforts in other sectors.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

3.3 Manufacture of Aluminium

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C24.4.2
Description	Manufacture of aluminium
Mitigation criteria	
Principle	<p>The manufacturing of aluminium is a highly energy intensive process. The CO₂ emissions related to the production of aluminium are primarily scope 2 emissions (i.e. from the generation of the electricity used). Aluminium manufacturing is eligible if relying on low carbon electricity and reduced direct emissions.</p> <p>Furthermore, all aluminium recycling is eligible due to significantly lower emissions than primary production.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p>Manufacture of primary aluminium is eligible if Criteria 1 (see below) is met in combination with either criteria 2 or 3 (see below):</p> <ol style="list-style-type: none"> Criteria 1: Direct emission for primary aluminium production is at or below the value of the related EU-ETS benchmark. <p>As of February 2020, the EU-ETS benchmarks values for aluminium manufacturing is 1.514 tCO₂e/t.</p> <p>Direct emissions are to be calculated according to the methodology used for EU-ETS benchmarks)</p> <ol style="list-style-type: none"> Criteria 2: Electricity consumption for electrolysis is at or below: 15.29 MWh/t (European average emission factor according to International Aluminium Institute, 2017, to be updated annually)²⁰⁴ Criteria 3: Average carbon intensity of the electricity that is used for primary aluminium production (electrolysis) is at or below: 100 g CO₂e/kWh (Taxonomy threshold for electricity production, subject to periodical update).

²⁰⁴ <http://www.world-aluminium.org/statistics/primary-aluminium-smelting-power-consumption/#data>

	<ul style="list-style-type: none"> • Manufacture of secondary aluminium (i.e. production of aluminium from recycled aluminium) is eligible. No additional mitigation criteria need to be met.
Rationale	
	<ul style="list-style-type: none"> - Emissions related to the manufacturing of aluminium are primarily related to the use of electricity. - Electricity costs contribute to over 50% of the production costs. Consequently, there is a strong incentive for the aluminium industry to aim for improving energy efficiency. - The key action for aluminium production to make a substantial contribution to climate change mitigation is to increase its share of use of low carbon electricity. It is acknowledged that on the short term the availability low carbon electricity may be a limiting factor, depending on the region. This will change in on the medium term, when sufficient low carbon electricity will become available. - The second action for aluminium production to make a substantial contribution to climate change mitigation is to decrease the process's direct emissions and the emissions due to fuel use for on-site energy production - It is acknowledged that aluminium production facilities can play an important role in stabilizing electricity grids by active management of electricity demand. This may result in substantial mitigation contributions, e.g. by limiting the need for electricity storage facilities. However, given the lack of available metrics to quantify these impacts, these benefits are not taken into account at this stage. - It is acknowledged that aluminium will play a role in a low carbon economy, in particular enabling light weight products and electrification (including transmission wires). Such applications could also be considered eligible under the activity "Manufacture of other low carbon technologies" provided they can demonstrate substantial emissions reductions according to the criteria for that activity. Furthermore, compared to a number of other construction materials, e.g. steel or plastics, the current process for aluminium manufacturing is easy to decarbonise, i.e. by use of low carbon electricity, - All aluminium recycling is considered to make a substantial contribution to climate change mitigation because of its association with much lower emissions than primary production

The emissions covered are:

- Scope 1: all direct emissions related to the production (the process's direct emissions and the emissions due to fuel use for on-site energy production).
- Scope 2: Electricity consumption for electrolysis process and related emissions from the generation of the electricity used.

Information sources:

- ASI Performance standard, version 2, December 2017, <https://aluminium-stewardship.org/asi-standards/asi-performance-standard/>
- CO2 benchmark as defined for free allocation of Emission allowances under the ETS: 1.514 allowances/ton Al
- International Aluminium institute: <http://www.world-aluminium.org/statistics/primary-aluminium-smelting-energy-intensity/>

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the manufacture of aluminium is associated with:

- the potential for significant air emission impacts: perfluorocarbons, fluoride gases, polycyclic aromatic hydrocarbons (PAHs), and particulate matter (e.g. unused cryolite). Hydrogen fluorides can be toxic to vegetation;
- the toxic, corrosive and reactive nature of waste generated by the used linings (cathodes) from the electrolytic cells (known as spent pot lining (SPL)). Dissolved fluorides and cyanides from the SPL material can create significant environmental impacts including groundwater contamination and pollution of local watercourses;
- the ability (or lacking thereof) of aluminium manufacturing plants to incorporate aluminium scrap (including scrap from their own manufacturing processes) in the production process; and the potential to impact ecosystems as a result of the land footprint of the site and from polluting emissions.

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Measures are in place to minimise and manage waste (including hazardous waste) and material use in accordance with the BREF for the Non-Ferrous Metals Industries.</p> <p>In order to avoid risks to circular economy, aluminium manufacturing plants need to be able to process aluminium scrap. In order to avoid unnecessary resource and energy consumption, the aluminium scrap collection and sorting activities should be optimised for separation on an alloy specific basis. If scrap alloys are mixed, the functionality of the recycled material is restricted, and valuable alloying elements may be lost.</p>
(5) Pollution	<p>Emissions to air (e.g. sulphur dioxide - SO₂, nitrogen oxide - NO_x, particulate matter, Total Organic Carbon (TOC), dioxins, , mercury (Hg), hydrogen chloride (HCl), hydrogen fluoride (HF), Total Fluoride, and (PFCs) polyfluorinated hydrocarbons (PFCs)) are within the BAT-AEL ranges set in the BREF for the Non-Ferrous Metals Industries.²⁰⁵</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>

205 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.174.01.0032.01.ENG

	A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO Word Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2018); • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and <p>a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.</p>

3.4 Manufacture of Iron and Steel

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	3 and 4
Code	<p>C24.1: Manufacture of basic iron and steel and of ferro-alloys</p> <p>C24.2: Manufacture of tubes, pipes, hollow profiles and related fittings, of steel</p> <p>C24.3: Manufacture of other products of first processing of steel</p> <p>C24.5.1: Casting of iron</p> <p>C24.5.2: Casting of steel</p>
Description	Manufacture of iron and steel
Mitigation criteria	
Principle	<p>Manufacturing of iron and steel at the level of performance achieved by best performing plants is considered to make a substantial contribution to climate change mitigation.</p> <p>Furthermore, secondary production of steel (i.e. using scrap steel) is considered eligible due to significantly lower emissions than primary steel production.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p>Manufacturing of iron and steel is eligible if the GHG emissions (calculated according to the methodology used for EU-ETS benchmarks) associated to the production processes are lower than the values of the related EU-ETS benchmarks.</p> <p>As of February 2020, the EU-ETS benchmarks values for iron and steel manufacturing are:</p> <ul style="list-style-type: none"> • Hot metal = 1.328 tCO2e/t product • Sintered ore = 0.171 tCO2e/t product • Iron casting = 0.325 tCO2e/t product • Electric Arc Furnace (EAF) high alloy steel = 0.352 tCO2e/t product • Electric Arc Furnace (EAF) carbon steel = 0.283 tCO2e/t product • Coke (excluding lignite coke) = 0.286 tCO2e/t product <p>All green new steel production, or combination of new and recycled steel production, is eligible if the emissions fall below the thresholds above.</p>

	Additionally, all production of steel in EAF where at least 90% of the iron content in the final products is sourced from scrap steel is considered eligible. In this case, no other thresholds are applicable.'
Rationale	
<p>The ETS benchmarks are the selected thresholds because of their reliability and the 5-year future update plan. Additionally, they are the only consistent data set available today.</p> <p>The "Achievable Reference Performance" specific emissions values, as defined in the standard EN 19694-2:2016, are considered to be accessible to any operator under normal operating conditions and therefore such specific emission values are less strict than the proposed EU ETS benchmarks.</p> <p>Therefore, the EU ETS benchmarks have been selected because they provide an ambitious threshold under which the steel and iron making industry should strive to operate in the short-term. However, given that the EU ETS benchmarks are for specific steps of production, the TEG recommends that the Sustainable Finance Platform analyses the possibility to define a threshold for the overall integrated steel plant using the methodology set in the standard EN 19694-2:2016.</p> <p>In the long-term, the steel and iron making industry should aim at implementing breakthrough technologies (characterised by ultra-low CO₂ emissions). Some of these technologies have already been demonstrated at the pilot or at industrial scale. Once these technologies become commercially available, the proposed thresholds will need to be revised in order to reflect the more ambitious specific emission values achievable. These technologies include:</p> <ul style="list-style-type: none"> • blast furnace top gas recycling with carbon capture and storage; • direct smelting reduction processes • direct reduction with natural gas for production of DRI combined with EAF steelmaking; • hydrogen steelmaking in shaft furnaces using H₂ produced via water electrolysis (e.g. using renewable electricity sources); • direct electrolysis of iron ore; 	
<p>This activity focuses on the greening of iron and steel manufacturing due to its high contribution to global GHG emissions. The potential of greening by products made of iron and steel can be addressed through other activities such as "manufacture of other low carbon technologies" where according to the criteria given for this activity, the manufacturer can prove the overall environmental benefits over the whole life.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from iron and steel production is associated with:</p> <ul style="list-style-type: none"> • emissions to air from coke-making and smelting operations, especially particulate matter (dust), oxides of nitrogen, sulphur dioxide, carbon monoxide, chlorides, fluorides, volatile organic compounds, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzodioxins/furans, and heavy metals; • emissions to water of hydrocarbons and suspended solids; • water consumption for quenching and cooling operations in water stressed areas; • the potential to impact local ecosystems and biodiversity due to the polluting emissions (if not properly mitigated) and due to the large land footprint of the operations and associated ancillary activities; and • wastes and by products from the coking and smelting operations including, tar and benzole. 	

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Appropriate measures are in place to minimise and manage waste and material use in accordance with BREF for iron and steel production.
(5) Pollution	<p>Ensure emissions to water and air are within the BAT-AEL ranges set in the BREF for iron and steel production (e.g. for pH, total suspended solids (TSS), chemical oxygen demand (COD), chromium (total) and heavy metals, for sulphur dioxide - SO₂, nitrogen oxide - NO_x, particulate matter, polychlorinated dibenzo-dioxins/furans, mercury (Hg), hydrogen chloride (HCl) and hydrogen fluoride (HF)).</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage and Key Biodiversity Areas (KBAs) have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

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| | <ul style="list-style-type: none">• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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3.5 Manufacture of Hydrogen

Sector classification and activity	
Macro-Sector	C - Manufacturing
NACE Level	4
Code	C20.1.1
Description	Manufacture of hydrogen (CPA: 20.11.11.50)
Mitigation criteria	
Principle	<p>The manufacturing of hydrogen is a highly carbon-intensive activity within the chemical industry²⁰⁶. Reducing the emissions from the manufacturing activity itself can positively contribute to the mitigation objectives.</p> <p>Hydrogen generated as a process by product of the chlor-alkali production is not eligible.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p>The following thresholds need to be met:</p> <ul style="list-style-type: none"> • Direct CO₂ emissions from manufacturing of hydrogen: 5.8 tCO₂e/t Hydrogen in alignment with energy thresholds in the taxonomy. • Electricity use for hydrogen produced by electrolysis is at or lower than 58 MWh/t Hydrogen ²⁰⁷ • Average carbon intensity of the electricity produced that is used for hydrogen manufacturing is at or below 100 gCO₂e/kWh (Taxonomy threshold for electricity production, subject to periodical update).
Rationale	
<p>Currently, almost 96% of industrially-produced hydrogen is manufactured via steam reforming using fossil fuels: 48% (natural gas), 30% (liquid hydrocarbon) and 18% (coal). Steam reforming is a mature process, associated with high CO₂ emissions and incompatible with the EU Strategy for long-term EU greenhouse gas emissions reductions.</p>	

²⁰⁶ Energy efficiency and JRC emissions, Perspective scenarios for the chemical and petrochemical industry, JRC (2017), page 12. <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>. Accounting for approximately 9% of the emissions from the chemical sector. Please note that emissions from the production of methanol and synthesis gas are included in the 9% share.

²⁰⁷ pag 52 of report published by DECHEMA and commissioned by CEFIC https://dechema.de/dechema_media/Downloads/Positionspapiere/Technology_study_Low_carbon_energy_and_feedstock_for_the_European_chemical_industry-p-20002750.pdf

Minimizing the emissions from hydrogen manufacturing, by promoting low carbon emission production processes can positively contribute to the mitigation objective.

The selected metrics are (1) emission factors, in terms of GHG emissions per unit of production and in terms of electricity consumed as well and (2) an energy efficiency threshold for electricity consumption. The thresholds cover both direct and indirect emissions, to ensure that the most effective abatement techniques are being incentivized, while avoiding inconsistent incentives, which might promote manufacturing processes which reduce direct emissions, but which are associated with extremely high indirect emissions.²⁰⁸

The thresholds reflect the performance of electrolysis with low carbon energy as defined in the electricity generation activities, and could also be achieved with CCS. The thresholds proposed are also in line with current best market practices to certify green hydrogen²⁰⁹.

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the manufacture of hydrogen is, in practical terms, inseparable from the potential for significant harm created by the hydrocarbon refining activity more generally and is associated with:

- polluting emissions to air (in the case of hydrogen production via electrolysis, there is an indirect environmental impact associated with the generation of electricity);
- water used for cooling might lead to local resource depletion, dependent of the local scarcity of water resources; and
- the generation of wastes (e.g. spent catalysts and by-products of the various physical and chemical treatment processes used in purifying the hydrogen produced via hydrocarbon processing).

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Where manufacture of hydrogen takes place within the context of an oil and gas refining installation, ensure appropriate measures are in place to minimize and manage waste and material use in accordance with the BAT conclusions of the BREF for the Refining of Mineral Oil and Gas.

208 The production of hydrogen through electrolysis using low carbon electricity will be the preferable process in the decarbonized future. See page 64 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

See also : page 22, http://www.energy-transitions.org/sites/default/files/ETC_MissionPossible_FullReport.pdf

page 73, <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>

page 354 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

209 see EU CertifHy project: <https://www.certifhy.eu>

(5) Pollution	<p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards.</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage and Key Biodiversity Areas (KBAs) have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

3.6 Manufacture of other inorganic basic chemicals

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.3
Description	<ul style="list-style-type: none"> • Manufacture of carbon black • Manufacture of disodium carbonate (soda ash) • Manufacture of chlorine <p>CPA codes:</p> <ul style="list-style-type: none"> • Carbon black: 20.13.21.30 • Disodium carbonate (soda ash): 20.13.43.10 • Chlorine: 20.13.21.11
Mitigation criteria	
Principle	<p>Reducing the emissions from the manufacturing of carbon black and soda ash and improving energy efficiency and switching to low carbon electricity²¹⁰ in the manufacturing of chlorine can positively contribute to the climate change mitigation objective.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p><u>Manufacturing of carbon black and soda ash</u> are eligible if the GHG emissions (calculated according to the methodology used for EU-ETS benchmarks) associated to the production processes are lower than the values of the related EU-ETS benchmarks.</p> <p>As of February 2020, the EU-ETS benchmarks values are:</p> <ul style="list-style-type: none"> • For carbon black: 1.954 tCO2e/t • For soda ash: 0.843 tCO2e/t <p><u>Manufacturing of chlorine</u> is eligible if the two following thresholds are met:</p> <ul style="list-style-type: none"> • Electricity use for chlorine manufacturing is at or lower than 2.45 MWh/t Chlorine (includes both electrolysis and chlorine treatment, threshold subject to periodical update)²¹¹

210 See page 40

https://dechema.de/dechema_media/Downloads/Positionspapiere/Technology_study_Low_carbon_energy_and_feedstock_for_the_European_chemical_industry-p-20002750.pdf

211 https://www.eurochlor.org/wp-content/uploads/2019/04/12-electrolysis_production_costs.pdf

	<ul style="list-style-type: none"> Average carbon intensity of the electricity that is used for chlorine manufacturing is at or below 100 gCO2e/kWh (Taxonomy threshold for electricity production, subject to periodical update).
Rationale	
<p>The <u>manufacturing process of carbon black</u> accounts for approximately 3.4% of the GHG emissions from the chemical sector, while the manufacturing of soda ash accounts for 1.5% of the emissions.²¹²</p> <p>The manufacturing process of chlorine is extremely energy-intensive, with chlor-alkali process accounting for 17% of total electrical consumption of the European chemical and petrochemical industry.²¹³</p> <p>Reducing the manufacturing emissions for carbon black and soda ash and improving energy efficiency in the manufacturing of chlorine can positively contribute to the mitigation objective. Moreover it is recognised that soda ash used in double glazing can enhance building efficiency gains.</p> <p>The absolute performance approach has been proposed in order to identify the maximum acceptable carbon intensities of the manufacturing processes of carbon black and soda ash that the activities should comply with in order to be able to substantially contribute to the mitigation objective.</p> <p>For the <u>manufacturing of chlorine</u>, a process that uses electricity to fuel the electrolysis process, the absolute performance approach has been proposed in order to identify the energy intensity threshold. In addition to complying with the energy efficiency threshold, the process shall be based on low carbon electricity.</p> <p>ETS product benchmarks have been selected as thresholds for the manufacturing of carbon black and soda ash. They reflect the average performance of the 10% most efficient installations in a sector.</p> <p>Emissions covered:</p> <ul style="list-style-type: none"> Scope 1: All direct emissions related to the production (the process direct emissions and the emissions due to fuel use for energy production). Note on the electricity: According to the methodology to calculate ETS benchmarks, emissions from electricity are considered where direct emissions and indirect emissions from electricity are to a certain level interchangeable (as is the case for carbon black but not for soda ash).²¹⁴ <p>For chlorine, the value corresponding to an efficient level of electricity consumption was selected as the threshold given that the main source of energy used for the production of chlorine is electricity and by improving the energy efficiency of the process, as well as using low carbon electricity sources, the activity can substantially contribute to the climate change mitigation objective.</p> <p>https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2012:387:0005:0013:EN:PDF</p> <p>https://epub.wupperinst.org/frontdoor/deliver/index/docId/6478/file/6478_Lechtenboehmer.pdf</p>	

212 Page 14 <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>

213 page 11 http://eippcb.jrc.ec.europa.eu/reference/BREF/CAK_BREF_102014.pdf

214 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0278&from=EN>

https://ec.europa.eu/clima/sites/clima/files/ets/allowances/docs/gd9_sector_specific_guidance_en.pdf

EU average data reported in a CEPS desk study. (CEPS, Ares(2014) 174266-27/01/2014)

BREF:

http://eippcb.jrc.ec.europa.eu/reference/BREF/lvic-s_bref_0907.pdf

http://eippcb.jrc.ec.europa.eu/reference/BREF/CAK_BREF_102014.pdf

Provisions to determine the benchmarks in the period from 2021 to 2025 and for the period from 2026 to 2030 are included in Art. 10a, paragraphs 2(a) and 2(c) of the Directive 2003/87/EC.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20180408&qid=1547917622180&from=EN>

The DNSH assessment is split across the three chemicals:

- Manufacture of carbon black
- Manufacture of disodium carbonate (soda ash)
- Manufacture of chlorine

Do no significant harm assessment	
<u>Manufacture of carbon black</u>	
The main potential significant harm to other environmental objectives from the manufacture of carbon black is associated with: <ul style="list-style-type: none">• polluting emissions to air, especially volatile organic compounds (VOC) and dust;• the use of water in water stressed areas for cooling purposes; and• the generation of wastes.	
(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none">• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.• In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Wastes and by-products, especially hazardous manufacturing wastes, are managed in line with the Waste Treatment BREF and the requirements set out in BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry).
(5) Pollution	Ensure polluting emissions to air are within BAT-AEL ranges set in the BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry). A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance

	Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), have been implemented.
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Do no significant harm assessment	
<u>Manufacture of disodium carbonate (soda ash)</u>	
The main potential significant harm to other environmental objectives from the manufacture of soda ash is associated with:	
(2) Adaptation	<ul style="list-style-type: none"> the generation of process effluents (e.g. calcium chloride in aqueous solution), by products and wastes with the potential to pollute groundwater and surface water bodies as well as soils; polluting air emissions; the use of water in water scarce areas for cooling purposes; and impacts on ecosystems and biodiversity from the disposal of wastes and by-products (primarily calcium carbonate, gypsum, sodium chloride and calcium chloride, although there can be trace amounts of toxic materials such as mercury, cadmium, arsenic and zinc depending on the source of the raw materials (e.g. limestone) for the production process) which create ‘waste beds’.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment and the requirements set out in BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry).
(5) Pollution	Ensure polluting emissions to air and water are within BAT-AEL ranges set in the BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry). The most stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the

	<p>site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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Do no significant harm assessment

Manufacture of chlorine

The main potential significant harm to other environmental objectives from the manufacture of chlorine is associated with:

- polluting emissions to air (e.g. chlorine);
- process water effluents which can contain oxidizing agents (e.g. chlorine)
- the use of water in water stressed areas; and
- the generation of wastes

Due to the intrinsic hazard properties of chlorine it is recommended to further assess when Chlorine could be considered part of the solution to achieving zero pollution (toxic free environment) and therefore should not be excluded from the taxonomy due to DNSH implications.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.

(4) Circular Economy	Wastes and by-products, especially hazardous process wastes, are managed in line with the Waste Treatment BREF and the requirements set out in the BREF for the Production of Chlor-Alkali.
(5) Pollution	Ensure polluting emissions to air and water are within the BAT-AEL ranges set in the BREF for the Production of Chlor-Alkali.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

3.7 Manufacture of other organic basic chemicals

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.4
Description	<p>Manufacture of:</p> <ul style="list-style-type: none"> • High volume chemicals: <ul style="list-style-type: none"> ○ acetylene: 20.14.11.90²¹⁵ ○ ethylene: 20.14.11.30 ○ propylene: 20.14.11.40 ○ butadiene: 20.14.11.60 ○ hydrogen: 20.11.11.50 • Aromatics: <ul style="list-style-type: none"> ○ Mixed alkylbenzenes, mixed alkylnaphthalenes other than HS 2707 or 2902: 20.59.56.70 ○ Cyclohexane: 20.14.12.13 ○ Benzene: 20.14.12.23 ○ Toluene: 20.14.12.25 ○ o-Xylene: 20.14.12.43 ○ p-Xylene: 20.14.12.45 ○ m-Xylene and mixed xylene isomers: 20.14.12.47 ○ Ethylbenzene: 20.14.12.60 ○ Cumene: 20.14.12.70 ○ Biphenyl, terphenyls, vinyltoluenes, other cyclic hydrocarbons excluding cyclanes, cyclenes, cycloterpenes, benzene, toluene, xylenes, styrene, ethylbenzene, cumene, naphthalene, anthracene: 20.14.12.90 ○ Benzol (benzene), toluol (toluene) and xylol (xylenes): 20.14.73.20 ○ Naphthalene and other aromatic hydrocarbon mixtures (excluding benzole, toluole, xylole): 20.14.73.40 • Vinyl chloride: 20.14.13.71 • Styrene: 20.14.12.50 • Ethylene oxide: 20.14.63.73

	<ul style="list-style-type: none"> • Monoethylene glycol: 20.14.23.10 • Adipic acid: 20.14.33.85 • Organic chemicals, which fall under the following CPA codes: <ul style="list-style-type: none"> ○ Saturated acyclic monocarboxylic acids and their derivatives (20.14.32) ○ Unsaturated monocarboxylic, cyclanic, cyclenic or cyclotepenic acyclic polycarboxylic acids and their derivatives (20.14.33) ○ Aromatic polycarboxylic and carboxylic acids with additional oxygen functions; and their derivatives, except salicylic acid and its salts (20.14.34)
Mitigation criteria	
Principle	<p>The manufacturing of organic chemicals is associated with significant CO2 emissions. Minimizing process emissions and promoting the manufacturing of organic chemicals with renewable feedstock can contribute to the mitigation objective.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p>For the manufacturing of all chemicals covered in this activity except the manufacture of the following CPA product categories: 20.14.32, 20.14.33, 20.14.34; the selected metric is:</p> <ul style="list-style-type: none"> • Emission factor: GHG emissions per unit of production (tCO2e/t) <p>GHG emissions must be calculated according to the methodology used for EU-ETS benchmarks.</p> <p>For the manufacturing of the organic chemicals falling under the codes:</p> <ul style="list-style-type: none"> • 20.14.32 • 20.14.33 • 20.14.34 <p>the following criterion shall apply:</p> <ul style="list-style-type: none"> • the manufacturing of the organic chemicals shall be wholly or partially based on renewable feedstock and, • the carbon footprint shall be substantially lower compared to the carbon footprint of the same chemical manufactured from fossil fuel feedstock. The carbon footprint shall be calculated in accordance with ISO 14067:2018 and validated by a third party. <p>For the purpose of applying these criteria, renewable feedstock refers to biomass, industrial bio-waste or municipal bio-waste.</p>

Additional criteria the activity needs to comply with:

If feedstock is biomass (excluding industrial and municipal bio-waste):

- a full traceability of sourcing through the corresponding chain of custody management system needs to be in place and its effectiveness proven through the corresponding certification systems;
- any forest biomass used in the process shall comply with EU Timber Regulation (EU/995/2010) and the EU Forest Law Enforcement Governance and Trade (FLEGT), where applicable;
- any forest biomass used in the process is committed to forest certification using independent third-party schemes that are regularly audited in the forest areas. Forest management and chain of custody practices in sourcing areas that are not yet certified, must be aligned (roadmap to certification) with the same certification standards;
- forest biomass coming from irrigated forest plantations shall not be used;
- any biomass produced and used in the process must be subject to a transparent, credible chain of custody and comply with biomass sustainability criteria as defined in the cross compliance conditionalities of the Common Agricultural Policy and as defined in the Common Fisheries Policy;
- Biomass used shall comply with align with the requirements defined under the directives RED + and RED2+ as applicable for biomass and biofuels and with the requirements for biomass defined in the forestry section in this Taxonomy. Biomass shall not come from agricultural land that has been the subject of land use change from forest or pasture since 2008 (Aligned with RED). The above-mentioned certification schemes shall provide a robust chain of custody audit system for the feedstock;
- products derived from new, greenfield oil palm tree plantations are excluded from the scope;
- particular case of forest biomass certification: small-scale palm oil cultivators operating in existing forest plantations should be able to be included in the certification system and ensure that they receive their fair share of profits.

If feedstock is industrial bio-waste (incl. waste from the food or feed industries) or municipal bio-waste:

- any solid bio-waste used in the manufacturing process shall originate from source-segregated and separately collected (non-hazardous) waste streams, i.e. shall not be separated from mixed residual waste;
- the bio-waste used in the process shall be consistent with the waste regulatory framework and the national/regional/local waste management plans, in particular with the proximity principle. Where municipal bio-waste is used as a feedstock, the project shall be complementary to and not compete with existing municipal bio-waste management infrastructure.

	<p>If the manufacturing processes for any of the organic chemicals for which the ETS benchmarks are used as thresholds is based on renewable feedstock, then the criteria for the renewable feedstock also apply.</p> <p>ETS product benchmarks only for the manufacturing of all chemicals covered in this activity except the manufacturing of the following CPA product categories: 20.14.32, 20.14.33, 20.14.34:</p> <ul style="list-style-type: none"> a) For HVC: 0,702 tCO₂e/t b) For aromatics: 0,0295 tCO₂e/t²¹⁶ c) For vinyl chloride: 0,204 tCO₂e/t d) For styrene: 0,527 tCO₂e/t e) For ethylene oxide/ethylene glycols: 0,512 tCO₂e/t g) For adipic acid 2,79 (allowances/t).
Rationale	
<p>For the manufacturing of all chemicals in this activity except CPA codes 20.14.31, 20.14.32, 20.14.33, 20.14.34:</p> <p>The manufacturing of high value chemicals, aromatics, ethylene chloride, vinyl chloride, ethylbenzene, styrene, ethylene oxide, mono ethylene glycol and methanol accounts for more than 35% of the emissions from the chemical sector.²¹⁷</p> <p>Steam cracking is the main industrial process for manufacturing high value chemicals, but is also the most energy intensive one in the chemical industry and responsible for 25% of the GHG emissions from the chemical industry.²¹⁸</p> <p>Reducing the emissions from the manufacturing process of organic chemicals can therefore positively contribute to the mitigation objective.</p> <p>The absolute performance approach has been proposed in order to identify the maximum acceptable carbon intensity that the activity should comply with in order to be able to substantially contribute to the mitigation objective.</p> <p>ETS product benchmarks have been selected as thresholds. They reflect the average performance of the 10% most efficient installations in a sector.</p> <p>Emissions covered:</p> <ul style="list-style-type: none"> – Scope 1: All direct emissions related to the production (the process direct emissions and the emissions due to fuel use for energy production). – Note on electricity: According to the methodology to calculate ETS benchmarks, emissions from electricity are considered where direct emissions and indirect emissions from electricity are to a certain level interchangeable. 	

216 Unit of production: CO₂ weighted tonne

217 Page 14 <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>

218 Page 14 <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>

The thresholds have been aligned with the work undertaken in the respective forestry subgroup. The following principles have been applied where biomass use is relevant:

- All Sustainable Forestry Management requirements have EU legislation as minimum baseline. The Forest Taxonomy includes this overarching principle ‘Carry out harvesting activities in compliance with national laws’ and refers to EU Timber Regulation (EU/995/2010) and FLEGT.
- The Taxonomy doesn’t include forest plantations – because of the mitigation focus. We do recognize the international guiding principles against deforestation provided by UN REDD, as an overarching principle.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0278&from=EN>

https://ec.europa.eu/clima/sites/clima/files/ets/allowances/docs/gd9_sector_specific_guidance_en.pdf

BREF:

<https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/best-available-techniques-bat-reference-document-production-large-volume-organic-chemicals>

Provisions to determine the benchmarks in the period from 2021 to 2025 and for the period from 2026 to 2030 are included in Art. 10a, paragraphs 2(a) and 2(c) of the Directive 2003/87/EC.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20180408&qid=1547917622180&from=EN>

For the manufacturing of chemicals under CPA codes 20.14.31, 20.14.32, 20.14.33, 20.14.34:

Art. 6 of the Commission’s proposed regulation on a framework to facilitate sustainable investment includes “switching to use of renewable materials” to provide a substantial contribution to climate change mitigation. The innovative bio-based chemical sector may contribute to that objective. Therefore, additional criteria have been specified to identify the conditions under which the manufacturing process of organic chemicals - when based on renewable feedstock, such as biomass - can substantially contribute to the mitigation objective.

“Bio-based chemicals are defined as chemical products that are wholly or partly derived from materials of biological origin (for example biomasses, feedstock, but also plants, algae, crops, trees, marine organisms and biological waste). Given their expected limited environmental footprint in comparison to their traditional counterparts, bio-based chemicals have recently emerged on EU markets as valid, environmentally friendly alternatives to standard chemicals”.²¹⁹

Do no significant harm assessment

The main potential significant harm to the environment from the production of other organic chemicals is associated with:

- polluting emissions to air and water from the production process;
- vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities;

219 <https://ec.europa.eu/jrc/en/science-update/future-bio-based-chemicals-eu-bioeconomy>

	<ul style="list-style-type: none"> the use of water resources for production purposes (e.g. cooling water) in water stressed areas; and the generation of hazardous wastes.
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment ²²⁰ .
(5) Pollution	<p>Ensure polluting emissions to air, soil and water are within BAT-AEL ranges as set out in the following BREF documents (as applicable):</p> <ul style="list-style-type: none"> BREF document LVOC (Large Volume Organic Chemicals)²²¹ BREF document CWW (for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector)²²² BREF document EFS (Emissions From Storage)²²³ BREF document REF (Refining of Mineral Oil and Gas)²²⁴ BREF document WT (Waste Treatment) (referenced above) BREF document WI (Waste Incineration)²²⁵ <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p>

220 Best Available Techniques (BAT) Reference Document for Waste Treatment available at http://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

221 Best Available Techniques (BAT) Reference Document for the Production of Large Volume Organic Chemicals, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/lvic-s_bref_0907.pdf

222 Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/CWW_Bref_2016_published.pdf (pp. 539-557)

223 Reference Document on Best Available Techniques on Emissions from Storage July 2006, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/esb_bref_0706.pdf (pp. 257-277)

224 Best Available Techniques (BAT) Reference Document for the Refining of Mineral Oil and Gas, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/REF_BREF_2015.pdf

225 Best Available Techniques (BAT) Reference Document for Waste Incineration available at http://eippcb.jrc.ec.europa.eu/reference/BREF/WI/WI_BREF_FD_Black_Watermark.pdf

	A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

3.8 Manufacture of fertilizers and nitrogen compounds

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.5
Description	<p>Manufacture of:</p> <ul style="list-style-type: none"> • Anhydrous ammonia (CPA: 20.15.10.75) • Nitric acid (CPA:20.15.10.50)
Mitigation criteria	
Principle	<p>The manufacturing of ammonia and nitric acid is highly carbon-intensive. Therefore, reducing the emissions from the manufacturing activity itself can positively contribute to the mitigation objective.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p>Manufacturing of nitric acid is eligible if the GHG emissions (calculated according to the methodology used for EU-ETS benchmarks) associated to the production processes are lower than the values of the related EU-ETS benchmarks.</p> <p>As of February 2020, the EU-ETS benchmarks values for the manufacturing of nitric acid are:</p> <ul style="list-style-type: none"> • ETS benchmark: 0.302 tCO2e/t²²⁶ <p>Manufacturing of <u>ammonia</u> is eligible if the two following thresholds are met:</p> <ul style="list-style-type: none"> • Scope 1 emissions lower than 1 tCO2/tAmmonia and • Combined CO2 emissions (scope 1 emissions and scope 2 emissions, from electricity consumed) lower than 1,3 tCO2/tAmmonia. <p>For the calculation of the emissions from the manufacturing process of ammonia, both the steps: production of the intermediate product hydrogen and synthesis of the ammonia are considered. Scope 1 emissions include both emissions.</p> <p>GHG emissions must be calculated according to the methodology used for EU-ETS benchmarks.</p>
Rationale	

226 See page 100 on the GWP used for the benchmark value:
https://ec.europa.eu/clima/sites/clima/files/ets/allowances/docs/gd9_sector_specific_guidance_en.pdf

The manufacturing of ammonia and nitric acid accounts for approximately 23% of emissions coming from the chemical sector.²²⁷ Reducing emissions from the manufacturing processes can positively contribute to the mitigation objective.

The ammonia sector is expected to substantially contribute to GHG emissions reduction, notably by using hydrogen produced from electrolysis.²²⁸²²⁹²³⁰

During the manufacturing process of nitric acid, the main type of GHG generated is nitrous oxide and by applying the available technologies it is possible to achieve more than 80% of emission reductions.²³¹

The selected metric for nitric acid is the emission factor, in terms of XX GHG emissions per unit of production. The absolute performance approach has been proposed in order to identify the maximum acceptable carbon intensity of the manufacturing process that the activity should comply with in order to be able to substantially contribute to the mitigation objective.

The selected threshold for nitric acid is the ETS product benchmark. ETS product benchmarks reflect the average performance of the 10% most efficient installations in a sector.

https://ec.europa.eu/clima/sites/clima/files/ets/allowances/docs/gd9_sector_specific_guidance_en.pdf

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011D0278&from=EN>

http://eippcb.jrc.ec.europa.eu/reference/BREF/lvic_aaf.pdf

Provisions to determine the benchmarks in the period from 2021 to 2025 and for the period from 2026 to 2030 are included in Art. 10a, paragraphs 2(a) and 2(c) of the Directive 2003/87/EC.

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20180408&qid=1547917622180&from=EN>

Do no significant harm assessment

The main potential significant harm to the environment from the production of nitric acid or ammonia production is associated with:

- polluting emissions to air (especially nitrogen oxides (NOx), and ammonia (NH₃)) from the production process;
- Vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities.
- the use of water resources for production purposes (especially for cooling processes) in water stressed areas; and
- the generation of hazardous wastes (e.g. spent catalyst material).

227 Energy efficiency and JRC emissions, Perspective scenarios for the chemical and petrochemical industry, JRC (2017), page 12. <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>.

228 Page 56, https://dechema.de/dechema_media/Downloads/Positionspapiere/Technology_study_Low_carbon_energy_and_feedstock_for_the_European_chemical_industry-p-20002750.pdf

229 The production of hydrogen trough electrolysis using low carbon electricity will be the preferable process in the decarbonized future. Page 64 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

230 In FORECAST, ammonia is assumed to be produced trough electrolysis with low carbon free electricity. See page 353 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

231 Page 39, <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC105767/kj-na-28471-enn.pdf>

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment.
(5) Pollution	<p>Ensure polluting emissions to air (e.g. nitrogen oxides (NOx), and ammonia (NH₃)) and water are within BAT-AEL ranges set in the BREF LVIC-AAF (Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilisers), the BREF CWW (Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector) and the BREF EFS (Emissions from Storage).</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Bey Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

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| | <ul style="list-style-type: none">• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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3.9 Manufacture of plastics in primary form

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.6
Description	Manufacture of plastics in primary form
Mitigation criteria	
Principle	<p>The manufacturing of plastics is associated with significant life cycle CO2 emissions. There are many types of plastics which are used in the production of multiple end products. The Taxonomy seeks to avoid including manufacture of products that do not have a positive impact in mitigation. Disposable plastic products are highly energy inefficient and undermine efforts to contribute to mitigation.</p> <p>In this context, plastic manufacturing is only eligible when at least 90% of the final plastic is not used for single use consumer products and is not recycled. This needs to be confirmed needs to be confirmed from science based research/studies etc.</p> <p>Mitigation measures are eligible provided they are incorporated into a single investment plan within a determined time frame (5 or 10 years) that outlines how each of the measures in combination with others will in combination enable the activity to meet the threshold defined below actions</p>
Threshold	<p>Manufacture of plastics in primary form shall comply with at least one of the following three criteria and when relevant with the additional criteria, reported below:</p> <ol style="list-style-type: none"> 1) The plastics in primary form is manufactured by mechanical recycling 2) The plastics in primary form is manufactured by chemical recycling including: chemical depolymerisation (aka monomerisation), pyrolysis, gasification, solvent-based purification of polymers etc.. When applying criterion 2, the carbon footprint of the plastics in primary form, manufactured by chemical recycling (excluding any calculated benefit from the production of fuels), shall be lower when compared to the carbon footprint of the plastics in primary form manufactured with fossil fuel feedstock. The carbon footprint shall be calculated in accordance with ISO 14067:2018 and validated by a third party. 3) Manufacture of plastics in primary form shall be wholly or partially derived from renewable feedstock and the carbon footprint of the plastics in primary form, manufactured wholly or partially from renewable feedstock shall be lower when compared to the carbon footprint of the plastics in primary form manufactured with fossil fuel feedstock. The carbon footprint shall be

	<p>calculated in accordance with ISO 14067:2018 and validated by a third party.</p> <p>For the purpose of applying criterion 3, renewable feedstock refers to biomass, industrial bio-waste or municipal bio-waste.</p> <p><u>Additional criteria the activity needs to comply with:</u></p> <p>Single use consumer products: Independent sector study confirms that at least 90% of the type of plastic manufactured is:</p> <ol style="list-style-type: none"> (1) not used for single use consumer products, or (2) based on recycled plastics as feedstock. <p><u>If feedstock is biomass (excluding industrial and municipal bio-waste):</u></p> <ul style="list-style-type: none"> – a full traceability of sourcing through the corresponding chain of custody management system needs to be in place and its effectiveness proven through the corresponding certification systems; – any forest biomass used in the process shall comply with EU Timber Regulation (EU/995/2010) and the EU Forest Law Enforcement Governance and Trade (FLEGT), where applicable; – any forest biomass used in the process is committed any forest biomass used in the process is committed to forest certification using independent third-party schemes that are regularly audited in the forest areas. Forest management and chain of custody practices in sourcing areas that are not yet certified, must be aligned (roadmap to certification) with the same certification standards; – forest biomass coming from irrigated forest plantations shall not be used; – any biomass produced within the EU used in the process must be subject to a transparent, credible chain of custody and comply with biomass sustainability criteria as defined in the cross compliance conditionalities of the Common Agricultural Policy and as defined in the Common Fisheries Policy; – Biomass used shall comply with align with the requirements defined under the directives RED + and RED2+ as applicable for biomass and biofuels and with the requirements for biomass defined in the forestry section in this Taxonomy.. – biomass shall not come from agricultural land that has been the subject of land use change from forest or pasture since 1994. The above-mentioned certification schemes shall provide a robust chain of custody audit system for the feedstock;
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	<ul style="list-style-type: none"> - products derived from new, greenfield oil palm tree plantation are excluded from the scope; - particular case of forest biomass certification: small-scale palm oil cultivators operating in existing forest plantations should be able to be included in the certification system and ensure that they receive their fair share of profits. <p>If feedstock is industrial bio-waste (incl. waste from the food or feed industries) or municipal bio-waste:</p> <ul style="list-style-type: none"> - any solid bio-waste used in the manufacturing process shall originate from source segregated and separately collected (non-hazardous) waste streams, i.e. shall not be separated from mixed residual waste; the bio-waste used in the process shall be consistent with the waste regulatory framework and the national/regional/local waste management plans, in particular with the proximity principle. Where municipal bio-waste is used as a feedstock, the project shall be complementary to and not compete with existing municipal bio-waste management infrastructure;
Rationale	
<p>Plastics production has been sharply growing over the last years and emissions from the plastics sector are expected to increase, not only because consumption is expected to increase – and so also the emissions from the manufacturing process - but also because plastics release CO2 when incinerated.</p> <p>In order to reduce CO2 emissions from the plastics sector it is therefore important to promote reduction in use of disposable consumer plastics, and promote increase in materials recirculation and manufacture of polymers with renewable feedstock.</p> <p>The manufacturing sector has a role to play in improving the contribution of the plastics supply chain to climate mitigation. It can contribute significantly to reducing the quantities of available disposable consumer plastics in the market but has limited control on the use of plastics.</p> <hr/> <p>Note on the link between manufacturing activity under NACE code 20.16 and code 22.2.</p> <p>The manufacturing of plastics in primary form is covered by NACE code 20.16 and the definition of “primary form” includes: liquids and pastes, blocks or irregular shape, lumps, powders (including molding powders), granules, flakes and similar bulk forms.²³² The manufacturing of plastic products falls under the NACE code 22.2.</p> <p>When setting the criteria for activity 22.2, for the purpose of objective 4 under Article 5 of the Regulation on the establishment of a framework to facilitate sustainable investment] (24.5.2018, COM(2018) 353 final, 2018/0178 (COD)²³³, the pursuing of which can also positively contribute to objective 1, it is recommended that the criteria for activity 22.2 take into account the criteria established for activity 20.16.</p> <p>It follows that the criteria for activity 22.2 should aim to promote:</p>	

232 <https://www.gov.uk/guidance/classifying-plastics>

233 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0353>

- the manufacture of plastic products which are substantially based on recycled plastics in line with the EU strategy for plastics,²³⁴ to minimize the production of virgin plastics, and
- the manufacture of plastic products which are based on plastics in primary form, which are wholly or partially derived from renewable feedstock.

Do no significant harm assessment

The main potential significant harm to the environment from the production of plastics in primary form is associated with:

- polluting emissions to air and water from the production process;
- vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities;
- the use of water resources for production purposes (e.g. cooling water) in water stressed areas); and
- the generation of hazardous wastes.

The production of polymers includes a lot of synthesis, hence, in order to allow a clear demarcation and in order to NOT go beyond the limits of this sector 20.16 it has to be acknowledged that precursors are covered under C.20.11, C.20.13, C.20.14; C.20.15.

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment²³⁵.</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p>
(5) Pollution	Ensure polluting emissions to air, soil and water are within BAT-AEL ranges as set out in BREF POL (Polymers) ²³⁶ .
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or

234 http://ec.europa.eu/environment/waste/plastic_waste.htm

235 Best Available Techniques (BAT) Reference Document for Waste Treatment available at http://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

236 The production of PVC is described in the Polymer (POL) BREF which was developed under the IPPC directive: http://eippcb.jrc.ec.europa.eu/reference/BREF/pol_bref_0807.pdf

Best available techniques are identified for PVC production on page v/vi and pages 266-268 of the POL BREF. Current consumption and emission levels are provided on page 101-104 of the POL BREF

	<p>other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4. ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY

Why heat and electricity generation is included in the Taxonomy

Heat and electricity generation are responsible for over a quarter of the EU's greenhouse gas emissions.²³⁷ Ambitious emissions reductions in this sector are vital to decarbonisation. The Taxonomy work on the heat and power sector has attempted to recognise this finding by developing suitably ambitious requirements within a model of supporting a transition to the EU's emission reduction goals.

Criteria: Metrics and Thresholds

This section covers a wide range of activities pertaining to the production, storage and delivery of heat and electrical energy. Technology-agnostic criteria have been developed for different sources of electricity and heating and cooling. This section also recognizes the important role that improvements to the supporting infrastructure associated with delivering both types of energy will play in meeting the EU's net-zero emissions objective. The TEG has developed these Taxonomy criteria for the energy sector so they can be used globally.

An overarching, technology-agnostic emissions intensity threshold of 100g CO₂e / kWh is proposed for electricity generation, heat production and the co-generation of heat and electricity. This threshold will be reduced every five years in line with political targets set out to achieve net-zero emissions by 2050.

For electricity and heat generation activities, an ISO 14067 or a GHG Protocol Product Lifecycle Standard compliant Product Carbon Footprint (PCF) assessment including measurement of fugitive emissions is required,. This includes actual physical measurements of methane leakage from the point of extraction/well-head to production of energy (electricity and/or heat). The TEG acknowledges that improved standards and methodologies will develop and recommend that the acceptance of the ISO 14067, GHG Protocol Product Lifecycle Standard and the PCF methodologies is reviewed periodically reviewed by the platform.

To aid the transition to a net-zero economy, certain technologies, such as solar, wind and tidal energy are derogated from the requirement to conduct PCFs assessments on the basis that these technologies currently perform significantly below the emissions intensity threshold. These derogations are subject to regular review in accordance with the declining threshold.

Furthermore, In the case where CCS is used to meet the emissions intensity threshold, a contractual agreement is required as proof to show that the carbon will be transported and sequestered in economic activities which are themselves eligible under the taxonomy.

²³⁷ Greenhouse gas emissions by economic activity according to the NACE classification EU-28, 2016. Eurostat (env_ac_ainah_r2) https://ec.europa.eu/eurostat/statistics-explained/index.php/Climate_change_driving_forces#Total_emissions.2C_main_breakdowns_by_source_and_general_drivers.

Method for selecting the emissions intensity threshold

The EU annual power sector emissions trajectory will need to reach net-zero emissions by 2050, in accordance with the EU's Paris Agreement and other climate and energy policy commitments.

The calculation of the 100g CO₂e / kWh threshold is based on the political targets for future allowed emissions from the power sector, divided by the expected evolution of electricity demand.

The threshold will be set at a single value for all new investments in electricity generation, until it is revised in future. It applies equally to the production of heating / cooling and co-generation of heat and electricity.

For a given investment or activity to be compatible with this trajectory, its average emissions over its physical lifetime, or 40 years (whichever is shorter), must be lower than the threshold.

The TEG recognizes that complementary emissions reductions activities (such as CCS or direct air capture with sequestration in a manner consistent with the corresponding EU Environmental Liability Directive Annex II page 12), may be attributed to an economic activity's emissions intensity as subject to the relevant activity threshold.

The threshold was determined as follows:

- Historical power sector emissions and electricity demand data for EU28 are sourced from Eurostat.
- Future emissions are in line with EU political commitments for the ETS sector (-43% by 2030), then linearly decline to zero by 2050. Future electricity demand (net generation) is assumed to grow as per the EU 2016 PRIMES Reference Scenario.
- Dividing the projected power sector emissions by the projected electricity demand results in policy-consistent projected annual values for emissions factors of the EU power sector.
- A given power generator is considered aligned with these policy targets if its emissions are below the average of these annual emissions factors over its lifetime.
- To determine a single technology-neutral threshold covering all technologies, the methodology considers the average annual emissions factors over a period of 40 years²³⁸ from the time of commissioning.
- The above calculation results in a threshold that varies by year of commissioning. To avoid updating it annually, and to provide some stability and certainty for investors, the threshold value is fixed for a

²³⁸ Power plants can have typical lifetimes of between 15 and over 100 years, depending on technology, operating mode and maintenance profile. 40 years is the maximum period over which the large majority of power plants can reasonably be expected to operate and emit GHGs without some form of repowering.

period of 5 years²³⁹ from 2020 and will be revised in 2025. It is set at the minimum value of calculated annual threshold values over this 5-year period.

- This calculation, rounded to the nearest 5g, results in a threshold value of 100 gCO₂e/kWh for the power sector.

Although the 100 gCO₂e/kWh threshold is derived from power sector assumptions, it will apply equally to both electricity and heating/cooling generation.

During future reviews of the threshold, actual energy sector emissions and generation, as well as long term projections and policy targets will be updated as necessary.

These criteria imply that:

- Unabated natural-gas fired power generation is not expected to meet the required threshold. Gas-fired power with carbon capture and sequestration may qualify.
- Blended gas-fired power: Co-combustion of multiple gases for the production of electricity, heat/cool and co-generation is also subject to the emissions intensity threshold. This includes combustion of RED II gases.
- Hydropower: the embedded emissions associated with the construction of hydropower facilities and the alteration of landscapes constitute a significant portion of lifecycle analysis emissions. Such emissions can be compensated for, by a complementary emissions reduction activity as mentioned above.
- Although the Taxonomy focuses on non-solid fossil fuel and renewable power, the DNSH to mitigation criteria are technology agnostic.

The TEG has also developed criteria for other economic activities across the energy sector including:

- Transmission and distribution of electricity
- Storage of energy
- Retrofit of gas transmission and distribution networks
- The manufacture of biofuels and biogas
- The operation of district heating and cooling networks
- Installation and operation of heat pumps

²³⁹ A 5-year period is consistent with the typical development time for most generation projects (3 to 5 years).

- The cogeneration of heating/cooling and power
- The production of heating/cooling

Brief summary of the stakeholder feedback on electricity, gas, steam and air conditioning

The energy working group thanks all respondents to energy criteria for their time and effort invested to provide input and help improve the energy taxonomy criteria. The following brief summary tries to highlight key feedback. The energy working group has evaluated the feedback and used the feedback in developing this report.

- Stakeholders highlighted that there are different levels of detail and ambition across the different activities. Stakeholders noted this might not fully be technology neutral. This includes some technologies being exempted from LCE analysis requirements. Other respondents suggested increasing the exemption list from LCE assessments.
- The EU Taxonomy should be aligned with current legislation (particularly the Renewable Energy Directive) for DNSH and bioenergy, as outlined by some respondents. Where there are standards and requirements, it was suggested making reference to them within the EU Taxonomy. Some respondents also noted that the EU Taxonomy should be structured in a way that minimises additional burden.
- Respondents commented on the proposed thresholds, often considering them as too ambitious or too unambitious.
- The suggested ISO 14044 criteria to be used for LCE assessments seems not being specific enough, and might not providing enough guidance for LCE assessments according to some respondents.
- In addition to the feedback received on the activities covered within the Technical Report for the EU Taxonomy from June 2019, several stakeholders would have liked to see the inclusion or a stronger acknowledgement of nuclear energy, waste-to-energy and unabated natural gas.
- Some feedback implies that more explanation on the rationale on principles, metrics and threshold would have been helpful.

Outlook

Energy criteria in the EU Taxonomy will require further refinement and development to ensure topicality and market coherence. This will encompass:

- Adjustments to thresholds: energy thresholds should be revisited on a five-year basis, in order to reflect state of the art research and progress on decarbonisation efforts. Particularly, the emission threshold for electricity generation should be reduced every five years.
- Adjustment of DNSH criteria: the criteria should be revisited and adjusted in accordance with the development of further taxonomy criteria on other environmental objectives and advances in research.

- Inclusion of new technologies: technological progress could allow for market entry in the near future. Technologies with a sufficiently high technology readiness level (TRL) could be added to the Taxonomy (e.g. nuclear fusion).
- Development of further metrics: as energy markets decarbonise and deployment patterns of certain technologies change, some activities (e.g. storage of electricity) might require the development of further metrics.
- The TEG also recognises that the use of biomass for energy requires trade-off decisions relative to other potential uses and across mitigation activities, but also for do no significant harm dimensions. For these reasons, the TEG recognises that possible production and use of bioenergy will require further consideration as the Taxonomy is developed and based on technical feedback in the outreach period.

Market impact

The TEG adopted a technology-neutral approach that can ensure rapid decarbonisation within the electricity sector. Adherence to the declining emissions intensity threshold is technically feasible for virtually any energy generation technology. However, it does imply that unabated fossil fuel combustion, namely coal and natural gas, will be ineligible under the Taxonomy.

TEG deliberations on waste-to-energy

On waste incineration with energy recovery (waste-to-energy, WtE) experts' opinions differed on whether this would be an appropriate environmentally sustainable activity offering a substantial contribution to climate mitigation. On the one hand, there were arguments against the inclusion of WtE. These highlighted the large portion of waste currently incinerated that could be recycled, the reliance of some individual Member States on the incineration of municipal waste, and the risk that further increasing capacities risk overcapacity and could result in lock-in effects. This would in turn discourage more reuse and recycling, options higher in the waste hierarchy that could deliver higher climate mitigation benefits. On the other hand, it was emphasized that WtE has a role to play even in an increasingly circular economy, as not all residual waste can be reused or recycled (as acknowledged by the EC in its Communication COM(2017)34 on 'the role of waste-to-energy in the circular economy', Section 5). According to the political agreement on the Taxonomy Regulation, any activity leading to a significant increase in the incineration (including WtE) of waste is not considered an eligible activity, as it causes harm to the environmental objective of the circular economy, as per Article 12(d) of the EU Taxonomy regulation, with the exception of the incineration of non-recyclable hazardous waste. This exception was not part of the Commission's proposal, which considered any significant increase of incineration capacity harmful to the circular economy and hence ineligible. Therefore, the TEG has not included WtE, but recommends bringing this matter for further discussion and consideration to the Platform on Sustainable Finance, in light of the changes in the political agreement text.

TEG deliberations on nuclear energy

The TEG assessed nuclear energy as part of its review on energy generation activities. Nuclear energy generation has near to zero greenhouse gas emissions in the energy generation phase and can be a contributor to climate mitigation objectives. Consideration of nuclear energy by the TEG from a climate mitigation perspective was therefore warranted.

The proposed Taxonomy regulation and thus TEG's methodology for including activities in the Taxonomy explicitly includes two equally important aspects, Substantial Contribution to one environmental objective

and Do No Significant Harm (DNSH) to the other environmental objectives. In making its recommendations, the TEG used evidence and expert opinion from others, but ultimately was mandated to make recommendations about the inclusion of economic activities and screening criteria in the Taxonomy.

Evidence on the potential substantial contribution of nuclear energy to climate mitigation objectives was extensive and clear. The potential role of nuclear energy in low carbon energy supply is well documented.^{240, 241},

On potential significant harm to other environmental objectives, including circular economy and waste management, biodiversity, water systems and pollution, the evidence about nuclear energy is complex and more difficult to evaluate in a taxonomy context. Evidence often addresses different aspects of the risks and management practices associated with nuclear energy. Scientific, peer-reviewed evidence of the risk of significant harm to pollution and biodiversity objectives arising from the nuclear value chain was received and considered by the TEG^{242, 243, 244}. Evidence regarding advanced risk management procedures and regulations to limit harm to environmental objectives was also received. This included evidence of multiple engineered safeguards, designed to reduce the risks. Despite this evidence, there are still empirical data gaps on key DNSH issues.

For example, regarding the long-term management of High-Level Waste (HLW), there is an international consensus that a safe, long-term technical solution is needed to solve the present unsustainable situation. A combination of temporary storage plus permanent disposal in geological formation is the most promising, with some countries leading the way in implementing those solutions. Yet nowhere in the world has a viable, safe and long-term underground repository been established^{245, 246}. It was therefore infeasible for the TEG to undertake a robust DNSH assessment as no permanent, operational disposal site for HLW exists yet from which long-term empirical, in-situ data and evidence to inform such an evaluation for nuclear energy.

240 IPCC, 2014: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA;

241 International Atomic Energy Agency, Climate Change and Nuclear Power 2018, IAEA, Vienna (2018);

242 NEA Issue Brief: An analysis of principal nuclear issues No. 3, January 1989. The disposal of high-level radioactive waste. <https://www.oecd-nea.org/brief/brief-03.html>, more recently: Preservation of Records, Knowledge and Memory (RK&M) Across Generations: Developing a Key Information File for a Radioactive Waste Repository, OECD 2019 NEA No. 7377;

243 Verbruggen A., Laes, E. Lemmens, S., Assessment of the actual sustainability of nuclear fission power, renewable and Sustainable Energy Reviews 32(2014)16–28;

244 Tierney Kieran M., Graham K.P. Muira, Gordon T. Cook, Johanna J. Heymans, Gillian MacKinnona, John A. Howeb, Sheng Xua, Andrew Brownlowc, Nicholas J. Davisonc, Mariel ten Doeschatec, Rob Deavilled, Nuclear reprocessing-related radiocarbon (14C) uptake into UK marine mammals, Marine Pollution Bulletin 124 (2017) 43–50;

245 World Nuclear Waste Report (WNWR), Focus Europe, 7 December 2018, available on: https://rebecca-harms.de/files/1/4/14p1u61xrv0/attc_RiBS6hfU8CMhUiD1.pdf;

246 Blue Ribbon Commission (BRC) on America's Nuclear Future, Report to the Secretary of Energy, January 2012.

Given these limitations, it was not possible for TEG, nor its members, to conclude that the nuclear energy value chain does not cause significant harm to other environmental objectives on the time scales in question. The TEG has therefore not recommended the inclusion of nuclear energy in the Taxonomy at this stage. Further, the TEG recommends that more extensive technical work is undertaken on the DNSH aspects of nuclear energy in future and by a group with in-depth technical expertise on nuclear life cycle technologies and the existing and potential environmental impacts across all objectives.

TEG recommendations for further work:

The experts identified further economic activities which could be relevant for the Taxonomy. However, constrained by limited manpower, these activities could not be assessed in detail and are for future consideration by the Platform. Such economic activities may include:

- The ownership, operation and recycling of energy storage facilities.
- Other gas infrastructure, except pipelines, which are relevant to the switch to hydrogen and zero-carbon gases and the recycling of existing gas infrastructure.
- CCU applications, which ensure CO₂ retention,
- Other eligible energy (electricity, co-gen, heat/cool) assets that can be included for example, production of heat/cool from ocean energy.

Furthermore, the TEG acknowledges that improved standards and methodologies will develop and recommend that the acceptance of the ISO 14067, GHG Protocol Product Lifecycle Standard and the PCF methodologies is reviewed periodically reviewed by the platform.

Finally, criteria for manufacture of biomass, biogas and biofuels, and use of these fuels in energy and transport are currently limited to advanced biofuels as per Article 2 (34) of the EU Renewable Energy Directive II (Directive (EU) 2018/2001). For other types of biofuels that are not advanced biofuels but may offer substantial climate mitigation benefits, the TEG request that the Platform undertake further work to consider establishing criteria for ensuring substantial contribution to climate mitigation.

Similarly, the TEG recommends that the Platform undertake further work to consider establishing criteria for the manufacture of renewable liquid and gaseous transport fuels of non-biological origin as defined by Article 2 (36) under the Directive (EU) 2018/2001, as this has been included in the Transport criteria of the Taxonomy.

4.1 Production of Electricity from Solar PV

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Solar Photovoltaic
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold.</p> <p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to net-0gCO₂e/kWh by 2050, are eligible.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought For activities which operate beyond 2050, it must be technically feasible to reach net-zero emissions in scope 1 emissions. <p>However:</p> <ul style="list-style-type: none"> Solar PV is currently derogated from performing a PCF or GHG lifecycle assessment subject to regular review in accordance with the declining threshold. Solar PV is currently deemed to be taxonomy eligible, which is subject to regular review.
Rationale	
<p>An over-arching, technology-agnostic emissions threshold of 100g CO₂e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO₂e in 2050.</p>	

Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the installation and operation of photovoltaic (PV) panels relate to:</p> <ul style="list-style-type: none"> • The PV installation siting: impacts on ecosystems and biodiversity if built in a designated conservation area or other areas with important ecosystem and biodiversity value. • The impacts from the production and end-of-life management of the PV systems and its component/materials: potentially significant environmental impacts are associated with the sourcing/production of materials and components of PV systems (see '<u>Manufacture of Low Carbon Technologies</u>' for DNSH criteria) 	
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Ensure PV panels and associated components have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in alignment with 'Manufacture of Renewable Energy Equipment' for DNSH criteria. • Ensure reparability of the solar photovoltaic (PV) installation or plant thanks to accessibility and exchangeability of the components.
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

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| | <ul style="list-style-type: none">• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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4.2 Production of Electricity from Concentrated Solar Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Concentrated Solar Power
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold.</p> <p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to 0gCO₂e/kWh by 2050, are eligible.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions <p>However:</p> <ul style="list-style-type: none"> CSP is currently derogated from performing a PCF or GHG lifecycle assessment, subject to regular review in accordance with the declining threshold. CSP is currently deemed to be taxonomy eligible, which is subject to regular review. <p>Cogeneration of Heat and Power is covered under Construction and operation of a facility used for cogeneration of heat/cooling and Power threshold.</p> <p>Generation of heat/cool is covered under the Generation of heat/cool threshold.</p>

Rationale	
An over-arching, technology-agnostic emissions threshold of 100g CO2e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO2e in 2050.	
Do no significant harm assessment	
The main potential significant harm to other environmental objectives from CSP is associated with:	
	<ul style="list-style-type: none"> the construction of the installation and the substantial land-take associated with the installation impacts to birdlife from the high temperatures generated by the plant impacts of the cooling system on water resources
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Ensure CSP installations have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in line with 'Manufacture of Renewable Energy Equipment' for DNSH criteria.
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;

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| | <ul style="list-style-type: none">• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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4.3 Production of Electricity from Wind Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Wind Power
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold.</p> <p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to 0gCO₂e/kWh by 2050, are eligible.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>However:</p> <ul style="list-style-type: none"> Wind Power is currently derogated from performing a PCF or GHG lifecycle assessment, subject to regular review in accordance with the declining threshold. Wind Power is currently deemed to be taxonomy eligible, which is subject to regular review.
Rationale	
<p>An over-arching, technology-agnostic emissions threshold of 100g CO₂e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO₂e in 2050.</p>	
Do no significant harm assessment	

In spite of the crucial contribution of wind energy to mitigating climate change, there may be conflicts arising between its deployment and nature conservation at a local level. The main environmental exposures to be considered as a Do No Significant Harm (DNSH) criteria, in the most stringent sense, include:

- Underwater noise created in the installation of bottom-fixed offshore wind turbines;
- The composite waste generated from both on- and offshore wind turbine blades at the end of their lifetime;
- The possible disturbance, displacement or collision of birds and bats by the construction and operation of wind farms
- The possible deterioration of water ecosystem associated to the construction of wind farms

The possible visual impacts created by landscape change in the installation of wind turbines²⁴⁷.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	State ambition to maximise recycling at end of life based on waste management plans, dismantling/decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of</p>

247 Selected references:

- Directive 2011/92/EU as amended
- Council Directive 92/43/EEC
- Directive 2009/147/EC
- Guidance Document: "Wind energy developments and Natura 2000"
- http://ec.europa.eu/environment/nature/natura2000/management/docs/Wind_farms.pdf

	<p>the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.4 Production of Electricity from Ocean Energy

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Ocean Energy
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold.</p> <p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to 0gCO₂e/kWh by 2050, are eligible.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>However:</p> <ul style="list-style-type: none"> Ocean Energy is currently derogated from performing a PCF or GHG lifecycle assessment, subject to regular review in accordance with the declining threshold. <p>Ocean Energy is currently deemed to be taxonomy eligible, which is subject to regular review.</p> <p>Combined Heat and Power is covered under Construction and operation of a facility used for cogeneration of heat/cooling and Power threshold</p>
Rationale	
<p>An over-arching, technology-agnostic emissions threshold of 100g CO₂e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO₂e in 2050.</p>	

Do no significant harm assessment	
The main potential significant harm to other environmental objectives from ocean energy is associated with:	
	<ul style="list-style-type: none"> - Construction, deployment, operation and maintenance of ocean energy installations can impact on marine ecosystems and biodiversity - Pollution from lubricants and anti-fouling paints and emissions from maintenance and inspection vessels
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on waste management plans, dismantling/decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	Measures in place to minimise toxicity of anti-fouling paint and biocides as regulated in the Biocidal Products Regulation: (EU) 528/2012 , which implements (in the EU) the International Convention on the Control of Harmful Anti-fouling Systems on Ships, which was adopted on 5 October 2001
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

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| | <ul style="list-style-type: none">• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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4.5 Production of Electricity from Hydropower

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Hydropower
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the allocated life cycle impacts for producing 1 kWh of electricity are below the declining threshold.</p> <p>Hydropower facilities with a power density above 5 W/m² are currently derogated from conducting the PCF or GHG Lifecycle Assessment (subject to regular review in accordance with the declining threshold)²⁴⁸</p> <ul style="list-style-type: none"> As part of the ISO 14067 G-res tool²⁴⁹ and the IEA Hydro Framework²⁵⁰ are acceptable methodologies. Allocated emissions should be calculated according to the operating regime, as per the allocation methodology developed by UNESCO/IHA and embedded in the G-res tool and IEA Hydro Framework These criteria also apply to pumped-storage facilities The full PCF assessment shall be subjected to review.

²⁴⁸ The power density approach has been proposed to ease the administrative burden for conducting PCFs.

²⁴⁹ <https://www.hydopower.org/gres>

²⁵⁰ as described in the 'Guidelines for the Quantitative Analysis of Net GHG Emissions from Reservoirs', issued in 2 volumes (Measurement Programmes & Data Analysis, and Modelling: Guidelines for Quantitative Analysis of Net GHG Emissions from Reservoirs).

	<p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to 0gCO₂e/kWh by 2050, are eligible</p> <ul style="list-style-type: none"> • This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory • Assets and activities must meet the threshold at the point in time when taxonomy approval is sought <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p>
Rationale	
An over-arching, technology-agnostic emissions threshold of 100g CO ₂ e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO ₂ e in 2050.	
Do no significant harm assessment	
	<p>The main environmental impacts associated with hydropower installations are:</p> <ul style="list-style-type: none"> - Emissions to water and generation of waste during construction; - Impacts on biodiversity associated with fragmentation of ecosystems and changes to habitat, to hydrological and hydrogeological regimes, water chemistry, and interference with species migration pathways as a result of the establishment of the installation and its operation
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<p>For new projects:</p> <p>Ensure implementation of a River Basin Management Plan (as outlined in the EU Water Framework Directive) and ensure that an appropriate cumulative impact assessment or equivalent study has been undertaken that identifies and addresses any significant regional or basin-level environmental and social impacts, in compliance with the Water Framework Directive (Directive 2000/60/EC), preferably at the strategic planning stage. Such a study must consider all of the planned infrastructure developments in the basin, for example as part of a hydropower cascade at the scale of the river catchment, involving all relevant stakeholders.</p> <p>Ensure that the conditions outlined in article 4(7) of the WFD are met based on ground evidence. Those include:</p> <ul style="list-style-type: none"> • All practical steps are taken to mitigate the impacts; • The project has been recognized of overriding public interest and/or it is proven that the benefits of the project outweigh its impacts; • There are no significantly environmentally better option. • The project does not show significant adverse impact on upstream or downstream water bodies. • This applies to newly built hydropower and extension of existing hydropower. <p>Construction of new hydropower should not lead to increase fragmentation of rivers, consequently refurbishment of existing hydropower plant and rehabilitation</p>

	<p>of existing barriers should be prioritised. Construction of small hydropower (<10MW) should be avoided.</p> <p>During operation:</p> <ul style="list-style-type: none"> • All necessary mitigation measures should be implemented to reach good ecological status or potential, in particular regarding ecological continuity and ecological flow. Priority should be given to nature-based solutions. • Reference for outside EU: IFC's and World Bank Group's environmental and social standards. • General impacts: Operation of the hydro power plant must adhere to the principles of the UNECE Convention on the Protection and Use of Transboundary, Watercourses and International Lakes
(4) Circular Economy	
(5) Pollution	<p>Establishing a River Basin Management Plan (as outlined in the EU Water Framework Directive) and ensure compliance with applicable EU regulations.</p> <p>Reference for outside EU: IFC's and World Bank Group's environmental and social standards.</p> <p>Parameters and acceptable limits/ranges and necessary sampling and measuring frequency are contained in EU Directive 2006/44/EC and should be observed. These address the Quality of Freshwaters needing Protection or Improvement in order to support fish life and relevant parameters contained in the WFD²⁵¹ surface water chemical monitoring and chemical monitoring of sediment and biota</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU</p>

251 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1–73).

	<p>countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.6 Production of Electricity from Geothermal

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Geothermal
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold.²⁵²</p> <p>A full PCF or GHG lifecycle assessment shall be applied, using project specific-data where relevant, and shall be subjected to review.</p> <p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to 0gCO₂e/kWh by 2050, are eligible.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>Combined Heat and Power is covered under Construction and operation of a facility used for cogeneration of heat/cooling and Power threshold.</p>
Rationale	

²⁵² Direct emissions of carbon dioxide (and to a lesser extent methane) result from the release of naturally occurring non-condensable gases (NCGs) from the geothermal fluid during the energy extraction process.

<p>An over-arching, technology-agnostic emissions threshold of 100g CO₂e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO₂e in 2050.</p>	
<p>Do no significant harm assessment</p>	
<p>The main potential significant harm to other environmental objectives from Production of electric energy from high-enthalpy geothermal system is associated with:</p>	
	<ul style="list-style-type: none"> Non-condensable geothermal gases with specific environmental threats, such as H₂S, CO₂, and CH₄, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems and no steam is emitted. Possible emissions to surface and underground water
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the EU regulatory framework (i.e. EU Water Framework Directive¹ and Daughter Directives). Emissions to air: the operations of high-enthalpy geothermal energy systems should ensure that adequate abatement systems are in place to comply with existing EU Air Quality Legislation and BAT²⁵³; including but not limited to <1 µg/Nm³ Hg.</p> <p>Thermal anomalies associated with the discharge of waste heat should not exceed 3°C for groundwater environments or 1.5°C for surface water environments, respectively.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of</p>

²⁵³ JRC. Best Available Techniques (BAT) Reference Document for Large Combustion Plants. JRC107769 / EUR 28836 EN. ISBN 978-92-79-74303-0. 2017

	<p>the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.7 Production of Electricity from Gas (not exclusive to natural gas)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Gas Combustion (not exclusive to natural gas)
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any electricity generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of electricity are below the declining threshold.</p> <p>A full PCF shall be applied, using project specific data where relevant and shall be subjected to review. This assessment should include actual physical measurements, i.e. methane leakage measurements across gas extraction, transport and storage systems.</p> <p>Declining threshold: Facilities operating at life cycle emissions lower than 100gCO₂e/kWh, declining to 0gCO₂e/kWh by 2050, are eligible.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>Facilities that will incorporate any form of abatement (e.g. CCS, Co-firing, other...) must show that the abatement activity is eligible under the Taxonomy.</p> <p>Electricity generation from other fossil-fuel based gases would be eligible under the Taxonomy, subject to meeting the declining emissions threshold.</p> <p>Combined Heat and Power is covered under Construction and operation of a facility used for cogeneration of heat/cooling and Power threshold.</p>

Rationale	
An over-arching, technology-agnostic emissions threshold of 100g CO2e / kWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO2e in 2050.	
Do no significant harm assessment	
The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control in line with BREF indicators and the avoidance of direct impacts on sensitive ecosystems, species or habitats.	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	Ensure emissions to air, water and soil are prevented / minimized by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur ²⁵⁴ .
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU</p>

²⁵⁴ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants

countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:

- a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- all necessary mitigation measures are in place to reduce the impacts on species and habitats; and
- a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.8 Production of Electricity from Bioenergy (Biomass, Biogas and Biofuels)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Bioenergy
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Production of electricity from biofuels shall be assessed in relation to the relative fossil fuel comparator set out in RED II.</p> <p>Facilities operating above 80% of GHG emissions-reduction in relation to the relative fossil fuel comparator set out in RED II increasing to 100% by 2050, are eligible</p> <p>Facilities must use feedstocks which meet the criteria on the Manufacture of Biomass, Biogas and Biofuels.</p> <p>This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory</p> <p>Assets and activities must meet the threshold at the point in time when taxonomy approval is sought</p> <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>For Anaerobic Digestion of Biowaste and Sewage Sludge, refer to activities 5.5 and 5.3 respectively.</p> <p>Any other anaerobic digestion of organic material (not covered under sections 5.3 and 5.5) is eligible provided that:</p> <ul style="list-style-type: none"> - methane leakage from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan. - the digestate produced is used as fertiliser/soil improver – directly or after composting or any other treatment.

Rationale	
<p>The Production of Electricity from Bioenergy can deliver mitigation benefits but, if done incorrectly can have no net positive impact or even a negative impact. Thus, the eligibility criteria are based on existing EU regulation but seek to advance the agenda by setting a higher threshold on the required GHG emissions savings outlined in RED II and restricting eligibility to advanced bioenergy feedstocks.</p>	
<p>An over-arching, technology-agnostic emissions threshold of 100g CO₂e / KWh is proposed for the electricity generation. This threshold will be reduced every 5 years in line with a trajectory to net-zero CO₂e in 2050.</p>	
<p>For ease of conversion, a GHG emission reduction of 80% in relation to the relative fossil fuel comparator set out in RED II is assumed to be equivalent to the 100g CO₂e / KWh threshold.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfillment of the applicable waste and recycling criteria, the SO₂, NO_x dust and other emissions control in line with BREF/ Medium Combustions Plants Directive and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p>	
<p>Intelligent pathways for cascading use are environmentally superior and preferable to single use.²⁵⁵.</p>	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Implement measures concerning waste management required by the Commission Implementing Decision (EU) 2017/1442 under the Industrial Emissions Directive 2010/75/EU, relying to the extent possible on the JRC's BAT Reference Document for Large Combustion Plants. These requirements apply for installations with a total rated thermal input of 50 MW or more.</p>
(5) Pollution	<p>Ensure emissions to air, water and soil are prevented / minimised by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL</p>

²⁵⁵ UBA (2017) Fehrenbach, et. al. BIOMASS CASCADES Increasing resource efficiency by cascading use of biomass — from theory to practice, TEXTE 53/2017, https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2017-06-13_texte_53-2017_biokaskaden_summary.pdf

	<p>ranges included therein, ensuring at the same time that no significant cross-media effects occur.</p> <p>Limit the emissions to values within the ranges given in the newest version of the following documents depending on the size of the installation:</p> <ul style="list-style-type: none"> ○ BREF document on Large Combustion Plants²⁵⁶, chapter 10.2.2 (BAT conclusions for the combustion of solid biomass and/or peat; SO₂, NO_x, dust, CO, Mercury, HCl, HF thresholds). These requirements apply for installations with a total rated thermal input of 50 MW or more and that fall under the scope of the LCP BREF. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered. ○ Medium Combustion Plants Directive²⁵⁷. These thresholds apply for combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW ('medium combustion plants'), and for a combination formed by new medium combustion plants pursuant to Article 4 of this directive, including a combination where the total rated thermal input is equal to or greater than 50 MW, unless the combination forms a combustion plant covered the BREF document on Large Combustion Plants (see above). The following thresholds apply: <ul style="list-style-type: none"> ○ In general: of Annex II (SO₂, NO_x and dust thresholds) ○ For plants in zones or parts of zones not complying with the air quality limit values laid down in EU Directive 2008/50/EC²⁵⁸: Recommended values which are to be published by the European Commission (DG ENV) pursuant to Article 6, paragraph 9 and 10 (of the Medium Combustion Plant Directive (EU) 2015/2193). <p>Emissions in mg/Nm³ (for biomass in large combustion plants: SO₂, NO_x, dust, CO, Mercury, HCl, HF; for biomass and for liquid biofuels in medium combustion plants: SO₂, NO_x, dust, for biogas in medium combustion plants: SO₂, NO_x)</p> <ul style="list-style-type: none"> ● In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.²⁵⁹ ● In case of AD, emissions to air (e.g. SO_x, NO_x) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation.
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²⁵⁶ http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

²⁵⁷ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193> (Annex II)

²⁵⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>

²⁵⁹ https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

	<ul style="list-style-type: none"> • In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009²⁶⁰ and respective national rules on fertilising products.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

260 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.9 Transmission and Distribution of Electricity

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.12, D.35.13
Description	<p>Construction and operation of transmission Systems that transport the electricity on the extra high-voltage and high-voltage interconnected System.</p> <p>Construction and operation of distribution Systems that transport electricity on high-voltage, medium-voltage and low-voltage distribution Systems.</p> <p>Construction and operation of interconnections that transport electricity between separate Systems.</p>
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support the integration of renewable energy into the power grid Support the transition from carbon-intensive energy supply, via electrification and parallel development of low carbon power generation capacity Support of grid management technology used for integrating low carbon emission generation and demand side energy savings Decreases direct emissions from transmission and distribution (T&D) infrastructure
Metric & Threshold	<p>All electricity transmission and distribution infrastructure or equipment in Systems which are on a trajectory to full decarbonisation* are eligible, except for infrastructure that:</p> <ul style="list-style-type: none"> Is dedicated to creating a direct connection, or expanding an existing direct connection between a power production plant that is more CO₂ intensive than 100 gCO₂e/kWh, measured on a LCE basis, and a substation or network. <p>* A System is deemed to be on a trajectory to full decarbonisation if either</p> <ul style="list-style-type: none"> more than 67% of newly connected generation capacity in the System is below the generation threshold value of 100 gCO₂e/kWh measured on a PCF basis, over a rolling five-year period; or the average System grid emissions factor is below the threshold value of 100 gCO₂e/kWh measured on a PCF basis, over a rolling five-year average period. <p>These criteria will be subject to regular review, in line with reviews of generation threshold values and progress to decarbonisation.</p> <p>Based on the results of an assessment carried out in 2019 by the EU JRC, the interconnected European System meets the criteria above that define a system to be on a trajectory to full decarbonisation. It, and its subordinated systems, meet</p>

the eligibility criteria for this activity and are derogated from carrying out the quantitative assessment.

This derogation will also be subject to regular review, in line with review of the criteria above, or in case of major policy changes that would negatively affect commitments to decarbonisation.

The following T&D grid related activities are eligible, irrespective of whether the system is on a pathway to full decarbonisation:

- Direct connection, or expansion of existing direct connection, of low carbon electricity generation below the threshold of 100 gCO₂e/kWh declining to 0g CO₂e/kWh in 2050, measured on a PCF basis, to a substation or network.
- EV charging stations and supporting electric infrastructure for the electrification of transport, subject to taxonomy eligibility under the transport section.
- Installation of T&D transformers that comply with the Tier 2 (2021) requirements from Regulation 548/2014 on the eco-design of small, medium and large power transformers and, for medium power transformers with highest voltage for equipment not exceeding 36 kV, with AAA0 level requirements on no-load losses set out in standard EN 50588-1.
- Equipment and infrastructure where the main objective is an increase of the generation or use of renewable electricity generation
- Equipment to increase the controllability and observability of the electricity system and enable the development and integration of renewable energy sources, this includes:
 - Sensors and measurement tools (including meteorological sensors for forecasting renewable production)
 - Communication and control (including advanced software and control rooms, automation of substations or feeders, and voltage control capabilities to adapt to more decentralised renewable infeed)
- Equipment to carry information to users for remotely acting on consumption
- Equipment to allow for exchange of renewable electricity between users
- Interconnectors between transmission systems are eligible, provided that one of the systems is eligible.

Definitions and Notes:

- A System is defined as the transmission or distribution network control area of the network or system operator(s) where the activity takes place.
- The European System shall be defined as the interconnected electricity system covering the interconnected control areas of EU Member States, Norway, Switzerland and the United Kingdom.

	<ul style="list-style-type: none"> The annual average System grid emissions factor is calculated as the total annual emissions from power generation, divided by the total annual net electricity production in that System. The rolling five-year (average) period used in determining compliance with the thresholds shall be based on historic data, and shall be include the year for which the most recent data is available. Transmission Systems may include generation capacity connected to subordinated Distribution Systems. Distribution Systems subordinated to a Transmission System that is deemed to be on a trajectory to full decarbonisation may also be deemed to be on a trajectory to full decarbonisation. To determine eligibility, it is possible to consider a System covering multiple control areas which are interconnected and with significant energy exchanges between them. In such a case, the weighted average emissions factor across all included control areas is used to determine eligibility, and individual subordinated transmission or distribution systems within this System will not be required to demonstrate compliance separately. It is possible for a System to become ineligible after having previously been eligible. In Systems that become ineligible, no <u>new</u> T&D activities are eligible from that moment onward, until the system is again in compliance with the threshold (except for those activities which are always eligible, see above). Activities in subordinated Systems may still be eligible, if these subordinated Systems meet the criteria of this Taxonomy. A direct connection or expansion of an existing direct connection to production plants includes infrastructure that is indispensable to carry the associated electricity from the power generating facility to a substation or network.
Rationale	<p>Increasing access to electricity will support its decarbonisation by enabling more consumers to transition from carbon-intensive energy supply, while increasing the utilisation of renewable energy. As countries continue to fulfil their decarbonisation objectives, there will be fewer and fewer investments in transmission and distribution which are not climate aligned.</p> <p>Under this logic, we propose that most investments in electricity transmission and distribution infrastructure in Systems where a significant majority of new generation capacity is from low carbon generation sources should be considered climate-aligned under the EU Taxonomy.</p>
Do no significant harm assessment	<p>The impacts of transmission and distribution lines are a function of the spatial alignment of the grid, the structures and conductors required for various voltages, the extent to which pre-existing corridors are used, and how the transmission and distribution lines are operated and maintained. The most common environmental impacts of electricity transmission and distribution infrastructure are visual, ecosystem and land use. In the cases of underground offshore electricity lines, water and marine resources may be impacted.</p>

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<p>Underground power lines:</p> <ul style="list-style-type: none"> Avoid routings with heavy impact on marine and terrestrial ecosystems (proven by an ESIA) and follow the principles of IFC General EHS Guidelines for construction site activities follow.
(4) Circular Economy	<p>State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).</p>
(5) Pollution	<p>Overground high voltage lines:</p> <ul style="list-style-type: none"> For construction site activities follow the principles of IFC General EHS Guideline. Respect applicable norms and regulations to limit impact of electromagnetic radiation on human health. For Europe: The applicable guidelines in force are the “Council recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)” (1999/519/EC). Outside Europe: 1998 ICNIRP (International Commission on Non-Ionizing Radiation Protection)²⁶¹ <p>Do not use PCBs Polyclorinated Biphenyls.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

261 <https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf>

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| | <ul style="list-style-type: none">• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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Underground power lines:

Avoid routings with heavy impact on marine and terrestrial ecosystems (proven by an ESIA), UNESCO World Heritage Sites and Key Biodiversity Areas (KBAs), and follow the principles of IFC General EHS Guidelines for construction site activities.

4.10 Storage of Electricity

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	
Code	No NACE Code
Description	Construction and operation of facilities that store electricity and return it at a later time, in the form of electricity.
Mitigation criteria	
Principle	<ul style="list-style-type: none"> • Power grid stabilisation: making best use of excess electricity • The effective utilisation of peak electricity generation • Enabling the integration of low-carbon electricity • Back-up power capabilities
Metric & Threshold	<p>Currently all electricity storage activities are eligible under the Taxonomy, subject to regular review.</p> <p>Eligibility criteria for Demand Side Management (load shedding and load shifting) activities are available under the transmission & distribution of electricity criteria.</p> <p>However, hydropower pumped storage shall comply with the criteria for “Production of Electricity from Hydropower”.</p>
Rationale	
<p>Electricity Storage is defined according to article 2.59 of the recast Electricity Directive as: “In the electricity system, deferring the final use of electricity to a moment later than when it was generated, or the conversion of electrical energy into a form of energy which can be stored, the storing of such energy, and the subsequent reconversion of such energy into electrical energy or use as another energy carrier.”</p> <p>Electricity storage can support the integration of renewable energy systems into electricity transmission and distribution. It can balance centralized and distributed electricity generation, while also contributing to energy security. It will supplement demand response and flexible generation and complement grid development. It can also contribute to the decarbonisation of other economic sectors and support the integration of higher shares of variable renewable energy (variable RES) in transport, buildings, or industry.</p> <p>At current levels of storage capacity available in European markets, all additional storage capacity should be beneficial to the EU climate change mitigation objectives (this will be subject to review in later taxonomy updates).</p>	
Do no significant harm assessment	
<p>The electricity storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.</p>	
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.

(3) Water	
(4) Circular Economy	<p>State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).</p>
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.11 Storage of Thermal Energy

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	
Code	No NACE Code
Description	Construction and operation of facilities that store thermal energy, and return it at a later time, in the form of thermal energy or other energy vectors
Mitigation criteria	
Principle	<ul style="list-style-type: none"> • Power grid stabilisation: making best use of excess renewable energy • The effective utilisation of peak generation renewable energy • Enabling the integration of renewable energy • Back-up power capabilities
Metric & Threshold	Currently all thermal energy storage is eligible under the Taxonomy (including Thermal Energy Storage (UTES) or Aquifer Thermal Energy Storage (ATES)), subject to regular review.
Rationale	
<p>Storage of thermal energy is one way of making use at a later time of thermal energy that is available at a time of low demand. It could thus avoid the need to produce the thermal energy with fossil fuels.</p> <p>It can also contribute to the decarbonisation of other economic sectors and support the integration of higher shares of variable renewable energy (variable RES) in transport, buildings, or industry.</p> <p>At current levels of storage capacity available in European markets, all additional storage capacity should be beneficial to the EU climate change mitigation objectives.</p>	
Do no significant harm assessment	
<p>The energy storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.</p>	
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure

	<p>any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.12 Storage of Hydrogen

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	
Code	No NACE Code
Description	Construction and operation of facilities that store hydrogen, and return it at a later time, in the form of hydrogen or other energy vectors
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Power grid stabilisation: making best use of excess renewable energy The effective utilisation of peak generation renewable energy
Metric & Threshold	<p>Currently construction of hydrogen storage assets is eligible under the Taxonomy, subject to regular review,</p> <p>Operation of hydrogen storage assets is eligible under the Taxonomy if:</p> <ul style="list-style-type: none"> The Infrastructure is used to store taxonomy-eligible hydrogen (see Manufacture of hydrogen). <p>Infrastructure that is required for zero direct emissions transport (e.g. hydrogen fuelling stations) is eligible under the transport section.</p>
Rationale	
Further clarification on the definition and inclusion of other low-carbon solids, liquids and gases is pending EU action on defining 'low carbon'.	
Do no significant harm assessment	
The energy storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key</p>

	<p>Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.13 Manufacture of Biomass, Biogas or Biofuels

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.21
Description	Manufacture of Biogas or Biofuels
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Reduce the risk of Indirect Land Use Change (iLUC) Manufacture of all biomass, biogas or biofuels should deliver robust climate benefits compared to fossil fuels
Metric & Threshold	<p>Manufacture of Biomass, Biogas and Biofuels is eligible if:</p> <p>Produced from the advanced feedstock listed in Part A of Annex IX of Directive (EU) 2018/2001.</p> <p>For Anaerobic Digestion of Biowaste and Sewage Sludge, refer to activities 5.5 and 5.3 respectively.</p> <p>Any other anaerobic digestion of organic material (not covered under sections 5.3 and 5.5) is eligible provided that:</p> <ul style="list-style-type: none"> - methane leakage from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan. - the digestate produced is used as fertiliser/soil improver – directly or after composting or any other treatment
Rationale	
<p>The Manufacture of Biomass, Biogas and Biofuel can deliver mitigation benefits but, if done incorrectly can have no net positive impact or even a negative impact. Thus, the eligibility criteria are based on existing EU regulation but seek to advance the agenda by restricting eligibility to advanced bioenergy feedstocks.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>For biomass feedstocks refer to Forestry Criteria and/or Crop criteria.</p>	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	<ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	For biogas production: the resulting digestate meets the requirements for fertilising materials in Proposed Regulation COM (2016) 157 or national rules on fertilisers/ soil improvers for agricultural use or the conditions established by the competent authority for a safe use.
(5) Pollution	For biogas production: apply a gas-tight cover on the digestate storage.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. <ul style="list-style-type: none"> • In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.²⁶² • In case of AD, emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation.

262 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

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| | <ul style="list-style-type: none">• In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009²⁶³ and respective national rules on fertilising products. |
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- In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009²⁶³ and respective national rules on fertilising products.

263 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.14 Retrofit of Gas Transmission and Distribution Networks

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D35.21 H49.50
Description	Retrofit of gas networks for the distribution of gaseous fuels through a system of mains. Retrofit of gas networks for long-distance transportation of gases by pipelines. The complete system must have been in place and operating for a minimum of 5 years.
Mitigation criteria	
Principle	Significant GHG emissions reductions by reducing leakage and increasing the volume of hydrogen and other low-carbon gases used in the gas system
Metric & Threshold	Retrofit of gas transmission and distribution networks whose main purpose is the integration of hydrogen and other low-carbon gases is eligible: <ul style="list-style-type: none"> Any gas transmission or distribution network activities which enable the network to increase the blend of hydrogen and/or other low carbon gasses in the gas system is eligible The repair of existing gas pipelines for the reduction of methane leakage is eligible if the pipelines are hydrogen-ready and/or other low carbon gasses-ready. Retrofit of gas networks whose main purpose is the integration of captured CO ₂ is eligible, if the operation of the pipeline meets the criteria outlined for the transportation of captured CO ₂ . Gas network expansion is not eligible.
Rationale	
Electrification of the energy sector will not be sufficient to fulfil the EU's net-zero by 2050 target. Molecule-based energy will continue to have a role to play in the future energy supply. This is particularly pertinent to supporting the uptake of hydrogen but one with an enormous capacity to decarbonise the electricity, transport and manufacturing sectors.	
Do no significant harm assessment	
The main potential significant harm to other environmental objectives from retrofit and operation of existing gas distribution and supply networks that allow for the use of hydrogen and other low-carbon gas systems are associated with: <ul style="list-style-type: none"> Retrofitting phase of the network: all aspects have to be considered that are usually connected with construction like terrestrial habitat alteration, loss of valuable ecosystems, land consumption, overburden disposal, negative impacts on biodiversity, emissions of particles and NOx, noise and hazardous materials. For larger projects an ESIA should be done. Operation phase: Leakages should be kept at a minimum. Underground networks can have an impact on ground water systems and on local ecosystems. 	

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Ensure appropriate measures are in place to minimize and manage waste and material use in construction and decommission phases. Thresholds: European Directives 2018/850, 2018/851, 2018/852 and BREF document ²⁶⁴
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent);</p> <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;

²⁶⁴ Integrated Pollution Prevention and Control Reference Document on Best Available Techniques on Emissions from Storage July 2006

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| | <ul style="list-style-type: none">• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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4.15 District Heating/Cooling Distribution

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Construction and operation of pipelines and associated infrastructure for distribution of heating and cooling, ending at the sub-station or heat exchanger.
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to individual equipment that do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards, including use of best available climate-friendly refrigerant Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds Support the installation and operation of energy efficiency upgrades
Metric & Threshold	<p>Construction and operation of pipelines and associated infrastructure for distributing heating and cooling is currently eligible, if the system meets the definition of efficient district heat/cool systems in the EU Energy Efficiency Directive.</p> <p>The EU Energy Efficiency Directive defines “efficient district heating and cooling” as a district heating or cooling system using at least 50% renewable energy or 50% waste heat or 75% cogenerated heat or 50% of a combination of such energy and heat.</p> <p>The following activities are always eligible:</p> <ul style="list-style-type: none"> Modifications to lower temperature regimes Advanced pilot systems (control and energy management systems, Internet of Things)
Rationale	
<p>Providing energy services in a low-carbon manner, particularly for heating and cooling distribution will require investments in newer and more efficient delivery models. The Taxonomy criteria on District Heating and Cooling Networks provide guidance that seeks to foster the market as a whole and ultimately lower the emissions intensity of the energy services that society needs.</p>	
Do no significant harm assessment	
<p>Key environmental aspects to be considered for the investments in Distribution of District Level Heating and Cooling are summarised as follow:</p>	

For the **construction** of the mains, the potential significant harms to the environmental objectives are constituted by the typical potential harms connected to construction of facilities in general. This includes inter alia, terrestrial habitat alteration, loss of valuable ecosystem, land consumption, overburden disposal, negative effects on biodiversity, emissions of particles and NOx, noise and hazardous materials.

For the **operation** of the district heating networks, potential significant impacts are considered low. They relate mainly to the potential impact of underground district heating networks on drinking water/ground water systems and local ecosystems through corrosion products from corrosion of the distribution system elements and applied water additives that may be non-biodegradable²⁶⁵.

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.

265 Selected references for this analysis:

- IFC General EHS Guideline – Environment, April 30,2007
- IFC's Environmental and Social Performance Standards, 2012
- Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
- Directive (EU) 2018/850 on landfill waste,
- Directive (EU) 2018/851 on waste,
- Directive (EU) 2018/851 on packaging and packaging waste

	<p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.16 Installation and operation of Electric Heat Pumps

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Installation and operation of electric heat pumps
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds Electric heat pumps have no direct emissions and can increase the use of low carbon electricity with a high coefficient of performance.
Metric & Threshold	<p>Currently, installation and operation of electric heat pumps is eligible, if:</p> <ul style="list-style-type: none"> Refrigerant threshold: GWP ≤ 675; and Must meet energy efficiency requirements stipulated in the implementing regulations under the Ecodesign Framework Directive²⁶⁶ <p>The criterion is subject to regular review.</p>
Rationale	
<p>Providing energy services in a low-carbon manner, particularly for heating and cooling distribution will require investments in newer and more efficient delivery models. Heat pumps are an energy efficient heating/cooling method. Heat pumps will play an important role in the European Union's decarbonisation efforts.</p> <p>The Taxonomy criteria on the Installation and Operation of Heat Pumps, provide guidance that seeks to foster the market as a whole and ultimately lower the emissions intensity of the energy services that society needs.</p>	
Do no significant harm assessment	
(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management

²⁶⁶ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products

	<p>plans, developed in consultation with relevant stakeholders, have been developed and implemented.</p> <ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	
(6) Ecosystems	

4.17 Cogeneration of Heat/Cool and Power from Concentrated Solar Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Concentrated Solar Power
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any cogeneration technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of heat/cool and power are below the declining threshold.</p> <p>Declining threshold: The Cogeneration Threshold is the combined heat/cool and power threshold of 100 gCO₂e/kWh.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂ in 2050 trajectory The threshold must be met at the point in time when taxonomy approval is sought for the first time For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions <p>However:</p> <ul style="list-style-type: none"> CSP is currently derogated from performing a PCF assessment, subject to regular review in accordance with the declining threshold. CSP is currently deemed to be taxonomy eligible, which is subject to regular review. <p>Generation of Heat/Cool is covered under the Generation of Heat/Cool threshold</p>
Rationale	
Efficient and low-emissions cogeneration of heating/cooling and power will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that	

<p>which applies to production of heating/cooling.</p> <p>Production of heat/cool using waste heat as defined by the EU Energy Efficiency Directive</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from CSP is associated with:</p> <ul style="list-style-type: none"> • The construction of the installation and the substantial land-take associated with the installation • Impacts to birdlife from the high temperatures generated by the plant • Impacts of the cooling system on water resources 	
(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<ul style="list-style-type: none"> • Ensure CSP installations have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in line with 'Manufacture of Renewable Energy Equipment' for DNSH criteria.
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;

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| | <ul style="list-style-type: none">• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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4.18 Cogeneration of Heat/Cool and Power from Geothermal Energy

Sector classification and activity	
Macro-Sector	D – Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Geothermal Energy
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any cogeneration technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of heat/cool and power are below the declining threshold.</p> <p>Declining threshold: The Cogeneration Threshold is the combined heat/cool and power threshold of 100 gCO₂e/kWh.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory The threshold must be met at the point in time when taxonomy approval is sought for the first time For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions <p>The full PCF assessment shall be subjected to review.</p>
Rationale	
<p>Efficient and low-emissions cogeneration of heating/cooling and power will be required if Europe is to meet its net-zero by 2050 target.</p> <p>Production of heat/cool using waste heat as defined by the EU Energy Efficiency Directive</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from Production of electric energy from high-enthalpy geothermal system is associated with:</p>	

	<ul style="list-style-type: none"> Non-condensable geothermal gases with specific environmental threats, such as H₂S, CO₂, and CH₄, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems and no steam is emitted. Possible emissions to surface and underground water
(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the EU regulatory framework (i.e. EU Water Framework Directive¹ and Daughter Directives). Emissions to air: the operations of high-enthalpy geothermal energy systems should ensure that adequate abatement systems are in place to comply with existing EU Air Quality Legislation and BAT²⁶⁷; including but not limited to <1 µg/Nm³ Hg.</p> <p>Thermal anomalies associated with the discharge of waste heat should not exceed 3°K for groundwater environments or 1.5°K for surface water environments, respectively.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management</p>

²⁶⁷ JRC. Best Available Techniques (BAT) Reference Document for Large Combustion Plants. JRC107769 / EUR 28836 EN. ISBN 978-92-79-74303-0. 2017

	<p>of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.19 Cogeneration of Heat/Cool and Power from Gas (not exclusive to natural gas)

Sector classification and activity	
Macro-Sector	D – Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Gas Combustion (not exclusive to natural gas)
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any cogeneration technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of heat/cool and power are below the declining threshold.</p> <p>A full PCF shall be applied, using project specific data where relevant and shall be subjected to review. This assessment should include actual physical measurements, i.e. methane leakage measurements across gas extraction, transport and storage systems.</p> <p>Declining threshold: The Cogeneration Threshold is the combined heat/cool and power threshold of 100 gCO₂e/kWh.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions Facilities that will incorporate any form of abatement (e.g. CCS, Co-firing, other...) must show that the abatement activity is eligible under the Taxonomy The full PCF assessment shall be subjected to review. <p>Cogeneration from other fossil-fuel based gases would be eligible under the Taxonomy, subject to meeting the declining emissions threshold.</p>

Rationale	
Efficient and low-emissions cogeneration of heating/cooling and power will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that which applies to production of heating/cooling.	
Do no significant harm assessment	
The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control in line with BREF indicators and the avoidance of direct impacts on sensitive ecosystems, species or habitats.	
(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	Ensure emissions to air, water and soil are prevented / minimized by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur ²⁶⁸ .
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and</p>

²⁶⁸ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants

	<p>Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.20 Cogeneration of Heat/Cool and Power from Bioenergy (Biomass, Biogas, Biofuels)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Bioenergy
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Facilities operating above 80% of GHG emissions-reduction in relation to the relative fossil fuel comparator set out in RED II increasing to 100% by 2050, are eligible,</p> <p>Facilities must use feedstocks which meet the criteria on the Manufacture of Biomass, Biogas and Biofuels.</p> <p>This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory</p> <p>Assets and activities must meet the threshold at the point in time when taxonomy approval is sought</p> <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>For Anaerobic Digestion of Biowaste and Sewage Sludge, refer to activities 5.5 and 5.3 respectively.</p> <p>Any other anaerobic digestion of organic material (not covered under sections 5.3 and 5.5) is eligible provided that:</p> <ul style="list-style-type: none"> - methane leakage from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan.

	<ul style="list-style-type: none"> - the digestate produced is used as fertiliser/soil improver – directly or after composting or any other treatment.
Rationale	
<p>Efficient and low-emissions cogeneration of heating/cooling and power will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that which applies to production of heating/cooling.</p> <p>For ease of conversion, a GHG emission reduction of 80% in relation to the relative fossil fuel comparator set out in RED II is assumed to be equivalent to the 100g CO₂e / KWh threshold.</p> <p>The Co-generation of Heat/Cool and Power from Bioenergy can deliver mitigation benefits but, if done incorrectly can have no net positive impact or even a negative impact. Thus, the eligibility criteria are based on existing EU regulation but seek to advance the agenda by setting a higher threshold on the required GHG emissions savings outlined in RED II and restricting eligibility to advanced bioenergy feedstocks.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the SO₂, NO_x dust and other emissions control in line with BREF/ Medium Combustions Plants Directive and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>Intelligent pathways for cascading use are environmentally superior and preferable to single use.²⁶⁹.</p>	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Implement measures concerning waste management required by the Commission Implementing Decision (EU) 2017/1442 under the Industrial Emissions Directive 2010/75/EU, relying to the extent possible on the JRC's BAT Reference Document for Large Combustion Plants. These requirements apply for installations with a total rated thermal input of 50 MW or more.
(5) Pollution	Ensure emissions to air, water and soil are prevented / minimised by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or

269 UBA (2017) Fehrenbach, et. al. BIOMASS CASCADES Increasing resource efficiency by cascading use of biomass — from theory to practice, TEXTE 53/2017, https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2017-06-13_texte_53-2017_biokaskaden_summary.pdf

	<p>other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur.</p> <p>Limit the emissions to values within the ranges given in the newest version of the following documents depending on the size of the installation:</p> <ul style="list-style-type: none"> ○ BREF document on Large Combustion Plants²⁷⁰, chapter 10.2.2 (BAT conclusions for the combustion of solid biomass and/or peat; SO₂, NO_x, dust, CO, Mercury, HCl, HF thresholds). These requirements apply for installations with a total rated thermal input of 50 MW or more and that fall under the scope of the LCP BREF. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered. ○ Medium Combustion Plants Directive²⁷¹. These thresholds apply for combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW ('medium combustion plants'), and for a combination formed by new medium combustion plants pursuant to Article 4 of this directive, including a combination where the total rated thermal input is equal to or greater than 50 MW, unless the combination forms a combustion plant covered the BREF document on Large Combustion Plants (see above). The following thresholds apply: <ul style="list-style-type: none"> ○ In general: of Annex II (SO₂, NO_x and dust thresholds) ○ For plants in zones or parts of zones not complying with the air quality limit values laid down in EU Directive 2008/50/EC²⁷²: Recommended values which are to be published by the European Commission (DG ENV) pursuant to Article 6, paragraph 9 and 10 (of the Medium Combustion Plant Directive (EU) 2015/2193). <p>Emissions in mg/Nm³ (for biomass in large combustion plants: SO₂, NO_x, dust, CO, Mercury, HCl, HF; for biomass and for liquid biofuels in medium combustion plants: SO₂, NO_x, dust, for biogas in medium combustion plants: SO₂, NO_x)</p> <ul style="list-style-type: none"> ● In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.²⁷³ ● In case of AD, emissions to air (e.g. SO_x, NO_x) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation.
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270 http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

271 Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193> (Annex II)

272 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>

273 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

	<ul style="list-style-type: none"> • In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009²⁷⁴ and respective national rules on fertilising products.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

²⁷⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.21 Production of Heat/Cool from Concentrated Solar Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of Heat/cool from Concentrated Solar Power
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any heat/cool generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of heat/cool are below the declining threshold.</p> <p>Declining threshold: Facilities operating at less than 100g CO₂e/kWh, declining to 0g CO₂e/kWh by 2050, are eligible</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions <p>However:</p> <ul style="list-style-type: none"> CSP is currently derogated from performing a PCF assessment, subject to regular review in accordance with the declining threshold. CSP is currently deemed to be taxonomy eligible, which is subject to regular review.
Rationale	
<p>Efficient and low-emissions production of heating and cooling will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that which applies to production of heating/cooling.</p>	
Do no significant harm assessment	

<p>The main potential significant harm to other environmental objectives from CSP is associated with:</p> <ul style="list-style-type: none"> • The construction of the installation and the substantial land-take associated with the installation • Impacts to birdlife from the high temperatures generated by the plant • Impacts of the cooling system on water resources 	
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Ensure CSP installations have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in line with 'Manufacture of Renewable Energy Equipment' for DNSH criteria.
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.22 Production of Heat/Cool from Geothermal

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling from Geothermal Energy
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Any heat/cool generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of heat/cool are below the declining threshold.</p> <p>Declining threshold: Facilities operating at less than 100g CO₂e/kWh, declining to 0g CO₂e/kWh by 2050, are eligible</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions <p>Cogeneration of Heat and Power is covered under the construction and operation of a facility used for cogeneration of heat/cooling and Power threshold</p>
Rationale	
<p>Efficient and low-emissions production of heating and cooling will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that which applies to production of heating/cooling.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from Production of electric energy from high-enthalpy geothermal system is associated with:</p>	

	<ul style="list-style-type: none"> Non-condensable geothermal gases with specific environmental threats, such as H₂S, CO₂, and CH₄, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems and no steam is emitted. Possible emissions to surface and underground water
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the EU regulatory framework (i.e. EU Water Framework Directive¹ and Daughter Directives). Emissions to air: the operations of high-enthalpy geothermal energy systems should ensure that adequate abatement systems are in place to comply with existing EU Air Quality Legislation and BAT²⁷⁵; including but not limited to <1 µg/Nm³ Hg.</p> <p>Thermal anomalies associated with the discharge of waste heat should not exceed 3°K for groundwater environments or 1.5°K for surface water environments, respectively.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p>

275 JRC. Best Available Techniques (BAT) Reference Document for Large Combustion Plants. JRC107769 / EUR 28836 EN. ISBN 978-92-79-74303-0. 2017

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| | <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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4.23 Production of Heat/Cool from Gas Combustion

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling from Gas Combustion (not exclusive to natural gas)
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds.
Metric & Threshold	<p>Any heat/cool generation technology can be included in the taxonomy if it can be demonstrated, using an ISO 14067 or a GHG Protocol Product Lifecycle Standard-compliant Product Carbon Footprint (PCF) assessment, that the life cycle impacts for producing 1 kWh of heat/cool and power are below the declining threshold.</p> <p>A full PCF shall be applied, using project specific data where relevant and shall be subjected to review. This assessment should include actual physical measurements, i.e. methane leakage measurements across gas extraction, transport and storage systems.</p> <p>Declining threshold: The Cogeneration Threshold is the combined heat/cool and power threshold of 100 gCO₂e/kWh.</p> <ul style="list-style-type: none"> This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory Assets and activities must meet the threshold at the point in time when taxonomy approval is sought For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions Facilities that will incorporate any form of abatement (e.g. CCS, Co-firing, other...) must show that the abatement activity is eligible under the Taxonomy The full PCF assessment shall be subjected to review. <p>Heat/cool generation from other fossil-fuel based gases would be eligible under the Taxonomy, subject to meeting the declining emissions threshold.</p>
Rationale	

Efficient and low-emissions production of heating and cooling will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that which applies to production of heating/cooling.

Do no significant harm assessment	
The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control in line with BREF indicators and the avoidance of direct impacts on sensitive ecosystems, species or habitats.	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	Ensure emissions to air, water and soil are prevented / minimized by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur ²⁷⁶ .
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management</p>

²⁷⁶ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants

	<p>of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.24 Production of Heat/Cool from Bioenergy (Biomass, Biogas and Biofuels)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling from Bioenergy
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	<p>Facilities operating above 80% of GHG emissions-reduction in relation to the relative fossil fuel comparator set out in RED II increasing to 100% by 2050, are eligible,</p> <p>Facilities must use feedstocks which meet the criteria on the Manufacture of Biomass, Biogas and Biofuels.</p> <p>This threshold will be reduced every 5 years in line with a net-zero CO₂e in 2050 trajectory</p> <p>Assets and activities must meet the threshold at the point in time when taxonomy approval is sought</p> <p>For activities which go beyond 2050, it must be technically feasible to reach net-zero emissions</p> <p>For Anaerobic Digestion of Biowaste and Sewage Sludge, refer to activities 5.5 and 5.3 respectively.</p> <p>Any other anaerobic digestion of organic material (not covered under sections 5.3 and 5.5) is eligible provided that:</p> <ul style="list-style-type: none"> - methane leakage from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan. - the digestate produced is used as fertiliser/soil improver – directly or after composting or any other treatment.
Rationale	

Efficient and low-emissions production of heating and cooling will be required if Europe is to meet its net-zero by 2050 target. A power-to-heat ratio has been adopted to draw an equivalence between the declining emissions intensity threshold set on the production of electricity and that which applies to production of heating/cooling.

For ease of conversion, a GHG emission reduction of 80% in relation to the relative fossil fuel comparator set out in RED II is assumed to be equivalent to the 100g CO₂e / KWh threshold.

The Production of Heat/Cool and Power from Bioenergy can deliver mitigation benefits but, if done incorrectly can have no net positive impact or even a negative impact. Thus, the eligibility criteria are based on existing EU regulation but seek to advance the agenda by setting a higher threshold on the required GHG emissions savings outlined in RED II and restricting eligibility to advanced bioenergy feedstocks.

Do no significant harm assessment

The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfillment of the applicable waste and recycling criteria, the SO₂, NO_x dust and other emissions control in line with BREF/ Medium Combustions Plants Directive and the avoidance of direct impacts on sensitive ecosystems, species or habitats.

Intelligent pathways for cascading use are environmentally superior and preferable to single use.²⁷⁷.

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Ensure appropriate measures are in place to minimize and manage waste and material use in accordance with BREF for Large Combustion Plants ²⁷⁸ . These requirements apply for installations with a total rated thermal input of 50 MW or more.
(5) Pollution	Ensure emissions to air, water and soil are prevented / minimised by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL

²⁷⁷ UBA (2017) Fehrenbach, et. al. BIOMASS CASCADES Increasing resource efficiency by cascading use of biomass — from theory to practice, TEXTE 53/2017, https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2017-06-13_texte_53-2017_biomass_cascades.pdf

²⁷⁸ http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

	<p>ranges included therein, ensuring at the same time that no significant cross-media effects occur.</p> <p>Limit the emissions to values within the ranges given in the newest version of the following documents depending on the size of the installation:</p> <ul style="list-style-type: none"> ○ BREF document on Large Combustion Plants²⁷⁹, chapter 10.2.2 (BAT conclusions for the combustion of solid biomass and/or peat; SO₂, NO_x, dust, CO, Mercury, HCl, HF thresholds). These requirements apply for installations with a total rated thermal input of 50 MW or more and that fall under the scope of the LCP BREF. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered. ○ Medium Combustions Plants Directive²⁸⁰. These thresholds apply for combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW ('medium combustion plants'), and for a combination formed by new medium combustion plants pursuant to Article 4 of this directive, including a combination where the total rated thermal input is equal to or greater than 50 MW, unless the combination forms a combustion plant covered the BREF document on Large Combustion Plants (see above). The following thresholds apply: <ul style="list-style-type: none"> ○ In general: of Annex II (SO₂, NO_x and dust thresholds) ○ For plants in zones or parts of zones not complying with the air quality limit values laid down in EU Directive 2008/50/EC²⁸¹: Recommended values which are to be published by the European Commission (DG ENV) pursuant to Article 6, paragraph 9 and 10 (of the Medium Combustion Plant Directive (EU) 2015/2193). <p>Emissions in mg/Nm³ (for biomass in large combustion plants: SO₂, NO_x, dust, CO, Mercury, HCl, HF; for biomass and for liquid biofuels in medium combustion plants: SO₂, NO_x, dust, for biogas in medium combustion plants: SO₂, NO_x)</p> <ul style="list-style-type: none"> ● In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.²⁸² ● In case of AD, emissions to air (e.g. SO_x, NO_x) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation.
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279 http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

280 Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193> (Annex II)

281 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>

282 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

	<ul style="list-style-type: none"> • In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009²⁸³ and respective national rules on fertilising products.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

²⁸³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.25 Production of Heat/Cool using Waste Heat

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling using Waste Heat
Mitigation criteria	
Principle	<ul style="list-style-type: none"> Support a transition to a net-zero emissions economy Avoidance of lock-in to technologies which do not support the transition to a net-zero emissions economy Ensure that economic activities meet best practice standards Ensure equal comparability within an economic activity with regards to achieving net-zero emissions economy target Where necessary, incorporating technology-specific considerations into secondary metrics and thresholds
Metric & Threshold	All recovery of waste heat is eligible.
Rationale	
The operation of waste heat infrastructure is eligible because the emissions from the underlying economic activity would be generated with or without the waste heat recovery system. Hence the waste heat recovery system would not increase operational emissions.	
Waste heat is heat that is discarded by an existing industrial process.	
Do no significant harm assessment	
Key environmental aspects to be considered for the production of heat/cool using waste heat are generally moderate and should mostly be covered by considerations at the heat / cool source.	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	Pumps and whatever kind of equipment is covered by Ecodesign and used should comply, where relevant, with the top class requirements of the energy label, and otherwise be compliant with the latest implementing measures of the Ecodesign Directive and representing the best available technology.
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions

	<p>or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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5. WATER, SEWERAGE, WASTE AND REMEDIATION

Why is water, sewerage, waste and remediation included in the Taxonomy

The sub-sector Water, Sewerage, Waste and Remediation (WSWR) covering NACE-Codes E36 to E39 contributes to a rather small share of the EU's total greenhouse gas emissions – water with 0.2% and sewerage, waste, remediation with 4.4% in 2016. However, advanced solid waste management has a great potential to trigger greenhouse gas emission reductions in other sectors of the economy through waste prevention, separate waste collection, waste reuse and recycling.

What is covered

In the waste sector, a systems approach describing the climate mitigation effects of an integrated package of closely interrelated and combined environmentally sustainable activities would have its merits. As, however, the scope of the Taxonomy subgroup was to define stand-alone activities, the chosen climate mitigation principles, metrics and thresholds were formulated in a way to allow for the assessment of singular activities without consideration of their linkages in a complex waste management system (respectively, waste hierarchy).

The TEG and the experts involved assessed the NACE codes for WSWR and identified nine economic activities that offer a substantial contribution for climate mitigation:

- E36.0.0 Water collection, treatment and supply: 1. Water collection, treatment and supply
- E37.0.0 Sewerage: 2. Centralized wastewater treatment; 3. Anaerobic digestion of sewage sludge
- E38.1.1 Collection of non-hazardous waste: 4. Separate collection and transport of non-hazardous waste in source segregated fractions
- E38.1.2 Collection of hazardous waste: -
- E38.2.1 Treatment and disposal of non-hazardous waste: 5. Anaerobic digestion of bio-waste; 6. Composting of bio-waste
- E38.2.2 Treatment and disposal of hazardous waste: -
- E38.3.1 Dismantling of wrecks: -
- E38.3.2 Recovery of sorted materials: 7. Material recovery from non-hazardous waste
- E39.0.0 Remediation activities: 8. Landfill gas capture and utilization; 9. Carbon Capture and Storage

NACE Codes 'E38.1.2 collection of hazardous waste', 'E38.2.2 treatment and disposal of hazardous waste' and 'E38.3.1 dismantling of wrecks' (e.g. automobiles, ships, etc.) were found to be of less relevance from a climate mitigation perspective and thus reprioritized for later consideration by the Platform on Sustainable Finance (see section on 'next steps' further below).

On waste incineration with energy recovery (waste-to-energy, WtE) experts' opinions differed on whether this would be an appropriate environmentally sustainable activity offering a substantial contribution to climate mitigation. On the one hand, there were arguments against the inclusion of WtE. These highlighted the large portion of waste currently incinerated that could be recycled, the reliance of some individual Member States on the incineration of municipal waste, and the risk that further increasing capacities risk overcapacity and could result in lock-in effects. This would in turn discourage more reuse and recycling, options higher in the waste hierarchy and that can deliver higher climate mitigation benefits. On the other hand, it was emphasized that WtE has a role to play even in an increasingly circular economy as not all residual waste can be reused or recycled (as acknowledged by the EC in its Communication COM(2017)34 on 'the role of waste-to-energy in the circular economy', Section 5). According to the political agreement on the Taxonomy Regulation, any activity leading to a significant increase in the incineration, including WtE, of waste is not considered an eligible activity as it causes harm to the environmental objectives of the circular economy as per Article 12(d) of the EU Taxonomy regulation, with the exception of the incineration of non-recyclable hazardous waste. This exception was not part of the Commission's proposal, which considered any significant increase of incineration capacity harmful to the circular economy and hence ineligible. Therefore, the TEG has not included WtE, but recommends bringing this matter for further discussion and consideration to the Platform on Sustainable Finance, in light of the changes in the political agreement text.

TEG Call for Public Feedback on its Report on EU Taxonomy, June 2019

The main issues raised in the public feedback on activities in the subsector WSWR related to broadening the scope of some activities: For 'anaerobic digestion of bio-waste', and similar for 'anaerobic digestion of sewage sludge' and 'landfill gas capture and utilization', respondents suggested to allow for additional uses of the produced biogas or landfill gas. For the 'anaerobic digestion of bio-waste', respondents warned against the exclusion of certain crops and against the exclusion of blending of feedstocks. Both issues are reflected in the revised criteria.

Setting criteria and thresholds

An important characteristic of subsector WSWR is that for the identified activities – with the exception of 'water collection, treatment and supply' – the climate mitigation effect is an inherent result of key characteristic of the corresponding business model, for example the energetic utilization of bio-gas produced through the anaerobic digestion of sewage sludge and bio-waste, or the material recovery from waste for reuse or recycling in other sectors. Hence, the choice of climate mitigation criteria mainly focuses on (qualitative) metrics that seek to securing the execution of the activities/businesses themselves.

Only in 'water collection, treatment and supply' – namely water supply – the climate mitigation effect is the result of a more efficient design of the production process (e.g. by raising pump efficiency or reducing leakages). Consequently, concrete quantitative thresholds were defined, with a first option describing an ambitious level of high energy efficiency in the water collection, treatment and supply system, and with a second option setting thresholds for the substantial improvement of the system's energy efficiency.

Given the heterogeneity of WSWR, it is challenging to establish a set of one size fits all criteria. This point was raised in the public consultation feedback. However, it is the view of the TEG that these criteria – even if some are referencing to EU regulation – are globally relevant for the contribution of WSWR to a

low carbon economy and with the in-built flexibility on options for demonstrating compliance, they can be applied globally.

Impact of these proposals

The activities do not impose major additional implementation costs on the stakeholders because (as explained) for most of them – except ‘water collection, treatment and supply’ – the climate mitigation effects are an inherent result of key characteristics of the correspondent business models and thus should come along without significant further cost. Considering ‘water collection, treatment and supply’, additional investments may be necessary in order to reach certain thresholds, however the corresponding costs may partially be equalized by cost savings from higher energy efficiency.

There should be no systematic distortive effect of the activities on the number and competitive position of the companies in the corresponding sectors. The overall sectoral technological impact will depend on the state of the water, wastewater and waste management in each Member State in terms of e.g. regional coverage of different management technologies. Outside of the EU the technological impact could be even greater if the state of the sector in an individual country or region is below that of the EU.

Clear additional beneficial environmental effects can be assumed for e.g. water, circular economy and pollution. Employment effects should be positive, and further beneficial economic impacts are induced through increased investments and the demand for consumer goods.

Why carbon capture and sequestration (CCS) is included in the Taxonomy

Carbon capture and sequestration (CCS) is a key technology for the decarbonisation of Europe. It is included in all pathways presented by the European Commission in its Long-Term Strategic Vision document and is relied upon heavily in three-out-of-four scenarios outlined by the IPCC in the Special Report on 1.5 Degrees.

A typical CCS chain consists of three main stages: capture, transport and storage. CO₂ transport and storage are established and proven processes, with decades of operation and well-established regulation here in Europe.

The Technical Expert Group has developed criteria to define the eligibility of facilities used to capture carbon dioxide directly from the atmosphere and, separately, to capture carbon dioxide directly from anthropogenic activities.

CCS can be eligible in any sector/activity if it enables that primary activity to operate in compliance with the threshold - for example, steel, cement or electricity production.

Capture

CCS facilitates the direct mitigation of both fossil and process emissions in many industrial sectors including steel, cement and chemicals. Time is a crucial factor: the later options for deep decarbonisation in an industry arise, the more costly they become, and the more likely the need for greater carbon dioxide removal

(CDR) in the future. 2050 is only one investment cycle away for many industries. Thus, decisions need to be made today.

In addition to renewable energies, energy storage and demand-side management, CCS on dispatchable generation allows all aspects of the electricity supply system to be deeply decarbonised.²⁸⁴ CCS provides a backstop to the unabated operation of flexible electricity generation plants that are required to guarantee the operation and supply of year-round electricity. This is especially true in more isolated grids with a high penetration of seasonally variable renewables (e.g. onshore and offshore wind) where the reliable operation of electricity networks requires on-demand electricity generation.

The availability of CCS means that no remaining segment of the electricity supply system will be capable of emitting CO₂ to the atmosphere.

Whilst some CO₂ capture technologies can incur an ‘energy penalty’ of 10-15%, others do not. For example, the Allam cycle being developed by Net Power on natural gas combustion for power generation does not incur an energy penalty, as supercritical CO₂ is integrated fully into the power cycle as a coolant. This significantly reduces both energy and water demand. It is therefore inaccurate to say that CCS is a highly energy-intensive technology.

Transport and Storage

The transport and storage of CO₂ should be considered essential to the infrastructure of a modern, sustainable society. It can aid electricity grid expansion, the integration of renewables and the deep decarbonisation of energy intensive industries; support and enable CO₂ removal; and help stimulate a green hydrogen market. Without CO₂ transport and storage infrastructure, Europe will not achieve its climate objectives.

Chemically, CO₂ bonds with surrounding minerals after injection (gradual re-fossilisation), making CO₂ storage sites safer as time progresses. The IPCC estimates that over 99.9% of CO₂ will remain underground. The EU has provided clear and extensive assessment and monitoring requirements through the 2009 CO₂ Storage Directive. CO₂ has already been safely stored in geological formations in Europe for over 20 years.

²⁸⁴ <https://pubs.rsc.org/en/content/articlelanding/2016/ee/c6ee01120a#!divAbstract>.

Through decade-long CO₂ injection experiences in North America, and the monitoring of CO₂ storage in Europe, the safe final disposal of CO₂ both on- and offshore has already been established. Selected sources on risk and safety of CO₂ storage can be found in the footnotes.^{285,286,287,288,289,290,291,292,293,294}

Next steps

The Platform on Sustainable Finance to come is expected to review several activities: By 2025, the threshold in Option 2 of 'water collection, treatment and supply' will have to be assessed for adjustment as the standards in the water supply sector and the technologies develop over time. Further, by 2025 the platform shall assess whether the Taxonomy has incentivized for 'landfill gas capture and energetic utilization' the closure of existing landfills and the increase of landfill gas capture, as intended.

The experts identified further economic activities which could be relevant for the Taxonomy. However, constrained by limited manpower, these activities could not be assessed in detail and are for future consideration by the Platform. Such economic activities may include:

- water management activities dealing with the separate management of rain water (e.g. through local infiltration or separate sewers);
- economic activities promoting the reuse of products and/or preparing products for reuse through the establishment of reuse and repair networks and dedicated separate collection and reverse logistics systems;
- waste management activities dealing with the 'collection of hazardous waste' and 'treatment and disposal of hazardous waste' (NACE Codes 38.1.2 and 38.2.2) where these are important enablers

285 Benson, S. M., Ed. (2004), The CO₂ Capture and Storage Project (CCP) for Carbon Dioxide Storage in Deep Geologic Formations for Climate Change Mitigation, Vol. 2: Geologic Storage of Carbon Dioxide with Monitoring and Verification, London, Elsevier Science.

286 Benson, S. M. et al. (2002), Lessons Learned from Natural and Industrial Analogues for Storage of Carbon Dioxide in Deep Geological Formations. Berkeley, CA, Lawrence Berkeley National Laboratory.

287 Busch, A. et. Al. (2010), The Significance of Caprock Sealing Integrity for CO₂ Storage, SPE International Conference on CO₂ Capture, Storage, and Utilization, 10-12 November, New Orleans, Louisiana, USA.

288 Duncan, I. J., Wang, H. (2014), 'Estimating the likelihood of pipeline failure in CO₂ transmission pipelines: New insights on risks of carbon capture and storage', International Journal of Greenhouse Gas Control 21: 49-60.

289 European Union (2009), On the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, Official Journal of the European Union.

290 IEA (2007), Remediation of Leakage from CO₂ Storage Reservoirs, IEA Greenhouse Gas R&D Programme.

291 IPCC (2005), IPCC Special Report on Carbon Dioxide Capture and Storage, Cambridge University Press, Cambridge, UK and New York, NY, USA.

292 Liebscher, A., Münch, U., Eds. (2015), Geological Storage of CO₂ – Long Term Security Aspects, Springer.

293 Phuoc Pham, L. H., Rusli, R., Keong, L. K. (2016), Consequence Study of CO₂ Leakage from Ocean Storage Procedia Engineering, 148: 1081-1088.

294 Wilson, E. J., T. L. Johnson, et al. (2003), 'Regulating the ultimate sink: Managing the risks of geologic CO₂ storage', Environmental Science & Technology 37(16): 3476-3483.

for subsequent material recovery, reuse and recycling activities (e.g. for products and assets containing hazardous components and substances, such as some categories of waste electrical and electronic equipment);

- waste management activities dealing with the valorisation and cascading uses of bio-waste (e.g. extraction of nutrients and biochemical feedstock from bio-waste substituting production from fossil sources) are still in their infancy but could gain in importance in the future;
- remediation activities involving the installation of bio-filters or the implementation of other landfill gas abatement measures where the installation of active landfill gas collection and utilization systems are not economically viable;
- waste management activities dealing with the ‘dismantling of wrecks’ (NACE Code 38.3.1), e.g. of vehicles, ships and other equipment, where these enable subsequent material recovery for reuse and recycling.

5.1 Water collection, treatment and supply

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E36.0.0
Description	<p>“Water collection, treatment and supply”</p> <p>Water collection, treatment and supply with high energy efficiency of the system.</p>
Mitigation criteria	
Principle	<p>Substantial contribution to GHG emissions savings through low specific energy consumption in the water collection, treatment and supply system.</p> <p>By 2025 the Sustainable Finance Platform should assess the feasibility of Option 2, in particular with regard to the intended incentive for substantial energy efficiency improvements in water supply systems.</p>
Metric & threshold	<p>The front-to-end water collection, treatment and supply system is eligible provided that:</p> <ul style="list-style-type: none"> • its performance in terms of energy consumption per cubic meter of final water supply is high or substantially improved. <p>Eligibility is demonstrated by adherence to one of two optional thresholds:</p> <p>Option 1: The front-to-end water supply system has a high degree of energy efficiency characterized by:</p> <ul style="list-style-type: none"> • an average energy consumption of the system (including abstraction, treatment and distribution) of 0.5 kWh per cubic meter billed/unbilled authorized water supply or less.²⁹⁵ <p>Option 2: The energy efficiency of the front-to-end water supply system is increased substantially:</p> <ul style="list-style-type: none"> • by decreasing the average energy consumption of the system by at least 20% (including abstraction, treatment and distribution; measured in kWh per cubic meter billed/unbilled authorized water supply); <p>or</p> <ul style="list-style-type: none"> • by closing the gap between the actual leakage of the water supply network and a given target value of low leakage by at least 20%.

²⁹⁵ Value of 0.5 according to the European benchmarking. Public Report IB2017 in <https://www.waterbenchmark.org/documents/Public-documents>.

	The unit of measurement is the Infrastructure Leakage Index (ILI) ²⁹⁶ , the target value of low leakage is an ILI of 1.5.
Rationale	
<p>The water supply sector is a wide and varied sector with very different performance conditions depending on the water source, the necessary treatment, the topography of the supplied area, the length of the network etc. "ILI" and "kwh/m3 supplied" are chosen as parameters in order to measure the efficiency of a water supply system.</p> <p>An average energy consumption of a water supply system of 0.5 kwh per cubic meter billed/unbilled authorized water supply indicates a high performing system in terms of energy consumption. Several energy efficiency measures can reduce directly the energy consumption in a water supply system, enabling significant reductions of GHG emissions, these are inter alia:</p> <ul style="list-style-type: none"> • to use more efficient sources in substitution of others more GHG demanding (e.g. surface sources instead groundwater sources, by means of water harvesting), • more efficient pumping systems, • frequency variators, • digitalization and automation. <p>An ILI of 1.5 represents a very efficient performance of the network with regards to water losses. ILI incorporates in its definition the length of the supply network, which makes it the most objective parameter. Water losses management (reduction of the ILI) reduces indirectly the energy consumption in the whole water supply system thus enabling significant reductions of GHG emissions from the water supply system. Water loss management measures consist inter alia of:</p> <ul style="list-style-type: none"> • active leakage control, • pressure management, • speed and quality of repairs, • infrastructure and assets management (including maintenance), • metering, • monitoring and reporting, • digitalization and automation. 	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> • water abstraction; • possible detrimental effects to ecosystems. <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement.</p>	
(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water

²⁹⁶ The Infrastructure Leakage Index (ILI) is calculated as current annual real losses (CARL) / unavoidable annual real losses (UARL). See Canfora P., Antonopoulos I. S., Dri M., Gaudillat P., Schönberger H. (2019), "Best Environmental Management Practice for the Public Administration Sector". JRC Science for Policy Report EUR 29705 EN.

	<p>use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.</p> <ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area.</p> <p>For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

5.2 Centralized wastewater treatment

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E37.0.0
Description	<p>“Centralized wastewater treatment”</p> <p>Treatment of wastewater in centralized systems (including collection and wastewater treatment plants), substituting treatment systems causing high GHG emissions (e.g. onsite sanitation, anaerobic lagoons).</p>
Mitigation criteria	
Principle	Net GHG emission reduction through centralization of wastewater treatment thus substituting decentralized sanitation systems with higher GHG emissions.
Metric & threshold	<p>Construction or extension of centralized wastewater systems including collection (sewer network) and treatment is eligible, provided that:</p> <ul style="list-style-type: none"> the new wastewater treatment substitutes more GHG emission intensive wastewater treatment systems (such as pit latrines, septic tanks, anaerobic lagoons etc.). <p>No threshold applies.</p>
Rationale	
<p>This activity considers collection and waste water treatment line in wastewater treatment plants. The sludge treatment is included in Taxonomy Activity “Anaerobic digestion of sewage sludge”.</p> <p>From common practice (see 2006 IPCC Guidelines for National Greenhouse Gas inventories) it is known that any level of treatment (primary, secondary, or tertiary) achieves substantial reductions of GHG emissions when compared with the emissions of the discharge of wastewater in the water bodies through on-site sanitation systems (such as pit latrines, septic tanks, anaerobic lagoons etc.).</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> emissions to water from wastewater treatment; combined sewer overflow in case of heavy rainfall; sewage sludge treatment; possible detrimental effects to ecosystems. <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local wastewater management strategies and plans is a minimum requirement.</p>	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	

(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Ensure emissions to water are within the ranges set in the Urban Waste Water Treatment Directive 91/271/EEC. • Implement appropriate measures to avoid and mitigate combined sewer overflow in case of heavy rainfall, such as Nature-based solutions, separate rainwater collection systems, retention tanks and / or treatment of the first flush. • Ensure sewage sludge is managed/used (e.g. anaerobic digestion, land application) according to relevant EU and respective national legislation.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

5.3 Anaerobic digestion of sewage sludge

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E37.0.0
Description	<p>“Anaerobic digestion of sewage sludge”</p> <p>Treatment of sewage sludge in wastewater treatment plants or in other dedicated installation with the resulting production and utilization of biogas.</p>
Mitigation criteria	
Principle	Net GHG emission reduction from sewage sludge treatment through the capture and utilization of the generated biogas in various forms and applications, often displacing fossil fuels.
Metric & threshold	<p>Anaerobic digestion of sewage sludge treatment is eligible provided that (cumulative):</p> <ul style="list-style-type: none"> methane leakage from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan; the produced biogas is used directly for the generation of electricity and/or heat, or upgraded to bio-methane for injection in the natural gas grid, or used as vehicle fuel (e.g. as bioCNG) or as feedstock in chemical industry (e.g. for production of H₂ and NH₃). <p>No threshold applies.</p>
Rationale	
<p>Sewage sludge is a by-product of waste-water treatment, with organic and inorganic content. The organic content of the sludge is subject of decomposition which might occur under controlled circumstances (in sludge treatment installations) or under un-controlled circumstances in the final disposal, with significant GHG emissions (mainly methane).</p> <p>Anaerobic Digestion (AD) and in some cases aerobic digestion are examples of sludge treatments. In AD microorganisms decompose the organic matter of the sludge (in the absence of oxygen) and produce methane-rich biogas.</p> <p>The primary climate mitigation effect of biogas is its use as a source of renewable energy in multiple forms and applications displacing fossil fuels.²⁹⁷ As an additional contribution to climate mitigation the sludge can be turned into a recyclable product (e.g. as fertilizer substituting synthetic fertilizers).</p>	

²⁹⁷ Canfora P., Antonopoulos I. S., Dri M., Gaudillat P., Schönberger H., Best Environmental Management Practice for the Public Administration Sector (JRC116121) Section 11.3 (Anaerobic Digestion of Sludge), JRC Science for Policy Report, EUR 29705 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-01442-3.

Sludge treatment is in many cases centralized in wastewater treatment plants (WWTP), which treat the sludge and produce energy from sludge produced in the WWTP or outside the plant.

Methane leakage may offset the climate mitigation benefits and needs to be avoided. A specific monitoring plan is therefore needed to detect methane leakages from relevant facilities. Where increasing methane emissions are detected, it is in the own interest of the operator to remove the causes through technical or operational measures in order to minimize economic losses.²⁹⁸

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- emissions to air, soil and water from the operation of the anaerobic digestion plant which may lead to emissions of pollutants that have significant impacts on human respiratory systems and on ecosystems through acidification and/or eutrophication. The most relevant emissions are resulting from the sludge storage as well as from the subsequent combustion of biogas, such as sulphur dioxide, nitrous oxide and particulates;
- the subsequent use of the resulting digestate as fertiliser / soil improver which may also result in soil and water pollution due to contaminants in the digestate.

Compliance with relevant EU and respective national law as well as consistency with national, regional or local wastewater management strategies and plans is a minimum requirement.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AELs)²⁹⁹ ranges set for anaerobic treatment of waste in the BREF for waste treatment.³⁰⁰ • Emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. • If the resulting digestate is intended for use as fertiliser / soil improver, it must meet the national rules on fertilisers/soil improvers for agricultural use.
(6) Ecosystems	

298 IEA Bioenergy, 2017: Methane emissions from Biogas Plants (https://www.ieabioenergy.com/wp-content/uploads/2018/01/Methane-Emission_web_end_small.pdf).

299 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1147&from=EN>

300 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

5.4 Separate collection and transport of non-hazardous waste in source segregated fractions

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.1.1
Description	<p>“Separate collection and transport of non-hazardous waste in source segregated fractions”</p> <p>Separate collection and transport of non-hazardous waste in single or comingled fractions aimed at preparing for reuse and/or recycling.</p>
Mitigation criteria	
Principle	Net GHG emission reductions through reuse and high quality recycling of waste, which are enabled by the separate collection and transport of source-segregated non-hazardous waste fractions. Reuse and recycling activities reduce GHG emissions by displacing alternative waste management options (e.g. landfilling and incineration) and alternative raw material sourcing options with higher GHG emission intensity.
Metric & threshold	<p>Separate collection and transport of non-hazardous waste is eligible provided that:</p> <ul style="list-style-type: none"> source segregated waste (in single or co-mingled fractions) is separately collected with the aim of preparing for reuse and/or recycling. <p>No threshold applies.</p>
Rationale	
<p>This activity includes the collection of source segregated non-hazardous waste from households and businesses for the purpose of material recovery and bio-waste treatment in dedicated facilities (see Taxonomy Activities “Material recovery from non-hazardous waste”, “Anaerobic digestion of bio-waste” and “Composting of bio-waste”).</p> <p>Separate waste collection is a precondition for reuse and high quality recycling of waste, whose net GHG emission reduction is proven by pertinent studies.³⁰¹ Additional GHG emissions resulting from</p>	

³⁰¹ German Federal Environmental Agency (UBA), 2015: The Climate Change Mitigation Potential of Waste Management, sections 4.2.4 and 11.1 (Recovering dry recyclables, specific emission factors).

https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_56_2015_the_climate_change_mitigation_potential_of_the_waste_sector.pdf.

Eunomia, 2015: The Potential Contribution of Waste Management to a Low Carbon Economy, section 3.2 (Quantifying the Impacts per Ton of Waste). <https://www.eunomia.co.uk/reports-tools/the-potential-contribution-of-waste-management-to-a-low-carbon-economy/>.

waste collection and transport activities are minimal compared to the overall net GHG emission reduction of reuse and recycling activities.

The collection and transport of waste may include the use of e.g. bins, containers, refuse collection and transport vehicles, ancillary technological equipment and IT systems, reverse vending machines and other forms of take-back systems, services useful to separate waste collection (i.e. information campaigns, activities of waste advisers) as well as related infrastructure such as civic amenity centres, temporary storage and transfer facilities.

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- emissions of collection vehicles that cause harm to human health and the environment;
- mixing source segregated waste fractions that could impair subsequent material recovery and recycling.

Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.

(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	Avoid mixing different source segregated waste fractions in waste storage and transfer facilities.
(5) Pollution	If waste collection is carried out by trucks, vehicles must at least meet Euro V standard.
(6) Ecosystems	

Dri M., Canfora P., Antonopoulos I. S., Gaudillat P., Best Environmental Management Practice for the Waste Management Sector (section 1.4.6 -Material recycling),JRC Science for Policy Report, EUR 29136 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-80361-1, doi:10.2760/50247. JRC111059.

United Nations Environmental Programme / Division of Technology, Industry and Economics International Environmental Technology Centre: Waste and Climate Change: Global trends and strategy framework; Osaka/Shiga / Japan 2010; www.unep.or.jp/ietc/Publications/spc/Waste&ClimateChange.

5.5 Anaerobic digestion of bio-waste

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.2.1
Description	<p>“Anaerobic digestion of bio-waste³⁰²”</p> <p>Treatment of separately collected bio-waste through anaerobic digestion in dedicated plants with the resulting production and utilization of biogas <u>and</u> digestate.</p>
Mitigation criteria	
Principle	<p>Net GHG emission reduction through</p> <ul style="list-style-type: none"> • avoidance of GHG emissions compared to alternative options for bio-waste management; • controlled production and utilization of biogas in various forms and applications, often displacing fossil fuels; • production and use of digestate as fertiliser/soil improver³⁰³, displacing synthetic fertilisers and increasing carbon sequestration in soils.
Metric & threshold	<p>Anaerobic digestion of bio-waste is eligible provided that (cumulative):</p> <ul style="list-style-type: none"> • the bio-waste is source segregated and collected separately; • methane leakage from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan; • the produced biogas is used directly for the generation of electricity and/or heat, or upgraded to bio-methane for injection in the natural gas grid, or used as vehicle fuel (e.g. as bioCNG) or as feedstock in chemical industry (e.g. for production of H₂ and NH₃); • the digestate produced is used as fertiliser/soil improver – directly or after composting or any other treatment; • in dedicated bio-waste treatment plants, bio-waste shall constitute a major share of the input feedstock (at least 70%, measured in weight, as an annual average). Co-digestion is eligible only with a minor share (up to 30% of the input feedstock) of advanced bioenergy feedstock listed in Annex IX of Directive (EU) 2018/2001. If energy crop feedstock covered

302 For definition of bio-waste refer to Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (Article 1(3)(b)). It comprises biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants.

303 For definition of fertilising products refer to ANNEX I of Regulation EU 2019/1009 laying down rules on the making available on the market of EU fertilising products, amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003.

	by Annex IX is used (with a minor share up to 30%) it shall be produced according to criteria defined for Taxonomy Activities “Growing of perennial crops” or “Growing of non-perennial crops” and respect any additional national limitations established for the purpose of biogas production.
Rationale	
<p>Anaerobic digestion (AD) is a process by which microorganisms decompose biodegradable material in the absence of oxygen. As part of an integrated waste management system, AD is a valid route to divert biodegradable waste from landfilling and thus reduce the uncontrolled emissions of landfill gas, in particular methane. The AD process produces methane-rich biogas under controlled conditions, and a sludge-like or liquid residue, termed ‘digestate’. Biogas can be used in multiple forms and applications that displace fossil fuels.</p> <p>The digestate is typically used on farmland as organic fertilizer, directly or after a composting step. The use of digestate instead of synthetic fertilizers derived from by-products of the petroleum industry saves energy and reduces the consumption of fossil fuels. Where there is no immediate use on farmland, the digestate can be dewatered and ‘cured’ by composting to stabilise the material, which can be stored for longer time and used as an organic fertiliser or soil improver.</p> <p>For the treatment of kitchen and food waste as well as other similar bio-waste, AD exhibits the best environmental and climate change mitigation performance compared to other forms of biological treatment and should therefore be given preference where it is technically and economically viable. This depends on several local conditions.³⁰⁴</p> <p>On the other hand, biodegradable garden and park wastes and other bio-waste with high lignous content are typically not directly degradable by AD. Where such bio-waste fraction is significant, it should be collected separately and treated by composting (see Taxonomy Activity “Composting of bio-waste”).</p> <p>Co-digestion of bio-wastes with solid or liquid manure and other agricultural residues as well as energy crops is sometimes practised to improve the stability of the AD process and increase biogas yields and is eligible under the conditions mentioned in the metrics. Due care needs to be taken however to ensure that the use of the digestate (or composts produced therefrom) as a fertilizer/soil conditioner is not negatively affected by such practice.</p> <p>Methane leakage may offset the climate mitigation benefits and therefore needs to be avoided. Specific monitoring is therefore needed to detect methane leakages from relevant facilities. Where increasing methane emissions are detected, it is in the interest of the operator to remove the causes through technical or operational measures in order to minimize economic losses.³⁰⁵</p>	
Do no significant harm assessment	
The main potential significant harm linked to this activity is related to:	

304 Dri M., Canfora P., Antonopoulos I. S., Gaudillat P., Best Environmental Management Practice for the Waste Management Sector (section 1.4.4), JRC Science for Policy Report, EUR 29136 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-80361-1, doi:10.2760/50247. JRC111059.

305 IEA Bioenergy, 2017: Methane emissions from Biogas Plants (https://www.ieabioenergy.com/wp-content/uploads/2018/01/Methane-Emission_web_end_small.pdf)

- emissions to air, soil and water from the operation of the anaerobic digestion plant which may lead to emissions of pollutants that have significant impacts on human respiratory systems and on ecosystems through acidification and/or eutrophication. The most relevant pollutant emissions result from the storage of input waste and the resulting digestate as well as from the subsequent combustion of biogas, such as sulphur dioxide, nitrous oxide and particulates;
- the subsequent use of the resulting digestate as fertiliser / soil improver which may also result in soil and water pollution due to contaminants in the digestate.

Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL)³⁰⁶ ranges set for anaerobic treatment of waste in the BREF for waste treatment.³⁰⁷ • Emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. • The resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009³⁰⁸ and respective national rules on fertilisers/soil improvers for agricultural use.
(6) Ecosystems	

306 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1147&from=EN>

307 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

308 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

5.6 Composting of bio-waste

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.2.1
Description	<p>“Composting of bio-waste³⁰⁹”</p> <p>Treatment of separately collected bio-waste through composting (aerobic digestion) in dedicated facilities with the resulting production and utilization of compost.</p>
Mitigation criteria	
Principle	Net GHG emission reduction through avoidance of GHG emissions compared to alternative options for bio-waste management and from the production of compost that can be used as fertiliser/soil improver displacing synthetic fertilisers and peat (e.g. in horticulture).
Metric & threshold	<p>Composting of bio-waste is eligible provided that (cumulative):</p> <ul style="list-style-type: none"> • the bio-waste is source segregated and collected separately; • anaerobic digestion is not a technically and economically viable alternative; • the compost produced is used as fertiliser/soil improver³¹⁰. <p>No threshold applies.</p>
Rationale	
<p>Composting describes the process by which microorganisms decompose biodegradable waste in the presence of oxygen, which is why it is sometimes also referred to as “aerobic digestion”.</p> <p>As part of an integrated waste management system, composting is a valid route to divert biodegradable waste from landfilling and thus reduce the uncontrolled emissions of landfill gas, in particular methane. Composting makes organic matter more resilient to further degradation.</p> <p>The end product is compost which can be used as a natural fertilizer or soil improver in agriculture, horticulture and hobby gardening (provided it is of a sufficient quality). The use of compost instead of synthetic fertilizers – e.g. derived from by-products of the petroleum industry – saves energy and</p>	

309 For definition of bio-waste refer to Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (Article 1(3)(b)).

310 For definition of fertilising products refer to ANNEX I of Proposed Regulation COM (2016) 157 laying down rules on the making available on the market of EU fertilising products, amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003.

reduces the consumption of fossil fuels. Other climate mitigation effects of compost use include the long-term carbon capture in soils.³¹¹

For the treatment of kitchen and food waste as well as other similar bio-waste, anaerobic digestion (AD) exhibits the best environmental and climate change mitigation performance compared to other forms of biological treatment and should therefore be given preference where it is technically and economically viable. This depends on several local conditions (see JRC publication referred to above).

On the other hand, biodegradable garden and park wastes and other bio-waste with high ligneous content are typically not directly degradable by AD and therefore better suited for composting.

Methane emissions from composting may offset the climate mitigation benefits and therefore needs to be minimized. Selection of proper feedstock and state of the art operational process management is needed to minimize methane leakages from the composting process.

Do no significant harm assessment

The main potential significant harm linked to this activity is related to:

- emissions to air, soil and water from the operation of the composting plant;
- the use of the resulting compost as fertiliser / soil improver which may also result in soil and water pollution due to contaminants in the compost.

Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.

(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none">• In case of composting plants treating over 75 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL)³¹² ranges set for aerobic treatment of waste in the BREF for waste treatment.³¹³• The site has a system in place that prevents leachate reaching groundwater.• The resulting compost meets the requirements for fertilising materials in Regulation EU 2019/1009³¹⁴ and respective national rules on fertilisers/soil improvers for agriculture use.
(6) Ecosystems	

³¹¹ Dri M., Canfora P., Antonopoulos I. S., Gaudillat P., Best Environmental Management Practice for the Waste Management Sector (section 1.4.4), JRC Science for Policy Report, EUR 29136 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-80361-1, doi:10.2760/50247. JRC111059.

³¹² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1147&from=EN>

³¹³ https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

³¹⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

5.7 Material recovery from non-hazardous waste

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.3.2
Description	<p>“Material recovery from non-hazardous waste”</p> <p>Sorting and processing of separately collected non-hazardous waste streams into secondary raw materials involving a mechanical transformation process.</p>
Mitigation criteria	
Principle	Net GHG emission reduction enabled through material recovery of separately collected non-hazardous waste streams thanks to the subsequent substitution of virgin materials with secondary raw materials having lower embedded GHG emissions.
Metric & threshold	<p>Material recovery from separately collected non-hazardous waste is eligible provided that:</p> <ul style="list-style-type: none"> • it produces secondary raw materials suitable for substitution of virgin materials in production processes; • at least 50%, in terms of weight, of the processed separately collected non-hazardous waste is converted into secondary raw materials.
Rationale	
<p>Various pertinent studies show that the recycling of waste has a positive net impact on climate change mitigation.³¹⁵ Sorting and processing of separately collected wastes (see separate activity “Separate collection and transport of non-hazardous waste in source segregated fractions”) are necessary enabling activities for material recovery from waste. The additional GHG emissions</p>	

315 German Federal Environmental Agency (UBA), 2015: The Climate Change Mitigation Potential of Waste Management, sections 4.2.4 and 11.1 (Recovering dry recyclables, specific emission factors).

https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_56_2015_the_climate_change_mitigation_potential_of_the_waste_sector.pdf.

Eunomia, 2015: The Potential Contribution of Waste Management to a Low Carbon Economy, section 3.2 (Quantifying the Impacts per Ton of Waste). <https://www.eunomia.co.uk/reports-tools/the-potential-contribution-of-waste-management-to-a-low-carbon-economy/>.

Dri M., Canfora P., Antonopoulos I. S., Gaudillat P., Best Environmental Management Practice for the Waste Management Sector (section 1.4.6), JRC Science for Policy Report, EUR 29136 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-80361-1, doi:10.2760/50247. JRC111059.

United Nations Environmental Programme / Division of Technology, Industry and Economics International Environmental Technology Centre: Waste and Climate Change: Global trends and strategy framework; Osaka/Shiga / Japan 2010; www.unep.or.jp/ietc/Publications/spc/Waste&ClimateChange.

resulting from such activities are minimal compared to the overall net GHG emission reduction of material recovery.

Do no significant harm assessment

Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.

(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	
(5) Pollution	
(6) Ecosystems	

5.8 Landfill gas capture and utilization

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	<p>“Landfill³¹⁶ gas capture and utilization”</p> <p>Landfill gas capture and utilization in permanently closed landfills using new (or supplementary) dedicated technical facilities and equipment installed during or post landfill closure.</p>
Mitigation criteria	
Principle	<p>Net GHG emission reduction through the capture and utilization of landfill gas in various forms and applications, often displacing fossil fuels.</p> <p>By 2025 the Sustainable Finance Platform should assess the feasibility of the principle, in particular with regard to the intended incentive to close landfills.</p>
Metric & threshold	<p>Collection and utilization of landfill gas is eligible provided that (cumulative):</p> <ul style="list-style-type: none"> • the landfill has not been opened after [date of entry into force of Taxonomy]; • the landfill (or landfill cell) where the system is newly installed (or extended and / or retrofitted) is permanently closed and is not taking further waste; • the produced landfill gas is used directly for the generation of electricity and/or heat, or upgraded to bio-methane for injection in the natural gas grid, or used as vehicle fuel (e.g. as bioCNG) or as feedstock in chemical industry (e.g. for production of H2 and NH3); • methane emissions from the landfill and leakages from the landfill gas collection and utilization facilities are controlled by a monitoring plan. <p>No threshold applies.</p>
Rationale	
<p>The activity is generally carried out as part of or complementary to the closure and remediation of old landfills. The landfill gas collection and its energetic utilization contributes to climate change mitigation (i) by reducing methane emissions to the atmosphere emanating from biodegradable waste previously deposited in the landfill body and (ii) by displacing the use of fossil fuels through various forms and applications.</p>	

³¹⁶ For definition of landfills refer to §2 (g) of the EU Landfill Directive (<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:31999L0031&from=EN>).

It is expected that the inclusion of this activity in the Taxonomy under the climate change mitigation objective will generally incentivize the closure of old landfills and the subsequent utilization of landfill gas.

Best landfill management practice and specific monitoring shall be applied to reduce methane emissions from the landfill and avoid leakages from the landfill gas collection and utilization facilities. Where increasing methane emissions are detected, it is in the own interest of the operator to fix the leakages through technical or operational measures in order to minimize economic losses.

Guidance on best practice concerning landfill gas management and control as well as closure and capping of landfills is available from various international and national organisations, including EC³¹⁷, ISWA³¹⁸ and other (see Appendix to the EC guidance document, including links to further guidance documents recommended by EU Member States). Guidance on the closing of waste dumpsites is also available from ISWA.³¹⁹

Do no significant harm assessment

The main potential significant harm linked to this activity is related to the emissions resulting from the energetic utilization of landfill gas, such as sulphur dioxide, nitrous oxide and particulates.

Compliance with relevant EU and national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.

(2) Adaptation	<ul style="list-style-type: none">Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none">The permanent closure and remediation as well as the after-care of old landfills, where the landfill gas capture system is installed, are carried out following the provisions on i), general requirements (ANNEX I) and ii) control and monitoring procedures (ANNEX II) specified in the Council Directive 99/31/EC.³²⁰Emissions to air (e.g. SOx, NOx) after combustion of landfill gas are controlled, abated (when needed) and within the limits set by EU and respective national legislation.
(6) Ecosystems	

317 <https://ec.europa.eu/environment/waste/landfill/pdf/guidance%20on%20landfill%20gas.pdf>

318 <https://www.iswa.org/home/news/news-detail/article/download-the-3rd-landfill-operations-guidelines/109/>

319 https://www.iswa.org/fileadmin/galleries/About%20ISWA/ISWA_Roadmap_Report.pdf

320 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999L0031&from=EN>, amended by Directive (EU) 2018/850

5.9 Direct Air Capture of CO₂

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Direct Air Capture of CO ₂
Mitigation criteria	
Principle	<ul style="list-style-type: none"> The activity provides substantial contribution to achieving net-zero GHG emissions target by 2050 The activity reduces net GHG emissions from economic activities and GHG concentrations in the atmosphere The activity leads to significant emissions reductions compared to BAU Ensure there is sufficient sequestration capacity available to meet the rate of capture of CO₂ Emissions captured from Direct Air Capture cannot be attributed towards meeting the threshold of another economic activity in the Taxonomy.
Metric & Threshold	All activities pertaining to the direct capture of CO ₂ from the atmosphere to lower global atmospheric CO ₂ concentration levels are currently eligible, subject to regular review.
Rationale	
<p>The TEG recommends that the following ISO standards are incorporated into this Taxonomy threshold when made publicly available:</p> <ul style="list-style-type: none"> ISO/TR 27912 - Carbon dioxide capture – Carbon dioxide capture systems, technologies and processes ISO/CD 27919-2 - Carbon dioxide capture -- Part 2: Evaluation procedure to assure and maintain stable performance of post-combustion CO₂ capture plant integrated with a power plant ISO/CD 27920 - Carbon dioxide capture, transportation and geological storage (CCS) -- Quantification and Verification ISO/DTR 27921 - Carbon dioxide capture, transport and storage -- CO₂ stream composition ISO/AWI TS 27924 - Lifecycle risk management for integrated CCS projects 	
Do no significant harm assessment	
<p>The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.</p>	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	<ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent);</p> <p>Follow all the requirements of EU Directive 2009/31/EC and in particular:</p> <ul style="list-style-type: none"> • Prevent release during operation by implementing permanent leakage detection systems. • Avoid loss of ammonia. • Minimize the formation of secondary aerosol and the production of tropospheric ozone. <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

5.10 Capture of Anthropogenic Emissions

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Capture of anthropogenic CO ₂ emissions
Mitigation criteria	
Principle	<ul style="list-style-type: none"> The activity provides substantial contribution to achieving net-zero GHG emissions target by 2050 The activity reduces net GHG emissions from economic activities and GHG concentrations in the atmosphere The activity leads to significant emissions reductions compared to BAU Ensure there is sufficient sequestration capacity available to meet the rate of capture of CO₂
Metric & Threshold	<p>Capture of anthropogenic emissions is currently eligible provided that:</p> <ul style="list-style-type: none"> it enables the economic activity to operate under its respective threshold and It shows that the captured CO₂ will be offloaded to a Taxonomy eligible CO₂ transportation operation and permanent sequestration facility <p>This criterion is subject to regular review.</p>
Rationale	
<p>Emissions captured from Direct Air Capture cannot be attributed towards meeting the threshold of another economic activity in the Taxonomy</p> <p>The TEG recommends that the following ISO standards are incorporated into this Taxonomy threshold when made publicly available:</p> <ul style="list-style-type: none"> ISO/TR 27912 - Carbon dioxide capture – Carbon dioxide capture systems, technologies and processes ISO/CD 27919-2 - Carbon dioxide capture -- Part 2: Evaluation procedure to assure and maintain stable performance of post-combustion CO₂ capture plant integrated with a power plant ISO/CD 27920 - Carbon dioxide capture, transportation and geological storage (CCS) -- Quantification and Verification ISO/DTR 27921 - Carbon dioxide capture, transport and storage -- CO₂ stream composition ISO/AWI TS 27924 - Lifecycle risk management for integrated CCS projects 	
Do no significant harm assessment	
<p>The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.</p>	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.

(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Select solvents based on environmental impact criteria and conducting full chemical risk assessments.</p> <p>Avoid hazardous waste from the amine solvent.</p> <p>Limit for nitrosamine concentration is 0.1 ppt.</p>
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent);</p> <p>Follow all the requirements of EU Directive 2009/31/EC and in particular:</p> <ul style="list-style-type: none"> Select solvents based on environmental impact criteria and conducting full chemical risk assessments. Prevent release during operation by implementing permanent leakage detection systems. Avoid loss of ammonia. Minimize the formation of secondary aerosol and the production of tropospheric ozone. <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p>

- | | |
|--|--|
| | <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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5.11 Transport of CO₂

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Transport of captured CO ₂ by rail, ship and pipeline
Mitigation criteria	
Principle	<ul style="list-style-type: none"> The activity provides substantial contribution to achieving net-zero GHG emissions target by 2050 The activity reduces net GHG emissions from economic activities and GHG concentrations in the atmosphere The activity leads to significant emissions reductions compared to BAU Ensure there is sufficient sequestration capacity available to meet the rate of capture of CO₂e
Metric & Threshold	<p>Transport modalities that contribute to the transport of CO₂ to eligible permanent sequestration sites are eligible, only if the asset operates below the leakage/tonne of CO₂ threshold.</p> <p>Leakage/tonne of CO₂ transported from head(s) of the transport network to injection point(s) is <0.5%, and the CO₂ is delivered to a taxonomy-eligible permanent sequestration site or to other transport modalities which lead directly to an eligible permanent sequestration site are eligible.</p> <p>Assets or activities that enable carbon capture and use (CCU) will deem all the connected elements of an existing transport network ineligible.</p> <p>Assets which increase the flexibility and management of an existing network, without expanding the network to include carbon capture and use activities is eligible.</p> <p>This criterion is subject to regular review.</p>
Rationale	
<p>The TEG recommends that the following ISO standards are incorporated into this Taxonomy threshold when made publicly available:</p> <ul style="list-style-type: none"> ISO 27913 – Carbon dioxide capture, transportation and geological storage – pipeline transportation systems ISO/CD 27919-2 - Carbon dioxide capture -- Part 2: Evaluation procedure to assure and maintain stable performance of post-combustion CO₂ capture plant integrated with a power plant ISO/CD 27920 - Carbon dioxide capture, transportation and geological storage (CCS) -- Quantification and Verification ISO/DTR 27921 - Carbon dioxide capture, transport and storage -- CO₂ stream composition 	

- ISO/AWI TS 27924 - Lifecycle risk management for integrated CCS projects

Do no significant harm assessment

The main environmental impacts associated with transport of CO₂ are due to:

- Construction phase of the transport network: all aspects have to be considered that are usually connected with construction, like terrestrial habitat alteration, loss of valuable ecosystems, land consumption, overburden disposal, negative impacts on biodiversity, emissions of particles and NO_x, noise and hazardous materials. An ESIA should be done.
- Operation phase: Leakages should be kept at a minimum. Underground networks can have an impact on ground water systems and on local ecosystems.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Prevent release during operation by implementing permanent leakage detection systems.</p> <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU</p>

	<p>countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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5.12 Permanent Sequestration of Captured CO₂

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Permanent Sequestration of captured CO ₂
Mitigation criteria	
Principle	<ul style="list-style-type: none"> The activity provides substantial contribution to achieving net-zero GHG emissions target by 2050 The activity reduces net GHG emissions from economic activities and GHG concentrations in the atmosphere The activity leads to significant emissions reductions compared to BAU Ensure there is sufficient sequestration capacity available to meet the rate of capture of CO₂
Metric & Threshold	<p>Operation of a permanent CO₂ storage facility is eligible if the facility complies with ISO 27914:2017 for geological storage of CO₂. These requirements are subject to periodical review.</p>
Rationale	
<p>The TEG recommends that the following ISO standards are incorporated into this Taxonomy threshold when made publicly available:</p> <ul style="list-style-type: none"> ISO/CD 27919-2 - Carbon dioxide capture -- Part 2: Evaluation procedure to assure and maintain stable performance of post-combustion CO₂ capture plant integrated with a power plant ISO/CD 27920 - Carbon dioxide capture, transportation and geological storage (CCS) -- Quantification and Verification ISO/DTR 27921 - Carbon dioxide capture, transport and storage -- CO₂ stream composition ISO/AWI TS 27924 - Lifecycle risk management for integrated CCS projects 	
Do no significant harm assessment	
<p>The main environmental impacts associated with Sequestration of CO₂ are due to:</p> <ul style="list-style-type: none"> the risk of leakage the long-term lack of geological containment of the reservoirs, central issues regarding the monitoring and the interrelation of carbon with physical, chemical and geological conditions in the reservoir is still a debated argument, however the safety of CO₂ storage may be assured with the implementation of specific rules and requirements. 	
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.

(4) Circular Economy	
(5) Pollution	<p>Follow all the requirements of EU Directive 2009/31/EC and in particular:</p> <ul style="list-style-type: none"> • The implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); • Prevent release during operation by implementing mobile and constant detection leakage detection systems. <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

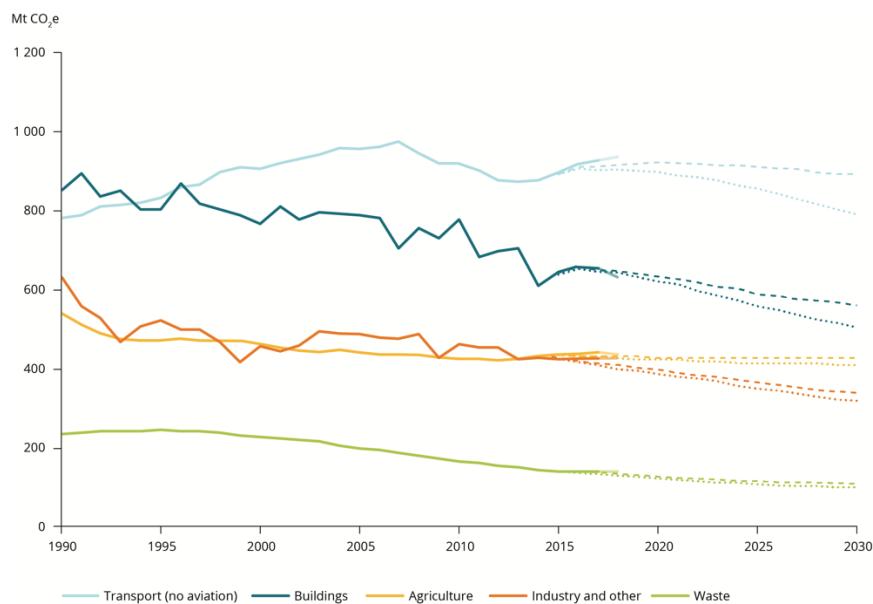
6. TRANSPORTATION AND STORAGE

Why transport is included in the Taxonomy

To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050 (compared to 1990). Road, rail, aviation, and waterborne transport will all have to contribute to the reduction³²¹.

Currently transport operations consume one-third of all energy in the EU. The bulk of this energy comes from oil. This means that transport is responsible for a large share of the EU's greenhouse gas emissions and is a major contributor to climate change. While most other economic sectors, such as industry, have reduced their emissions since 1990, those from transport have risen (see Figure 1). Preliminary estimates from EU Member States show that GHG emissions from transport were 29% above 1990 levels in 2018³²². They now account for more than one quarter of the EU's total greenhouse gas emissions. This presents a major challenge in addressing transport sector emissions to ensure that the EU's emission reduction target is met. Although vehicle efficiency improvements have had a mitigating effect on GHG emissions, growing transport demand³²³ and a sluggish share of low-carbon solutions have outweighed it.

Figure 1: GHG emission trends and projections under the scope of the Effort Sharing Decision



Source: EEA, Trends and Projections in Europe 2019 (<https://www.eea.europa.eu/publications/trends-and-projections-in-europe-1>)

321 The European Green Deal, COM(2019) 640 final

322 <https://www.eea.europa.eu/themes/transport/term/increasing-oil-consumption-and-ghg>

323 Passenger and freight transport demand:

<https://www.eea.europa.eu/data-and-maps/indicators/passenger-and-freight-transport-demand/assessment>.

Within the transport sector, road transport is the dominant emissions source, accounting for more than two-thirds (71.7%³²⁴) of transport-related greenhouse gas emissions. Passenger cars and vans are responsible for the bulk of these emissions, the rest resulting from trucks and buses. Road transport is followed by shipping and aviation as the second and third largest sources of GHG emissions from transport.

The transport sector represents about 30% of additional annual investment needs for sustainable development in the Union.³²⁵

Subjects covered

To make a substantial contribution to climate mitigation, the activities and technical screening criteria (hereafter ‘criteria’) included in the Taxonomy need to focus on the main emissions sources from the transport sector. Reducing the GHG emissions from road transport is therefore key. For road vehicles there is a well-developed legislative framework in the EU that includes mandatory emissions testing. This system is most mature for cars and vans. It has recently evolved significantly for trucks, and buses are set to follow.

Rail and inland waterways are also important emissions sources covered by the Taxonomy. Compared to road and air, they can provide modal shift benefits. However, EU legislation provides less direct orientation regarding these modes of transport.

While public transport and the infrastructure for low-carbon transport in themselves are smaller sources of GHG emissions, they are vital to achieve systemic change towards more sustainable mobility and are therefore also included in the Taxonomy.

Scope

The transport section of the climate mitigation Taxonomy deals primarily with climate mitigation activities regarding operations of vehicle/vessel fleets and the associated enabling infrastructure. The taxonomy criteria for the manufacturing of vehicles and vessels are addressed in Manufacturing and are based on the criteria in this section.

There are several principal options³²⁶ for climate mitigation in the transport sector including:

- Increasing the number of low- and zero emission vehicles, improving vehicle efficiency and infrastructure

324 Greenhouse gas emissions from transport:

https://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2019_en

325 Proposal for a Regulation of the European Parliament and of the Council on the Establishment of a Framework to Facilitate Sustainable Investment (COM (2018) 353 final).

326 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'.https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

- Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels³²⁷
- Improving efficiency of the overall transport/mobility system

Setting criteria and thresholds

The general Taxonomy approach for the transport section was based on the agreed taxonomy regulation text³²⁸ and was inspired by the long-term strategic options for decarbonisation of the transport sector as per the Commission's long-term strategic vision 'A Clean Planet for All'.³²⁹ The associated criteria proposed has been grouped into three categories below, as identified in the Long Term Strategy.³³⁰ Criteria developed for fleet efficiency and fuel substitution have been designed to be discrete, and refer to relevant EU legislation³³¹. For fleet efficiency criteria, tank-to-wheel criteria have been used since the basis for criteria is the Clean Vehicles Directive, the post-2020 CO₂ Regulation for cars and vans and the Heavy Duty CO₂ regulation. Life-cycle and well-to-wheel considerations for thresholds is pending on the possibility to develop and agree a common Union methodology in future as per the above mentioned legislations.

Efficient, low- and zero direct emissions fleets

This category of criteria requires that operated fleets to become more efficient over time by linking eligibility to emissions performance below a certain threshold set to ensure substantially reduced emissions. Thresholds are based on performance metrics (vehicle km, passenger km or tonne km). They are mode specific and are linked to available testing methods where available. They require efficiency improvements without being technology prescriptive, so long as the benefits of relevant technologies can be demonstrated.

The operation of vehicles with zero tailpipe emissions, or close to zero tailpipe emissions, is automatically eligible in the proposed criteria. Vehicle/vessel electrification is the main category in this context. This approach is also motivated by ETS inclusion and the ongoing decarbonisation of the EU power sector.

327 The European Green Deal, COM(2019) 640 final

328 <https://www.consilium.europa.eu/media/41897/st14970-ad01-en19.pdf>

329 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'. https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

330 The criteria developed is set with an EU focus, due to its links to EU legislation and the European context in general. It is acknowledged that for other regions the criteria proposed may not be applicable in defining substantial contributions to climate change mitigation.

331 There is no intention on the part of the TEG to undermine the approach in existing regulations covering these different aspects

Fuel substitution to net-zero carbon fuels

The operation of vehicle fleets where fossil fuels are substituted with low- or net-zero carbon fuels such as advanced bio- and synthetic fuels can make a substantial contribution to CO₂ net emissions savings in the transport sector by enhancing climate neutral mobility.^{332 333,334,335,336,337}

In the technical criteria below, the TEG considers a role for low- or net-zero carbon fuels in four activities where they can offer substantial mitigation benefits, and where commercialisation of zero tailpipe emissions vehicles or vessels is limited to date and where the operating conditions for the vehicles or vessels may slow the implementation of zero direct emissions alternatives, including freight transport services by road; interurban scheduled road transport services of passengers; inland passenger water transport; inland freight water transport. The 'Clean Planet for All' states that a variety of fuels and powertrains are likely to be needed for long haul heavy goods vehicles and long distance coaches. Furthermore, the Communication from the Commission on the European Green Deal sets out the need to ramp up the production and deployment of sustainable alternative transport fuels. In this context, the Commission has committed to consider legislative options to boost the production and uptake of sustainable alternative fuels for the different transport modes. As the taxonomy is developed in future to cover other activities, sustainable alternative fuels (such as advanced biofuels and electro-fuels produced using renewable energy) may also have a role to play e.g. in aviation and maritime shipping.

The proposed criteria limit their eligibility for use in certain modes and for dedicated fleets, where it is understood that these fuels and the finance needed to support a shift can have a greater role to play from a climate mitigation perspective through the substitution of fossil fuels. In addition, it is noted in 'A Clean Planet for All' that land constraints imply that biofuels and biomethane should be deployed only in those transport modes or means where they are necessary. TEG notes that it's important to ensure that these fuels are solely used to realise the maximum benefits of fuel substitution. As such, the criteria proposed also require a strict monitoring regime to ensure that these particular fuels are used. However, it is noted that blended fuels with very high levels of sustainable alternative fuels (such as advanced biofuels and electro-fuels produced using renewable energy) biofuels may also offer climate mitigation benefits, and could be considered by the Platform in future, particularly in respect to aviation and shipping.

As an example of how this might work in practice, a road freight transport operator may seek to operate a new or existing fleet of trucks solely using an eligible fuel (e.g. advanced fuel). To meet the Taxonomy criteria, the operator would need to demonstrate through ongoing verification that the fleet was solely

332 Taxonomy regulation Article 6.1.c: <https://www.consilium.europa.eu/media/41897/st14970-ad01-en19.pdf>

333 The CO₂ emissions from the use of biofuels are not counted in the total GHG emissions from the transport sector in EU's official GHG inventory under the UNFCCC. Without fuel substitution - the CO₂ emissions from the transport sector would have been substantially higher.

(Annual European Union greenhouse gas inventory 1990-2017 and inventory report 2019, EEA, 2019).

334 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'. https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

335 IPPC (2014), AR5 Climate Change 2014: Mitigation of Climate Change.

336 OECD/IEA (2017), The Future of Trucks - Implications for energy and the environment.

337 The European Green Deal, COM(2019) 640 final

using biofuels as specified in the criteria. A financier may be able to claim its investment (e.g. in a new fleet) was Taxonomy eligible through a contractual agreement with an operator to solely use biofuels, also establishing a verification system to enable ongoing monitoring.

Improving the efficiency of the transport system - modal shift

An important contribution to meeting GHG targets and reducing environmental pressures from the transport sector could come from a modal shift from aviation and road transport to rail and non-motorised passenger transport, as well as from road to rail and waterborne freight transport. However, ‘modal shift’ is not included as a distinct economic activity with associated criteria in the proposed Taxonomy due to the complexities of capturing it in a robust, unambiguous manner within the given Taxonomy architecture. Instead, the proposed Taxonomy acknowledges the potential carbon savings from a modal shift³³⁸ and therefore sets similar thresholds across modes, which indirectly promotes modal shifts (e.g. a greater proportion of fleets in lower carbon modes are Taxonomy eligible, facilitating investment in these activities). The relative emissions performance of modes will change over time as technologies evolve and uptake increases, therefore the approach taken within the Taxonomy should be reviewed in the future.

Stakeholder feedback

The feedback received on TEG’s report from June 2019 with regard to the transport sector was in general polarized with groups of respondents often advocating for technical criteria at opposite ends of the spectrum. After careful consideration of all feedback no major revisions were made of the proposed substantial contribution criteria, although criteria and rationales have been fine-tuned and further clarified where deemed necessary. Feedback on DNSH criteria have been received for most modes of transport and has led to refinement and clarifications across the board.

International applicability

The scope of economic activities and the type of criteria proposed in this section may help to inform the design of technical criteria for the transport sector beyond the EU. However, the quantitative thresholds proposed are EU focused by design given the EU taxonomy regulation itself, but also because they are based on EU legal reference points.

Guidance on Ex-Ante Assessments

Detailed guidance should be established to assist in interpretation and implementation of the taxonomy. For transport, specific guidance will be required for how to undertake ex-ante assessments on utilisation of transport, for example to establish if passenger-km or tonne-km criteria are met. The following is a proposed guidance on methods for undertaking such assessments and are presented in order of preference because the likely accuracy of resulting data:

- a) Demand forecasts and a reasoned analysis of the relation between capacity offered and demand;

³³⁸ Taxonomy regulation Article 14.3: <https://www.consilium.europa.eu/media/41897/st14970-ad01-en19.pdf>

- b) In case there is no modelling available actual load factor data from comparable operations should be used (for example actual data from fleets that are replaced by new fleets);
- c) Local, regional or national benchmarks could be used as reference, where it provides a very clear demonstration of meeting thresholds

Next steps and recommendations

At this stage, there are other activities in the transport sector that have not been addressed, but which need consideration as part of further work on the Taxonomy, e.g. by the Platform on Sustainable Finance.

These include:

- Maritime shipping (including reference to EU MRV regime)
- Aviation
- ICT for transport
- Energy efficiency improvements in equipment and infrastructure (e.g. in ports)
- Research, development & innovation related activities having the potential to substantially decarbonize the transport sector
- Identifying or developing standardised methodologies and guidance for addressing the metric of the criteria where those are not yet specified
- Explore life-cycle considerations for criteria relating to fleets once EU-agreed methods have been developed and agreed
- Consider development of criteria for infrastructure in future that take account of embedded carbon emissions in construction materials
- Criteria for manufacture of biomass, biogas and biofuels, and use of these fuels in transport-are currently limited to advanced biofuels as per Article 2 (34) of the EU Renewable Energy Directive II (Directive (EU) 2018/2001),. For other types of biofuels that are not advanced biofuels but may offer substantial climate mitigation benefits, the TEG request that the Platform undertake further work to consider establishing criteria for ensuring substantial contribution to climate mitigation.

Maritime shipping has been considered by the TEG. Whilst it was evident that zero direct emissions fleets should be eligible as for other modes, criteria will also need to be established for short sea shipping where modal shift benefits can be achieved. Furthermore, it will be also important to consider approaches to maritime shipping based on the efficiency of transport fleets. Discussions in this area were not concluded during the timeframe of the TEG and should be continued in further work on the Taxonomy. Aviation was not considered within the scope of the work of the TEG but should be addressed in the future considering the significance of emissions from the sector. In addition, ICT transport specific solutions and transport demand management can be important measures for enabling mitigation that have not been included at this stage but warrant further study.

For a number of criteria, a review period is recommended as detailed in the tables that follow.

6.1 Passenger rail transport (interurban)

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.1.0
Description	Passenger Rail Transport (Interurban)
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission fleets, and improving fleet efficiency - Improving efficiency of the overall transport/mobility system
Criteria	<ul style="list-style-type: none"> • Zero direct emissions trains are eligible. • Other trains are eligible if direct emissions (TTW) are below 50g CO₂e emissions per passenger kilometre (gCO₂e/pkm) until 2025 (non-eligible thereafter) <p>Brief rationale: Zero direct emissions rail (e.g. electric, hydrogen) is eligible because:</p> <ul style="list-style-type: none"> • With the present energy mix, the overall emissions associated with zero direct emissions rail transport (i.e. electric or hydrogen) are among the lowest compared with other transport modes. • The generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future <p>The threshold of 50 gCO₂e/pkm until 2025 ensures that the carbon intensity remains similar to criteria for eligible road vehicles with low occupation factor (50 gCO₂/vkm) and significantly lower than emissions for an average car in the current vehicle stock.</p>
Rationale	
<p>Zero direct emissions rail (e.g. electric, hydrogen) is eligible because:</p> <ul style="list-style-type: none"> • With the present energy mix, the overall emissions associated with zero direct emissions rail transport (i.e. electric or hydrogen) are among the lowest compared with other transport modes. • The generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future <p>The threshold of 50 gCO₂e/pkm until 2025 ensures that the carbon intensity remains similar to criteria for eligible road vehicles with low occupation factor (50 gCO₂/vkm) and significantly lower than</p>	

emissions for an average car in the current vehicle stock (290 gCO₂ /vkm³³⁹). This means that (diesel) passenger rail transport emission activities will only be eligible when the carbon intensity of the vehicle divided by the number of actual passengers is similar to eligible low carbon road transport vehicles (activity 24.5). The criteria is based on actual ridership (passenger-km) and not capacity offered (seat-km or places-km). This should be justified through real monitoring data from operations or ex-ante demand assessments. The current average for EU diesel rail is 70-90 g CO₂ /pkm³⁴⁰, so the threshold is stringent enough to screen out most of the rail systems based on diesel operating in Europe as the load factor would need to be higher than 60% to reach eligibility. However, it would still enable certain hybrid systems of high efficiency to be eligible.

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of rail transport activities are attributed to air pollution, noise and vibration, water use.. Direct emissions of air pollutants are not an issue of concern in the case of electrified rail, but only where (very efficient) diesel or hybrid engines would meet the CO₂e-threshold defined to ensure substantial mitigation of GHG emissions.

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> Ensure proper waste management both at the use phase (maintenance) and the end-of-life for the rolling stock, e.g. reuse and recycle of parts like batteries, in compliance with EU and national legislation on hazardous waste generation, management and treatment.
(5) Pollution	<ul style="list-style-type: none"> Engines for the propulsion of railway locomotives (RLL) and engines for the propulsion of railcars (RLR) must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation. Minimise noise and vibrations of rolling stock, thresholds in line with Regulation 1304/2014 Noise TSI (also consider adjustment periods): <ul style="list-style-type: none"> Electric locomotives <84dB at 80km/h & <99 at 250 km/h; Diesel locomotives <85 at 80km/h; Electric multiple units <80dB at 80km/h & <95 at 250 km/h; Diesel Multiple Units <81dB at 80km/h & <96 at 250 km/h; Coaches <79dB at 80km/h; Wagons <83dB at 80km/h

³³⁹ The factor represents urban operational emissions for the current average car in the vehicle stock (weighting the share of diesel, petrol, LPG, CNG, hybrid in the fleet). It does not represent emissions of new vehicles. Source: COPERT data for different vehicle types and COPERT data for annual utilization, to obtain 3.35 MJ/vkm. 88.87 gCO₂/MJ.

³⁴⁰ Source: UIC data for average diesel rail emissions in 2016 in Europe per pkm. It does not represent emissions per seat-km (capacity) but actual emissions per passenger-km, thus taking into account not only the technological component but also the operational efficiency of the system. Average load factor for diesel rail in EU is 24% or 24 passengers-km per 100 seats-km offered (source UIC 2010)

6.2 Freight rail transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.2.0
Description	Freight Rail Transport
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission fleets, and improving fleet efficiency - Improving efficiency of the overall transport/mobility system
Threshold	<ul style="list-style-type: none"> • Zero direct emissions trains (e.g. electric, hydrogen) are eligible. • Other trains are eligible if direct emissions per tonne-km (gCO₂e/tkm) are 50% lower than average reference CO₂ emissions of HDVs as defined for the Heavy Duty CO₂ Regulation, to be reviewed in 2025. • Rail that is dedicated to the transport of fossil fuels or fossil fuels blended with alternative fuels is not eligible even if meeting the criteria above. <p>Brief rationale: Zero direct emissions rail (e.g. electric, hydrogen) is eligible because:</p> <ul style="list-style-type: none"> • With the present energy mix, the overall emissions associated with zero direct emissions rail transport (i.e. electric or hydrogen) are among the lowest compared with other transport modes. • The generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future <p>The threshold of 50% lower than average reference CO₂ emissions of HDVs ensures that the carbon intensity remains similar to criteria for eligible road freight vehicles, with a review in 2025 to assess technology developments in the freight transport sector. The Heavy Duty CO₂ Regulation uses a g CO₂/km metric. To convert this to a g CO₂/tonne-km metric, the average payload for the road freight vehicles should be applied. Once reference value data is available, it is expected that the taxonomy will specify CO₂e/tkm threshold values.</p>
Rationale	
<p>The carbon intensity of freight rail, even if diesel, is in most cases significantly lower than road freight transport, rail freight transport at least meeting the threshold proposed in the road transport HDV criteria is eligible. Average direct emissions for diesel rail is in the range of 18-40 g CO₂</p>	

e/tkm³⁴¹ compared 80-100g CO₂ e/tkm for road freight³⁴². Emissions intensity can vary significantly depending on the type of cargo transported. This criterion should be reviewed in 2025.

Transport of fossil fuels is considered to have potential negative impacts on climate change and therefore is excluded. A percentage of fossil fuels transported was considered as a threshold, but following feedback from experts, it is considered difficult to implement a % threshold because for example it is not easily known, particularly ex-ante, how locomotives will be used.

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of rail transport activities are attributed to air pollution, noise and vibration pollution, and water use. Direct emissions of air pollutants are not an issue of concern in the case of electrified rail, but only where (very efficient) diesel or hybrid engines would meet the CO₂e-threshold defined to ensure substantial mitigation of GHG emissions.

(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> Ensure proper waste management both at the use phase (maintenance) and the end-of-life for the rolling stock, e.g. reuse and recycle of parts like batteries, in compliance with EU and national legislation on hazardous waste generation, management and treatment.
(5) Pollution	<ul style="list-style-type: none"> Engines for the propulsion of railway locomotives (RLL) and engines for the propulsion of railcars (RLR) must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation . Minimise noise and vibrations of rolling stock, thresholds in line with Regulation 1304/2014 Noise TSI : <ul style="list-style-type: none"> Electric locomotives <84dB at 80km/h & <99 at 250 km/h; Diesel locomotives <85 at 80km/h; Electric multiple units <80dB at 80km/h & <95 at 250 km/h; Diesel Multiple Units <81dB at 80km/h & <96 at 250 km/h; Coaches <79dB at 80km/h; Wagons <83dB at 80km/h
(6) Ecosystems	

341 IFEU et al, 2018. Ecological Transport Information Tool for Worldwide Transports Methodology and Data Update 2018, Berne - Hannover - Heidelberg: IFEU, INFRAS, IVE, based on data from ECOTRANSIT

342 Consumption factors per km for different HDV segments are based on COPERT. The average load per vehicle type is based the load capacity of the vehicles and an average utilization factors based on STREAM Freight (2016) and the capacity values are deduced from HBEFA data for empty and full vehicles.

6.3 Public transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.3.1
Description	Urban and suburban passenger land transport (public transport)
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission fleets, and improving fleet efficiency - Improving efficiency of the overall transport/mobility system
Criteria	<p>CO₂e emissions per passenger- kilometre (gCO₂e/pkm).</p> <ul style="list-style-type: none"> • Zero direct emissions land transport activities (e.g. light rail transit, metro, tram, trolleybus, bus and rail) are eligible. • Other fleets are eligible if direct emissions are below 50 gCO₂e/pkm until 2025 (non-eligible thereafter) <p>Brief rationale:</p> <p>Zero direct emissions public transport (e.g. electric, hydrogen) is eligible because:</p> <ul style="list-style-type: none"> • With the present energy mix, the overall emissions associated with zero direct emissions public transport (i.e. electric or hydrogen) are among the lowest compared with other transport modes. • The generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future <p>The threshold of 50 gCO₂e/pkm until 2025 ensures that the carbon intensity remains similar to criteria for eligible road vehicles with low occupation factor (50 gCO₂/vkm) and significantly lower than emissions for an average car.</p>
Rationale	
<p>The threshold of 50 gCO₂e/pkm until 2025 ensures that the carbon intensity remains similar to criteria for eligible road vehicles with low occupation factor (50 gCO₂/vkm) and significantly lower than the average car (290 gCO₂ /vkm³⁴³). The criteria is based on actual ridership (passenger-km) and not capacity offered (seat-km or places-km). This should be justified through real monitoring data from operations or ex-ante demand assessments. The current average emissions intensity for</p>	

³⁴³ The factor represents urban operational emissions for the current average car in the vehicle stock (weighting the share of diesel, petrol, LPG, CNG, hybrid in the fleet). It does not represent emissions of new vehicles. Source: COPERT data for different vehicle types and COPERT data for annual utilization, to obtain 3.35 MJ/vkm. 88.87 gCO₂/MJ

a bus in the EU is 70-90 g CO₂ e/pkm³⁴⁴ with load factors of around 10 passengers per bus, with the variation dependent on a number of considerations such as public service obligations, type of service, etc. As per current average technology, a hybrid bus would require at least 16 passenger average occupation factor, and diesel more than 20 passengers to be eligible. This threshold is therefore stringent while it provides some flexibility to recognize highly efficient systems and advanced hybrid technology.

Diesel and petrol cars still represent the immense majority of the road fleet in all countries and the penetration of electric vehicles will materialize at a yet unknown pace. In the meanwhile, a lack of investment in public transport fleet renewal can lead to behavioural changes, such as modal shift to private car that would be significantly more difficult to revert in the future³⁴⁵.

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of urban and suburban passenger land transport (public transport) are summarised as follows:

- Direct emissions to air³⁴⁶ from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions³⁴⁷;
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle or rolling stock.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Regarding both maintenance and end-of-life management of vehicles or rolling stock, compliance with EU and national legislation on hazardous waste generation, management and treatment.

³⁴⁴ The consumption factors per veh-km are based on Copert. The average consumption factor is made up of a ratio between urban, rural and motorway which is typical for an urban bus according to the Copert data: 12.18 MJ/km. The EU average (km weighted) occupation of a standard bus is 8.9 persons (STREAM 2016). does not represent emissions per seat-km (capacity) but actual emissions per passenger-km, thus taking into account not only the technological component but also the operational efficiency of the system.

³⁴⁵ In 2015, 1,2% of all new cars and 0,5% of vans sold in Europe was electric. In total, electric vehicles represent 1 in 700 cars in Europe (0,15%) (EEA, 2016). A further uptake is expected in the next decades.

There are various projections for the global EV stock in 2030, ranging between 60 and 200 million EVs, which would be between 4 and 14%. Worldwide (Bloomberg, 2018). Other sources indicate 125 million EVs, around 9% of global stock in 2030 (CNBC, 2018).

In Europe, EC estimates between 20 and 70 million passenger cars in Europe by 2030. Projections on the quantity of vehicles indicate 200 million passenger cars in Europe in 2030 (PWC, 2018). This would mean that in 2030 in Europe between 10 and 35% of cars are electric.

³⁴⁶ ELV Directive 2000/53/EC (<http://ec.europa.eu/environment/waste/elv/index.htm>); Promotion of clean and energy-efficient road transport vehicles Directive (http://www.europarl.europa.eu/doceo/document/TA-8-2019-0427_EN.html?redirect), EU GPP criteria for road transport (http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm) and (https://ec.europa.eu/growth/sectors/automotive/environment-protection/noise-reduction_en)

³⁴⁷ Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

	<ul style="list-style-type: none"> • Compliance with Directive 2000/53/EC ("End-of-life of vehicles Directive") only for vehicle types M1 and N1 (busses are out of scope of the Directive)
(5) Pollution	<ul style="list-style-type: none"> • Buses must comply with the current Euro VID and from 2022, the Euro VIE stage. Railcars, locomotives must comply with latest applicable standards (currently stage 5) of Non-Road Mobile Machinery Regulation³⁴⁸. • Where applicable, tyres must comply with the (revised) Tyre labelling regulation³⁴⁹. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration of all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible. • Where applicable, tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles³⁵⁰. • Vehicles must comply with Regulation (EU) No 540/2014³⁵¹ on the sound level of motor vehicles and of replacement silencing systems. • Minimise noise and vibrations of rolling stock by applying thresholds on pass-by noise in dB in line with Regulation 1304/2014 Noise TSI³⁵²: <ul style="list-style-type: none"> ○ Electric locomotives <84dB at 80km/h & <99 at 250 km/h; ○ Diesel locomotives <85 at 80km/h; ○ Electric multiple units <80dB at 80km/h & <95 at 250 km/h; ○ Diesel Multiple Units <81dB at 80km/h & <96 at 250 km/h; ○ Coaches <79dB at 80km/h; ○ Wagons <83dB at 80km/h
(6) Ecosystems	

348 Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.

349 Revision of the Tyre labelling regulation, https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3509962_en

350 Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor

351 Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems

352 Technical Specifications for Interoperability (TSIs, Regulation 1304/2014, also known as TSI NOI)

6.4 Infrastructure for low carbon transport (land transport)

Sector classification and activity	
Macro-Sector	F - Construction
NACE Level	4
Code	F42.1.1, F42.1.2, F42.1.3
Description	<p>Infrastructure for low carbon transport – land transport including NACE categories:</p> <ul style="list-style-type: none"> • Construction of roads and motorways • Construction of railways and underground railways • Construction of bridges and tunnels <p>Also includes categories of activities not covered by NACE including:</p> <ul style="list-style-type: none"> • Other infrastructure supporting transport activities not included above • Infrastructure and equipment for active mobility
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by enabling an:</p> <ul style="list-style-type: none"> - Increase the number of low- and zero emission fleets, and improving fleet efficiency - Improvement in efficiency of the overall transport/mobility system
Threshold	<p>The construction and operation of transport infrastructure is eligible in the following cases:</p> <ol style="list-style-type: none"> 1. Infrastructure that is required for zero direct emissions transport (e.g. electric charging points, electricity grid connection upgrades, hydrogen fuelling stations or electric highways). 2. Infrastructure and equipment (including fleets) for active mobility (walking, cycling, e-bikes and e-scooters) 3. Infrastructure that is predominantly used for low-carbon transport if the fleet that uses the infrastructure meets the thresholds for direct emissions as defined in the relevant activity - measured in CO₂ emissions per kilometre (gCO₂/km), CO₂e emissions per tonne-kilometre (gCO₂e/tkm), or CO₂e emissions per passenger-kilometre (gCO₂e/pkm)). . 4. Non-electrified rail infrastructure with an existing plan for electrification or use of alternatively powered trains. <p>For all cases:</p> <ul style="list-style-type: none"> • Only infrastructure that is fundamental to the operation of the transport service is eligible. • Infrastructure that is dedicated to the transport of fossil fuels or blended fossil fuels is not eligible <p>Brief Rationale</p> <p>The construction and operation of infrastructure for low carbon land transport is considered eligible because this is considered a key enabling factor for improving</p>

	the uptake of the transport activities that are considered eligible under the rest of the land transport section of the Taxonomy. Eligibility for infrastructure is linked to eligibility criteria for fleets using the infrastructure, with additional criteria relating to zero carbon transport (active mobility)
Rationale	
<p>The construction and operation of infrastructure for low carbon land transport is considered eligible because this is considered a key enabling factor for improving the uptake of the transport activities that are considered eligible under the rest of the land transport section of the Taxonomy.</p> <p>Criteria 3. above would accommodate all electric rail lines and non-electrified lines with battery powered and hydrogen trains operating. However even if non-electrified, there might be a case for renewal of rail infrastructure in order to ensure continuity of the service while alternative powered trains (hydrogen, battery) are deployed in the future years, hence the inclusion of criteria 4 above. There is no significant risk of lock-in in those cases where the fleet is due for renewal.</p> <p>In criteria 3 above, “predominantly used for” should be interpreted to mean that the majority of the use of the infrastructure is by fleets meeting the substantial contribution criteria in other land transport activities identified in the taxonomy. Where there may be greater uncertainty in fleet use e.g. estimations based on future projections, a more conservative approach should be applied to ensure that the predominant use requirement will be met.</p> <p>There is requirement that only infrastructure that is fundamental to the operation of the transport service is eligible. Infrastructure that is fundamental to the operation are those infrastructure that are needed to ensure the day-to-day delivery of a transport service e.g. tracks, IT equipment ensuring service delivery, ticket offices and fleet maintenance facilities. It does not include ancillary infrastructure that do not directly ensure delivery of the operation of the fleet e.g. head offices of the transport operator.</p> <p>For the criteria that “infrastructure that is dedicated to the transport of fossil fuels or blended fossil fuels is not eligible”, the term “dedicated” is defined as infrastructure being built and acquired with the explicit intention to transport or store fossil fuels, even if actual use may serve other purposes as well.</p> <p>It is acknowledged that embedded carbon emissions in infrastructure projects (e.g. upstream emissions from manufacture of construction materials) may be significant in certain circumstances. The level of uncertainty around data in this respect makes it challenging at this time to incorporate this consideration within thresholds for infrastructure. However, this element should be considered for ongoing work on the Taxonomy. Transport of fossil fuels is considered to have potential negative impacts on climate change and therefore is excluded.</p> <p>ICT infrastructure meeting the criteria above is eligible i.e. it meets one of the stated criteria and is fundamental to the operation of the transport service. However it is recognised that wider ICT activities in transport may have substantial contribution to climate change mitigation and this will require future work to define criteria.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from infrastructure activities are attributed to noise and vibration pollution, water contamination, waste generation and impacts on biodiversity (habitat and wildlife) and land use consumption with ecosystem impacts specifically:</p>	

	<ul style="list-style-type: none"> Contamination of water during construction and unsustainable use of water during construction and operations Unsustainable use of resources during constructions, e.g. generation of high amount of waste, no recycling/reuse of construction waste Noise pollution can be relevant for both rolling stock and railway infrastructure as noise can be generated by both rolling stock and poor conditions of rail tracks.³⁵³ Construction of infrastructure can cause significant harm when taking place in protected areas or areas of high biodiversity values outside protected areas. Infrastructure can cause fragmentation and degradation of the natural and urban landscape due to the “barrier” effects of the infrastructure and can involve risks of wildlife accidents caused by collisions. Railway infrastructure (in particular tunnels) can cause change and degradation of hydromorphological conditions of water bodies and therefore have impacts on aquatic ecosystems.
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<ul style="list-style-type: none"> Re-use parts and use recycled material during the renewal, upgrade and construction of infrastructure. At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list) generated on the construction site must be prepared for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials. This can be achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol³⁵⁴.
(5) Pollution	<ul style="list-style-type: none"> Minimise noise and vibrations from use of infrastructure by introducing open trenches/ wall barriers/ other measures and comply with the Environmental Noise Directive 2002/49/EC Minimise noise, dust, emissions pollution during construction / maintenance works.
(6) Ecosystems	Infrastructure for low carbon transport is land use intensive and is a major factor of ecosystem deterioration and biodiversity loss. Projects should ensure that:

353 <http://www.diva-portal.org/smash/get/diva2:675304/FULLTEXT02>

354 EU Construction and Demolition Waste Protocol. Available at https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol_0_en

	<ul style="list-style-type: none"> • Environmental Impact Assessment (EIA) has been completed in accordance with EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or other equivalent national provisions. • Such impact assessments should, at the very least, identify, evaluate, and mitigate any potential negative impacts of the designated activities, projects, or assets on ecosystems and its biodiversity and should be assessed and conducted in compliance with the provisions of the EU Habitats and Birds Directives. • Invasive plants are appearing very often along transport infrastructure and are sometimes even spread due to transport infrastructure, which might negatively impact natural ecosystems (e.g. natural fauna). Care should be taken not to spread any invasive plants through proper maintenance. • Wildlife collisions is a problem and should be considered. Solutions developed for should be applied for the detection and avoidance of potential traps that may cause the unnecessary death of animals. • Mitigation options exist and different types of measures can be beneficial for wildlife, such as: • Wildlife warning systems combined with heat sensors can reduce the number of collisions. • Fences along areas with high strike risk. • Viaducts, tunnels, overpasses and bridges, etc. • Warning signals that are triggered by approaching traffic, particularly in areas of high strike risk.
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6.5 Passenger cars and commercial vehicles

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	
Code	
Description	Passenger cars, light commercial vehicles and category L vehicles (this includes all M1, N1 and L category vehicles including where applicable NACE 49.32, 53.10, 53.20, 77.11)
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission vehicles, and improving vehicle efficiency
Criteria	<p>CO₂ emissions per vehicle kilometre (gCO₂/km).</p> <p><u>For passenger cars and light commercial vehicles:</u></p> <ul style="list-style-type: none"> • Zero tailpipe emission vehicles (incl. hydrogen, fuel cell, electric). These are automatically eligible. • Vehicles with tailpipe emission intensity of max 50 g CO₂/km (WLTP) are eligible until 2025. • From 2026 onwards only vehicles with emission intensity of 0g CO₂/km (WLTP) are eligible. <p><u>For category L vehicles:</u></p> <p>Zero tailpipe emission vehicles (incl. hydrogen, fuel cell, electric).</p> <p>Brief rationale:</p> <p>Zero direct emissions vehicles (e.g. electric, hydrogen) are eligible because the generation of the energy carriers used by zero tailpipe emissions vehicles is assumed to become low or zero carbon in the near future</p> <p>Vehicles with tailpipe emission intensity of max 50 g CO₂/km (WLTP) are eligible until 2025 because the post-2020 CO₂ Regulation for cars and vans sets this threshold as an ambitious mid-term target that is significantly below the expected average emissions of new cars and vans. The 50 g CO₂/km threshold does not apply to L vehicles (e.g. motorcycles) due to their lower weight and high electrification potential.</p>
Rationale	
<p>This activity includes operation of all vehicles classified as M1, N1, as defined by Regulation (EU) 2018/858, and of vehicles classified as category L (2- and 3-wheel vehicles and quadricycles) as defined in Regulation (EU) No 168/2013. It also applies to NACE code 49.32 Taxi operation, NACE code 53.10 Postal activities under universal service obligation, NACE code 53.20 Other postal and courier activities, and NACE 77.11 Rental and leasing of cars and light motor vehicles where these activities may include the operation of eligible vehicles.</p>	

Zero direct emission vehicles and vehicles with low and reducing emission intensities contribute substantially to climate mitigation and are aligned with Article 6. 1. (c) increasing clean or climate-neutral mobility, and Article 6. 1. (f) phasing out anthropogenic emissions of greenhouse gases, including from fossil fuels,

Zero direct emissions vehicles (e.g. electric, hydrogen) are eligible because:

- the generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future (for instance, in the scenario called EU CO 3038 that meets the EU targets in the clean energy package, 70% of electricity in the EU is generated from decarbonized sources in 2030).

Point of reference for thresholds:

Clean Vehicles Directive (CVD - Directive (EU) 2019/1161 of the European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles. <https://eur-lex.europa.eu/eli/dir/2019/1161/>

The revised Directive includes ambitious and binding procurement targets for each EU member state using harmonized definition what a clean-vehicle is. The notion of clean-vehicle is principally aligned with aim of the Taxonomy and the proposed Art 6.1.c (above). The transition element is also built into the CVD.

The relevant definitions for light duty vehicles are aligned with the post-2020 CO₂ Regulation for cars and vans. Taken together, these two pieces of EU legislation reflect the latest thinking on ambitious and sufficiently mature performance metrics. The potential for synergies is significant when the Taxonomy is aligned to the legislative thresholds for clean vehicles. It will reduce market uncertainty in terms of what are green vehicles to manufacture and operate- both from the demand and supply side.

Life-cycle and well-to-wheel considerations for thresholds is pending on the feasibility to develop and agree a common Union methodology:

The Clean Vehicles Directive acknowledges that life-cycle and well-to-wheel emission are to be addressed at a later point in time (recital 31): The possible reflection of life cycle CO₂ emissions and of well-to-wheel CO₂ emissions of vehicles for the period after 2030 should be considered taking into account relevant provisions of Union law for their calculation at that point in time.

By 31 December 2027, the Commission should review the implementation of Directive 2009/33/EC. In its review the Commission should also assess, inter alia, the possibility of aligning this Clean Vehicles Directive to any methodology for counting life-cycle CO₂ emissions and well-to-wheel CO₂ emissions developed in the context of EU vehicle CO₂ emission performance standards.

The new CO₂ Regulation for cars and vans (EU) 2019/631 mandates in Art. 7 (10) that:

The Commission shall no later than 2023 evaluate the possibility of developing a common Union methodology for the assessment and the consistent data reporting of the full life-cycle CO₂ emissions of light duty vehicles that are placed on the Union market. The Commission shall transmit that evaluation, including where appropriate proposals for follow-up measures, such as legislative proposals, to the European Parliament and the Council.

Do no significant harm assessment

Key environmental aspects to be considered for investments on passenger cars and light commercial vehicles are the following:

- Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions
- Indirect emissions to air from the production of fuels and energy carriers. However, this is out of the control of vehicles manufacturers and operators.
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle.
- Recycling of materials in order to reduce consumption of critical raw materials and impact on ecosystems and natural capital.

The manufacture of vehicles, particularly batteries, is part of the scope of the sub-group "Manufacture of low carbon transport vehicles, equipment and infrastructure"

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment. Special focus on critical raw materials recovery from batteries. • Compliance with Directive 2000/53/EC ("End-of-life of vehicles Directive")
(5) Pollution	<ul style="list-style-type: none"> • Vehicles must comply with the emission thresholds for clean light-duty vehicles in Table 2 in the Annex of Directive (EU) 2019/1161 of the European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles • Tyres must comply with the (revised) Tyre labelling regulation³⁵⁵. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible. • Tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles³⁵⁶.

355 Revision of the Tyre labelling regulation, https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3509962_en

356 Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor

	<ul style="list-style-type: none">• Vehicles must comply with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems³⁵⁷.
(6) Ecosystems	

357 Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems

6.6 Freight transport services by road

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.4.1 (including where applicable NACE 53.10, 53.20)
Description	Freight transport services by road
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission vehicles, and improving vehicle efficiency - Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels
Criteria	<p>CO₂ emissions per vehicle kilometre (g CO₂ /km) or g CO₂ KWh.</p> <ul style="list-style-type: none"> • Zero direct emission heavy-duty vehicles that emits less than 1g CO₂ /kWh (or 1g CO₂ /km for certain N2 vehicles) are automatically eligible; • Low-emission heavy-duty vehicles with specific direct CO₂ emissions of less than 50% of the reference CO₂ emissions of all vehicles in the same sub-group are eligible. • Dedicated vehicles solely using advanced biofuels or renewable liquid and gaseous transport fuels of non-biological origin as defined in Art. 2 (34) and Art. 2 (36) as well as low indirect land-use change-risk biofuels as defined in Art 2(37) in line with Directive (EU) 2018/2001, guaranteed either by technological design or ongoing monitoring and third-party verification. In addition, for an investment in new vehicles, only vehicles with efficiency corresponding to direct CO₂ emissions (gCO₂/ km) (biogenic CO₂) below the reference CO₂ emissions of all vehicles in the same sub-group are eligible. Eligibility should be reviewed latest by 2025.or when Directive (EU) 2018/2001 is reviewed. • Fleets of vehicles dedicated to transport fossil fuels or fossil fuels blended with alternative fuels are not eligible.
	<p>Brief rationale:</p> <p>Road freight transport with zero direct emissions vehicles (e.g. electric, hydrogen) is eligible because the generation of these energy carriers is assumed to become low or zero carbon in the near future. The definition is aligned with the heavy duty CO₂ regulation, which provides the most recent legislative point of orientation. Road freight transport with low-emission heavy-duty vehicles defined in the same regulation and dedicated vehicles solely using a narrowly defined range of bio- or other renewable fuels are also eligible due to the relatively high challenges in electrifying this vehicle category.</p> <p>Substantial contribution to climate mitigation from fuel substitution is in line with the agreed taxonomy regulation.</p>

Rationale

This activity includes operation of vehicles classified as N2 and N3 vehicles, as defined by REGULATION (EU) 2018/858. It also applies to NACE code 53.10 Postal activities under universal service obligation, and NACE code 53.20 Other postal and courier activities, where these activities may include the operation of eligible vehicles.

Zero direct emission vehicles and vehicles with low and reducing emission intensities contribute substantially to climate mitigation and are aligned with Article 6. 1. (c) increasing clean or climate-neutral mobility, and Article 6. 1. (f) phasing out anthropogenic emissions of greenhouse gases, including from fossil fuels

Zero direct emissions vehicles (e.g. electric, hydrogen) is eligible because:

- the generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future (for instance, in the scenario called EUCO 3038 that meets the EU targets in the clean energy package, 70% of electricity in the EU is generated from decarbonised sources in 2030).

Key reference point for thresholds: Heavy Duty CO₂ Regulation:

Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 setting CO₂ emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC

<https://eur-lex.europa.eu/eli/reg/2019/1242/oj>

-zero emission heavy-duty vehicle means a heavy-duty vehicle without an internal combustion engine, or with an internal combustion engine that emits less than 1g CO₂/kWh (or 1g CO₂/km for certain N2 vehicles)

-Low-emission heavy-duty vehicle means a heavy-duty vehicle, which is not a zero emission heavy-duty vehicle, with specific CO₂ emissions of half of the reference CO₂ emissions of all vehicles in the sub-group to which the heavy-duty vehicle belongs. The reference CO₂ emissions shall be based on the monitoring data reported pursuant to Regulation (EU) 2018/956 for the period from 1 July 2019 to 30 June 2020.

Life-cycle and well-to-wheel considerations for thresholds is pending on the feasibility to develop and agree a common Union methodology:

Heavy Duty CO₂ Regulation Recital (42)³⁵⁸: It is important to assess the full life-cycle emissions from heavy-duty vehicles at EU level. To this end the Commission should no later than 2023 evaluate the possibility of developing a common Union methodology for the assessment and the consistent data reporting of the full life-cycle CO₂ emissions of heavy-duty vehicles that are placed on the Union market. The Commission should adopt follow-up measures, including, where appropriate, legislative proposals.

By contrast to light duty vehicles, the electrification of trucks is currently limited to small demonstration fleets. Especially for heavy trucks for regional and long-haul operations, fuel substitution to advanced

358 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=consil:ST_8444_2019_INIT

biofuels and renewable synthetic fuels are considered a relevant mitigation option in the medium term³⁵⁹.

The operation of vehicle fleets where fossil fuels are substituted with low- or net-zero carbon fuels such as advanced bio- and synthetic fuels can make a substantial contribution to CO₂ net emissions savings in the transport sector.^{360,361,362,363} This criteria only applies for vehicles that have a specified minimum level of efficiency. The criteria for producing these fuels are set elsewhere in the Taxonomy.

As an example of how this might work in practice, a road freight transport operator may seek to operate a new or existing fleet of trucks solely using an eligible fuel (e.g. advanced fuel). To meet the Taxonomy criteria, the operator would need to demonstrate through ongoing verification that the fleet was solely using biofuels as specified in the criteria. A financier may be able to claim its investment (e.g. in a new fleet) was Taxonomy eligible through a contractual agreement with an operator to solely use biofuels, also establishing a verification system to enable ongoing monitoring.

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of freight road transport are summarised as follows:

- Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions .
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment for both the use and the end-of-life phases of the vehicles. Particular focus on critical raw materials recovery from batteries. • Compliance with Directive 2000/53/EC ("End-of-life of vehicles Directive") for vehicle types M1 (passenger cars) and N1 (vans)

359 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

360 The CO₂ emissions from the use of biofuels are not counted in the total GHG emissions from the transport sector in EU's official GHG inventory under the UNFCCC. Without fuel substitution - the CO₂ emissions from the transport sector would have been substantially higher.

(Annual European Union greenhouse gas inventory 1990-2017 and inventory report 2019, EEA, 2019).

361 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'. https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

362 IPPC (2014), AR5 Climate Change 2014: Mitigation of Climate Change.

363 OECD/IEA (2017), The Future of Trucks - Implications for energy and the environment.

(5) Pollution	<ul style="list-style-type: none"> Vehicles must comply with the current Euro VID and from 2022, the Euro VIE stage. Tyres must comply with the (revised) Tyre labelling regulation³⁶⁴. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible. Tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles³⁶⁵. Vehicles must comply with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems³⁶⁶.
(6) Ecosystems	

6.7 Interurban scheduled road transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.39
Description	Interurban scheduled road transport services of passengers
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission vehicle, and improving vehicle efficiency - Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels - Improving in efficiency of the overall transport/mobility system

364 Revision of the Tyre labelling regulation, https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3509962_en

365 Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor

366 Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems

Rationale	<p>CO₂e emissions per passenger-kilometre (gCO₂e/pkm).</p> <ul style="list-style-type: none"> Zero tailpipe emission vehicles (incl. hydrogen, fuel cell, electric) are automatically eligible. Dedicated vehicles solely using advanced biofuels or renewable liquid and gaseous transport fuels of non-biological origin as defined in Art. 2 (34) and Art. 2 (36) in line with Directive (EU) 2018/2001, guaranteed either by technological design or ongoing monitoring and third-party verification. In addition, for an investment in new vehicles, only vehicles with efficiency corresponding to direct emissions below 95g CO₂ e /pkm (including biogenic CO₂) are eligible.. Eligibility should be reviewed latest by 2025, or when Directive (EU) 2018/2001 is reviewed. Other vehicles are eligible if direct emissions are below 50 gCO₂e/pkm <p>Brief rationale:</p> <p>Passenger transport with zero tailpipe emissions vehicles (e.g. electric, hydrogen) is eligible because the generation of these energy carriers is assumed to become low or zero carbon in the near future. Dedicated vehicles solely using a narrowly defined range of bio- or other renewable fuels are also eligible due to the relatively high challenges in electrifying the vehicle category typically used on interurban routes. Substantial contribution to climate mitigation from fuel substitution is in line with the agreed taxonomy regulation. The threshold of 50gCO₂e/pkm relates to the thresholds set for passenger cars (assuming occupancy of one) and represents a value that is significantly below average new car emissions.</p>
Rationale	
<p>The threshold of 50 gCO₂e/pkm until 2025 ensures that the carbon intensity remains similar to criteria for eligible road vehicles with low occupation factor (50 gCO₂/vkm) and significantly lower than average diesel car (290 gCO₂/vkm³⁶⁷). The criteria is based on actual ridership (passenger-km) and not capacity offered (seat-km or places-km). This should be justified through real monitoring data from operations or ex-ante demand assessments.</p> <p>Unlike urban buses, zero tailpipe emission vehicle technologies are not commercially available, therefore the threshold should be reviewed in or prior to 2025, rather than specifying now that only zero direct emissions will be eligible at that point, to analyze the modal shift comparison with cars in interurban transport, and technology developments in the sector.</p> <p>With no commercial availability of zero tailpipe emission vehicles for this activity, fuel substitution to advanced biofuels and renewable synthetic fuels are considered a relevant mitigation option for some transport modes in the medium term as identified in the EC Long term strategy³⁶⁸:</p> <p>“for those transport modes where the deployment of zero emission vehicles is unfeasible due to energy density requirements or technology costs, carbon neutral fuels (i.e. advanced biofuels and biomethane, as well as e-fuels) can be deployed for use in conventional vehicle engines”.</p>	

³⁶⁷ The factor represents urban operational emissions for the current average car in the vehicle stock (weighting the share of diesel, petrol, LPG, CNG, hybrid in the fleet). It does not represent emissions of new vehicles. Source: COPERT data for different vehicle types and COPERT data for annual utilization, to obtain 3.35 MJ/vkm. 88.87 gCO₂/MJ.

³⁶⁸ https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

The operation of vehicle fleets where fossil fuels are substituted with low- or net-zero carbon fuels such as advanced bio- and synthetic fuels can make a substantial contribution to CO₂ net emissions savings in the transport sector.^{369,370,371,372} This criteria only applies for vehicles that have a specified minimum level of efficiency. The criteria for producing these fuels are set elsewhere in the Taxonomy.

As an example of how this might work in practice, an operator may seek to operate a new or existing fleet of vehicles solely using an eligible fuel (e.g. advanced fuel). To meet the Taxonomy criteria, the operator would need to demonstrate through ongoing verification that the fleet was solely using biofuels as specified in the criteria. A financier may be able to claim its investment (e.g. in a new fleet) was Taxonomy eligible through a contractual agreement with an operator to solely use biofuels, also establishing a verification system to enable ongoing monitoring.

Do no significant harm assessment

The main potential significant harm to other environmental objectives from the operation of **interurban scheduled road transport services of passengers** are summarized as follows:

- Direct emissions to air from the exhaust gases of internal combustion engine³⁷³: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions³⁷⁴.
- Waste generation³⁷⁵ (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle.

(2) Adaptation	<ul style="list-style-type: none">• Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none">• Compliance with EU and national legislation on hazardous waste generation, management and treatment for both the use and the end-of-life phases of the vehicles. Particular focus on critical raw materials recovery from batteries.

369 The CO₂ emissions from the use of biofuels are not counted in the total GHG emissions from the transport sector in EU's official GHG inventory under the UNFCCC. Without fuel substitution - the CO₂ emissions from the transport sector would have been substantially higher.

(Annual European Union greenhouse gas inventory 1990-2017 and inventory report 2019, EEA, 2019).

370 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'. https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

371 IPPC (2014), AR5 Climate Change 2014: Mitigation of Climate Change.

372 OECD/IEA (2017), The Future of Trucks - Implications for energy and the environment.

373 373 Promotion of clean and energy-efficient road transport vehicles Directive (http://www.europarl.europa.eu/doceo/document/TA-8-2019-0427_EN.html?redirect), EU GPP criteria for road transport (http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm)

374 Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

375 EU Waste legislation: Directive 2008/98/EC, Decision 2000/532/EC (http://ec.europa.eu/environment/waste/hazardous_index.htm), ELV Directive 2000/53/EC (<http://ec.europa.eu/environment/waste/elv/index.htm>)

(5) Pollution	<ul style="list-style-type: none"> • Buses must comply with the current Euro VID and from 2022, the Euro VIE stage. Tyres must comply with the (revised) Tyre labelling regulation. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible. • Tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles. • Vehicles must comply with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems.
(6) Ecosystems	

6.8 Inland passenger water transport

Sector classification and activity	
Macro-Sector	H – Transport and storage
NACE Level	4
Code	H50.3.0
Description	Inland passenger water transport
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission fleets, and improving fleet efficiency - Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels - Improvement in efficiency of the overall transport/mobility system
Threshold	<ul style="list-style-type: none"> - Zero direct emissions inland waterway vessels are eligible. • Dedicated vessels solely using advanced biofuels or renewable liquid and gaseous transport fuels of non-biological origin as defined in Art. 2 (34) and Art. 2 (36) in line with Directive (EU) 2018/2001), guaranteed either by technological design or ongoing monitoring and third-party verification. In addition, for an investment in new vessels, only vessels with efficiency corresponding to direct emissions below 95g CO₂ e /pkm (including biogenic CO₂) are eligible.. Eligibility should be reviewed latest by 2025, or when Directive (EU) 2018/2001 is reviewed. - Other Inland waterways vessels are eligible if direct emissions are below 50 gCO₂e emissions per passenger kilometre (gCO₂e/pkm) (or 92.6 g per passenger nautical mile (gCO₂e/pnm)). Eligibility should be reviewed in 2025.
Brief Rationale	
<p>Zero direct emissions inland waterway transport (e.g. electric, hydrogen) is eligible because:</p> <ul style="list-style-type: none"> • With the present energy mix, the overall emissions associated with zero direct emissions rail transport (i.e. electric or hydrogen) are among the lowest compared with other transport modes. • The generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future <p>The threshold of 50 gCO₂e/pkm until 2025 (when it will be reviewed) ensures that the carbon intensity remains similar to criteria for eligible road vehicles with low occupation factor (50 gCO₂/vkm) and significantly lower than emissions for an average car in the current vehicle stock.</p>	

	Substantial contribution to climate mitigation from fuel substitution is in line with the agreed taxonomy regulation.
Rationale	
<p>The threshold of 50g CO₂e/pkm relates to the thresholds set for road passenger vehicles and passenger rail. The criteria is based on actual ridership (passenger-km) and not capacity offered (seat-km or places-km). This should be justified through real monitoring data from operations or ex-ante demand assessments. If inland passenger water transport operations can at least match the thresholds of those modes, it is deemed to be making a substantial contribution as it offers significantly lower emissions than average car emissions.</p> <p>The threshold should be reviewed in or prior to 2025, rather than specifying now that only zero direct emissions will be eligible at that point, to analyse the modal shift comparison with cars, and technology developments in the sector.</p> <p>With limited availability of zero tailpipe emission fleets for this activity, fuel substitution to advanced biofuels and renewable synthetic fuels are considered a relevant mitigation option for some transport modes in the medium term as identified in the EC Long term strategy³⁷⁶</p> <p>The operation of fleets where fossil fuels are substituted with low- or net-zero carbon fuels such as advanced bio- and synthetic fuels can make a substantial contribution to CO₂ net emissions savings in the transport sector.^{377,378,379,380} This criteria only applies for vessels that have a specified minimum level of efficiency. The criteria for producing these fuels are set elsewhere in the Taxonomy.</p> <p>As an example of how this might work in practice, an operator may seek to operate a new or existing fleet solely using an eligible fuel (e.g. advanced fuel). To meet the Taxonomy criteria, the operator would need to demonstrate through ongoing verification that the fleet was solely using biofuels as specified in the criteria. A financier may be able to claim its investment (e.g. in a new fleet) was Taxonomy eligible through a contractual agreement with an operator to solely use biofuels, also establishing a verification system to enable ongoing monitoring.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of inland passenger and freight water transport are summarised as follows:</p>	

376 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

377 The CO₂ emissions from the use of biofuels are not counted in the total GHG emissions from the transport sector in EU's official GHG inventory under the UNFCCC. Without fuel substitution - the CO₂ emissions from the transport sector would have been substantially higher.

(Annual European Union greenhouse gas inventory 1990-2017 and inventory report 2019, EEA, 2019).

378 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'. https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

379 IPPC (2014), AR5 Climate Change 2014: Mitigation of Climate Change.

380 OECD/IEA (2017), The Future of Trucks - Implications for energy and the environment.

- Direct emissions to air of carbon oxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulate matter (PM), as well as noise emissions³⁸¹.
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vessel.
- Direct and indirect emission of pollutants in water.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Compliance with EU and national legislation on hazardous waste generation, management and treatment during both the use and the end-of-phase of a vessel ³⁸² . Compliance with Regulation 1257/2013 ³⁸³ ("Ship recycling Regulation")
(5) Pollution	<ul style="list-style-type: none"> • Engines in vessels must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation³⁸⁴ (including vessels meeting stage V without type-approved solutions such as through after-treatment).
(6) Ecosystems	<ul style="list-style-type: none"> • The activity should not lead to releases of ballast water containing aquatic invasive species³⁸⁵

381 Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

382 EU Waste legislation: Directive 2008/98/EC, Decision 2000/532/EC, http://ec.europa.eu/environment/waste/hazardous_index.htm

383 Regulation (EU) No 1257/2013 of the European Parliament and of the Council of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC

384 Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.

385 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

6.9 Inland freight water transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H50.4.0
Description	Inland freight water transport
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by:</p> <ul style="list-style-type: none"> - Increasing the number of low- and zero emission fleets, and improving fleet efficiency - Increasing substitution of fossil fuels with sustainable alternative and net-zero carbon fuels - Improving in efficiency of the overall transport/mobility system
Threshold	<ul style="list-style-type: none"> • Zero direct emissions inland waterways vessels are eligible. • Dedicated vessels solely using advanced biofuels or renewable liquid and gaseous transport fuels of non-biological origin as defined in Art. 2 (34) and Art. 2 (36) in line with Directive (EU) 2018/2001, guaranteed either by technological design or ongoing third-party monitoring and verification. In addition, for an investment in new vessels, only vessels with efficiency corresponding to direct CO₂ emissions (gCO₂/ tkm) (including biogenic CO₂) below the average reference value defined for HDVs (Heavy Duty CO₂ Regulation) are eligible. Eligibility should be reviewed in 2025, or when Directive (EU) 2018/2001 is reviewed. • Other inland waterway vessels are eligible if direct emissions per tkm CO₂e emissions per tonne kilometre (gCO₂e/ tkm) or per tonne nautical mile (gCO₂e/tnm) are 50% lower than the average reference value defined for HDVs (Heavy Duty CO₂ Regulation). Eligibility should be reviewed in 2025. • Vessels that are dedicated to the transport of fossil fuels or any blended fossil fuels are not eligible even if meeting the criteria above <p>Brief rationale:</p> <p>Zero direct emissions inland waterway transport (e.g. electric, hydrogen) is eligible because:</p> <ul style="list-style-type: none"> • With the present energy mix, the overall emissions associated with zero direct emissions rail transport (i.e. electric or hydrogen) are among the lowest compared with other transport modes. • The generation of the energy carriers used by zero direct emissions transport is assumed to become low or zero carbon in the near future <p>The threshold of 50% lower than average reference CO₂ emissions of HDVs ensures that the carbon intensity remains similar to criteria for eligible road freight vehicles, with a review in 2025 to assess technology developments in the freight</p>

	<p>transport sector. The Heavy Duty CO₂ Regulation uses a g CO₂/km metric. To convert this to a g CO₂/tonne-km metric, the average payload for the road freight vehicles should be applied. Once reference value data is available, it is expected that the taxonomy will specify CO_{2e}/tkm threshold values.</p> <p>Substantial contribution to climate mitigation from fuel substitution is in line with the agreed taxonomy regulation.</p>
Rationale	
	<p>The threshold of 50% of the HDV reference value relates to the thresholds set for road freight vehicles and freight rail. If inland freight water transport operations can at least match the thresholds of those modes, it is deemed to be making a substantial contribution as it is significantly lower emissions than average road freight emissions.</p> <p>The threshold should be reviewed in or prior to 2025, rather than specifying now that only zero direct emissions will be eligible at that point, to analyse the modal shift comparison with cars, and technology developments in the sector.</p> <p>Transport of fossil fuels is considered to have potential negative impacts on climate change and therefore is excluded.</p> <p>With limited availability of zero tailpipe emission fleets for this activity, fuel substitution to advanced biofuels and renewable synthetic fuels are considered a relevant mitigation option for some transport modes in the medium term. The EC Long term strategy³⁸⁶.</p> <p>The operation of fleets where fossil fuels are substituted with low- or net-zero carbon fuels such as advanced bio- and synthetic fuels can make a substantial contribution to CO₂ net emissions savings in the transport sector.^{387,388,389,390} This criteria only applies for vessels that have a specified minimum level of efficiency. The criteria for producing these fuels are set elsewhere in the Taxonomy.</p> <p>As an example of how this might work in practice, an operator may seek to operate a new or existing fleet solely using an eligible fuel (e.g. advanced fuel). To meet the Taxonomy criteria, the operator would need to demonstrate through ongoing verification that the fleet was solely using biofuels as specified in the criteria. A financier may be able to claim its investment (e.g. in a new fleet) was Taxonomy eligible through a contractual agreement with an operator to solely use biofuels, also establishing a verification system to enable ongoing monitoring.</p>
Do no significant harm assessment	

386 https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

387 The CO₂ emissions from the use of biofuels are not counted in the total GHG emissions from the transport sector in EU's official GHG inventory under the UNFCCC. Without fuel substitution - the CO₂ emissions from the transport sector would have been substantially higher.

(Annual European Union greenhouse gas inventory 1990-2017 and inventory report 2019, EEA, 2019).

388 "A Clean Planet for All". A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy'. https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf.

389 IPPC (2014), AR5 Climate Change 2014: Mitigation of Climate Change.

390 OECD/IEA (2017), The Future of Trucks - Implications for energy and the environment.

The main potential significant harm to other environmental objectives from the operation of inland passenger and freight water transport are summarised as follows:

- Direct emissions to air of carbon dioxide (CO₂), hydrocarbons (HC), nitrogen oxides (NO_x), and particulate matter (PM), as well as noise emissions³⁹¹.
- Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vessel.
- Direct and indirect emission of pollutants in water.

(2) Adaptation	<ul style="list-style-type: none"> • Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment during both the use and the end-of-life phases of a building³⁹². • Compliance with Regulation 1257/2013³⁹³ ("Ship recycling Regulation")
(5) Pollution	<ul style="list-style-type: none"> • Vessels must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation³⁹⁴ (including vessels meeting stage V without type-approved solutions such as through after-treatment).
(6) Ecosystems	<ul style="list-style-type: none"> • The activity should not lead to releases of ballast water containing aquatic invasive species³⁹⁵

391 Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

392 EU Waste legislation: Directive 2008/98/EC, Decision 2000/532/EC, http://ec.europa.eu/environment/waste/hazardous_index.htm

393 Regulation (EU) No 1257/2013 of the European Parliament and of the Council of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC

394 Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.

395 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

6.10 Infrastructure for low carbon transport (water transport)

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	4
Code	F42.9.1
Description	<p>Infrastructure for low carbon transport - water including the following category:</p> <ul style="list-style-type: none"> • Construction of water projects (including construction of inland port and sea port infrastructure) <p>Also includes categories of activities not covered by NACE including:</p> <ul style="list-style-type: none"> • Other infrastructure supporting transport activities not included above
Mitigation criteria	
Principle	<p>Demonstrate substantial GHG emission reduction by enabling an:</p> <ul style="list-style-type: none"> - Increase the number of low- and zero emission fleets, and improving fleet efficiency - Improvement in efficiency of the overall transport/mobility system
Threshold	<p>The construction and operation of transport infrastructure is eligible in the following cases:</p> <ol style="list-style-type: none"> 1. Infrastructure that is required for zero direct emissions water transport (e.g. batteries or hydrogen fuelling facilities) is eligible 2. Infrastructure dedicated to supporting the renewable energy sector 3. Infrastructure that is predominantly used for low-carbon transport is eligible if the fleet that uses the infrastructure meets the thresholds for direct emissions as defined in the relevant activity - measured in CO₂e emissions per passenger-kilometre (gCO₂e/pkm), per tonne-kilometre (gCO₂e/tkm), per passenger nautical mile (gCO₂e/pnm) or per tonne nautical mile (gCO₂e/tnm). ³⁹⁶ <p>For all cases:</p> <ul style="list-style-type: none"> • Only infrastructure that is fundamental to the operation of the transport service is eligible. • Infrastructure that is dedicated to the transport of fossil fuels or blended fossil fuels is not eligible <p>Brief rationale</p> <p>The construction and operation of infrastructure for low carbon water transport is considered eligible because this is considered a key enabling factor for improving the uptake of the transport activities that are considered eligible under the rest of the land transport section of the Taxonomy. Eligibility for infrastructure is linked to</p>

³⁹⁶ At this stage, only criteria for inland waterway transport passenger and freight fleets are defined. The criteria for infrastructure could not be applied to non-zero direct emissions maritime shipping fleets until criteria for that type of activity is defined.

	eligibility criteria for fleets using the infrastructure, with additional criteria relating to infrastructure supporting the renewable energy sector.
Rationale	
	<p>The construction and operation of infrastructure for low carbon water transport is considered eligible because this is considered a key enabling factor for improving the uptake of the activities considered eligible under the rest of the water transport section of the Taxonomy.</p> <p>Criteria 2 is a supply chain activity for renewable energy. It includes for example port facilities dedicated to supporting the offshore wind power sector.</p> <p>In criteria 3 above, “predominantly used for” should be interpreted to mean that the majority of the use of the infrastructure is by fleets meeting the substantial contribution criteria in other water transport activities identified in the taxonomy. Where there may be greater uncertainty in fleet use e.g. estimations based on future projections, a more conservative approach should be applied to ensure that the predominant use requirement will be met.</p> <p>There is requirement that only infrastructure that is fundamental to the operation of the transport service is eligible. Infrastructure that is fundamental to the operation are those infrastructure that are needed to ensure the day-to-day delivery of a transport service e.g. fuelling/charging facilities. It does not include ancillary infrastructure that do not directly ensure delivery of the operation of the fleet e.g. head offices of the transport operator.</p> <p>For the criteria that “infrastructure that is dedicated to the transport of fossil fuels or blended fossil fuels is not eligible”, the term “dedicated” is defined as infrastructure being built and acquired with the explicit intention to transport or store fossil fuels, even if actual use may serve other purposes as well.</p> <p>It is acknowledged that embedded carbon emissions in infrastructure projects (e.g. upstream emissions from manufacture of construction materials) can be significant. The level of uncertainty around data in this respect makes it challenging at this time to incorporate this consideration within thresholds for infrastructure. However, this element should be considered for ongoing work on the Taxonomy.</p> <p>Transport of fossil fuels is considered to have potential negative impacts on climate change and therefore is excluded.</p> <p>ICT infrastructure meeting the criteria above is eligible i.e. it meets one of the stated criteria and is fundamental to the operation of the transport service. However, it is recognised that wider ICT activities in transport may have substantial contribution to climate change mitigation and this will require future work to define criteria.</p>
Do no significant harm assessment	
	<p>The main potential significant harm to other environmental objectives from water infrastructure activities are attributed to the alteration of hydromorphology due to dredging, maintenance activities and construction of new infrastructures and waterways, as well as impact on biodiversity and ecosystems from such activities.</p>
(2) Adaptation	<ul style="list-style-type: none"> Refer to the screening criteria for DNSH to climate change adaptation.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans,

	<p>developed in consultation with relevant stakeholders, have been developed and implemented.</p> <ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation. • Canalisation and fragmentation of rivers should be avoided.
(4) Circular Economy	<p>Re-use parts and use recycled material during the renewal, upgrade and construction of water projects.</p> <p>At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list) generated on the construction site must be prepared for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials. This can be achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol³⁹⁷.</p>
(5) Pollution	<p>Minimise noise, vibration, dust, pollutant emissions during construction / maintenance works.</p>
(6) Ecosystems	<p>Infrastructure for low carbon water projects is a major factor of marine ecosystem deterioration and biodiversity loss. Projects should ensure that:</p> <ul style="list-style-type: none"> • Environmental Impact Assessment (EIA) has been completed in accordance with EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or other equivalent national provisions. • Such impact assessments should, at the very least, identify, evaluate, and mitigate any potential negative impacts of the designated activities, projects, or assets on ecosystems and its biodiversity and should be assessed and conducted in compliance with the provisions of the EU Habitats and Birds Directives including the Marine Strategy Framework Directive, as well as the Water Framework Directive (in particular ensuring conditions outlined in article 4(7) of the WFD are met.

397 EU Construction and Demolition Waste Protocol. Available at https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en

7. INFORMATION AND COMMUNICATIONS

Why is ICT included in the Taxonomy

Analysis by the European Commission's Joint Research Centre (JRC) on the EU ICT sector³⁹⁸ – based on 2015 data – assesses that its Value Added amounted to 581 billion euros, it employed 5.8 million people, spent 30 billion euros on R&D, and represented 3.9% of the EU value added, 2.5% of total employment, and 15.7% of total R&D. The ICT service sector in particular represented 3.6% of GDP. In general, the ICT sector in 2015 was more dynamic than the whole EU economy, as value added increased 5.2%, employment 1.8% and R&D 2.9%

However, based on the estimates published by the “European Framework Initiative for Energy & Environmental Efficiency in the ICT Sector”³⁹⁹ ICT currently accounts for 8-10% of the European electricity consumption.

The demand for telecommunications services is consistently growing. It IP traffic (data through telecom networks) has been estimated to be growing at a Compound Annual Growth Rate (CAGR) of 26 percent from 2017 to 2022.⁴⁰⁰

Subjects covered

The analysis carried out here focuses on NACE sector J – Information and Communication, which does not include electronics manufacturing. The TEG has analysed the sector from two angles:

- Mitigation potential associated with high-emitting ICT sectors (“transition activities”): data centres, telecommunication networks, and software;
- Enabling potential of digitalisation solutions (“enabling activities”): data-driven solutions for GHG emissions reductions, and context-specific digitalisation solutions for resource efficiency.

Response to feedback from stakeholders

The main updates to the screening criteria based on comments from the call for feedback are related to Data Centres and are as follows:

- Edge computing and data centre power distribution equipment added to the scope;
- Clarification that both required and where relevant, optional practices of the voluntary European Code of Conduct for Data Centre Energy Efficiency should be implemented;

³⁹⁸ JRC (2018), The 2018 PREDICT Key Facts Report, available at http://publications.jrc.ec.europa.eu/repository/bitstream/JRC112019/jrc112019_2018_predict_key_facts_report.pdf

³⁹⁹ <https://ictfootprint.eu/en/about/ict-carbon-footprint/ict-carbon-footprint>

⁴⁰⁰ Cisco Annual Internet Report (2018-2023) – Updated on 28 February 2020 - <https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html>

- Standards CEN/CENELEC documents CLC TR50600-99-1 and CLC TR50600-99-2 – which build on the European Code of Conduct for Data Centre Energy Efficiency – added as alternative standards for compliance;.
- Updates to DNSH criteria

Comments received for the activities proposed as areas for further work are discussed in the relevant sections below.

Setting criteria and thresholds

Data centres

The JRC estimated total annual energy consumption of data centres in Western Europe as 56 TWh (or 2% of the total electricity consumption) per year. In 2012, this was projected to increase to 104 TWh (or 4%) per year by 2020. The large consumption of energy is due to the need for permanent storage of data (24 hour availability, back-up generators, etc.) and the need for cooling of the servers and other equipment to maintain optimal operating temperatures⁴⁰¹.

Considering this economic activity's dependence on electricity, in a long-term scenario of decarbonized but limited energy from the grid, the sector mitigation potential has been identified in high standards of energy efficiency rather than in low carbon footprints.

Given the complexity of data centres – which encompass hardware, software, cooling systems, monitoring and back-up energy systems, only to name a few components – and the trade-offs that are present in the industry between energy efficiency and reliability and security, the TEG has opted for a comprehensive approach setting as “threshold” for significant contribution to mitigation a data centre compliance with the more advanced standard of energy efficiency available for this sector, the Best Practice Guidelines for the EU Code of Conduct on Data Centre Energy Efficiency (JRC) updated every year by the Commission to take account of technological advances⁴⁰².

Data-driven solutions for GHG emissions reductions

Despite the almost negligible contribution to the economy, data driven solution for data collection, transmission and modelling of GHG emissions reductions-related information plays an important enabling role. Given the nature of the activity, no threshold are necessary.

Next steps

The TEG recommends that the Commission undertakes work on the following activities.

⁴⁰¹ JRC, Best Environmental Management Practice in the Telecommunications and ICT Services Sector, 2016 available at http://susproc.jrc.ec.europa.eu/activities/emas/documents/TelecomICT_BEMP_BackgroundReport.pdf

⁴⁰² The 2019 version is available at this link: <https://e3p.jrc.ec.europa.eu/publications/2019-best-practice-guidelines-eu-code-conduct-data-centre-energy-efficiency>

Telecommunication networks

The International Energy Agency (IEA)⁴⁰³ has developed two different electricity demand and energy efficiency scenarios for data transmission networks (fixed+mobile) in 2021. The first scenario assumes a moderate rate of improvement in energy efficiency of 10% per year (which is close to conservative estimates of historical improvements) and the other assumes a more rapid rate of improvement of 20% per year. In the moderate efficiency-improvement scenario, the midpoint of the electricity demand range in 2021 rises by over 70% to about 320 TWh.

To ensure significant contribution to climate change mitigation, the TEG has considered setting a threshold in terms of energy efficiency for each type of communication network, based on environmental and energy efficiency standard as set by the European Telecommunications Standards Institute (ETSI)⁴⁰⁴ which fully take into account the complexity and diversity of telecommunication networks. The recommended threshold would be set at the top 10% – meaning that only the networks belonging to the top decile in their category for energy efficiency would qualify as Taxonomy-eligible.

This “best-in-class” approach is different from the incremental or mitigation approach advocated by a few stakeholders, who recommend defining significant contribution in terms of incremental improvement in energy efficiency compared to a previous baseline at every company. For example, a move from 4G to 5G – which implies a 15% improvement in energy efficiency - would qualify for the definition of significant contribution to mitigation.

Considering the potential use of the taxonomy, this approach would not be helpful for investors who need to compare equity investments, and need to benchmark companies against each other, and not against a previous state.

Example of activities in scope based on this alternative approach:

- Upgrading of telecommunication networks to new generation
- Energy efficiency and management in existing telecommunication networks

Based on this alternative approach, threshold should for example be set in terms of “attaining at least 15% energy saving compared to the energy consumption measured before the eligible project was implemented”.

The EU could explore the option to adjust the 10% threshold, in the context of the whole Taxonomy.

⁴⁰³ IEA (2017), Digitalization & Energy, available at <https://www.iea.org/publications/freepublications/publication/DigitalizationandEnergy3.pdf>

⁴⁰⁴ See for examples Operational energy Efficiency for Users (OEU); Technical Global KPIs for Fixed Access Networks (ETSI) available at https://www.etsi.org/deliver/etsi_gs/OEU/001_099/012/01.01.01_60/gs_OEU012v010101p.pdf

Or the ETSI ES 203 228 V1.2.1 (2017-04): Environmental Engineering (EE); Assessment of mobile network energy efficiency (ETSI) available at https://www.etsi.org/deliver/etsi_es/203200_203299/203228/01.02.01_60/es_203228v010201p.pdf

Software

The energy efficiency of software and programming languages is an emerging area of research which is starting to grab the attention of academics⁴⁰⁵. The TEG recommends that the Commission develop a code of conduct (similar to the one published for data centres) to ensure that best practices are identified and standards adopted by the software industry.

Context-specific digitalisation solutions for resource efficiency

Defined as development and/or use of integrated systems i.e. combination of software and hardware, or software applications that minimize resource consumption in other sectors of the economy, these digitilasion solution are essential to ensure that other sectors of the economy – agriculture, energy, transport, buildings – meet the eligibility criteria set for other sectors' inclusion in the EU Taxonomy.

Examples include:

- Transport: Electric-vehicle smart charging - manage EV charging stations smartly to leverage on the extra storage capacity connected to the grid.
- Agriculture: Precision agriculture digital solutions – allow, for example, for the right amount of water for irrigation, or fertiliser use.
- Energy: Innovative grid equipment (e.g. short circuit breakers) to ensure security in grids with growing decentralised renewable production.⁴⁰⁶

Stakeholders have also flagged the possibility to use avoided emissions to inform thresholds. However, in the absence of established benchmarks for the accounting of avoided emissions for these sectors as part of the EU PEF and OEF harmonised methodology for the calculation of the environmental footprint of products and organisations methods, this should be left to future iterations of the Taxonomy.

⁴⁰⁵ See for examples Pereira et al.(2017), "Energy efficiency across programming languages" available at: <http://greenlab.di.uminho.pt/wp-content/uploads/2017/09/paperSLE.pdf>

⁴⁰⁶ Further examples mentioned by stakeholders include services based on connectivity, the Internet of Things (IoT), Cloud or Big Data can lead to a more efficient use of energy and can contribute to mitigating climate change effects through:
- improving the efficiency of farming methods and increasing yields;
- more effective monitoring and management of electricity use, heating and cooling;
- enabling a more efficient distributed system of low carbon energy generation and smart grids;
- using smart devices or digital services that enable individuals to have lower carbon lifestyles;
- improving logistics, vehicle use, vehicle efficiency and use of public transportation;
- enabling more effective remote working or education, thus avoiding travel and commuting;
- and even through the replacement of physical products by digital services.

7.1 Data processing, hosting and related activities

Sector classification and activity	
Macro-Sector	J – Information and communication
NACE Level	4
Code	J63.1.1
Description	<p>Storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of diversity of data through data centres, including edge computing.</p> <p>Data centres include the following equipment:</p> <ul style="list-style-type: none"> • ICT equipment and services; • cooling; • data centre power equipment; • data centre power distribution equipment; • data centre building; • monitoring systems.-
Mitigation criteria	
Principle	Data centres implementing a comprehensive set of energy efficiency practices are considered to make a substantial contribution to climate change mitigation
Metric and threshold	<p>The data centre implements the European Code of Conduct for Data Centre Energy Efficiency.</p> <p>This implies Implementation of the practices - including relevant optional ones where reasonable - described in the most recent “Best Practice Guidelines for the European Code of Conduct for Data Centre Energy Efficiency “ (JRC) or in CEN/CENELEC documents CLC TR50600-99-1 and CLC TR50600-99-2”.</p>
Rationale	
<p>Rationale for <u>energy efficiency versus emission reduction</u> as mitigation principle: low or zero emissions can be achieved by sourcing electricity from renewable sources, from the grid or on site. Given the mounting competition for renewable energy, an expected greening of the energy system, and the projected growth of electricity consumption deriving from the digitalisation of the economy, inclusion in the Taxonomy will only depend on energy efficiency.</p> <p><u>Reference standard:</u> 2019 Best Practice Guidelines for the EU Code of Conduct on Data Centre Energy Efficiency (JRC) available at https://e3p.jrc.ec.europa.eu/publications/2019-best-practice-guidelines-eu-code-conduct-data-centre-energy-efficiency</p> <p>This EU code of conduct is also the basis for the CEN/CENELEC documents CLC TR50600-99-1 and CLC TR50600-99-2 (on data centre energy efficiency and data centre environmental sustainability respectively).</p> <p>Geographical scope: Europe.</p>	
Do no significant harm assessment	

<p>Preamble</p> <p>The main DNSH risks are related to life-cycle considerations, from manufacturing of equipment (see Ecodesign Directive), to disposal.</p>	
(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • The production of servers, storage devices and network technology also consumes a great deal of energy and thus emits CO2. The equipment used should meet the requirements of the EU Ecodesign Directive for servers and data storage products. • When electrical and electronic equipment reaches its end of service, the waste electrical and electronic equipment is collected and managed by an authorised operator and treated according to the waste hierarchy
(5) Pollution	Refrigerants employed in the refrigeration systems must meet the requirement of the EU F-Gas Regulation.
(6) Ecosystems	

7.2 Data-driven solutions for GHG emission reductions

Sector classification and activity	
Macro-Sector	J – Information and communication
NACE Level	2 and 4
Code	J61, J62, J63.1.1
Description	Development and/or use of ICT solutions that are aimed at collecting, transmitting, storing data and at its modelling and use when these activities are exclusively aimed at the provision of data and analytics for decision making (by the public and private sector) enabling GHG emission reductions.
Mitigation criteria	
Principle	Data-driven solutions for GHG emission reductions are considered to make a substantial contribution to climate change mitigation because of the emissions reductions they enable.
Metric and threshold	N/A
Rationale	
<ul style="list-style-type: none"> The option to adopt a threshold for multi-purpose solutions (eg. “50% of activity has to be applied to climate change”) has been considered but turned down not to incur behavioural issues (related to the lack of control over the use of the data and analytics by the end user) The mix of NACE codes (telecommunication, software and data processing) is necessary to keep the category open to solutions that will emerge in the future Exclusive use of data for climate change mitigation purposes is deemed sufficient to prove significant mitigation contribution and avoid application of thresholds. <u>Example:</u> Advanced weather forecasting models tailored to integrating more renewables in electricity generation. Digital technologies, such as machine-learning algorithms, when applied to weather and power plant output data, can increase the accuracy of renewable forecasts to up to 94%, from around 88% across the industry 	
Geographical scope: Global.	
Do no significant harm assessment	
Activities falling in this category are mostly based on small-scale data processing and storage, with negligible physical impacts.	
(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	
(4) Circular Economy	
(5) Pollution	

(6) Ecosystems	
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8. CONSTRUCTION AND REAL ESTATE ACTIVITIES

Preamble

In the EU, buildings are effectively the largest energy consuming sector, responsible for around 40% of energy consumption and 36% of carbon emissions.⁴⁰⁷ At the same time, embodied carbon emissions are increasing and receiving growing attention. About three-quarters of European buildings are considered inefficient, while only 0.4-1.2% (depending on the country) of the building stock is renovated each year to improve its efficiency⁴⁰⁸. Renovation rates must be increased in order to set the whole building stock on a net-zero emissions pathway, while embodied and operational carbon emissions of new buildings must be significantly reduced in order to minimise their impact over their life cycle. At the same time, designing and renovating buildings to high energy performance standards is not sufficient to ensure low carbon emissions during operations, thus more needs to be done to address the ‘performance gap’⁴⁰⁹ of efficient buildings. Within this context, the TEG acknowledged the need for an ambitious approach and the crucial role that the taxonomy can play in directing financial flows towards the decarbonisation of the built environment.

Subjects covered

The taxonomy distinguishes four ‘economic activities’ and defines consistent mitigation criteria that enable assessing the eligibility of investments in construction and real estate on the basis of their potential impact on building energy performance and thus carbon emissions. The four activities are designed to be relevant to most real estate market participants and facilitate investment flows to mitigation measures in the building sector:

1. Construction of new buildings: this activity covers real estate development and enables accounting of:
 - a. project capital expenditures of developers and construction clients as eligible ‘low-carbon activities’;
 - b. turnover of developers and contractors.
2. Building renovation: this activity covers comprehensive renovation and enables accounting of:
 - a. project capital expenditures for renovation as eligible ‘transition activities’.
 - i. When expenditures can be distinguished by type, at least 50% must be related to energy-efficiency measures in order to consider the renovation expenditures as eligible in their entirety.⁴¹⁰
 - ii. When expenditures cannot be distinguished by type, 50% of the total renovation expenditures may be counted as the proxy representing energy-efficiency measures.

⁴⁰⁷ <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-performance-of-buildings>

⁴⁰⁸ <https://ec.europa.eu/energy/en/eu-buildings-database>

⁴⁰⁹ <https://www.carbontrust.com/media/81361/ctg047-closing-the-gap-low-carbon-building-design.pdf>

⁴¹⁰ Certain types of financial instruments such as loans for acquisition and renovation of buildings may need to consider acquisition costs integrally with the eligible renovation costs if these costs cannot be practically separated in those types of financial instruments.

- b. turnover of contractors.
3. Individual measures and professional services: this activity covers technical interventions aimed at increasing energy efficiency and professional services that are functional to energy improvements, and enables accounting of:
 - a. project capital expenditures of clients as eligible ‘transition activities’;
 - b. turnover of installers and services providers.
 4. Acquisition and ownership: this activity covers the purchase and management of buildings, and enables accounting of:
 - a. project capital expenditures of the buyer/owner as eligible ‘transition activities’ or ‘low carbon activities’ depending on building performance;
 - b. turnover of real estate brokers and facility managers.

Setting criteria and thresholds

The TEG faced several challenges to develop appropriate Mitigation criteria for the construction and real estate sectors:

- The lack of consistent and comparable data across countries for benchmarking building stock performance and setting suitable thresholds for the top performing buildings within the respective national stock.
- The inherent difficulty of creating a level playing field across countries with different climates and degrees of market readiness. Compared to other economic activities, the operation of individual buildings has unique characteristics, which means the performance of different assets cannot easily be compared. Due to climatic differences across regions, buildings in different locations have different energy needs for heating, air conditioning and lighting, and therefore different potential to contribute to climate change mitigation. Furthermore, the nature of the existing building stock varies significantly from country to country, and even from region to region, due to differences in design, construction techniques and building age.
- The desire to find a compromise between rising ambition and building upon already existing ‘green’ financing instruments. The financing of buildings and building energy improvements is the most developed segment of the green finance market, and the ownership of buildings in portfolios is an extensively practiced economic activity. As the Taxonomy is introduced to the market, it is important to maintain the volume of existing investors and enable them to use the Taxonomy to evaluate their portfolios.
- The intention to direct finance towards new buildings designed to higher standards than mandatory design and construction requirements, considering the varying levels of ambition and rigor regarding the implementation of nearly zero-energy buildings (NZEB) across EU Member States.
⁴¹¹
- The necessity to acknowledge existing high-performing buildings built before 2021 through a practical best-in-class approach, due to a lack of transparency on national performance requirement levels.
- The urgent need to increase the number of energy renovations, especially in private households.

⁴¹¹ According to Article 9 of the EPBD, by 31 December 2020 all new buildings must be NZEB.

Meanwhile, stakeholders' feedback on the first version of the taxonomy report highlighted the following issues:

- The need to foster energy-efficient operations of buildings through performance monitoring and reporting, while considering practicality and privacy requirements.
- The need to ensure minimum safeguards across the building life cycle through DNSH criteria by adopting EU and international standards and considering the practical implications of demonstrating taxonomy eligibility across different building type and activities.
- The current inability of significant parts of the market to operate with carbon metrics, as well as the need to progress towards the adoption of such metrics in conjunction with energy metrics.

Taking into account these challenges and feedback, the TEG agreed on a specific strategy:

- Setting criteria for new constructions to raise above mandatory design requirements and progress towards net-zero emissions in the use phase by 2030, and work to introduce a requirement on including embodied carbon.
- Setting criteria to direct finance towards a large volume of major renovation projects as well as towards individual measures aimed at improving energy and carbon performance.
- Adopting a best-in-class approach to ensure that the acquisition and ownership criteria support both significant market uptake and sufficient environmental benefits. Encouraging buyers to acquire efficient buildings over less-efficient ones can also provide an opportunity to support substantial contribution to climate mitigation by increasing the demand for such buildings and by enabling buyers to consume less energy during the use phase. The TEG considers that the best-in-class approach can be approximated by benchmarking the top performing 15% of the existing national stock. This performance level is intended to decline following 2050 decarbonisation targets. The performance of the top performing 15% of the national stock needs to be transposed into absolute energy or carbon metrics, but the TEG considered that data is not yet adequately available.
- Requiring improvements over time to ensure overall stock decarbonisation. The TEG is aware that there will be limited long-term impact in terms of emission reductions if the market simply trades financial exposure in the top 15% of national stocks without improving the energy efficiency of such buildings through renovation. In fact, there may be a risk of undermining renovation efforts if financing acquisition becomes less onerous than financing energy efficiency measures. For this reason, the TEG recommends introducing a requirement to renovate assets that are acquired through financial instruments that have long tenure periods.
- Setting additional criteria on performance monitoring to ensure that large non-commercial properties are efficiently operated and deliver real energy and carbon savings.

These principles led the TEG to develop the following criteria to identify environmentally sustainable activities in terms of Substantial Contribution to Climate Change Mitigation:

1. **Construction of new buildings:** to be eligible, the design and construction of new buildings needs to ensure a net primary energy demand that is at least 20% lower than the level mandated by national regulations. This is assessed through the calculated energy performance of the building, i.e. performance forecasted on the basis of modelling building physics under typical climatic and occupancy conditions.

This criterion is meant to be subject to reviews in the transitional decade 2020-2030 in order to take into account potential tightening of NZEB requirements by EU Member States, with the aim of setting the whole sector on convergence towards net-zero energy and carbon targets by 2030.

2. **Building renovations:** renovations designed to meet the local national or regional requirements for ‘major renovation’ as defined in the Energy Performance of Buildings Directive (EPBD)⁴¹²; this will stimulate the market and encourage building owners undertaking a ‘conventional’ renovation to include energy-efficiency measures established by EU Member States in national and regional regulations implementing the EPBD.
In alternative, renovations are eligible if undertaken to ensure at least 30% savings in net primary energy demand in comparison to the baseline energy performance of the building before the renovation, assessed through the calculated energy performance of the building.
3. **Individual measures and professional services:** measures and services aimed at reducing energy and/or carbon emissions in buildings. This is assessed through technical requirements for each measure and service.
4. **Acquisition and ownership:** buildings built after 2021 are eligible if they meet the criteria for the ‘Construction of new buildings’, while buildings built before 2021 are eligible if their performance is comparable to the performance of the top 15% of the national stock, in terms of calculated Primary Energy Demand during the use phase. An additional requirement is applied only to large non-residential buildings (built both before and after 2021) to ensure efficient operations through energy management.

With regards to the criteria established for Do No Significant Harm (DNSH) to the other 5 environmental objectives, in the interest of practicality and ease of market application the TEG has opted to rely on EU policy and regulations when possible. The TEG is conscious that the DNSH criteria to climate change adaptation requires extensive clarification in terms of its implementation in practice.

Market coverage

Except for buildings used for the extraction, storage, transportation or manufacture of fossil fuels, the taxonomy does not exclude any particular type of building, and therefore covers virtually the whole market for construction and real estate activities⁴¹³. This does not mean that every activity will be eligible, only that any participant in the market can use the taxonomy to assess the eligibility of his/her investments related to buildings.

The Mitigation criteria will impact EU Member States differently as the share of the market eligible under the taxonomy will vary from location to location due to differences in the ‘levels of ambition’ established by national regulations (definition of NZEB and minimum energy performance requirements and implementation of the EPBD) for new and existing buildings undergoing and renovations. Buildings in countries with a highly decarbonised electricity grid will have an inherent advantage in delivering net-zero carbon buildings.

⁴¹² According to Article 7 of the EPBD buildings undergoing major renovation must meet the cost-optimal minimum energy performance requirements.

⁴¹³ With the exemption of Article 4, paragraph 4 of the EPBD which allows EU Member States to exclude specific types of buildings from the applying the minimum energy performance requirements.

For renovations, differences in the minimum energy performance requirements set for 'major renovations' across EU Member States imply that the Mitigation criteria will be easier to meet in some countries. However, it should be considered that requirements for 'major renovations' have been established by Member States on the basis of local climatic and building stock conditions as well as cost-optimality calculations and will be to be updated in the future.

Outside the EU, the share of the market that could be eligible will also vary from country to country. Countries with ambitious building regulations that are accepted as taxonomy-equivalent will more easily be able to make large shares of their market eligible. The principle of the top performing 15% of the national stock provides a methodology to demonstrate eligibility of the non-EU best in class building stock.

For renovations, the 30% energy savings threshold (alternative to the compliance with 'major renovation' requirements) will not only facilitate immediate functionality of the taxonomy outside the EU, it will also make a significant part of renovation activities eligible, even in countries where national building regulations may not be ambitious enough. Moreover, the share of the market that could be eligible outside EU Member States will also depend on the local proliferation of taxonomy-eligible sustainability certification schemes.

Impact of proposals

Uptake if the taxonomy among market participants will have both beneficial and adverse effects on the sector. By enabling owners and developers to access dedicated 'green' financial instruments, the taxonomy will stimulate much needed investment in the renovation of buildings with lower levels of energy performance as the well as construction of new energy-efficient buildings and the efficient operation of existing buildings. Market participants who do not upgrade their practices in line with taxonomy criteria may lose competitiveness and the ability to brand their economic activities and products as 'green'. The TEG acknowledges the risk of creating stranded assets but considers that by creating different paths to accessing finance, sufficient safeguards have been included in the criteria to adequately manage this possibility.

In terms of implementation costs, the taxonomy will affect market participants differently. Meeting eligibility criteria for new constructions, renovations and acquisitions may result in additional costs in comparison to business-as-usual practices. These additional costs can be counterbalanced over time through the expected energy savings and the wider benefits (on health, comfort, lower volume of energy consumption and reduced energy bills, etc) associated with high-performing buildings. Market participants may also incur further costs due to the process required to demonstrate eligibility with taxonomy criteria, especially when the latter are based on several technical parameters. However, these parameters have been largely based on international standards and EU regulations to take into account usability issues, considering also the differences between the residential and commercial sectors.

Overall, considering the importance and urgency of improving the energy performance and decarbonising the building stock, the impact of implementation costs can be considered proportionate to the goals of the taxonomy, especially as successful taxonomy uptake will also have significant positive social and economic impacts. Requiring high standards for new buildings and renovating existing ones will reduce energy bills and improve indoor air quality and thermal comfort, positively impacting occupants' health and available income. Requiring high standards will also stimulate the demand for sustainability professionals, service providers and skilled construction workers, thus creating employment and upskilling opportunities. The eligibility of individual measures and professional services will also boost the market for energy efficiency,

low-carbon technologies and related services. Eligibility of measures such as the installation of electric vehicle charging stations will facilitate an integrated cross-sectoral approach with the transport sector.

Recommendations for future developments

The TEG acknowledges the need to review and update the criteria identified in this report and encourages the Sustainable Finance Platform to agree on a timeline for this purpose. Consistency of criteria across the four activities should be maintained in future iterations of the taxonomy.

The TEG strongly recommends the following actions in order to develop a taxonomy capable of fully covering the contribution that the built environment can bring to climate change mitigation:

- The Sustainable Finance Platform should establish a timeline for reviewing the 20% relative improvement from NZEB requirements (which applies to the ‘Construction of new buildings’), in conjunction with the expected updates of NZEB regulations by EU Member States, and with the clear objective of converging towards net-zero energy and net-zero carbon targets for new buildings by 2030. Such targets are aligned with the strategies of the World Green Building Council⁴¹⁴, the Global Alliance for Buildings and Construction⁴¹⁵ and other organisations⁴¹⁶. Buildings built between 2021 and 2050 will represent up to 23% of the total stock in 2050⁴¹⁷. If the entire stock is meant to be net-zero carbon by 2050, it follows that those buildings built between 2021 and 2050 must be net-zero carbon in order for the overall target to be met. The sooner new buildings are built with net-zero performance, the less difficult it will be to meet the 2050 target for the whole sector to be net-zero. Since the TEG recommends working towards the introduction of net-zero carbon only after 2030, this already constitutes a compromise between the urgent need to eliminate emissions from new constructions and the capacity of the real estate sector to deliver net-zero carbon buildings.

Considering the updates of NZEB regulations by EU Member States (expected in 2023 and 2028), the timeline for the Sustainable Finance platform could be as follows:

- 2023: review of threshold, considering tightening of NZEB requirements;
- 2025: review of threshold, if necessary;
- 2028: review of threshold, considering tightening of NZEB requirements;
- 2030: introduction and technical definition of net-zero energy and net-zero carbon requirements.

Where net-zero carbon is already mandated by regulation (as may be the case for some building types in some Member States), the taxonomy should not require better performance, since net-zero carbon can be considered sufficient (from the side of new constructions) to allow the entire building stock to be climate-neutral by 2050.

- Although the reduction of carbon embodied in buildings has been often neglected in favour of reducing carbon emissions arising during operations, awareness of their importance is quickly

⁴¹⁴ <https://www.worldgbc.org/thecommitment>

⁴¹⁵ <https://globalabc.org/uploads/media/default/0001/02/9ab4984b5d2e006ad533bca08257a43bdf974fa9.pdf>

⁴¹⁶ For example, C40 Cities (<https://www.c40.org/>) and Architecture 2030 (https://architecture2030.org/2030_challenges/)

⁴¹⁷ https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

growing among built environment professionals, while methods and tools for embodied carbon assessment based on LCA are becoming more widespread. Notably, a large share of emissions embodied in buildings takes place during resource extraction and product manufacturing, before buildings are even occupied, which means that all new constructions begin their lifecycle with a significant amount of embodied carbon.

The Sustainable Finance Platform should gather and analyse existing data in order to establish reliable thresholds for carbon emission embodied in new constructions, which will be integrated into the taxonomy criteria for the activity 'Construction of new buildings' as additional threshold to be met. These thresholds should be based on a wide and consistent set of data, suitable for benchmarking best practice across different building uses and typologies (i.e. houses, flats, offices, etc.), thus the Sustainable Finance Platform should encourage and support the generation of such data. The Sustainable Finance Platform should progress this work with the aim of introducing thresholds for embodied carbon by 2025.

In parallel, the methodology adopted to assess embodied emissions should be defined in detail with reference to widely accepted LCA and CEN/TC350 standards, with particular attention towards adequately recognising the beneficial impact of carbon sequestration in timber products sourced from sustainably managed forests.

- By the end of 2024, the Sustainable Finance Platform should establish absolute thresholds for energy and carbon emissions to represent the performance of the top 15% of national stocks and provide a clear decarbonisation pathway as threshold for assessing the acquisition and ownership of assets built before 2021. By then, the performance of the top 15% of each national stock will have been converted into absolute thresholds for energy and carbon emissions. Until 31 December 2025, the top 15% of the national stock represents the performance level required to be eligible. From that date onward, and every five years afterwards, the performance level should be lowered to reflect a pathway reaching net-zero operational carbon in 2050. Such pathway could look as follows:
 - Until 2025: X kgCO₂eq/m²y, corresponding to the performance of the top 15% of the national stock
 - 2026-2030: (5/6)*X kgCO₂eq/m²y
 - 2031-2035: (4/6)*X kgCO₂eq/m²y
 - 2036-2040: (3/6)*X kgCO₂eq/m²y
 - 2041-2045: (2/6)*X kgCO₂eq/m²y
 - 2046-2050: (1/6)*X kgCO₂eq/m²y
 - From 2051: net-zero kgCO₂eq/m²y
- The Sustainable Finance Platform should consider how to address long-term eligibility, i.e. assets covered by financial instruments with a tenure period of ten years or more. These assets could be required to be renovated in order to maintain eligibility. For example, there could be a requirement for renovations to occur within 15 years from the acquisition date.
- The Sustainable Finance Platform should provide guidance on the practical implementation of the DNSH criteria to climate change adaptation, especially for the activity of building renovation taking into account the need to avoid disproportionate administrative and financial burden.
- The Sustainable Finance Platform should develop appropriate criteria and thresholds to address carbon emissions arising from unregulated energy use (i.e. plug-in electric loads) in buildings,

considering different building typologies. Emissions due to unregulated energy use are not currently covered by the criteria established in this report, but these emissions can represent a significant share of the operational impact of buildings, especially from specific non-residential typologies. To shorten the process and avoid the duplication of efforts, these thresholds could be developed on the basis of the decarbonisation trajectories identified in the research project Carbon Risk Real Estate Monitor (CRREM), funded by Horizon 2020.

- The Sustainable Finance Platform should periodically review and update the list of eligible individual measures and professional activities.
- The Sustainable Finance Platform should develop appropriate criteria and thresholds to address Scope 1 emissions of construction companies, i.e. emission that are associated with the operation of such firms and the associated construction works.

The Platform should ensure future alignment of the existing Individual Measures with the low-carbon technology list within the Manufacturing sector.

8.1 Construction of new buildings

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	2
Code	F41, F43
Description	Construction of new buildings. This relates to activities under NACE codes F41.1 - Development of building projects and F41.2 - Construction of residential and non-residential buildings.
Mitigation criteria	
Principle	<p>The construction of new buildings designed to minimise energy use and carbon emissions throughout the lifecycle can make a substantial contribution to climate change mitigation by saving large part of the energy and carbon emissions that would be associated with conventionally designed buildings.</p> <p>Condition for non-eligibility: to avoid lock-in and undermining the climate mitigation objective, the construction of new buildings designed for the purpose of extraction, storage, transportation or manufacture of fossil fuels is not eligible.</p> <p>Use of alternative schemes as proxies: outside EU Member States, established schemes such as ‘green building’ certifications or building regulations and standards may be used as alternative proof of eligibility, provided that this is verified by the Sustainable Finance Platform. The organisation responsible for the scheme will be able to apply for official recognition of its scheme by presenting evidence that a specific level of certification/regulation can be considered equivalent (or superior) to the taxonomy mitigation and DNSH threshold for the relevant climatic zone and building type. The Sustainable Finance Platform will assess the evidence and approve or reject the application.</p>
Metric and threshold	<p>The metric is Primary Energy Demand (PED), defining the energy performance of a building: the annual primary energy demand associated with regulated energy use during the operational phase of the building life-cycle (i.e. ‘module B6’ as defined in EN15978), calculated ex-ante according to the national methodologies for asset design assessment, or as defined in the set of standards ISO 52000, expressed as kWh/m² per year.</p> <p>The threshold is based on ‘nearly zero-energy building’ (NZEB) requirements, which are defined in national regulation implementing the EPBD and are mandatory for all new buildings across EU Member States from 2021. To be eligible, the net primary energy demand of the new construction must be at least 20% lower than the primary energy demand resulting from the relevant NZEB requirements.⁴¹⁸ This reduction can be met through a direct decrease of the</p>

⁴¹⁸ The PED is either directly expressed by NZEB requirements or is derived by applying those requirements and calculating the resulting PED. When NZEB requirements specify a PED, the percentage improvement should be applied to this figure.

	<p>primary energy demand via a more efficient design or by offsetting with on-site and off-site renewable generation, or a combination of both strategies. Off-site energy generation must be limited to district heating and cooling systems and local renewable energy sources.⁴¹⁹</p> <p>The methodology used for the measurement of floor area should be stated referring to the categories defined in the International Property Measurement Standards.⁴²⁰</p>
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Rationale

The establishment of a relative threshold in the form of a percentage improvement on NZEB requirements is justified by the fact that from 2021 new constructions will be mandated by national/regional building regulations to comply with NZEB requirements. This implies that the taxonomy must require better levels of performance than NZEB, or all new constructions would be automatically eligible, which would fail to direct finance towards more sustainable solutions and run the risk of diverting finance from the renovation of existing buildings. Since NZEB requirements correspond to different levels of performance across EU Member States , the use of a percentage improvement, rather than absolute figures, allows a degree of proportionality to be applied: in Member States where NZEB requirements result in a comparatively low PED, the energy reduction necessary to achieve the 20% improvement is smaller than in Member States where NZEB requirements result in a comparatively high primary energy demand.

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with the construction of new buildings is determined by:

- Lack of resistance to extreme weather events (including flooding), and lack of resilience to future temperature increases in terms of internal comfort conditions.
- Excessive water consumption due to inefficient water appliances.
- Landfill and/or incineration of construction and demolition waste that could be otherwise recycled/reused.
- Presence of asbestos and/or substances of very high concern in the building materials.
- Presence of hazardous contaminants in the soil of the building site.
- Inappropriate building location: impacts on ecosystems if built on greenfield and especially if in a conservation area or high biodiversity value area.
- Indirect damage to forest ecosystems due to the use of timber products originating from forests that are not sustainably managed.

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	All relevant water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and flushing

419 As defined in national methodologies developed by EU Member States to implement the EPBD

420 International Property Measurement Standards (IPMS): <https://ipmsc.org/>

	cisterns, bathtubs) must be in the top 2 classes for water consumption of the EU Water Label. ⁴²¹
(4) Circular Economy	At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list ⁴²²) generated on the construction site must be prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials. ⁴²³
(5) Pollution	<p>5.a - It is ensured that building components and materials do not contain asbestos nor substances of very high concern as identified on the basis of the "Authorisation List" of the REACH Regulation.⁴²⁴</p> <p>5.b – If the new construction is located on a potentially contaminated site (brownfield site), the site must be subject to an investigation for potential contaminants, for example using standard BS 10175.⁴²⁵</p> <p>5.c – Non-road mobile machinery used on the construction site should comply with the requirements of the NRMM Directive.</p>
(6) Ecosystems	<p>6.a - The new construction must not be built on protected natural areas, such as land designated as Natura 2000, UNESCO World Heritage and Key Biodiversity Areas (KBAs), or equivalent outside the EU as defined by UNESCO and / or the International Union for Conservation of Nature (IUCN) under the following categories:</p> <ul style="list-style-type: none"> • Category Ia: Strict Nature Reserve • Category Ib: Wilderness Area • Category II: National Park <p>Buildings that are associated supporting infrastructure to the protected natural area, such as visitor centres, museums or technical facilities are exempted from this criterion.</p> <p>6.b - The new construction must not be built on arable or greenfield land of recognised high biodiversity value and land that serves as habitat of endangered</p>

⁴²¹ (<http://www.europeanwaterlabel.eu/>) Outside the EU, relevant water appliances will need to meet the flow rates identified by the EU Water Label as threshold for the top 2 classes of water consumption. Details on flow rates and testing method: <http://www.europeanwaterlabel.eu/pdf/scheme-march2019-en.pdf>

⁴²² Commission Decision of 3 May 2000 replacing Decision 94/3/EC (2000/532/EC)

⁴²³ This requirement is achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol.

⁴²⁴ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

⁴²⁵ BS 10175:2011+A2:2017 - Investigation of potentially contaminated sites. Code of practice.

	<p>species (flora and fauna) listed on the European Red List and / or the IUCN Red List.</p> <p>6.c - At least 80% of all timber products used in the new construction for structures, cladding and finishes⁴²⁶ must have been either recycled/reused or sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/PEFC standards or equivalent.⁴²⁷</p>
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426 These products are categorised as follows according to the Combined Nomenclature set out in Annex I to Council Regulation (EEC) No 2658/87: 4407 Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm; 4408 Sheets for veneering (including those obtained by slicing laminated wood), for plywood or for other similar laminated wood and other wood, sawn lengthwise, sliced or peeled, whether or not planed, sanded, spliced or end-jointed, of a thickness not exceeding 6 mm; 4409 Wood (including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded or the like) along any of its edges, ends or faces, whether or not planed, sanded or end-jointed; 4410 Particle board, oriented strand board (OSB) and similar board (for example, waferboard) of wood or other ligneous materials, whether or not agglomerated with resins or other organic binding substances; 4411 Fibreboard of wood or other ligneous materials, whether or not bonded with resins or other organic substances; 4412 Plywood, veneered panels and similar laminated wood; 4413 00 00 Densified wood, in blocks, plates, strips or profile shapes; 4418 Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes; 9406 00 20 Prefabricated buildings

427 To be reviewed after the upcoming publication of an EU study on forests

8.2 Building renovation

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	2
Code	F41, F43
Description	Building renovation: this relates to activities under NACE codes F41.2 - Construction of residential and non-residential buildings and F43 - Specialised construction activities.
Mitigation criteria	
Principle	<p>The renovation of existing buildings to improve their energy performance makes a substantial contribution to climate change mitigation by reducing energy consumption and GHG emissions for the remaining operational phase of the buildings, and by avoiding emissions that would be associated with the construction of new buildings.</p> <p>Condition for non-eligibility: to avoid lock-in and undermining the climate mitigation objective, the renovation of buildings occupied for the purpose of extraction, storage, transportation or manufacture of fossil fuels is not eligible.</p> <p>Use of alternative schemes as proxies: outside EU Member States, established schemes such as “green building” certifications or building regulations and standards may be used as alternative proof of eligibility, provided that this is verified by the Sustainable Finance Platform. The organisation responsible for the scheme will be able to apply for official recognition of its scheme by presenting evidence that a specific level of certification/regulation can be considered equivalent (or superior) to the taxonomy mitigation and DNSH threshold for the relevant climatic zone and building type. The Sustainable Finance Platform will assess the evidence and approve or reject the application.</p>
Metric and thresholds	<p>The thresholds used to assess the renovation rely on either the respective metrics set in the applicable building energy performance regulation for ‘major renovation’ transposing the EPBD, or, in the case of relative improvement, on Primary Energy Demand (PED) defined as follows: the annual primary energy demand associated with regulated energy use during the operational phase of the building life-cycle (i.e. ‘module B6’ according to EN15978), calculated ex-ante according to the national methodologies for asset design assessment, or as defined in the set of standards ISO 52000, expressed as kWh/m² per year.</p> <p>A renovation is eligible when it meets either one of the following thresholds:</p>

	<p>a) Major renovation⁴²⁸: the renovation is compliant with the requirements set in the applicable building regulations for ‘major renovation’ transposing the Energy Performance of Buildings Directive (EPBD). The energy performance of the building or the renovated part upgraded must meet cost-optimal minimum energy performance requirements in accordance with the EPBD.</p> <p>b) Relative improvement: the renovation leads to reduction of Primary Energy Demand of at least 30% in comparison to the energy performance of the building before the renovation.⁴²⁹ The initial energy performance and the estimated improvement shall be based on a specialised building survey and validated by an Energy Performance Certificate, an energy audit conducted by an accredited independent expert or any other transparent and proportionate method.</p> <p>The methodology used for the measurement of floor area should be stated referring to the categories defined in the International Property Measurement Standards.⁴³⁰</p>
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Rationale

The choice of a threshold based on the minimum energy performance requirements to be met by buildings undergoing ‘major renovation’ is strongly affected by the necessity of substantially increasing the annual rates of renovations that include energy-efficiency measures. Such requirements are established in EU Member States at national or regional level in building regulations implementing the EPBD and are based on calculations of cost-optimality. Access to advantageous financing conditions is meant to incentivise homeowners and businesses to undertake a renovation that includes energy efficiency measures.

The threshold for ‘relative improvement’ is given as alternative to allow the eligibility of renovations that may not meet the ‘major renovation’ requirements but still deliver considerable energy savings, as well as to provide a threshold that is easily applicable outside EU Member States.

Since the focus of the criteria is the renovation project and not the building in itself, any renovation can be eligible, independently from the absolute performance of the building as long as it meets either one of the two thresholds.

Do no significant harm assessment

428 ‘major renovation’ means the renovation of a building where:

- (a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated; or
 - (b) more than 25 % of the surface of the building envelope undergoes renovation;
- Member States may choose to apply option (a) or (b)

429 The 30% improvement must result from an actual reduction in primary energy demand (i.e. reductions in net primary energy demand through renewable energy sources do not count), and can be achieved through a succession of measures within a maximum of 3 years

430 International Property Measurement Standards (IPMS): <https://ipmsc.org/>

The main potential for significant harm to the other environmental objectives associated with the renovation of existing buildings is determined by:

- Lack of resistance to extreme weather events (including flooding), and lack of resilience of to future temperature increases in terms of internal comfort conditions (only for large buildings).
- Excessive water consumption due to inefficient water appliances.
- Landfill and/or incineration of construction and demolition waste that could be otherwise recycled/reused.
- Presence of asbestos and/or substances of very high concern in the building materials.
- The unprotected handling of building components that are likely to contain substances of concern (e.g. asbestos containing materials) and of any hazardous construction and demolition waste arising from the building renovation;
- Indirect damage to forest ecosystems due to the use of timber products originating from forests that are not sustainably managed (only for large buildings).

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	All relevant new water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and flushing cisterns, bathtubs) must be in the top 2 classes for water consumption of the EU Water Label. ⁴³¹
(4) Circular Economy	At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list ⁴³²) generated on the construction site must be prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials. ⁴³³
(5) Pollution	<p>5.a - It is ensured that building components and materials do not contain asbestos nor substances of very high concern as identified on the basis of the "Authorisation List" of the REACH Regulation.⁴³⁴</p> <p>5.b - Before starting the renovation work, a building survey must be carried out in accordance with national legislation by a competent specialist with training in asbestos surveying and in identification of other materials containing substances</p>

431 (<http://www.europeanwaterlabel.eu/>) Outside the EU, relevant water appliances will need to meet the flow rates identified by the EU Water Label as threshold for the top 2 classes of water consumption. Details on flow rates and testing method: <http://www.europeanwaterlabel.eu/pdf/scheme-march2019-en.pdf>

432 Commission Decision of 3 May 2000 replacing Decision 94/3/EC (2000/532/EC)

433 This requirement is achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol.

434 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

	<p>of concern. Any stripping of lagging that contains or is likely to contain asbestos, breaking or mechanical drilling or screwing and/or removal of insulation board, tiles and other asbestos containing materials shall be carried out by appropriately trained personnel, with health monitoring before, during and after the works, in accordance with national legislation.</p> <p>5.c – Non-road mobile machinery used on the construction site should comply with the requirements of the NRMM Directive.</p>
(6) Ecosystems	<p>At least 80% of all timber products used in the renovation for structures, cladding and finishes must have been either recycled/reused or sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/PEFC standards or equivalent.⁴³⁵</p>

⁴³⁵ To be reviewed after the upcoming publication of an EU study on forests

8.3 Individual measures and professional services

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	2
Code	F41, F43
Description	Individual measures and professional services. This relates to activities under NACE codes F43 - Specialised construction activities and M – Professional, scientific and technical activities.
Mitigation criteria	
Principle	Individual measures make a contribution to climate change mitigation by reducing energy use and carbon emissions for the operational phase of the building. Professional services are a necessary support and validation mechanism, especially for building renovation. The investment linked to the individual measure(s) must be aimed at improving energy performance and/or reduction of carbon emissions. The motivation can be demonstrated through an energy audit, an Energy Performance Certificate (EPC) or any other transparent and proportionate method acceptable by the Sustainable Finance Platform.
Metric and threshold	<p>There are no defined metrics across the individual measures and professional services.</p> <p>The following individual measures are eligible if compliant with minimum requirements set for individual components and systems in the applicable national regulations transposing the Energy Performance Building Directive (EPBD), and must meet Ecodesign requirements pursuant to Directive 2009/125/EC:</p> <ul style="list-style-type: none"> a) Addition of insulation to the existing envelope components, such as external walls, roofs (including green roofs), lofts, basements and ground floors (including measures to ensure air-tightness, measures to reduce the effects of thermal bridges and scaffolding) and products for the application of the insulation to the building envelope (mechanical fixings, adhesive, etc.). b) Replacement of existing windows with new energy efficient windows. c) Replacement of existing external doors with new energy efficient doors. d) Installation and replacement of HVAC and domestic hot water systems, including equipment related to district heating service. e) Replacement of inefficient boiler or stove with highly efficient condensing boiler. <p>The following individual measures are eligible if specific requirements are met:</p> <ul style="list-style-type: none"> f) Replacement of old pumps with efficient circulating pumps (as defined in Art. 2 of EU Regulation 622/2012).

- g) Installation of efficient LED lighting appliances and systems.
- h) Installation of low-flow kitchen and sanitary water fittings in the top two categories of the EU Water Label scheme.

The following **individual measures** are always eligible:

- i) Installation of zoned thermostats, smart thermostat systems and sensoring equipment, e.g. motion and day light control.
- j) Installation of Building Management Systems (BMS) and Energy Management Systems (EMS).
- k) Installation of charging stations for electric vehicles.
- l) Installation of smart meters for gas and electricity.
- m) Installation of façade and roofing elements with a solar shading or solar control function, including those that support the growing of vegetation.

The following **individual measures** are eligible if installed on-site as building services:

- n) Installation of solar photovoltaic systems (and the ancillary technical equipment).
- o) Installation of solar hot water panels (and the ancillary technical equipment).
- p) Installation and upgrade of heat pumps contributing to the targets for renewable energy in heating and cooling in accordance with Directive 2018/2001/EU (and the ancillary technical equipment).
- q) Installation of wind turbines (and the ancillary technical equipment).
- r) Installation of solar transpired collectors (and the ancillary technical equipment).
- s) Installation of thermal or electric energy storage units (and the ancillary technical equipment).
- t) Installation of High Efficiency Micro CHP (combined heat and power) plant
- u) Installation of heat exchanger/recovery systems.

The following **professional services** are eligible:

- v) Technical consultations (energy consultants, energy simulation, project management, production of EPC, dedicated training, etc.) linked to the individual measures mentioned above.
- w) Accredited energy audits and building performance assessments.
- x) Energy Management Services.
- y) Energy Performance Contracts.
- z) Energy Services provided by Energy Service Companies (ESCOs)

Rationale

Individual measures and professional services have been included as enabling activities contributing to the improvement of the energy performance and the decarbonisation of the buildings

stock in its use phase. The list of eligible measures and activities will be periodically updated by the Sustainable Finance Platform.

Requirements for individual measures a) to e) are based on cost-optimal measures defined in the applicable regulation transposing the revised EPBD. As such, they represent feasible levels of improvements within the local context, taking into consideration climate, building stock and market conditions. However, the TEG recognises that these requirements have been determined differently by each Member State, and therefore do not necessarily represent a consistent level of ambition across countries.

Requirements for individual measures f) to h) are based on specific technical criteria, aimed at ensuring that the eligible technologies are highly efficient.

Individual measures i) to m) are always eligible, i.e. there are no technical requirements to be met, because these technologies are dedicated to facilitating energy savings and the use of electricity.

Individual measures n) to u) are eligible as long as they are installed on site, as these technologies are dedicated to renewable energy generation and/or the exploitation of waste energy and heat.

Professional activities v) and w) are eligible as they are necessary for the appropriate assessment of building conditions and potential for energy efficiency. Professional activities x) to z) are eligible as they can help deliver energy savings through efficient building operations.

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with individual measures is determined by:

- Excessive water consumption due to inefficient water appliances.
- The handling of building components that are likely to contain substances of concern (e.g. asbestos containing materials) and of any hazardous construction and demolition waste arising from the building renovation;
- Ensuring the future possibility of reusing and recycling building component and materials through careful selection of components/materials that prioritises recyclable materials and avoids hazardous substances.

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	
(4) Circular Economy	

(5) Pollution	<p>5.a - It is ensured that building components and materials do not contain asbestos nor substances of very high concern as identified on the basis of the "Authorisation List" of the REACH Regulation.⁴³⁶</p> <p>5.b - In case of addition of thermal insulation to the existing building envelope: a building survey must be carried out in accordance with national legislation by a competent specialist with training in asbestos surveying and in identification of other materials containing substances of concern. Any stripping of lagging that contains or is likely to contain asbestos, breaking or mechanical drilling or screwing and/or removal of insulation board, tiles and other asbestos containing materials shall be carried out by appropriately trained personnel, with health monitoring before, during and after the works, in accordance with national legislation.</p>
(6) Ecosystems	

⁴³⁶ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

8.4 Acquisition and ownership

Sector classification and activity	
Macro-Sector	L – Real Estate activities
NACE Level	2
Code	L68
Description	Building acquisition and ownership: this activity relates to NACE code L68 “Real estate activities”.
Mitigation criteria	
Principle	<p>The acquisition of buildings designed to minimise energy use and carbon emissions throughout the lifecycle instead of lower-performing ones can make a substantial contribution to climate change mitigation objectives. While specific data on embodied carbon and thus carbon emissions from the full lifecycle is still limited and needs to be further generated, the acquisition of buildings designed to minimise energy use and carbon emissions during the use phase can already make an important contribution by directing users towards high-performing properties and by sending signals to markets about the need to lift the overall energy performance of the whole stock.</p> <p>For large non-residential buildings (i.e. buildings with an effective rated output for heating systems or systems for combined space heating and ventilation of over 290 kW, or buildings with floor area⁴³⁷ over 1000 m²), an additional requirement is introduced to ensure that these buildings are operated efficiently, and that actual energy and carbon savings are delivered each year.</p> <p>Condition for non-eligibility: to avoid lock-in and undermining the climate mitigation objective, the acquisition and ownership of buildings for the purpose of extraction, storage, transportation or manufacture of fossil fuels are not eligible.</p> <p>Use of alternative schemes as proxies: outside EU Member States, established schemes such as ‘green building’ certifications or building regulations may be used as alternative proof of eligibility, provided that this is verified by the Sustainable Finance Platform. The organisation responsible for the scheme will be able to apply for official recognition of its scheme by presenting evidence that a specific level of certification/regulation can be considered equivalent (or superior) to the taxonomy mitigation and DNSH threshold established for the relevant climatic zone and building type. The Sustainable Finance Platform will assess the evidence and approve or reject the application.</p>
Metric and threshold	The metric is Primary Energy Demand (PED): the annual primary energy demand associated with regulated energy use during the operational phase of the building life-cycle (i.e. ‘module B6’ according to EN15978), calculated ex-ante according to

⁴³⁷ Measured according to the IPSM 1 definition, see <https://ipmsc.org/>

	<p>the national methodologies for asset design assessment, or as defined in the set of standards ISO 52000, expressed as kWh/m² per year.</p> <p>Case A – Acquisition of buildings built before 31 December 2020</p> <p>The calculated performance of the building must be within the top 15% of the local existing stock in terms of operational Primary Energy Demand, expressed as kWh/m²y.</p> <p>Alignment with this criterion can be demonstrated by providing adequate evidence comparing the performance of the relevant asset to the performance of the local stock built before 31 December 2020. Such evidence should be based on a representative sample of the building stock in the respective area where the building is located, distinguishing at the very least between residential and non-residential buildings. The area can be defined as a city, a region or a country.</p> <p>Certification schemes such as EPCs may be used as evidence of eligibility when adequate data is available to demonstrate that a specific level (e.g. EPC A) clearly falls within the top 15% of the respective local stock.</p> <p>The TEG recognises that more work needs to be done to collect and analyse data in order to define absolute thresholds corresponding to the performance of the top 15% of each local stock, such as data showing the distribution of EPCs across the stock and the thresholds used to define EPC ratings.</p> <p>Large non-residential buildings must meet an additional requirement: efficient building operations must be ensured through dedicated energy management.⁴³⁸</p> <p>Case B – Acquisition of buildings built after 31 December 2020</p> <p>The building must meet the criteria established for the ‘Construction of new buildings’ that are relevant at the time of the acquisition.</p> <p>Large non-residential buildings must meet an additional requirement: efficient building operations must be ensured through dedicated energy management.</p>
Rationale	
	<p>The acquisition of buildings designed to minimise energy use and carbon emissions throughout the lifecycle instead of lower-performing ones can make a substantial contribution to climate change mitigation objectives by:</p> <ul style="list-style-type: none"> • creating demand for such buildings; this in turn will stimulate owners to build and renovate buildings to a higher level of performance than they would have done otherwise. • sending a clear signal to the market that the acquisition of such buildings against an ever more stringent legislative background and changing client preferences can help reduce future potential risk and value depreciation. <p>For buildings built after 2020, the same criteria established for the activity ‘Construction of new buildings’ are applied. Buildings built before 2021 are assessed on the basis of a best in class</p>

⁴³⁸ This can be demonstrated, for example, through the presence of an Energy Performance Contract or an energy management programme supported by a building management system.

approach in each local stock. Rather than attempting to establish absolute thresholds with an incomplete set of data, for the time being the TEG opted for a threshold based on a percentage of the stock, which ensures a level-playing field across different Member States. For now, the corresponding 15% was deemed an appropriate level for the best in class performance, finding a compromise between the need to establish high standards of performance while recognising the need to maintain and create opportunity in the existing market.

Do no significant harm assessment

The main potential for significant harm to the other environmental objectives associated with the acquisition of buildings is determined by:

- Lack of resistance to extreme weather events (including flooding), and lack of resilience of to future temperature increases in terms of internal comfort conditions.
- Excessive water consumption due to inefficient water appliances.
- Presence of asbestos and/or substances of very high concern in the building materials.
- Presence of hazardous contaminants in the soil of the building site.
- Inappropriate building location: impacts on ecosystems if built on greenfield and especially if in a conservation area or high biodiversity value area.

(2) Adaptation	Refer to the screening criteria for DNSH to climate change adaptation .
(3) Water	
(4) Circular Economy	
(5) Pollution	If the property is located on a potentially contaminated site (brownfield site), the site must be subject to an investigation for potential contaminants, for example using standard BS 10175. ⁴³⁹
(6) Ecosystems	<p>6.a – The building must not be built on protected natural areas, such as land designated as Natura 2000, UNESCO World Heritage and Key Biodiversity Areas (KBAs), or equivalent outside the EU as defined by UNESCO and / or the International Union for Conservation of Nature (IUCN) under the following categories:</p> <ul style="list-style-type: none"> • Category Ia: Strict Nature Reserve • Category Ib: Wilderness Area • Category II: National Park

⁴³⁹ BS 10175:2011+A2:2017 - Investigation of potentially contaminated sites. Code of practice.

	<p>Buildings that are associated supporting infrastructure to the protected natural area, such as visitor centres, museums or technical facilities are exempted from this criterion.</p> <p>6.b - The building must not be built on arable or greenfield land of recognised high biodiversity value and land that serves as habitat of endangered species (flora and fauna) listed on the European Red List and / or the IUCN Red List.</p>
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Technical screening

criteria: substantial contribution to climate change adaptation

Using the adaptation principles

The technical screening criteria for substantial contribution to climate change adaptation are re-stated here for convenience. They differentiate between 'adapted activities' and 'activities enabling adaptation'. For further discussion of these concepts, please see [Substantial contribution to Climate change adaptation.](#)

Screening criteria for adapted activities

Criterion	Description
A1: Reducing material physical climate risks	The economic activity must reduce all material physical climate risks to that activity to the extent possible and on a best effort basis.
A1.1	The economic activity integrates physical and non-physical measures aimed at reducing - to the extent possible and on a best effort basis - all material physical climate risks to that activity, which have been identified through a risk assessment.
A1.2	The above-mentioned assessment has the following characteristics: <ul style="list-style-type: none">• considers both current weather variability and future climate change, including uncertainty;• is based on robust analysis of available climate data and projections across a range of future scenarios;• is consistent with the expected lifetime of the activity.
A2: Supporting system adaptation	The economic activity and its adaptation measures do not adversely affect the adaptation efforts of other people, nature and assets.
A2.1	The economic activity and its adaptation measures do not increase the risks of an adverse climate impact on other people, nature and

	assets, or hamper adaptation elsewhere. Consideration should be given to the viability of 'green' or 'nature-based-solutions' over 'grey' measures to address adaptation.
A2.3	The economic activity and its adaptation measures are consistent with sectoral, regional, and/or national adaptation efforts.
A3: Monitoring adaptation results	The reduction of physical climate risks can be measured.
A3.1	Adaptation results can be monitored and measured against defined indicators. Recognising that risk evolves over time, updated assessments of physical climate risks should be undertaken at the appropriate frequency where possible.

Screening criteria for an activity enabling adaptation

Criterion	Description
B1. Supporting adaptation of other economic activities	<p>The economic activity reduces material physical climate risk in other economic activities and/or addresses systemic barriers to adaptation. Activities enabling adaptation include, but are not limited to, activities that:</p> <ul style="list-style-type: none"> • Promote a technology, product, practice, governance process or innovative uses of existing technologies, products or practices (including those related to natural infrastructure); or, • Remove information, financial, technological and capacity barriers to adaptation by others.
B1.1	<p>The economic activity reduces or facilitates adaptation to physical climate risks beyond the boundaries of the activity itself. The activity will need to demonstrate how it supports adaptation of others through:</p> <ul style="list-style-type: none"> • an assessment of the risks resulting from both current weather variability and future climate change, including uncertainty, that the economic activity will contribute to address based on robust climate data; • an assessment of the effectiveness of the contribution of the economic activity to reducing those risks, taking into account the scale of exposure and the vulnerability to them.
B1.2	In the case of infrastructure linked to an activity enabling adaptation, that infrastructure must also meet the screening criteria A1, A2 and A3.

Additional information

Some extra information is provided throughout this report for the economic activities in the taxonomy, and activities which should be included in future subject to full DNSH assessment. These examples were selected on the basis of the following characteristics:

- They are among the sectors most vulnerable to the negative effects of climate change in Europe;⁴⁴⁰
- They represent a large share of gross value added (GVA) and employment in Europe;⁴⁴¹ and
- They allow for testing of the adaptation taxonomy approach in natural resource-based sectors (agriculture and water), service sectors (ICT and professional services) and asset-based sectors (electricity, gas, steam and air conditioning supply).

Not all of the activities selected are included in the Taxonomy at this stage, subject to further technical work. In particular, two activities, Research and development (natural sciences and engineering) and Provision of specialised telecommunications applications for weather monitoring and forecast, are considered to have the potential to make a substantial contribution to climate change adaptation and therefore a full evaluation of their environmental impacts should be prioritised.

The activities are as follows:

Activities included in the Taxonomy with additional guidance	Activities with additional adaptation guidance but not included in the Taxonomy (see Section “Additional adaptation activities for future consideration”)
<ul style="list-style-type: none">• Forestry (the guidance is applicable across a wide range of forestry activities)• Growing of non-perennial crops• Production of Electricity from Hydropower• Transmission and Distribution of Electricity• Centralized wastewater treatment	<ul style="list-style-type: none">• Research and development (natural sciences and engineering)• Provision of specialised telecommunications applications for weather monitoring and forecast.

⁴⁴⁰ EEA Report No 15/2017, “Climate change adaptation and disaster risk reduction in Europe” (2017).

⁴⁴¹ Based on EUROSTAT data available at <https://ec.europa.eu/eurostat/news/themes-in-the-spotlight/gva-employment>

- [Error! Reference source not found.](#)
- [Engineering activities and related technical consultancy dedicated to adaptation to climate change](#)

This additional information covers the typical climate-related hazards that those activities tend to be sensitive to, and adaptation measures that may be taken to address those sensitivities. This is based on experience drawn from industry practice and existing sensitivity matrices used by development finance institutions. This additional information is provided simply as a starting point by users to assist in identifying physical climate risks to an activity and measures to address those risks. But it does not take the place of a context specific risk assessment given that relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described below.

1. FORESTRY

1.1 Afforestation

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	Afforestation Afforestation is defined as the establishment of forest through planting and/or deliberate seeding on land that, until then, was under a different land use, implies a transformation of land use from non-forest to forest ⁴⁴² .
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
<u>Non-exhaustive list of examples of measures that can contribute to Adaptation of Forestry activities:</u>	
The activity itself can be made climate-resilient through different measures, such as:	
<ul style="list-style-type: none">• Use of early warning systems or wildfire control measures (to reduce damages due to wildfires enhanced by heat waves);• Use of regeneration material (species and ecotypes) less sensitive to strong wind or timely management of seedling stand and timely thinning (to reduce damage to forest stands from increased wind);	
Use of species and ecotypes less susceptible to drought or diversification of species and ecotypes (to minimise tree losses due to lack of water availability).	
Do no significant harm assessment	
Key environmental aspects span across all other five objectives and are summarized as follows:	
<ul style="list-style-type: none">• ensure the long term ability of the forests to sequester carbon;• impact on water resources as well as on water quality;• pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;	

442 Source: FAO, Global Forest Resources Assessment, 2020

	<ul style="list-style-type: none"> impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.
(1) Mitigation	<p>Forests are an unusual economic sector in which they provide a substantial carbon sink, and that significant harm for forest climate change mitigation include where an (adaptation) activity leads to a significant long-term reduction of the carbon sink. It is therefore important to maintain the forest area and thus forest carbon stocks and sink potential over the long-term. The principles for ensuring mitigation proofed adaptation activities are that adaptation responses should:</p> <ul style="list-style-type: none"> Not undermine the long-term ability of the forests to sequester carbon Not undermine the long-term maintenance of existing forest carbon sinks, both above and below ground <p>A criterion by which the activity can be judged as Taxonomy compliant is as follows – in line with existing EU legislation:</p> <ul style="list-style-type: none"> Adaptation responses shall comply with the requirement set out in Article 29(7)b of the recast Renewable Energy Directive (EU/2018/2001) which determines the requirement for management systems to be in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term .
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leaching of nutrients to waters. Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.

(6) Ecosystems	<ul style="list-style-type: none"> • Take measures to ensure sustained or improved long term conservation status at the landscape level⁴⁴³ • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁴⁴⁴ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.
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⁴⁴³ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁴⁴⁴ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

1.2 Rehabilitation, Restoration

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Restoration & Rehabilitation</p> <p>The Taxonomy defines rehabilitation/restoration as any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state⁴⁴⁵.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p> <p>Non-exhaustive list of examples of measures that can contribute to Adaptation of Forestry activities:</p> <p>The activity itself can be made climate-resilient through different measures, such as:</p> <ul style="list-style-type: none"> • Use of early warning systems or wildfire control measures (to reduce damages due to wildfires enhanced by heat waves); • Use of regeneration material (species and ecotypes) less sensitive to strong wind or timely management of seedling stand and timely thinning (to reduce damage to forest stands from increased wind); <p>Use of species and ecotypes less susceptible to drought or diversification of species and ecotypes (to minimise tree losses due to lack of water availability).</p>	
Do no significant harm assessment	
<p>Key environmental aspects span across all other five objectives and are summarized as follows:</p> <ul style="list-style-type: none"> • ensure the long-term ability of the forests to sequester carbon; • impact on water resources as well as on water quality; • pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer; • impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging. 	

⁴⁴⁵ Source: FAO, Unasylva, Forest and landscape restoration (referencing the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, IPBES).

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

<p>(1) Mitigation</p>	<p>Forests are an unusual economic sector in which they provide a substantial carbon sink, and that significant harm for forest climate change mitigation include where an (adaptation) activity leads to a significant long-term reduction of the carbon sink. It is therefore important to maintain the forest area and thus forest carbon stocks and sink potential over the long-term. The principles for ensuring mitigation proofed adaptation activities are that adaptation responses should:</p> <ul style="list-style-type: none"> • Not undermine the long-term ability of the forests to sequester carbon • Not undermine the long-term maintenance of existing forest carbon sinks, both above and below ground <p>A criterion by which the activity can be judged as Taxonomy compliant is as follows – in line with existing EU legislation:</p> <ul style="list-style-type: none"> • Adaptation responses shall comply with the requirement set out in Article 29(7)b of the recast Renewable Energy Directive (EU/2018/2001) which determines the requirement for management systems to be in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term .
<p>(3) Water</p>	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
<p>(4) Circular Economy</p>	
<p>(5) Pollution</p>	<ul style="list-style-type: none"> • Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt

	<p>the use of fertilizers to what is needed to prevent leaching of nutrients to waters.</p> <ul style="list-style-type: none"> • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> • Take measures to ensure sustained or improved long term conservation status at the landscape level⁴⁴⁶ • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁴⁴⁷ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.

⁴⁴⁶ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁴⁴⁷ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

1.3 Reforestation

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Reforestation</p> <p>Reforestation is defined as the re-establishment of forest through planting and/or deliberate seeding on land classified as forest. It implies no change of land use, includes planting/seeding of temporarily un-stocked forest areas as well as planting/seeding of areas with forest cover. It includes coppice from trees that were originally planted or seeded⁴⁴⁸. The FAO FRA definition of reforestation excludes natural regeneration. However, the Taxonomy recognises the importance of natural regeneration to the increased carbon sink and stock potential provided by forests in general. It is therefore included explicitly within this context in line with the FAO FRA definition of naturally regenerating forest⁴⁴⁹.</p> <p>In the context of the Taxonomy, the category 'reforestation' applies in cases following extreme events (wind throws, fires etc.), and not as part of normal, legally binding obligation to reforest after harvesting.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p> <p><u>Non-exhaustive list of examples of measures that can contribute to Adaptation of Forestry activities:</u></p> <p>The activity itself can be made climate-resilient through different measures, such as:</p> <ul style="list-style-type: none"> • Use of early warning systems or wildfire control measures (to reduce damages due to wildfires enhanced by heat waves); 	

448 Source: FAO, Global Forest Resources Assessment, 2020.

449 Forest predominantly composed of trees established through natural regeneration.

Explanatory notes: 1. Includes forests for which it is not possible to distinguish whether planted or naturally regenerated. 2. Includes forests with a mix of naturally regenerated native tree species and planted/seeded trees, and where the naturally regenerated trees are expected to constitute the major part of the growing stock at stand maturity. 3. Includes coppice from trees originally established through natural regeneration. 4. Includes naturally regenerated trees of introduced species.

- Use of regeneration material (species and ecotypes) less sensitive to strong wind or timely management of seedling stand and timely thinning (to reduce damage to forest stands from increased wind);

Use of species and ecotypes less susceptible to drought or diversification of species and ecotypes (to minimise tree losses due to lack of water availability).

Do no significant harm assessment

Key environmental aspects span across all other five objectives and are summarized as follows:

- ensure the long-term ability of the forests to sequester carbon;
- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

<p>(1) Mitigation</p>	<p>Forests are an unusual economic sector in which they provide a substantial carbon sink, and that significant harm for forest climate change mitigation include where an (adaptation) activity leads to a significant long-term reduction of the carbon sink. It is therefore important to maintain the forest area and thus forest carbon stocks and sink potential over the long-term. The principles for ensuring mitigation proofed adaptation activities are that adaptation responses should:</p> <ul style="list-style-type: none"> • Not undermine the long-term ability of the forests to sequester carbon • Not undermine the long-term maintenance of existing forest carbon sinks, both above and below ground <p>A criterion by which the activity can be judged as Taxonomy compliant is as follows – in line with existing EU legislation:</p> <p>Adaptation responses shall comply with the requirement set out in Article 29(7)b of the recast Renewable Energy Directive (EU/2018/2001) which determines the requirement for management systems to be in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term .</p>
<p>(3) Water</p>	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water

	<p>use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.</p> <ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leaching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> • Take measures to ensure sustained or improved long term conservation status at the landscape level⁴⁵⁰ • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁴⁵¹ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations;

⁴⁵⁰ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁴⁵¹ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

	<ul style="list-style-type: none">• Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.
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1.4 Existing forest management

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Existing Forest Management</p> <p>The Taxonomy defines forest management as management of the land which is reported as forest, in accordance with the Sustainable Forest Management principles. SFM is further defined by Forest Europe as: 'sustainable forest management' means using forests and forest land in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems⁴⁵².</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p> <p>Non-exhaustive list of examples of measures that can contribute to Adaptation of Forestry activities:</p> <p>The activity itself can be made climate-resilient through different measures, such as:</p> <ul style="list-style-type: none"> • Use of early warning systems or wildfire control measures (to reduce damages due to wildfires enhanced by heat waves); • Use of regeneration material (species and ecotypes) less sensitive to strong wind or timely management of seedling stand and timely thinning (to reduce damage to forest stands from increased wind); <p>Use of species and ecotypes less susceptible to drought or diversification of species and ecotypes (to minimise tree losses due to lack of water availability).</p>	
Do no significant harm assessment	
<p>Key environmental aspects span across all other five objectives and are summarized as follows:</p> <ul style="list-style-type: none"> • ability of forests to adapt to a changing climate; 	

⁴⁵² https://foresteurope.org/wp-content/uploads/2016/10/MC_lisbon_resolutionL2_with_annexes.pdf#page=18.

- impact on water resources as well as on water quality;
- pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer;
- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

<p>(1) Mitigation</p>	<p>Forests are an unusual economic sector in which they provide a substantial carbon sink, and that significant harm for forest climate change mitigation include where an (adaptation) activity leads to a significant long-term reduction of the carbon sink. It is therefore important to maintain the forest area and thus forest carbon stocks and sink potential over the long-term. The principles for ensuring mitigation proofed adaptation activities are that adaptation responses should:</p> <ul style="list-style-type: none"> ○ Not undermine the long-term ability of the forests to sequester carbon ○ Not undermine the long-term maintenance of existing forest carbon sinks, both above and below ground <p>A criterion by which the activity can be judged as Taxonomy compliant is as follows – in line with existing EU legislation:</p> <ul style="list-style-type: none"> • Adaptation responses shall comply with the requirement set out in Article 29(7)b of the recast Renewable Energy Directive (EU/2018/2001) which determines the requirement for management systems to be in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term⁴⁵³.
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453 Article 29 of the recast RED, sets out sustainability criteria for forests to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. This is explicitly defined in Article 29(7)b which requires "...management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term." This places the emphasis of the no significant harm requirement at a level more appropriate for the operation of the Taxonomy and/or investment, rather than relying on national level requirements.

(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leaching of nutrients to waters. Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> Take measures to ensure sustained or improved long term conservation status at the landscape level⁴⁵⁴ In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation

⁴⁵⁴ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

	<ul style="list-style-type: none"> • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁴⁵⁵ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.
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⁴⁵⁵ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

1.5 Conservation forest

Sector classification and activity	
Macro-Sector	A - Agriculture, forest and silviculture
NACE Level	2
Code	A2
Description	<p>Conservation forest</p> <p>That in which the '<u>primary designated management objective</u>' (FAO FRA definition) is that of conservation. Specifically, those forests where the management objectives are '<u>conservation of biodiversity</u>' or '<u>social services</u>' based on the FAO FRA definitions⁴⁵⁶.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p> <p><u>Non-exhaustive list of examples of measures that can contribute to Adaptation of Forestry activities:</u></p> <p>The activity itself can be made climate-resilient through different measures, such as:</p> <ul style="list-style-type: none"> • Use of early warning systems or wildfire control measures (to reduce damages due to wildfires enhanced by heat waves); • Use of regeneration material (species and ecotypes) less sensitive to strong wind or timely management of seedling stand and timely thinning (to reduce damage to forest stands from increased wind); <p>Use of species and ecotypes less susceptible to drought or diversification of species and ecotypes (to minimise tree losses due to lack of water availability).</p>	
Do no significant harm assessment	
<p>Key environmental aspects span across all other five objectives and are summarized as follows:</p> <ul style="list-style-type: none"> • ensure the long-term ability of the forests to sequester carbon; • impact on water resources as well as on water quality; • pollution to water, air, and soil, and risks associated from the use of pesticides and fertilizer; 	

⁴⁵⁶ Source: FAO, Global Forest Resources Assessment, 2020

- impacts on biodiversity and ecosystems from intensification and conversion of land of high ecological value to forests and illegal logging.

The DNSH criteria below should be considered in combination with the SFM requirements of the forest mitigation Taxonomy (criterion 1). The criteria can be informed by applying forest certification using independent third-party schemes that are regularly audited. Compliance shall be reported through a forest management plan (or equivalent) as per criterion 3 of the forest mitigation Taxonomy.

(1) Mitigation	<p>Forests are an unusual economic sector in which they provide a substantial carbon sink, and that significant harm for forest climate change mitigation include where an (adaptation) activity leads to a significant long-term reduction of the carbon sink. It is therefore important to maintain the forest area and thus forest carbon stocks and sink potential over the long-term. The principles for ensuring mitigation proofed adaptation activities are that adaptation responses should:</p> <ul style="list-style-type: none"> ○ Not undermine the long-term ability of the forests to sequester carbon ○ Not undermine the long-term maintenance of existing forest carbon sinks, both above and below ground <p>A criterion by which the activity can be judged as Taxonomy compliant is as follows – in line with existing EU legislation:</p> <ul style="list-style-type: none"> • Adaptation responses shall comply with the requirement set out in Article 29(7)b of the recast Renewable Energy Directive (EU/2018/2001) which determines the requirement for management systems to be in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term⁴⁵⁷.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	

⁴⁵⁷ Article 29 of the recast RED, sets out sustainability criteria for forests to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term. This is explicitly defined in Article 29(7)b which requires "...management systems are in place at forest sourcing area level to ensure that carbon stocks and sinks levels in the forest are maintained, or strengthened over the long term." This places the emphasis of the no significant harm requirement at a level more appropriate for the operation of the Taxonomy and/or investment, rather than relying on national level requirements.

(5) Pollution	<ul style="list-style-type: none"> • Minimise the use of pesticides and favour alternative approaches or techniques, such as non-chemical alternatives to pesticides, in line with the Directive 2009/128/EC on the sustainable use of pesticides. With exception of occasions that this is needed to control pest and diseases outbreaks. Adapt the use of fertilizers to what is needed to prevent leeching of nutrients to waters. • Take well documented and verifiable measures to avoid the use of active ingredients that are listed in the Stockholm Convention, the Rotterdam Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer, or that are listed as classification Ia or Ib in the WHO recommended Classification of Pesticides by Hazard; • Prevent pollution of water and soil in the forest concerned and undertake clean up measures when it does happen.
(6) Ecosystems	<ul style="list-style-type: none"> • Take measures to ensure sustained or improved long term conservation status at the landscape level⁴⁵⁸ • In designated conservation areas, actions should be demonstrated to be in line with the conservation objectives for those areas. • No conversion of habitats specifically sensitive to biodiversity loss or of high conservation value such as grasslands and any high carbon stock area (e.g. peat lands and wetlands), and areas set aside for the restoration of such habitats in line with national legislation • Develop a forest management plan (or equivalent) that includes provisions for maintaining biodiversity⁴⁵⁹ • Evaluate the ecosystem service provision with the aim to not decrease the amount and quality of ecosystem services provided. • Forests are monitored and protected to prevent illegal logging, in compliance with national laws • Promote close-to-nature forestry or similar concepts depending on the local requirements and limitations; • Select native species or species, varieties, ecotypes and provenance of trees that adequately provide the necessary resilience to climate change, natural disasters and the biotic, pedologic and hydrologic condition of the area concerned, as well as the potential invasive character of the species under local conditions, current and projected climate change.

⁴⁵⁸ Landscape management level may be used to emphasize that the goal to preserve conservation status for different species is at a scale above the single forest stand.

⁴⁵⁹ This criterion should be considered in combination with criterion 3 of the mitigation criteria to disclose through a forest management plan (or equivalent).

2. AGRICULTURE

2.1 Growing of perennial crops

Sector classification and activity	
Macro-Sector	A - Agriculture, forestry and fishing
NACE Level	3
Code	A1.2
Description	Growing of perennial crops
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to	
Do no significant harm assessment	
Key environmental aspects to be considered for investments in growing of perennial crops span across all other five objectives and are summarized as follows:	
<ul style="list-style-type: none">• ability of farming systems to adapt to a changing climate;• impact on water quantity, water quality and water ecosystems;• impacts on air quality;• inefficiencies in the production system including nutrient management;• pollutant and nutrient run-off and leaching;• impacts on habitats and species, e.g. through conversion of areas, intensification of existing arable land, and invasive alien species.	
Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.	
DNSH Objective	Thresholds and Metrics
(1) Mitigation	<ul style="list-style-type: none">• Maintain permanent grassland⁴⁶⁰

⁴⁶⁰ Consistent with GAEC 1 of Annex III of COM(2018)392

	<ul style="list-style-type: none"> • No burning of arable stubble except where authority has granted an exemption for plant health reasons.⁴⁶¹ • Appropriate protection of wetland or peatland⁴⁶² and no conversion of continuously forested areas or land spanning more than one hectare with trees higher than 5m and a canopy cover of between 10 & 30% or able to reach those thresholds in situ⁴⁶³ • Minimum land management under tillage to reduce risk of soil degradation including on slopes.⁴⁶⁴ • No bare soil in most sensitive period to prevent erosion and loss of soils.⁴⁶⁵
(3) Sustainable use and protection of water and marine resources	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular economy and waste prevention and recycling	<ul style="list-style-type: none"> • Activities should minimise raw material use per unit of output, including energy through increased resource use efficiency⁴⁶⁶. • Activities should minimise the loss of nutrients (in particular nitrogen and phosphate) leaching out from the production system into the environment.⁴⁶⁷ • Activities should use residues and by-products the production or harvesting of crops to reduce demand for primary resources, in line with good agricultural practice;⁴⁶⁸

⁴⁶¹ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

⁴⁶² Consistent with GAEC 2 of Annex III of COM(2018)392

⁴⁶³ Consistent with RED II, Article 29, paragraphs 4 and 5. It is be applied to all perennial crop production, whether for biofuels, bioliquids or biomass, or for food or feed uses. The intention is per RED II, namely, to ensure high carbon stock land is not converted for the purposes for agricultural production.

⁴⁶⁴ Consistent with GAEC 6 of Annex III of COM(2018)392

⁴⁶⁵ Consistent with GAEC 7 of Annex III of COM(2018)392

⁴⁶⁶ The criterion refers to “unit of output” to allow for production efficiency increases where raw material use may not decline

⁴⁶⁷ Consistent with GAEC 5 of Annex III of COM(2018)392. The aim is to provide farmers with a digital tool that helps them optimize the use of nutrients on their farm leading to environmental and agronomic benefits.

⁴⁶⁸ It is noted that the EU Circular Economy Strategy and many of the actions from the corresponding actions plans have relevance to agriculture that may provide guidance here (e.g. proposing legislation setting minimum requirements for reused water for agricultural irrigation, new Fertiliser Regulation introducing harmonised rules for organic fertilisers manufactured from secondary raw materials such as agricultural by-products and bio-wastes).

(5) Pollution prevention and control ⁴⁶⁹	<ul style="list-style-type: none"> • Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) and with appropriate equipment and techniques to <u>reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution)</u> and the loss of excess nutrients.⁴⁷⁰ • The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment.⁴⁷¹
(6) Healthy Ecosystems	<ul style="list-style-type: none"> • Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter.⁴⁷² • Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetlands, forests, or other areas of high-biodiversity value⁴⁷³. This includes highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> i) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. • Activities should not⁴⁷⁴: <ul style="list-style-type: none"> ○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; ○ contravene existing management plans or conservation objectives. • Where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and on-

⁴⁶⁹ See also National Emission Ceilings Directive (EU) 2016/2284 (notably Annex III, part 2), and the related provisions in the National Air Pollution Control Programme, established by each Member State under this Directive.

⁴⁷⁰ See Directive 2009/128/EC on sustainable use of pesticides and the Nitrates Directive. SMR 13 of CAP post 2020 will link the implementation of the pesticide directive with direct payments under cross compliance,

⁴⁷¹ In the EU, this means the use of plant protection products that are categorised in groups 1, 2 or 3 as regard their hazard weighting under Directive (EU) 2019/782 (table1).

⁴⁷² Consistent with GAECs 6 & 7 of Annex III of COM(2018)392

⁴⁷³ Areas of high-biodiversity-value can be defined as set out in Article 29(3) of the Directive EU(2018)2001

⁴⁷⁴ Consistent with Statutory Management Directive 3 and 4 of the post 2020 CAP and specifically Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7): Article 6(1) and (2) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7): Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)

	going monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment.
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2.2 Growing of non-perennial crops

Sector classification and activity	
Macro-Sector	A - Agriculture, forestry and fishing
NACE Level	3
Code	A1.1
Description	Growing of non-perennial crops
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p>	
Do no significant harm assessment	
<p>Key environmental aspects to be considered for investments in growing of non-perennial crops span across all other five objectives and are summarized as follows:</p> <ul style="list-style-type: none"> • ability of farming systems to adapt to a changing climate; • impact on water quantity, water quality and water ecosystems; • impacts on air quality; • inefficiencies in the production system including nutrient management; • pollutant and nutrient run-off and leaching; • impacts on habitats and species, e.g. through conversion of areas, intensification of existing arable land, and invasive alien species. <p>Note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.</p>	
DNSH Objective	Thresholds and Metrics
(1) Mitigation	<ul style="list-style-type: none"> • Maintain permanent grassland⁴⁷⁵

475 Consistent with GAEC 1 of Annex III of COM(2018)392

	<ul style="list-style-type: none"> • No burning of arable stubble except where authority has granted an exemption for plant health reasons.⁴⁷⁶ • Appropriate protection of wetland or peatland⁴⁷⁷ and no conversion of continuously forested areas or land spanning more than one hectare with trees higher than 5m and a canopy cover of between 10 & 30% or able to reach those thresholds in situ⁴⁷⁸ • Minimum land management under tillage to reduce risk of soil degradation including on slopes.⁴⁷⁹ • No bare soil in most sensitive period to prevent erosion and loss of soils.⁴⁸⁰
(3) Sustainable use and protection of water and marine resources	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular economy and waste prevention and recycling	<ul style="list-style-type: none"> • Activities should minimise raw material use per unit of output, including energy through increased resource use efficiency⁴⁸¹. • Activities should minimise the loss of nutrients (in particular nitrogen and phosphate) leaching out from the production system into the environment.⁴⁸² • Activities should use residues and by-products the production or harvesting of crops to reduce demand for primary resources, in line with good agricultural practice.⁴⁸³
(5) Pollution prevention and control	<ul style="list-style-type: none"> • Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible)

⁴⁷⁶ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

⁴⁷⁷ Consistent with GAEC 2 of Annex III of COM(2018)392

⁴⁷⁸ Consistent with RED II, Article 29, paragraphs 4 and 5. It is be applied to all perennial crop production, whether for biofuels, bioliquids or biomass, or for food or feed uses. The intention is per RED II, namely, to ensure high carbon stock land is not converted for the purposes for agricultural production.

⁴⁷⁹ Consistent with GAEC 6 of Annex III of COM(2018)392

⁴⁸⁰ Consistent with GAEC 7 of Annex III of COM(2018)392

⁴⁸¹ The criterion refers to “unit of output” to allow for production efficiency increases where raw material use may not decline

⁴⁸² Consistent with GAEC 5 of Annex III of COM(2018)392. The aim is to provide farmers with a digital tool that helps them optimize the use of nutrients on their farm leading to environmental and agronomic benefits.

⁴⁸³ It is noted that the EU Circular Economy Strategy and many of the actions from the corresponding actions plans have relevance to agriculture that may provide guidance here (e.g. proposing legislation setting minimum requirements for reused water for agricultural irrigation, new Fertiliser Regulation introducing harmonised rules for organic fertilisers manufactured from secondary raw materials such as agricultural by-products and bio-wastes).

	<p>and with appropriate equipment and techniques to <u>reduce risk and impacts of pesticide use on human health and the environment</u> (e.g. water and air pollution) and the loss of excess nutrients.⁴⁸⁴</p> <ul style="list-style-type: none"> The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment.⁴⁸⁵
(6) Healthy Ecosystems	<ul style="list-style-type: none"> Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter. Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value farmland, wetlands, forests, or other areas of high-biodiversity value⁴⁸⁶. This includes highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> iii) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or iv) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority. Activities should not⁴⁸⁷: <ul style="list-style-type: none"> result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; contravene existing management plans or conservation objectives. Where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and on-going monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment.

484 See Directive 2009/128/EC on sustainable use of pesticides and the Nitrates Directive. SMR 13 of CAP post 2020 will link the implementation of the pesticide directive with direct payments under cross compliance,

485 In the EU, this means the use of plant protection products that are categorised in groups 1, 2 or 3 as regard their hazard weighting under Directive (EU) 2019/782 (table1).

486 Areas of high-biodiversity-value can be defined as set out in Article 29(3) of the Directive EU(2018)2001

487 Consistent with Statutory Management Directive 3 and 4 of the post 2020 CAP and specifically Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7): Article 6(1) and (2) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7): Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)

Further guidance

Typical sensitivities

The table below illustrates the typical sensitivities of the growing of non-perennial crops to climate-related hazards. Relevant climate-related hazard will be location and context specific and should be identified through a climate risk assessment as indicated in screening criterion A1.

Temperature-related		Wind-related		Water-related		Solid mass - related	
Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
<ul style="list-style-type: none"> • Changing temperature • Heat stress • Temperature variability • Permafrost thawing 	<ul style="list-style-type: none"> • Heat wave • Cold wave/frost • Wildfire 	<ul style="list-style-type: none"> • Changing wind patterns 	<ul style="list-style-type: none"> • Cyclone, hurricane, typhoon • Storm • Tornado 	<ul style="list-style-type: none"> • Changing precipitation patterns and types • Sea level rise 	<ul style="list-style-type: none"> • Drought • Extreme precipitation • Flood • Glacial lake outburst 	<ul style="list-style-type: none"> • Coastal erosion • Soil erosion • Solifluction 	<ul style="list-style-type: none"> • Avalanche • Landslide • Subsidence

Legend:  typically sensitive;  typically non sensitive.

Examples of adaptation measures

The table below provides examples of adaptation measures that can be adopted to reduce risks resulting from specific hazards for illustrative purpose only. Relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described above.

Temperature-related - chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Temperature increase	Increase of specific plant diseases and insect infestations	Use of crops/varieties less susceptible to temperature-related diseases and pests Controlled agriculture (e.g. greenhouses,	% cropping area with less susceptible crops/varieties % production from controlled agriculture

		<p>vertical farming, hydroponics)</p> <p>Use of integrated pest control measures (incl. chemical and biological measures)</p> <p>Use of multi-functional field margins (mffm) and (semi)natural vegetation (s)nv</p>	<p>% cropping area with integrated pest control measures</p> <p>% area with mffm and (s)nv within a defined region</p>
Temperature-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Frost (outside “normal” periods)	Frost damage to susceptible crops	<p>Use of crops/varieties less susceptible to frost</p> <p>Controlled agriculture (e.g. greenhouses, vertical farming, hydroponics)</p> <p>Use of irrigation (for some fruit crops)</p>	<p>% cropping area with less susceptible crops/ varieties</p> <p>% production from controlled agriculture</p> <p>% susceptible crop surface with irrigation</p>
Water-related - chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Changing precipitation patterns and types	Yield losses due to reduced water availability, particularly after planting	<p>Use of irrigation</p> <p>Enhancement of soil water retention (e.g. through use of cover crops, organic fertilizers, minimum tillage)</p>	<p>% cropping area with irrigation</p> <p>% cropping area with enhanced soil water retention</p>

Water-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Drought	Yield losses	Use of crops/varieties less susceptible to drought Use of irrigation Controlled agriculture (e.g. greenhouses, vertical farming, hydroponics) Enhancement of soil water retention (e.g. through use of cover crops, organic fertilizers, minimum tillage)	% cropping area with less susceptible crops/varieties. % cropping area with irrigation % production from controlled agriculture % cropping area with enhanced soil water retention
Flooding of fields due to extreme precipitation or river flooding	Yield losses	Use of crops/varieties less susceptible to flooding Improved land drainage Set-aside of land in flood plain areas	% cropping area with less susceptible crops/varieties. % cropping area with improved drainage % cropping area in flood plains
Solid mass related – chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Soil Erosion (due to intensive	Yield losses	Soil conservation measures (e.g. use of cover crops, minimum/no tillage, wind breaks)	% cropping area with soil conservation measures

precipitation or wind)		Use of perennial crops / pasture in highly erosion susceptible areas Set-aside of land in highly erosion susceptible areas	% susceptible cropping area with perennial soil cover % susceptible cropping area set aside
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2.3 Livestock production

Sector classification and activity	
Macro-Sector	A - Agriculture, forestry and fishing
NACE Level	3
Code	A1.4
Description	Livestock production
Adaptation criteria	
Depending on the primary objective of the activity, refer to: <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation Users of the Taxonomy should identify and explain which criteria they are responding to	
Do no significant harm assessment	
The activity livestock production captures a distinct set of sub-activities that would include intensive and extensive forms of livestock rearing, as well as the management of permanent grassland. These come with different key environmental aspects that need to be considered for investments in this sector, summarised as follows: <ul style="list-style-type: none"> • ability of farming systems to adapt to a changing climate; • impact on water quantity, water quality and water ecosystems, incl. waste water treatment from intensive rearing; • manure treatment; • Emissions of pollutants (such as methane, ammonia, dust, odour, noise) to air, water and soil, in particular in the case of intensive rearing; • impact on habitats and species. To note that areas of environmental risk are highly geographically variable. Guidance should be sought from the relevant competent national or regional authority to identify areas or issues of importance and relevance within the area or project concerned.	
DNSH Objective	Thresholds and Metrics
(1) Mitigation	<ul style="list-style-type: none"> • Maintain permanent grassland⁴⁸⁸

488 Consistent with GAEC 1 of Annex III of COM(2018)392

	<ul style="list-style-type: none"> No burning of arable stubble except where authority has granted an exemption for plant health reasons.⁴⁸⁹ Appropriate protection of wetland or peatland⁴⁹⁰ and no conversion of continuously forested areas or land spanning more than one hectare with trees higher than 5m and a canopy cover of between 10 & 30% or able to reach those thresholds in situ⁴⁹¹ Minimum land management under tillage to reduce risk of soil degradation including on slopes.⁴⁹² No bare soil in most sensitive period to prevent erosion and loss of soils.⁴⁹³
(3) Sustainable use and protection of water and marine resources	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular economy and waste prevention and recycling	<ul style="list-style-type: none"> Activities should use residues and by-products and take any other measures to minimise primary raw material use per unit of output, including energy⁴⁹⁴. Activities should minimise the loss of nutrients from the production system into the environment.
(5) Pollution prevention and control	<ul style="list-style-type: none"> Activities ensure that nutrients (fertilisers) and plant protection products (e.g. pesticides and herbicides) are targeted in their application (in time and area treated) and are delivered at appropriate levels (with preference to sustainable biological, physical or other non-chemical methods if possible) to <u>reduce risk and impacts of pesticide use on human health and the environment (e.g. water and air pollution)</u> and the loss of excess nutrients through leaching, volatilisation or oxidisation.⁴⁹⁵

⁴⁸⁹ In the EU, this should be interpreted as Member States granting an exemption in line with GAEC 3 of Annex III of COM(2018)392

⁴⁹⁰ Consistent with GAEC 2 of Annex III of COM(2018)392

⁴⁹¹ Consistent with RED II, Article 29, paragraphs 4 and 5. It is to be applied to all perennial crop production, whether for biofuels, bioliquids or biomass, or for food or feed uses. The intention is per RED II, namely, to ensure high carbon stock land is not converted for the purposes of agricultural production.

⁴⁹² Consistent with GAEC 6 of Annex III of COM(2018)392

⁴⁹³ Consistent with GAEC 7 of Annex III of COM(2018)392

⁴⁹⁴ The criterion refers to “unit of output” to allow for production efficiency increases where raw material use may not decline.

⁴⁹⁵ See Directive 2009/128/EC on sustainable use of pesticides and the Nitrates Directive. SMR 13 of CAP post 2020 will link the implementation of the pesticide directive with direct payments under cross compliance,

	<ul style="list-style-type: none"> The use only of plant protection products with active substances that ensure high protection of human and animal health and the environment.⁴⁹⁶ Ensure emissions to air, water and soil are within the BATAEL ranges / are prevented or reduced by using a combination of BAT techniques as set out in the BREF for the Intensive Rearing of Poultry or Pigs⁴⁹⁷, and by using similar emission reducing techniques for dairy farming; Ensure that mitigation and emission reduction techniques for feeding and housing of livestock and for manure storage and processing are applied, as recommended in the UNECE Framework Code for Good Agricultural Practice for Reducing Ammonia; Where manure is applied to the land, activities should comply with the limit of 170kg nitrogen application per hectare per year, or alternatively, the derogated threshold where one has been set in that member state⁴⁹⁸.
(6) Healthy Ecosystems	<ul style="list-style-type: none"> Activities ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter. Activities do not lead to the conversion, fragmentation or unsustainable intensification of high-nature-value land, wetland, forests or other areas of high-biodiversity value⁴⁹⁹. This includes highly biodiverse grassland spanning more than one hectare that is: <ul style="list-style-type: none"> iii) natural, namely grassland that would remain grassland in the absence of human intervention and that maintains the natural species composition and ecological characteristics and processes; or iv) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and that is species-rich and not degraded and has been identified as being highly biodiverse by the relevant competent authority.

⁴⁹⁶ In the EU, this means the use of plant protection products that are categorised in groups 1, 2 or 3 as regard their hazard weighting under Directive (EU) 2019/782 (table1).

⁴⁹⁷ <http://eippcb.jrc.ec.europa.eu/reference/irpp.html>

⁴⁹⁸ This threshold derives from the provisions set out under the Nitrates Directive 91/676/EC [Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources]. In practice the threshold of 170kg/ha/year has been implemented by Member States by setting limits on livestock density between 1.7 - 2.0 livestock units / ha. Livestock unit is a reference unit which facilitates the aggregation of livestock from various species and age as per convention, via the use of specific coefficients established on the basis of the nutritional or feed requirement of each type of animal (see, for example, [https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Livestock_unit_\(LSU\)](https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Livestock_unit_(LSU)))

⁴⁹⁹ Areas of high-biodiversity-value can be defined as set out in Article 29(3) of the Directive EU(2018)2001

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| | <ul style="list-style-type: none"> • Activities should not⁵⁰⁰: <ul style="list-style-type: none"> ○ result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern; ○ contravene existing management plans or conservation objectives; ○ lead to overgrazing other forms of degradation of grasslands. |
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⁵⁰⁰ Consistent with Statutory Management Directive 3 and 4 of the post 2020 CAP and specifically Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7): Article 6(1) and (2) and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7): Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)

3. MANUFACTURING

3.1 Manufacture of Low carbon technologies

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	
Code	No specific NACE code
Description	<p>Manufacture of low carbon technologies</p> <ul style="list-style-type: none">• Manufacturing of products, key components, and machinery that are essential for eligible renewable energy technologies• Manufacture of eligible low carbon transport vehicles, fleets and vessels.• Manufacture of eligible energy efficiency equipment for buildings• Manufacture of other low carbon technologies that result in substantial GHG emission reductions in other sectors of the economy (including private households)
Adaptation criteria	
Depending on the primary objective of the activity, refer to: <ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to	
Do no significant harm assessment	
The main potential significant harm to other environmental objectives from the manufacture of low carbon technologies is associated with: <ul style="list-style-type: none">• Climate mitigation• the (potential) use of toxic substances and generation of toxic wastes (both at the manufacturing stage as well as at other stages of the product/equipment lifecycle); and• the potential for polluting emissions to air, water and soil from the manufacturing process.	
Depending on the product/equipment being manufactured, there may, also be issues with respect to the embodied carbon and the demand for certain metals and materials (e.g. rare earth metals) which are in limited supply and may have significant environmental impact issues associated with the mining phase.	
(1) Mitigation	GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are

	<p>lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	Embodied carbon emissions should represent less than 50% of the total carbon emissions saved by the use of the energy efficient equipment. Carbon emissions and savings at the end-of-life stage are not included in the assessment for this criteria (too uncertain).
(5) Pollution	Compliance with the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Regulation (1272/2008/EC) and the RoHS (Restriction of Hazardous Substances) Regulation (2002/95/EC) or the equivalent for equipment manufactured and used outside the EU (n.b.: equipment manufactured outside of the EU but imported into the EU must comply with the REACH and RoHS Regulations).
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/ecosystems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU</p>

	<p>countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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3.2 Manufacture of Cement

Sector classification and activity	
Macro-Sector	C - Manufacturing
NACE Level	4
Code	C23.5.1
Description	Manufacture of cement
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from cement manufacturing is associated with:</p> <ul style="list-style-type: none"> • Climate mitigation • Polluting emissions to air associated to the consumption of fossil fuels and calcinations reaction in the cement kiln; • Water consumption at production facilities located in water-stressed areas; • Potential for soil and groundwater contamination associated with the handling and storage of (hazardous) wastes used as fuel substitute ('secondary' fuels) in the cement production process; 	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Cement manufacturing plants accept alternative fuels such as SRF originating from waste, as well as secondary raw materials such as recycled concrete aggregates (RCA).</p> <p>For cement production sites using hazardous wastes as alternative fuels, ensure a waste management plan that meets EU standards (or equivalent for plants operated in non-EU countries) exists and is implemented.</p>
(5) Pollution	<p>Ensure emissions to air and water are within the BAT-AEL ranges set in the BREF for the Production of Cement, Lime and Magnesium Oxide¹</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p> <p>Ensure implementation of a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p> <p>Exclusion of refuse derived fuels for cement production. Co-incineration of waste has significant impacts on health and the environment due to the polluting nature of the associated emissions, and higher emissions ceiling for cement plants in comparison with dedicated waste incineration plants. Furthermore, promoting waste as eligible fuel source may undermine waste minimisation efforts in other sectors.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/ecosystems, particularly UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU</p>

	<p>countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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3.3 Manufacture of Aluminium

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C24.4.2
Description	Manufacture of aluminium
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the manufacture of aluminium is associated with:</p> <ul style="list-style-type: none"> • Climate mitigation • the potential for significant air emission impacts: perfluorocarbons, fluoride gases, polycyclic aromatic hydrocarbons (PAHs), and particulate matter (e.g. unused cryolite). Hydrogen fluorides can be toxic to vegetation; • the toxic, corrosive and reactive nature of waste generated by the used linings (cathodes) from the electrolytic cells (known as spent pot lining (SPL)). Dissolved fluorides and cyanides from the SPL material can create significant environmental impacts including groundwater contamination and pollution of local watercourses; • the ability (or lacking thereof) of aluminium manufacturing plants to incorporate aluminium scrap (including scrap from their own manufacturing processes) in the production process; and the potential to impact ecosystems as a result of the land footprint of the site and from polluting emissions. 	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water

	<p>use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.</p> <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<p>Measures are in place to minimise and manage waste (including hazardous waste) and material use in accordance with the BREF for the Non-Ferrous Metals Industries.</p> <p>In order to avoid risks to circular economy, aluminium manufacturing plants need to be able to process aluminium scrap. In order to avoid unnecessary resource and energy consumption, the aluminium scrap collection and sorting activities should be optimised for separation on an alloy specific basis. If scrap alloys are mixed, the functionality of the recycled material is restricted, and valuable alloying elements may be lost.</p>
(5) Pollution	<p>Emissions to air (e.g. sulphur dioxide - SO₂, nitrogen oxide - NO_x, particulate matter, Total Organic Carbon (TOC), dioxins, mercury (Hg), hydrogen chloride (HCl), hydrogen fluoride (HF), Total Fluoride, and (PFCs) polyfluorinated hydrocarbons (PFCs)) are within the BAT-AEL ranges set in the BREF for the Non-Ferrous Metals Industries.⁵⁰¹</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p>

501 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.174.01.0032.01.ENG

For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:

- a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2018);
- all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

3.4 Manufacture of Iron and Steel

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	3 and 4
Code	C24.1: Manufacture of basic iron and steel and of ferro-alloys C24.2: Manufacture of tubes, pipes, hollow profiles and related fittings, of steel C24.3: Manufacture of other products of first processing of steel C24.5.1: Casting of iron C24.5.2: Casting of steel
Description	Manufacture of iron and steel
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from iron and steel production is associated with:</p> <ul style="list-style-type: none"> • Climate mitigation • emissions to air from coke-making and smelting operations, especially particulate matter (dust), oxides of nitrogen, sulphur dioxide, carbon monoxide, chlorides, fluorides, volatile organic compounds, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzodioxins/furans, and heavy metals; • emissions to water of hydrocarbons and suspended solids; • water consumption for quenching and cooling operations in water stressed areas; • the potential to impact local ecosystems and biodiversity due to the polluting emissions (if not properly mitigated) and due to the large land footprint of the operations and associated ancillary activities; and • wastes and by products from the coking and smelting operations including, tar and benzole. 	
(1) Mitigation	GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission

	<p>performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Appropriate measures are in place to minimise and manage waste and material use in accordance with BREF for iron and steel production.
(5) Pollution	<p>Ensure emissions to water and air are within the BAT-AEL ranges set in the BREF for iron and steel production (e.g. for pH, total suspended solids (TSS), chemical oxygen demand (COD), chromium (total) and heavy metals, for sulphur dioxide - SO₂, nitrogen oxide - NO_x, particulate matter, polychlorinated dibenzodioxins/furans, mercury (Hg), hydrogen chloride (HCL) and hydrogen fluoride (HF)).</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage and Key Biodiversity Areas (KBAs) have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance</p>

	<p>Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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3.5 Manufacture of Hydrogen

Sector classification and activity	
Macro-Sector	C - Manufacturing
NACE Level	4
Code	C20.1.1
Description	Manufacture of hydrogen (CPA: 20.11.11.50)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the manufacture of hydrogen is, in practical terms, inseparable from the potential for significant harm created by the hydrocarbon refining activity more generally and is associated with:</p> <ul style="list-style-type: none"> • Climate mitigation • polluting emissions to air (in the case of hydrogen production via electrolysis, there is an indirect environmental impact associated with the generation of electricity); • water used for cooling might lead to local resource depletion, dependent of the local scarcity of water resources; and • the generation of wastes (e.g. spent catalysts and by-products of the various physical and chemical treatment processes used in purifying the hydrogen produced via hydrocarbon processing). 	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation

	<p>with relevant stakeholders, have been developed and implemented.</p> <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<p>Where manufacture of hydrogen takes place within the context of an oil and gas refining installation, ensure appropriate measures are in place to minimize and manage waste and material use in accordance with the BAT conclusions of the BREF for the Refining of Mineral Oil and Gas.</p>
(5) Pollution	<p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards.</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage and Key Biodiversity Areas (KBAs) have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and

	<ul style="list-style-type: none">• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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3.6 Manufacture of other inorganic basic chemicals

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.3
Description	<ul style="list-style-type: none"> • Manufacture of carbon black • Manufacture of disodium carbonate (soda ash) • Manufacture of chlorine <p>CPA codes:</p> <ul style="list-style-type: none"> • Carbon black: 20.13.21.30 • Disodium carbonate (soda ash): 20.13.43.10 • Chlorine: 20.13.21.11
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to</p>	

The DNSH assessment is split across the three chemicals:

- Manufacture of carbon black
- Manufacture of disodium carbonate (soda ash)
- Manufacture of chlorine

Do no significant harm assessment	
<p><u>Manufacture of carbon black</u></p> <p>The main potential significant harm to other environmental objectives from the manufacture of carbon black is associated with:</p> <ul style="list-style-type: none"> • climate mitigation • polluting emissions to air, especially volatile organic compounds (VOC) and dust; • the use of water in water stressed areas for cooling purposes; and • the generation of wastes. 	
<p>(1) Mitigation</p> <p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions</p>	

	<p>(based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Wastes and by-products, especially hazardous manufacturing wastes, are managed in line with the Waste Treatment BREF and the requirements set out in BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry).</p>
(5) Pollution	<p>Ensure polluting emissions to air are within BAT-AEL ranges set in the BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry).</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, particularly UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), have been implemented.</p>

Do no significant harm assessment

Manufacture of disodium carbonate (soda ash)

The main potential significant harm to other environmental objectives from the manufacture of soda ash is associated with:

- Climate mitigation
- the generation of process effluents (e.g. calcium chloride in aqueous solution), by products and wastes with the potential to pollute groundwater and surface water bodies as well as soils;
- polluting air emissions;
- the use of water in water scarce areas for cooling purposes; and
- impacts on ecosystems and biodiversity from the disposal of wastes and by-products (primarily calcium carbonate, gypsum, sodium chloride and calcium chloride, although there can be trace amounts of toxic materials such as mercury, cadmium, arsenic and zinc depending on the

source of the raw materials (e.g. limestone) for the production process) which create ‘waste beds’.	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	For operations situated in areas of water stress (ratio between naturally incoming and extracted water, UNEP endorsed AWARE methodology, ISO compliant), ensure that water use/conservation management plans, developed in consultation with relevant (local) stakeholders, exist and are implemented.
(4) Circular Economy	Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment and the requirements set out in BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry).
(5) Pollution	<p>Ensure polluting emissions to air and water are within BAT-AEL ranges set in the BREF LVIC- S (Large Volumes Inorganic Chemicals- Solids and others Industry).</p> <p>The most stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries)</p>

	<p>based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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Do no significant harm assessment	
<u>Manufacture of chlorine</u>	
The main potential significant harm to other environmental objectives from the manufacture of chlorine is associated with:	
	<ul style="list-style-type: none"> • climate mitigation • polluting emissions to air (e.g. chlorine); • process water effluents which can contain oxidizing agents (e.g. chlorine) • the use of water in water stressed areas; and • the generation of wastes
Due to the intrinsic hazard properties of chlorine it is recommended to further assess when Chlorine could be considered part of the solution to achieving zero pollution (toxic free environment) and therefore should not be excluded from the taxonomy due to DNSH implications.	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	For operations situated in areas of water stress (ratio between naturally incoming and extracted water, UNEP endorsed AWARE methodology, ISO compliant), ensure that water use/conservation management plans, developed in consultation with relevant (local) stakeholders, exist and are implemented.
(4) Circular Economy	Wastes and by-products, especially hazardous process wastes, are managed in line with the Waste Treatment BREF and the requirements set out in the BREF for the Production of Chlor-Alkali.
(5) Pollution	Ensure polluting emissions to air and water are within the BAT-AEL ranges set in the BREF for the Production of Chlor-Alkali.

(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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3.7 Manufacture of other organic basic chemicals

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.4
Description	<p>Manufacture of:</p> <ul style="list-style-type: none"> • High volume chemicals: <ul style="list-style-type: none"> ○ acetylene: 20.14.11.90⁵⁰² ○ ethylene: 20.14.11.30 ○ propylene: 20.14.11.40 ○ butadiene: 20.14.11.60 ○ hydrogen: 20.11.11.50 • Aromatics: <ul style="list-style-type: none"> ○ Mixed alkylbenzenes, mixed alkylnaphthalenes other than HS 2707 or 2902: 20.59.56.70 ○ Cyclohexane: 20.14.12.13 ○ Benzene: 20.14.12.23 ○ Toluene: 20.14.12.25 ○ o-Xylene: 20.14.12.43 ○ p-Xylene: 20.14.12.45 ○ m-Xylene and mixed xylene isomers: 20.14.12.47 ○ Ethylbenzene: 20.14.12.60 ○ Cumene: 20.14.12.70 ○ Biphenyl, terphenyls, vinyltoluenes, other cyclic hydrocarbons excluding cyclanes, cyclenes, cycloterpenes, benzene, toluene, xylenes, styrene, ethylbenzene, cumene, naphthalene, anthracene: 20.14.12.90 ○ Benzol (benzene), toluol (toluene) and xylol (xylenes) I: 20.14.73.20 ○ Naphthalene and other aromatic hydrocarbon mixtures (excluding benzole, toluole, xylole): 20.14.73.40 • Vinyl chloride: 20.14.13.71 • Styrene: 20.14.12.50 • Ethylene oxide: 20.14.63.73

502 CPA code

	<ul style="list-style-type: none"> • Monoethylene glycol: 20.14.23.10 • Adipic acid: 20.14.33.85 • Organic chemicals, which fall under the following CPA codes: <ul style="list-style-type: none"> ○ Saturated acyclic monocarboxylic acids and their derivatives (20.14.32) ○ Unsaturated monocarboxylic, cyclanic, cyclenic or cyclotepenic acyclic polycarboxylic acids and their derivatives (20.14.33) ○ Aromatic polycarboxylic and carboxylic acids with additional oxygen functions; and their derivatives, except salicylic acid and its salts (20.14.34)
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none"> • <u>Screening criteria for adapted activities</u> • <u>Screening criteria for an activity enabling adaptation</u> 	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main potential significant harm to the environment from the production of other organic chemicals is associated with:	
<ul style="list-style-type: none"> • Climate mitigation • polluting emissions to air and water from the production process; • vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities; • the use of water resources for production purposes (e.g. cooling water) in water stressed areas; and • the generation of hazardous wastes. 	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment ⁵⁰³ .
(5) Pollution	<p>Ensure polluting emissions to air, soil and water are within BAT-AEL ranges as set out in the following BREF documents (as applicable):</p> <ul style="list-style-type: none"> • BREF document LVOC (Large Volume Organic Chemicals)⁵⁰⁴ • BREF document CWW (for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector)⁵⁰⁵ • BREF document EFS (Emissions From Storage)⁵⁰⁶ • BREF document REF (Refining of Mineral Oil and Gas)⁵⁰⁷ • BREF document WT (Waste Treatment) (referenced above) • BREF document WI (Waste Incineration)⁵⁰⁸ <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent). A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for

503 Best Available Techniques (BAT) Reference Document for Waste Treatment available at http://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

504 Best Available Techniques (BAT) Reference Document for the Production of Large Volume Organic Chemicals, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/lvic-s_bref_0907.pdf

505 Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/CWW_Bref_2016_published.pdf (pp. 539-557)

506 Reference Document on Best Available Techniques on Emissions from Storage July 2006, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/esb_bref_0706.pdf (pp. 257-277)

507 Best Available Techniques (BAT) Reference Document for the Refining of Mineral Oil and Gas, available at http://eippcb.jrc.ec.europa.eu/reference/BREF/REF_BREF_2015.pdf

508 Best Available Techniques (BAT) Reference Document for Waste Incineration available at http://eippcb.jrc.ec.europa.eu/reference/BREF/WI/WI_BREF_FD_Black_Watermark.pdf

	<p>protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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3.8 Manufacture of fertilizers and nitrogen compounds

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.5
Description	<p>Manufacture of:</p> <ul style="list-style-type: none"> • Anhydrous ammonia (CPA: 20.15.10.75) • Nitric acid (CPA:20.15.10.50)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation 	
<p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to the environment from the production of nitric acid or ammonia production is associated with:</p> <ul style="list-style-type: none"> • Climate mitigation • polluting emissions to air (especially nitrogen oxides (NOx), and ammonia (NH3)) from the production process; • Vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities. • the use of water resources for production purposes (especially for cooling processes) in water stressed areas; and • the generation of hazardous wastes (e.g. spent catalyst material). 	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment.
(5) Pollution	<p>Ensure polluting emissions to air (e.g. nitrogen oxides (NOx), and ammonia (NH₃)) and water are within BAT-AEL ranges set in the BREF LVIC-AAF (Large Volume Inorganic Chemicals - Ammonia, Acids and Fertilisers), the BREF CWW (Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector) and the BREF EFS (Emissions from Storage).</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p> <p>A stringent level of BAT-AEL is required if an activity materially contributes to local air pollution levels, exceeding air quality standards</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Bey Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

3.9 Manufacture of plastics in primary form

Sector classification and activity	
Macro-Sector	C – Manufacturing
NACE Level	4
Code	C20.1.6
Description	Manufacture of plastics in primary form
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to the environment from the production of plastics in primary form is associated with:</p> <ul style="list-style-type: none"> • polluting emissions to air and water from the production process; • vulnerable ecosystems might be damaged by the construction and/or operation of the production facilities; • the use of water resources for production purposes (e.g. cooling water) in water stressed areas); and • the generation of hazardous wastes. <p>The production of polymers includes a lot of synthesis, hence, in order to allow a clear demarcation and in order to NOT go beyond the limits of this sector 20.16 it has to be acknowledged that precursors are covered under C.20.11, C.20.13, C.20.14; C.20.15.</p>	
(1) Mitigation	<p>GHG Emissions from manufacturing economic activities that are either (1) proven to be aligned with an internationally recognised method for determining low carbon transition pathway or (2) that are lower than the average global emissions (based on emission performance standard determined by internationally recognised data) for that economic activity.</p> <p>The purpose of this approach is to ensure that there is a strong signal to the manufacturing sector to ambitiously improve energy efficiency and reduce emissions</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in

	<p>consultation with relevant stakeholders, have been developed and implemented.</p> <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<p>Wastes and by-products, especially hazardous wastes, are managed in line with the BREF for Waste Treatment⁵⁰⁹.</p> <p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent).</p>
(5) Pollution	Ensure polluting emissions to air, soil and water are within BAT-AEL ranges as set out in BREF POL (Polymers) ⁵¹⁰ .
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – whichever is stricter - in the case of sites/operations in non-EU countries) for the site/operation (including ancillary services, e.g. transport infrastructure and operations, waste disposal facilities, etc.) and any required mitigation measures for protecting biodiversity/eco-systems, in particular UNESCO World Heritage and Key Biodiversity Areas (KBAs), have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives (or other equivalent national provisions or international standards (e.g. IFC Performance Standard 6) – whichever is stricter - in case of sites/operations in non-EU countries) based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard

509 Best Available Techniques (BAT) Reference Document for Waste Treatment available at
http://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

510 The production of PVC is described in the Polymer (POL) BREF which was developed under the IPPC directive:
http://eippcb.jrc.ec.europa.eu/reference/BREF/pol_bref_0807.pdf

Best available techniques are identified for PVC production on page v/vi and pages 266-268 of the POL BREF. Current consumption and emission levels are provided on page 101-104 of the POL BREF

	<p>6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;</p> <ul style="list-style-type: none">• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4. ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY

4.1 Production of Electricity from Solar PV

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Solar Photovoltaic
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the installation and operation of photovoltaic (PV) panels relate to:</p> <ul style="list-style-type: none"> • The PV installation siting: impacts on ecosystems and biodiversity if built in a designated conservation area or other areas with important ecosystem and biodiversity value. • The impacts from the production and end-of-life management of the PV systems and its component/materials: potentially significant environmental impacts are associated with the sourcing/production of materials and components of PV systems (see 'Manufacture of Low Carbon Technologies' for DNSH criteria) 	
(1) Mitigation	
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Ensure PV panels and associated components have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in alignment with 'Manufacture of Renewable Energy Equipment' for DNSH criteria. • Ensure reparability of the solar photovoltaic (PV) installation or plant thanks to accessibility and exchangeability of the components.
(5) Pollution	
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the

	<p>case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.2 Production of Electricity from Concentrated Solar Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Concentrated Solar Power
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from CSP is associated with:</p> <ul style="list-style-type: none"> • the construction of the installation and the substantial land-take associated with the installation • impacts to birdlife from the high temperatures generated by the plant • impacts of the cooling system on water resources 	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>

(4) Circular Economy	Ensure CSP installations have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in line with 'Manufacture of Renewable Energy Equipment' for DNSH criteria.
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.3 Production of Electricity from Wind Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Wind Power
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>In spite of the crucial contribution of wind energy to mitigating climate change, there may be conflicts arising between its deployment and nature conservation at a local level. The main environmental exposures to be considered as a Do No Significant Harm (DNSH) criteria, in the most stringent sense, include:</p> <ul style="list-style-type: none"> • Underwater noise created in the installation of bottom-fixed offshore wind turbines; • The composite waste generated from both on- and offshore wind turbine blades at the end of their lifetime; • The possible disturbance, displacement or collision of birds and bats by the construction and operation of wind farms • The possible deterioration of water ecosystem associated to the construction of wind farms <p>The possible visual impacts created by landscape change in the installation of wind turbines⁵¹¹.</p>	
(1) Mitigation	
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans,

511 Selected references:

- Directive 2011/92/EU as amended
- Council Directive 92/43/EEC
- Directive 2009/147/EC
- Guidance Document: "Wind energy developments and Natura 2000"
- http://ec.europa.eu/environment/nature/natura2000/management/docs/Wind_farms.pdf

	<p>developed in consultation with relevant stakeholders, have been developed and implemented.</p> <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<p>State ambition to maximise recycling at end of life based on waste management plans, dismantling/decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).</p>
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.4 Production of Electricity from Ocean Energy

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Ocean Energy
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from ocean energy is associated with:</p> <ul style="list-style-type: none"> • Construction, deployment, operation and maintenance of ocean energy installations can impact on marine ecosystems and biodiversity • Pollution from lubricants and anti-fouling paints and emissions from maintenance and inspection vessels 	
(1) Mitigation	
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on waste management plans, dismantling/decommissioning processes at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	Measures in place to minimise toxicity of anti-fouling paint and biocides as regulated in the Biocidal Products Regulation: (EU) 528/2012 ,which implements (in the EU) the International Convention on the Control of Harmful Anti-fouling Systems on Ships, which was adopted on 5 October 2001
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the

	<p>case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.5 Production of Electricity from Hydropower

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Hydropower
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main environmental impacts associated with hydropower installations are:</p> <ul style="list-style-type: none"> • Emissions to water and generation of waste during construction; • Impacts on biodiversity associated with changes to habitat, to hydrological and hydrogeological regimes, water chemistry, and interference with species migration pathways as a result of the establishment of the installation and its operation; 	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<p>For new projects:</p> <p>Ensure implementation of a River Basin Management Plan (as outlined in the EU Water Framework Directive) and ensure that an appropriate cumulative impact</p>

	<p>assessment or equivalent study has been undertaken that identifies and addresses any significant regional or basin-level environmental and social impacts, in compliance with the Water Framework Directive (Directive 2000/60/EC), preferably at the strategic planning stage. Such a study must consider all of the planned infrastructure developments in the basin, for example as part of a hydropower cascade at the scale of the river catchment, involving all relevant stakeholders.</p> <p>Ensure that the conditions outlined in article 4(7) of the WFD are met based on ground evidence. Those include:</p> <ul style="list-style-type: none"> • All practical steps are taken to mitigate the impacts; • The project has been recognized of overriding public interest and/or it is proven that the benefits of the project outweigh its impacts; • There are no significantly environmentally better option. • The project does not show significant adverse impact on upstream or downstream water bodies. • This applies to newly built hydropower and extension of existing hydropower. <p>Construction of new hydropower should not lead to increase fragmentation of rivers, consequently refurbishment of existing hydropower plant and rehabilitation of existing barriers should be prioritised. Construction of small hydropower (<10MW) should be avoided.</p> <p>During operation:</p> <ul style="list-style-type: none"> • All necessary mitigation measures should be implemented to reach good ecological status or potential, in particular regarding ecological continuity and ecological flow. Priority should be given to nature-based solutions. • Reference for outside EU: IFC's and World Bank Group's environmental and social standards. <p>General impacts: Operation of the hydro power plant must adhere to the principles of the UNECE Convention on the Protection and Use of Transboundary, Watercourses and International Lakes</p>
(4) Circular Economy	
(5) Pollution	<p>Establishing a River Basin Management Plan (as outlined in the EU Water Framework Directive) and ensure compliance with applicable EU regulations.</p> <p>Reference for outside EU: IFC's and World Bank Group's environmental and social standards.</p> <p>Parameters and acceptable limits/ranges and necessary sampling and measuring frequency are contained in EU Directive 2006/44/EC and should be observed. These address the Quality of Freshwaters needing Protection or Improvement in</p>

	order to support fish life and relevant parameters contained in the WFD ⁵¹² surface water chemical monitoring and chemical monitoring of sediment and biota
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

Further guidance

Typical sensitivities

The table below illustrates the typical sensitivities of hydropower to climate-related hazards. Relevant climate-related hazard will be location and context specific, and should be identified through a climate risk assessment as indicated in screening criteria A1.

512 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1–73).

Temperature-related		Wind-related		Water-related		Solid mass - related	
Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
• Not typically sensitive	• Not typically sensitive	• Not typically sensitive	• Cyclone, hurricane, typhoon • Storm • Tornado	• Changing precipitation patterns • Hydrological variability	• Drought • Extreme precipitation • Flood • Glacial lake outburst	• Soil erosion • Sedimentation	• Avalanche • Landslide

Legend:  typically sensitive;  typically non sensitive.

Examples of adaptation measures

The table below provides examples of adaptation measures that can be adopted to reduce risks resulting from specific hazards for illustrative purpose only. Relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described above.

Wind-related – acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Cyclones	Physical damage to hydropower facilities (e.g. dams, turbine houses, switchyards, ancillary infrastructure, etc.)	Adoption of structural strengthening of hydropower facilities (e.g. dams, spillways, turbine houses, switchyards, ancillary infrastructure, etc.)	Reduction in down-time due to acute "wind" events (days)
Hurricanes			Reduction in annual damage due to acute "wind" events (EUR)
Typhoons		Adoption of hydro-meteorological monitoring and forecasting equipment	As above

Water-related – chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Hydrological variability	Reduced water flows through turbines	Adoption of turbines capable of operating at low and/or variable flow conditions	Increased electricity production (MWh)
	Increased variability of water flows through turbines	Adoption of increased dam storage capacity	As above
		Adoption of hydro-meteorological monitoring and forecasting equipment	As above
Water-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Droughts	Insufficient water flowing through turbines	Adoption of turbines capable of operating at low and/or variable flow conditions	Increased electricity production (MWh)
		Adoption of increased dam storage capacity	As above
		Adoption of hydro-meteorological monitoring and forecasting equipment	As above
Extreme precipitation events	Physical damage to hydropower facilities (e.g. dams, turbine houses, switchyards, etc.)	Adoption of structural strengthening of hydropower facilities (e.g. dams, spillways, turbine houses, switchyards, ancillary infrastructure, etc.)	Reduction in down-time due to acute “water” events (days)
Floods			

GLOFs	ancillary infrastructure, etc.)		Reduction in annual damage due to acute "water" events (EUR)
		Adoption of hydro-meteorological monitoring and forecasting equipment	As above
Solid mass related – chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Soil Erosion	Loss of dam storage capacity	Adoption of sediment dredging and/or other sediment management measures	Increased dam storage capacity (km ³)
	Sediment damage to turbines	Adoption of sediment-resistant turbines	Reduction in annual damage caused by sediment (EUR)
Solid mass-related – acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Avalanche Landslide	Physical damage to hydropower facilities (e.g. dams, turbine houses, switchyards, ancillary infrastructure, etc.)	Adoption of structural strengthening of hydropower facilities (e.g. dams, spillways, turbine houses, switchyards, ancillary infrastructure, etc.)	Reduction in down-time due to acute "land mass" events (days) Reduction in annual damage due to acute "land mass" events (EUR)

		Adoption of early warning monitoring equipment	As above
		Adoption of emergency response systems and equipment	As above

4.6 Production of Electricity from Geothermal

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Geothermal
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from Production of electric energy from high-enthalpy geothermal system is associated with:</p> <ul style="list-style-type: none"> • Non-condensable geothermal gases with specific environmental threats, such as H₂S, CO₂, and CH₄, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems and no steam is emitted. • Possible emissions to surface and underground water 	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.

	In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the EU regulatory framework (i.e. EU Water Framework Directive¹ and Daughter Directives). Emissions to air: the operations of high-enthalpy geothermal energy systems should ensure that adequate abatement systems are in place to comply with existing EU Air Quality Legislation and BAT⁵¹³; including but not limited to <1 µg/Nm³ Hg.</p> <p>Thermal anomalies associated with the discharge of waste heat should not exceed 3°K for groundwater environments or 1.5°K for surface water environments, respectively.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

⁵¹³ JRC. Best Available Techniques (BAT) Reference Document for Large Combustion Plants. JRC107769 / EUR 28836 EN. ISBN 978-92-79-74303-0. 2017

4.7 Production of Electricity from Gas (not exclusive to natural gas)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Gas Combustion (not exclusive to natural gas)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control in line with BREF indicators and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>If adaptation investments are made, climate change mitigation criteria are relevant.</p>	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>

(4) Circular Economy	
(5) Pollution	<p>Ensure emissions to air, water and soil are prevented / minimized by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur⁵¹⁴.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

⁵¹⁴ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants

4.8 Production of Electricity from Bioenergy (Biomass, Biogas and Biofuels)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.1.1
Description	Construction and operation of electricity generation facilities that produce electricity from Bioenergy
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the SO₂, NO_x dust and other emissions control in line with BREF/ Medium Combustions Plants Directive and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>Intelligent pathways for cascading use are environmentally superior and preferable to single use.⁵¹⁵.</p>	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities</p>

⁵¹⁵ UBA (2017) Fehrenbach, et. al. BIOMASS CASCADES Increasing resource efficiency by cascading use of biomass — from theory to practice, TEXTE 53/2017, https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2017-06-13_texte_53-2017_biokaskaden_summary.pdf

	below this threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	Implement measures concerning waste management required by the Commission Implementing Decision (EU) 2017/1442 under the Industrial Emissions Directive 2010/75/EU, relying to the extent possible on the JRC's BAT Reference Document for Large Combustion Plants. These requirements apply for installations with a total rated thermal input of 50 MW or more.
(5) Pollution	<p>Ensure emissions to air, water and soil are prevented / minimised by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur.</p> <p>Limit the emissions to values within the ranges given in the newest version of the following documents depending on the size of the installation:</p> <ul style="list-style-type: none"> BREF document on Large Combustion Plants⁵¹⁶, chapter 10.2.2 (BAT conclusions for the combustion of solid biomass and/or peat; SO₂, NO_x, dust, CO, Mercury, HCl, HF thresholds). These requirements apply for installations with a total rated thermal input of 50 MW or more and that fall under the scope of the LCP BREF. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered. Medium Combustion Plants Directive⁵¹⁷. These thresholds apply for combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW ('medium combustion plants'), and for a combination formed by new medium combustion plants pursuant to Article 4 of this directive, including a combination where the total rated thermal input is equal to or greater than 50 MW, unless the combination forms a combustion plant covered by the BREF document on Large Combustion Plants (see above). The following thresholds apply: <ul style="list-style-type: none"> In general: of Annex II (SO₂, NO_x and dust thresholds)

⁵¹⁶ http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

⁵¹⁷ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193> (Annex II)

	<ul style="list-style-type: none"> ○ For plants in zones or parts of zones not complying with the air quality limit values laid down in EU Directive 2008/50/EC⁵¹⁸: Recommended values which are to be published by the European Commission (DG ENV) pursuant to Article 6, paragraph 9 and 10 (of the Medium Combustion Plant Directive (EU) 2015/2193). <p>Emissions in mg/Nm³ (for biomass in large combustion plants: SO₂, NO_x, dust, CO, Mercury, HCl, HF; for biomass and for liquid biofuels in medium combustion plants: SO₂, NO_x, dust, for biogas in medium combustion plants: SO₂, NO_x)</p> <ul style="list-style-type: none"> ● In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.⁵¹⁹ ● In case of AD, emissions to air (e.g. SO_x, NO_x) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. <p>In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009⁵²⁰ and respective national rules on fertilising products.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p>

518 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>

519 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

520 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

	<ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.9 Transmission and Distribution of Electricity

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.12, D.35.13
Description	<p>Construction and operation of transmission Systems that transport the electricity on the extra high-voltage and high-voltage interconnected System.</p> <p>Construction and operation of distribution Systems that transport electricity on high-voltage, medium-voltage and low-voltage distribution Systems.</p> <p>Construction and operation of interconnections that transport electricity between separate Systems.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The impacts of transmission and distribution lines are a function of the spatial alignment of the grid, the structures and conductors required for various voltages, the extent to which pre-existing corridors are used, and how the transmission and distribution lines are operated and maintained. The most common environmental impacts of electricity transmission and distribution infrastructure are visual, ecosystem and land use. In the cases of underground offshore electricity lines, water and marine resources may be impacted.</p>	
(1) Mitigation	Direct connections to generation units shall be below the average emission intensity of all electricity generation facilities in the region
(3) Water	<p>Underground power lines:</p> <p>Avoid routings with heavy impact on marine and terrestrial ecosystems (proven by an ESIA) and follow the principles of IFC General EHS Guidelines for construction site activities follow.</p>
(4) Circular Economy	State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	<p>Overground high voltage lines:</p> <ul style="list-style-type: none"> • For construction site activities follow the principles of IFC General EHS Guideline. • Respect applicable norms and regulations to limit impact of electromagnetic radiation on human health. For Europe: The applicable guidelines in force in are the "Council recommendation on the limitation of exposure of the general

	<p>public to electromagnetic fields (0 Hz to 300 GHz)" (1999/519/EC). Outside Europe: 1998 ICNIRP (International Commission on Non-Ionizing Radiation Protection)⁵²¹</p> <ul style="list-style-type: none"> • Do not use PCBs Polychlorinated Biphenyls.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. <p>Underground power lines:</p> <p>Avoid routings with heavy impact on marine and terrestrial ecosystems (proven by an ESIA), UNESCO World Heritage Sites and Key Biodiversity Areas (KBAs), and follow the principles of IFC General EHS Guidelines for construction site activities.</p>

521 <https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf>

Further guidance

Typical sensitivities

The table below illustrates the typical sensitivities of this activity to climate-related hazards. Relevant climate-related hazard will be location and context specific and should be identified through a climate risk assessment as indicated in screening criteria A1.

Temperature-related		Wind-related		Water-related		Solid mass - related	
Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
<ul style="list-style-type: none"> • Changing temperature • Heat stress • Temperature variability • Permafrost thawing 	<ul style="list-style-type: none"> • Heat wave • Cold wave/frost • Wildfire 	<ul style="list-style-type: none"> • Changing wind patterns 	<ul style="list-style-type: none"> • Cyclone, hurricane, typhoon • Storm • Tornado 	<ul style="list-style-type: none"> • Changing precipitation patterns and types • Sea level rise 	<ul style="list-style-type: none"> • Drought • Extreme precipitation • Flood • Glacial lake outburst 	<ul style="list-style-type: none"> • Coastal erosion • Soil erosion • Solifluction 	<ul style="list-style-type: none"> • Avalanche • Landslide • Subsidence

Legend: typically sensitive; typically non sensitive.

Examples of adaptation measures

The table below provides examples of adaptation measures that can be adopted to reduce risks resulting from specific hazards for illustrative purpose only. Relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described above.

Temperature-related - chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Changing temperature (increase)	<p>Reduced thermal rating (i.e. the maximum current allowed at a given temperature), causing lines to sag to dangerous levels</p>	<p>Increasing the height of poles supporting power lines</p> <p>Installing conductors with hotter operating limits</p> <p>Using 'low-sag' conductors</p>	<p>Reduction of efficiency losses during period of temperature > design temperature</p>

Temperature-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Heat waves	<p>Overheating of lines and transformers causing them to trip off</p> <p>Electricity disruptions due to grid overload during higher peak energy demands</p>	<p>Integrate higher temperatures into design calculation for maximum temperature/rating</p> <p>Increase system capacity by adding external coolers to transformers</p> <p>Increase system capacity by increasing height of the poles or otherwise increasing tension on the line to reduce snag</p>	<p>System Average Interruption Duration Index and/or</p> <p>System Average Interruption Frequency Index after adaptation compared to before adaptations</p>
Wind-related – chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Changing Wind Speeds	<p>Downed transmission lines or gradual weakening of infrastructure leading to more frequent repairs</p>	<p>Adjust wind loading standards</p> <p>Reroute power lines away from sensitive objects or move them underground</p>	Reduced repair costs
Wind-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics

Hurricanes/typhoons	<p>Downed or damaged transmission lines, substations or poles due to wind and rain, leading to disruptions</p> <p>Debris or trees damaging lines or poles causing short circuit</p>	<p>Adjust wind loading standards</p> <p>Reroute power lines away from sensitive objects or move underground</p> <p>Improve hurricane forecasting</p> <p>Redefine technical standards so that grid operators are required to build in resilience</p>	Reduced repair costs or decreased number of downed power lines during storms
Winter Storm	Potential for ice build-up disrupting transmissions	<p>Improve forecasting of ice storms' impact on overhead lines and transmission circuits</p> <p>Improve forecasting of winter storms</p> <p>Enhance design standards to withstand larger ice loading</p>	<p>Accuracy of impact projection and of storm forecasting</p> <p>Reduced transmission disruptions during winter storms</p>
Water-related - chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Water Stress	<p>Potential for energy supply disruptions from sources that rely on hydropower</p> <p>Potential for overheating of generation equipment that relies on water for cooling, which could lead to transmission disruptions</p>	<p>Incorporate rainfall projections and drought forecasting into reservoir management strategies</p> <p>Explore alternative water sources such as water banks, water supply contracts, groundwater wells, processed waste water</p>	Reservoir levels maintained above a critical level throughout the dry season
Water-related - acute			

Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Flash flooding	Inundation and potential damage to pipelines, towers, substations, or infrastructure	Relocate assets into areas that are not located in flood plains Waterproof pipelines, substations, etc. Incorporate submersible transformers, switches, pumps Seal manhole covers	Proportion of critical assets waterproofed and located outside of flood plains Reduced repair costs have flood events
Solid mass related - chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Soil Erosion	Electricity poles or pipelines made unstable	Replant any disturbed soil around asset	Reduced costs of restabilising poles or pipelines
Solid mass-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Landslide	Toppled electricity poles Buried pipelines or other transmission infrastructure, making them harder to reach in case of repairs	Relocate electricity poles away from areas prone to landslide Plant vegetation on empty hillsides above critical infrastructure	Proportion of electricity poles located in areas prone to landslide Reduced repair costs

4.10 Storage of Electricity

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	
Code	No NACE Code
Description	Construction and operation of facilities that store electricity and return it at a later time, in the form of electricity.
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The electricity storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	<p>State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).</p>
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU</p>

	<p>countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.11 Storage of Thermal Energy

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	
Code	No NACE Code
Description	Construction and operation of facilities that store thermal energy, and return it at a later time, in the form of thermal energy or other energy vectors
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The energy storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	<p>State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).</p>
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC</p>

	<p>Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.12 Storage of Hydrogen

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	
Code	No NACE Code
Description	Construction and operation of facilities that store hydrogen, and return it at a later time, in the form of hydrogen or other energy vectors
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The energy storage activities differ considerably in their physical, chemical and biological bases and forms, which result in divergent environmental impacts in each case.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management</p>

	<p>of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.13 Manufacture of Biomass, Biogas or Biofuels

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.21
Description	Manufacture of Biogas or Biofuels
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>For biomass feedstocks refer to Forestry Criteria and/or Crop criteria.</p>	
(1) Mitigation	Performance is consistent with Annex IX of Directive (EU) 2018/2001. There are no additional Taxonomy feedstock activity constraints.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	For biogas production: the resulting digestate meets the requirements for fertilising materials in Proposed Regulation COM (2016) 157 or national rules on fertilisers/ soil improvers for agricultural use or the conditions established by the competent authority for a safe use.
(5) Pollution	For biogas production: apply a gas-tight cover on the digestate storage.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key</p>

	<p>Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. • In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.⁵²² • In case of AD, emissions to air (e.g. SO_x, NO_x) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. • In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009⁵²³ and respective national rules on fertilising products.
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522 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

523 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.14 Retrofit of Gas Transmission and Distribution Networks

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D35.21 H49.50
Description	Retrofit of gas networks for the distribution of gaseous fuels through a system of mains. Retrofit of gas networks for long-distance transportation of gases by pipelines. The complete system must have been in place and operating for a minimum of 5 years.
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from retrofit and operation of existing gas distribution and supply networks that allow for the use of hydrogen and other low-carbon gas systems are associated with:</p> <ul style="list-style-type: none"> • Retrofitting phase of the network: all aspects have to be considered that are usually connected with construction like terrestrial habitat alteration, loss of valuable ecosystems, land consumption, overburden disposal, negative impacts on biodiversity, emissions of particles and NOx, noise and hazardous materials. For larger projects an ESIA should be done. <p>Operation phase: Leakages should be kept at a minimum. Underground networks can have an impact on ground water systems and on local ecosystems.</p>	
(1) Mitigation	No increase in emissions
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	Ensure appropriate measures are in place to minimize and manage waste and material use in construction and decommission phases. Thresholds: European Directives 2018/850, 2018/851, 2018/852 and BREF document ⁵²⁴

⁵²⁴ Integrated Pollution Prevention and Control Reference Document on Best Available Techniques on Emissions from Storage July 2006

(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.15 District Heating/Cooling Distribution

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Construction and operation of pipelines and associated infrastructure for distribution of heating and cooling, ending at the sub-station or heat exchanger.
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>Key environmental aspects to be considered for the investments in Distribution of District Level Heating and Cooling are summarised as follow:</p> <p>For the construction of the mains, the potential significant harms to the environmental objectives are constituted by the typical potential harms connected to construction of facilities in general. This includes inter alia, terrestrial habitat alteration, loss of valuable ecosystem, land consumption, overburden disposal, negative effects on biodiversity, emissions of particles and NOx, noise and hazardous materials.</p> <p>For the operation of the district heating networks, potential significant impacts are considered low. They relate mainly to the potential impact of underground district heating networks on drinking water/ground water systems and local ecosystems through corrosion products from corrosion of the distribution system elements and applied water additives that may be non-biodegradable⁵²⁵.</p>	
(1) Mitigation	The direct greenhouse gas emissions of the activity are lower or equal to 262 gCO2e/KWh in the EU or to the regional average lifecycle emission intensity of electricity generation in other world regions.

525 Selected references for this analysis:

- IFC General EHS Guideline – Environment, April 30,2007
- IFC's Environmental and Social Performance Standards, 2012
- Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
- Directive (EU) 2018/850 on landfill waste,
- Directive (EU) 2018/851 on waste,
- Directive (EU) 2018/851 on packaging and packaging waste

	This approach ensures translation of the threshold used for electricity to thermal activity to keep consistency in the emissions performance.
(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	
(5) Pollution	Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; all necessary mitigation measures are in place to reduce the impacts on species and habitats; and a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.16 Installation and operation of Electric Heat Pumps

Sector classification and activity	
Macro-Sector	Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Installation and operation of electric heat pumps
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
(1) Mitigation	
(3) Water	<ul style="list-style-type: none">• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.• In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	
(6) Ecosystems	

4.17 Cogeneration of Heat/Cool and Power from Concentrated Solar Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Concentrated Solar Power
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from CSP is associated with:</p> <ul style="list-style-type: none"> • The construction of the installation and the substantial land-take associated with the installation • Impacts to birdlife from the high temperatures generated by the plant • Impacts of the cooling system on water resources 	
(1) Mitigation	
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<ul style="list-style-type: none"> • Ensure CSP installations have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in line with 'Manufacture of Renewable Energy Equipment' for DNSH criteria.
(5) Pollution	
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure</p>

	<p>any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.18 Cogeneration of Heat/Cool and Power from Geothermal Energy

Sector classification and activity	
Macro-Sector	D – Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Geothermal Energy
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from Production of electric energy from high-enthalpy geothermal system is associated with:</p> <ul style="list-style-type: none"> • Non-condensable geothermal gases with specific environmental threats, such as H₂S, CO₂, and CH₄, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems and no steam is emitted. • Possible emissions to surface and underground water 	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>

(4) Circular Economy	
(5) Pollution	<p>Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the EU regulatory framework (i.e. EU Water Framework Directive¹ and Daughter Directives). Emissions to air: the operations of high-enthalpy geothermal energy systems should ensure that adequate abatement systems are in place to comply with existing EU Air Quality Legislation and BAT⁵²⁶; including but not limited to <1 µg/Nm³ Hg.</p> <p>Thermal anomalies associated with the discharge of waste heat should not exceed 3°K for groundwater environments or 1.5°K for surface water environments, respectively.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

⁵²⁶ JRC. Best Available Techniques (BAT) Reference Document for Large Combustion Plants. JRC107769 / EUR 28836 EN. ISBN 978-92-79-74303-0. 2017

4.19 Cogeneration of Heat/Cool and Power from Gas (not exclusive to natural gas)

Sector classification and activity	
Macro-Sector	D – Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Gas Combustion (not exclusive to natural gas)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control in line with BREF indicators and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p>	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	Ensure emissions to air, water and soil are prevented / minimized by employing the techniques included in the reference documents for the Best Available

	<p>Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur⁵²⁷.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

⁵²⁷ Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants

4.20 Cogeneration of Heat/Cool and Power from Bioenergy (Biomass, Biogas, Biofuels)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.11 D.35.30
Description	Construction and operation of a facility used for cogeneration of heat/cooling and power from Bioenergy
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the SO₂, NO_x dust and other emissions control in line with BREF/ Medium Combustions Plants Directive and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>Intelligent pathways for cascading use are environmentally superior and preferable to single use.⁵²⁸.</p>	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>

528 UBA (2017) Fehrenbach, et. al. BIOMASS CASCADES Increasing resource efficiency by cascading use of biomass — from theory to practice, TEXTE 53/2017, https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2017-06-13_texte_53-2017_biokaskaden_summary.pdf

(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<p>Implement measures concerning waste management required by the Commission Implementing Decision (EU) 2017/1442 under the Industrial Emissions Directive 2010/75/EU, relying to the extent possible on the JRC's BAT Reference Document for Large Combustion Plants. These requirements apply for installations with a total rated thermal input of 50 MW or more.</p>
(5) Pollution	<p>Ensure emissions to air, water and soil are prevented / minimised by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur.</p> <p>Limit the emissions to values within the ranges given in the newest version of the following documents depending on the size of the installation:</p> <ul style="list-style-type: none"> BREF document on Large Combustion Plants⁵²⁹, chapter 10.2.2 (BAT conclusions for the combustion of solid biomass and/or peat; SO₂, NO_x, dust, CO, Mercury, HCl, HF thresholds). These requirements apply for installations with a total rated thermal input of 50 MW or more and that fall under the scope of the LCP BREF. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered. Medium Combustions Plants Directive⁵³⁰. These thresholds apply for combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW ('medium combustion plants'), and for a combination formed by new medium combustion plants pursuant to Article 4 of this directive, including a combination where the total rated thermal input is equal to or greater than 50 MW, unless the combination forms a combustion plant covered the BREF document on Large Combustion Plants (see above). The following thresholds apply: <ul style="list-style-type: none"> In general: of Annex II (SO₂, NO_x and dust thresholds) For plants in zones or parts of zones not complying with the air quality limit values laid down in EU Directive 2008/50/EC⁵³¹: Recommended values which are to be published by the European Commission (DG ENV) pursuant to Article 6, paragraph 9 and 10 (of the Medium Combustion Plant Directive (EU) 2015/2193). <p>Emissions in mg/Nm³ (for biomass in large combustion plants: SO₂, NO_x, dust, CO, Mercury, HCl, HF; for biomass and for liquid biofuels in medium combustion plants: SO₂, NO_x, dust, for biogas in medium combustion plants: SO₂, NO_x)</p>

529 http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

530 Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193> (Annex II)

531 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>

	<ul style="list-style-type: none"> • In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.⁵³² • In case of AD, emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. <p>In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009⁵³³ and respective national rules on fertilising products.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

532 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

533 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.22 Production of Heat/Cool from Concentrated Solar Power

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of Heat/cool from Concentrated Solar Power
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from CSP is associated with:</p> <ul style="list-style-type: none"> • The construction of the installation and the substantial land-take associated with the installation • Impacts to birdlife from the high temperatures generated by the plant • Impacts of the cooling system on water resources 	
(1) Mitigation	
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	Ensure CSP installations have been designed and manufactured for high durability, easy dismantling, refurbishment, and recycling in line with 'Manufacture of Renewable Energy Equipment' for DNSH criteria.
(5) Pollution	
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.

	<p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.23 Production of Heat/Cool from Geothermal

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling from Geothermal Energy
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from Production of electric energy from high-enthalpy geothermal system is associated with:</p> <ul style="list-style-type: none"> • Non-condensable geothermal gases with specific environmental threats, such as H₂S, CO₂, and CH₄, are often released from flash-steam and dry-steam power plants. Binary plants ideally represent closed systems and no steam is emitted. • Possible emissions to surface and underground water 	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	
(5) Pollution	Discharges to water bodies should comply with individual license conditions for specific operations, where applicable, and/or national threshold values in line with the EU regulatory framework (i.e. EU Water Framework Directive ¹ and Daughter Directives). Emissions to air: the operations of high-enthalpy geothermal energy

	<p>systems should ensure that adequate abatement systems are in place to comply with existing EU Air Quality Legislation and BAT⁵³⁴; including but not limited to <1 µg/Nm³ Hg.</p> <p>Thermal anomalies associated with the discharge of waste heat should not exceed 3°K for groundwater environments or 1.5°K for surface water environments, respectively.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

4.24 Production of Heat/Cool from Gas (not exclusive to natural gas)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling from Gas Combustion (not exclusive to natural gas)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the NOx and CO emissions control in line with BREF indicators and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p>	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	
(5) Pollution	<p>Ensure emissions to air, water and soil are prevented / minimized by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur⁵³⁵.</p>

535 Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants

(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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4.25 Production of Heat/Cool from Bioenergy (Biomass, Biogas and Biofuels)

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling from Bioenergy
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The key environmental aspects to be taken into account when investing in this activity are the impact on local water (consumption and sewage), the fulfilment of the applicable waste and recycling criteria, the SO₂, NO_x dust and other emissions control in line with BREF/ Medium Combustions Plants Directive and the avoidance of direct impacts on sensitive ecosystems, species or habitats.</p> <p>Intelligent pathways for cascading use are environmentally superior and preferable to single use.⁵³⁶.</p>	
(1) Mitigation	<p>If the activity operates at above the threshold for substantial contribution to climate change mitigation, there should be:</p> <ul style="list-style-type: none"> • no increase in emissions intensity of the activity as a result of the adaptation; and • no activity can have emissions intensity above the average emissions intensity of all electricity generation facilities in the respective region. <p>The TEG interprets DNSH to mitigation as avoidance of activities which would compromise the EU's net zero by 2050 climate mitigation targets. We have determined that activities which operate below the 100g threshold provide a significant contribution, and that activities that operate above the regional average of 262g (as per the IEA) would cause significant harm. Therefore, while activities below this this 262 threshold are not considered to be providing a substantial contribution, they are also not considered to be doing significant harm.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans,

536 UBA (2017) Fehrenbach, et. al. BIOMASS CASCADES Increasing resource efficiency by cascading use of biomass — from theory to practice, TEXTE 53/2017, https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2017-06-13_texte_53-2017_biokaskaden_summary.pdf

	<p>developed in consultation with relevant stakeholders, have been developed and implemented.</p> <p>In the EU, fulfil the requirements of EU water legislation.</p>
(4) Circular Economy	<p>Ensure appropriate measures are in place to minimize and manage waste and material use in accordance with BREF for Large Combustion Plants⁵³⁷. These requirements apply for installations with a total rated thermal input of 50 MW or more.</p>
(5) Pollution	<p>Ensure emissions to air, water and soil are prevented / minimised by employing the techniques included in the reference documents for the Best Available Techniques (BAT) – so-called BREF(s)) – concerning the activity in question or other techniques that provide for an equivalent level of environmental protection. The Emission Limit Values set should be in line with the lower end of the BAT-AEL ranges included therein, ensuring at the same time that no significant cross-media effects occur.</p> <p>Limit the emissions to values within the ranges given in the newest version of the following documents depending on the size of the installation:</p> <ul style="list-style-type: none"> ○ BREF document on Large Combustion Plants⁵³⁸, chapter 10.2.2 (BAT conclusions for the combustion of solid biomass and/or peat; SO₂, NO_x, dust, CO, Mercury, HCl, HF thresholds). These requirements apply for installations with a total rated thermal input of 50 MW or more and that fall under the scope of the LCP BREF. For the purpose of calculating the total rated thermal input of a combination of combustion plants referred to in paragraphs 1 and 2, individual combustion plants with a rated thermal input below 15 MW shall not be considered. ○ Medium Combustion Plants Directive⁵³⁹. These thresholds apply for combustion plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW ('medium combustion plants'), and for a combination formed by new medium combustion plants pursuant to Article 4 of this directive, including a combination where the total rated thermal input is equal to or greater than 50 MW, unless the combination forms a combustion plant covered by the BREF document on Large Combustion Plants (see above). The following thresholds apply: <ul style="list-style-type: none"> ○ In general: of Annex II (SO₂, NO_x and dust thresholds) ○ For plants in zones or parts of zones not complying with the air quality limit values laid down in EU Directive 2008/50/EC⁵⁴⁰: Recommended values which are to be published by the European Commission (DG ENV) pursuant to Article 6, paragraph 9 and 10 (of the Medium Combustion Plant Directive (EU) 2015/2193). <p>Emissions in mg/Nm³ (for biomass in large combustion plants: SO₂, NO_x, dust, CO, Mercury, HCl, HF; for biomass and for liquid biofuels in medium combustion plants: SO₂, NO_x, dust, for biogas in medium combustion plants: SO₂, NO_x)</p>

537 http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

538 http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC_107769_LCPBref_2017.pdf

539 Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants, available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2193> (Annex II)

540 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>

	<ul style="list-style-type: none"> • In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL) ranges set for anaerobic treatment of waste in the BREF for waste treatment.⁵⁴¹ • In case of AD, emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. <p>In case of AD, the resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009⁵⁴² and respective national rules on fertilising products.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

541 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

542 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

4.26 Production of Heat/Cool using Waste Heat

Sector classification and activity	
Macro-Sector	D - Electricity, Gas, Steam and Air Conditioning Supply
NACE Level	4
Code	D.35.30
Description	Production of heating and cooling using Waste Heat
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>Key environmental aspects to be considered for the production of heat/cool using waste heat are generally moderate and should mostly be covered by considerations at the heat / cool source.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	<p>State ambition to maximise recycling at end of life based on BAT at time of decommissioning (e.g. through contractual agreements with recycling partners, reflection in financial projections or official project documentation).</p>
(5) Pollution	<p>Pumps and whatever kind of equipment is covered by Ecodesign and used should comply, where relevant, with the top class requirements of the energy label, and otherwise be compliant with the latest implementing measures of the Ecodesign Directive and representing the best available technology.</p>
(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p>

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| | <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented. |
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5. WATER, SEWERAGE, WASTE AND REMEDIATION

5.1 Water collection, treatment and supply

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E36.0.0
Description	“Water collection, treatment and supply” Water collection, treatment and supply with high energy efficiency of the system.
Adaptation criteria	
Depending on the primary objective of the activity, refer to: <ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main potential significant harm linked to this activity is related to water abstraction. Compliance with relevant EU and respective national law as well as consistency with national, regional or local water management strategies and plans is a minimum requirement.	
(1) Mitigation	
(3) Water	<ul style="list-style-type: none">• Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented.• In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.

	<p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none">• a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;• all necessary mitigation measures are in place to reduce the impacts on species and habitats; and• a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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5.2 Centralized wastewater treatment

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E37.0.0
Description	<p>“Centralized wastewater treatment”</p> <p>Treatment of wastewater in centralized systems (including collection and wastewater treatment plants), substituting treatment systems causing high GHG emissions (e.g. onsite sanitation, anaerobic lagoons).</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> • emissions to water from wastewater treatment; • Combined sewer overflow in case of heavy rainfall; • Sewage sludge treatment. <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local wastewater management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Ensure emissions to water are within the ranges set in the Urban Waste Water Treatment Directive 91/271/EEC. • Implement appropriate measures to avoid and mitigate combined sewer overflow in case of heavy rainfall, such as Nature-based solutions, separate rainwater collection systems, retention tanks and / or treatment of the first flush. • Ensure sewage sludge is managed/used (e.g. anaerobic digestion, land application) according to relevant EU and respective national legislation.
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic

	<p>Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and <p>a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.</p>
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Further guidance

Typical sensitivities

The table below illustrates the typical sensitivities of this activity to climate-related hazards. Relevant climate-related hazard will be location and context specific and should be identified through a climate risk assessment as indicated in screening criteria A1.

Temperature-related		Wind-related		Water-related		Solid mass - related	
Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
<ul style="list-style-type: none"> • Changing temperature • Heat stress • Temperature variability • Permafrost thawing 	<ul style="list-style-type: none"> • Heat wave • Cold wave/frost • Wildfire 	<ul style="list-style-type: none"> • Changing wind patterns 	<ul style="list-style-type: none"> • Cyclone, hurricane, typhoon • Storm • Tornado 	<ul style="list-style-type: none"> • Changing precipitation patterns and types • Sea level rise 	<ul style="list-style-type: none"> • Drought • Extreme precipitation • Flood • Glacial lake outburst 	<ul style="list-style-type: none"> • Coastal erosion • Soil erosion • Solifluction 	<ul style="list-style-type: none"> • Avalanche • Landslide • Subsidence



Legend: typically sensitive; typically non sensitive.

Examples of adaptation measures

The table below provides examples of adaptation measures that can be adopted to reduce risks resulting from specific hazards for illustrative purpose only. Relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described above.

Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Temperature-related - chronic			
Temperature-related	Changes to the biological or physico-chemical internal processes of the sewer system can be a source of infectious diseases	Adjust water and wastewater management and treatment processes under NACE 37 – Sewerage	Reduced number of days of disrupted operation
	Exacerbated hygiene conditions causing outbreaks of infectious diseases (significantly higher risk in urban areas)	Preventive activities against infectious diseases Increasing the knowledge level of residents regarding sewerage water or contaminated water Building new medical institutions or healthcare centres around the target areas	Reduced number of infectious disease patients
Temperature-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics

Cold waves/frost	Source water freeze leading to insufficient water input for operations; ice build-up in process components and mechanical equipment lubricant freeze. These can lead either the mechanical equipment freezing before sludge freezes, with a risk of overflow; or to sludge freeze, leading to the temporary closing of operations to protect mechanical infrastructure (ie. frozen sludge in basins can damage treatment tanks, ruptured pipes etc.).	Building additional storage capacity, shortening retention duration, and covering tanks. Equipping mechanical equipment with warming/heating systems, such as lamps, hot air guns etc.	No excess overflow because of cold waves/frost Continued service during cold waves/frost
	Changes in physical, chemical and biological reactions.	Adjust water and wastewater management and treatment processes under NACE 37 – Sewerage	Reduced number of days of disrupted operation

Water-related – chronic

Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Increase in the frequency and severity of droughts Reduction of surface water and groundwater levels	Undermining sewer function and operations	Construction, extension or upgrading of: - Network connectivity infrastructure (to channel water and wastewater flows between plants) - NACE 42.2 Construction of utility projects - Distributed small-scale closed-loop systems - NACE 42.2 Construction of utility projects	No or limited reduction in the quantity of wastewater water treated in the occurrence of drought/reduced of water availability

Seasonal (and likely overall) reduction of river flows			
Extreme precipitations and flooding	<p>Excess existing capacity: overflow into and contamination of rivers and coastal areas; contamination of clean water infrastructure</p> <p>Damage to existing wastewater infrastructure (pipes, pumping stations, tanks, treatment plants)</p>	<p>Construction, extension or upgrading of:</p> <ul style="list-style-type: none"> - Increase pumping stations capacity - NACE 42.2 Construction of utility projects - Upgrade and extend pipes (+ pipe replacement and dredging/insulation from flooding) - NACE 42.2 Construction of utility projects - Build additional storm tanks - NACE 42.2 Construction of utility projects - Upgrade the drainage networks - NACE 42.2 Construction of utility projects - Build flood protection for water treatment plants and pumping stations (elevate buildings; prioritize or relocate to higher grounds or away from vulnerable costal zones) - Build permeable urban surfaces - NACE 42.11 Construction of roads and motorways 	<p>Total number or length of sewerage and drainage networks at risk from flooding</p> <p>Reduced investment in repair of sewer networks damaged by precipitations, rainstorms and/or flooding</p> <p>Number of properties affected by sewer flooding</p> <p>Quantity of contaminated flow into drainage</p> <p>Quality of water in surrounding water bodies</p>
	Exacerbated hygiene conditions causing outbreaks of infectious diseases (significantly higher risk in urban areas)	<p>Preventive activities against infectious diseases – NACE 86 Human Health Activities</p> <p>Knowledge level of residents regarding sewerage water or contaminated water – NACE 85.5 Other Education</p> <p>Build new medical institutions or healthcare centres around the target areas – NACE 41 Construction of buildings</p>	<p>Reduced number of infectious disease patients during outbreaks following flooding</p> <p>Number of people reached by awareness campaign on hygiene</p>
Water-related - acute			

Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Flash flooding	Inundation and potential damage to treatment plant, piping, or infrastructure	<p>Relocate assets into areas that are not located in flood plains</p> <p>Waterproof treatment plants</p> <p>Incorporate submersible transformers, switches, pumps</p>	<p>Proportion of critical assets waterproofed and located outside of flood plains</p> <p>Reduced repair costs have flood events</p>

5.3 Anaerobic digestion of sewage sludge

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E37.0.0
Description	<p>“Anaerobic digestion of sewage sludge”</p> <p>Treatment of sewage sludge in wastewater treatment plants or in other dedicated installation with the resulting production and utilization of biogas.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation 	
<p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> • emissions to air, soil and water from the operation of the anaerobic digestion plant which may lead to emissions of pollutants that have significant impacts on human respiratory systems and on ecosystems through acidification and/or eutrophication. The most relevant emissions are resulting from the sludge storage as well as from the subsequent combustion of biogas, such as sulphur dioxide, nitrous oxide and particulates; • the subsequent use of the resulting digestate as fertiliser / soil improver which may also result in soil and water pollution due to contaminants in the digestate; • methane leakage which may offset the climate mitigation benefit of the biogas which is captured and utilized. 	
<p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local wastewater management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	Methane leakages from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan.
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • Emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AELs)⁵⁴³ ranges set for anaerobic treatment of waste in the BREF for waste treatment.⁵⁴⁴

543 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1147&from=EN>

544 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

	<ul style="list-style-type: none"> Emissions to air (e.g. SO_x, NO_x) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. If the resulting digestate is intended for use as fertiliser / soil improver, it must meet the national rules on fertilisers/soil improvers for agricultural use.
(6) Ecosystems	

Further guidance

Typical sensitivities

The table below illustrates the typical sensitivities of this activity to climate-related hazards. Relevant climate-related hazard will be location and context specific and should be identified through a climate risk assessment as indicated in screening criteria A1.

Temperature-related		Wind-related		Water-related		Solid mass - related	
Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute
<ul style="list-style-type: none"> • Changing temperature • Heat stress • Temperature variability • Permafrost thawing 	<ul style="list-style-type: none"> • Heat wave • Cold wave/frost • Wildfire 	<ul style="list-style-type: none"> • Changing wind patterns 	<ul style="list-style-type: none"> • Cyclone, hurricane, typhoon • Storm • Tornado 	<ul style="list-style-type: none"> • Changing precipitation patterns and types • Sea level rise 	<ul style="list-style-type: none"> • Drought • Extreme precipitation • Flood • Glacial lake outburst 	<ul style="list-style-type: none"> • Coastal erosion • Soil erosion • Solifluction 	<ul style="list-style-type: none"> • Avalanche • Landslide • Subsidence

Legend: typically sensitive; typically non sensitive.

Examples of adaptation measures

The table below provides examples of adaptation measures that can be adopted to reduce risks resulting from specific hazards for illustrative purpose only. Relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described above.

Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Temperature-related - chronic			

Temperature-related	Changes to the biological or physico-chemical internal processes of the sewer system can be a source of infectious diseases	Adjust water and wastewater management and treatment processes under NACE 37 – Sewerage	Reduced number of days of disrupted operation
	Exacerbated hygiene conditions causing outbreaks of infectious diseases (significantly higher risk in urban areas)	Preventive activities against infectious diseases Increasing the knowledge level of residents regarding sewerage water or contaminated water Building new medical institutions or healthcare centres around the target areas	Reduced number of infectious disease patients
Temperature-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Cold waves/frost	Source water freeze leading to insufficient water input for operations; ice build-up in process components and mechanical equipment lubricant freeze. These can lead either the mechanical equipment freezing before sludge freezes, with a risk of overflow; or to sludge freeze, leading to the temporary closing of operations to protect mechanical infrastructure (ie. frozen sludge in basins can damage treatment tanks, ruptured pipes etc.).	Building additional storage capacity, shortening retention duration, and covering tanks. Equipping mechanical equipment with warming/heating systems, such as lamps, hot air guns etc.	No excess overflow because of cold waves/frost Continued service during cold waves/frost

	Changes in physical, chemical and biological reactions.	Adjust water and wastewater management and treatment processes under NACE 37 – Sewerage	Reduced number of days of disrupted operation
Water-related – chronic			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Increase in the frequency and severity of droughts Reduction of surface water and groundwater levels Seasonal (and likely overall) reduction of river flows	Undermining sewer function and operations	<p>Construction, extension or upgrading of:</p> <ul style="list-style-type: none"> - Network connectivity infrastructure (to channel water and wastewater flows between plants) - NACE 42.2 Construction of utility projects - Distributed small-scale closed-loop systems - NACE 42.2 Construction of utility projects 	No or limited reduction in the quantity of wastewater water treated in the occurrence of drought/reduced of water availability
Extreme precipitations and flooding	Excess existing capacity: overflow into and contamination of rivers and coastal areas; contamination of clean water infrastructure Damage to existing wastewater infrastructure (pipes, pumping stations, tanks, treatment plants)	<p>Construction, extension or upgrading of:</p> <ul style="list-style-type: none"> - Increase pumping stations capacity - NACE 42.2 Construction of utility projects - Upgrade and extend pipes (+ pipe replacement and dredging/insulation from flooding) - NACE 42.2 Construction of utility projects - Build additional storm tanks - NACE 42.2 Construction of utility projects - Upgrade the drainage networks - NACE 42.2 Construction of utility projects - Build flood protection for water treatment plants and 	Total number or length of sewerage and drainage networks at risk from flooding Reduced investment in repair of sewer networks damaged by precipitations, rainstorms and/or flooding Number of properties affected by sewer flooding

		<p>pumping stations (elevate buildings; prioritize or relocate to higher grounds or away from vulnerable coastal zones)</p> <ul style="list-style-type: none"> - Build permeable urban surfaces - NACE 42.11 Construction of roads and motorways 	<p>Quantity of contaminated flow into drainage</p> <p>Quality of water in surrounding water bodies</p>
	Exacerbated hygiene conditions causing outbreaks of infectious diseases (significantly higher risk in urban areas)	<p>Preventive activities against infectious diseases – NACE 86 Human Health Activities</p> <p>Knowledge level of residents regarding sewerage water or contaminated water – NACE 85.5 Other Education</p> <p>Build new medical institutions or healthcare centres around the target areas – NACE 41 Construction of buildings</p>	<p>Reduced number of infectious disease patients during outbreaks following flooding</p> <p>Number of people reached by awareness campaign on hygiene</p>
Water-related - acute			
Specific hazards	Associated impacts	Illustrative examples of adaptation measures	Suggested performance metrics
Flash flooding	Inundation and potential damage to treatment plant, piping, or infrastructure	<p>Relocate assets into areas that are not located in flood plains</p> <p>Waterproof treatment plants</p> <p>Incorporate submersible transformers, switches, pumps</p>	<p>Proportion of critical assets waterproofed and located outside of flood plains</p> <p>Reduced repair costs have flood events</p>

5.4 Separate collection and transport of non-hazardous waste in source segregated fractions

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.1.1
Description	<p>“Separate collection and transport of non-hazardous waste in source segregated fractions”</p> <p>Separate collection and transport of non-hazardous waste in single or comingled fractions aimed at preparing for reuse and/or recycling.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> • emissions of collection vehicles that cause harm to human health and the environment; • mixing source segregated waste fractions that could impair subsequent material recovery and recycling. <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	Avoid mixing different source segregated waste fractions in waste storage and transfer facilities.
(5) Pollution	If waste collection is carried out by trucks, vehicles must at least meet Euro V standard.
(6) Ecosystems	

5.5 Anaerobic digestion of bio-waste

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.2.1
Description	<p>“Anaerobic digestion of bio-waste⁵⁴⁵”</p> <p>Treatment of separately collected bio-waste through anaerobic digestion in dedicated plants with the resulting production and utilization of biogas <u>and</u> digestate.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> • emissions to air, soil and water from the operation of the anaerobic digestion plant which may lead to emissions of pollutants that have significant impacts on human respiratory systems and on ecosystems through acidification and/or eutrophication. The most relevant pollutant emissions result from the storage of input waste and the resulting digestate as well as from the subsequent combustion of biogas, such as sulphur dioxide, nitrous oxide and particulates; • the subsequent use of the resulting digestate as fertiliser / soil improver which may also result in soil and water pollution due to contaminants in the digestate; • methane leakage which may offset the climate mitigation benefit of the biogas which is captured and utilized. <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	Methane leakages from relevant facilities (e.g. for biogas production and storage, energy generation, digestate storage) is controlled by a monitoring plan.
(3) Water	
(4) Circular Economy	

⁵⁴⁵ For definition of bio-waste refer to Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (Article 1(3)(b)). It comprises biodegradable garden and park waste, food and kitchen waste from households, offices, restaurants, wholesale, canteens, caterers and retail premises and comparable waste from food processing plants.

(5) Pollution	<ul style="list-style-type: none"> • In case of AD plants treating over 100 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL)⁵⁴⁶ ranges set for anaerobic treatment of waste in the BREF for waste treatment.⁵⁴⁷ • Emissions to air (e.g. SOx, NOx) after combustion of biogas are controlled, abated (when needed) and within the limits set by EU and respective national legislation. • The resulting digestate meets the requirements for fertilising materials in Regulation EU 2019/1009⁵⁴⁸ and respective national rules on fertilisers/soil improvers for agricultural use.
(6) Ecosystems	

546 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1147&from=EN>

547 https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

548 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

5.6 Composting of bio-waste

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.2.1
Description	<p>“Composting of bio-waste⁵⁴⁹”</p> <p>Treatment of separately collected bio-waste through composting (aerobic digestion) in dedicated facilities with the resulting production and utilization of compost.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to:</p> <ul style="list-style-type: none"> • emissions to air, soil and water from the operation of the composting plant; • the use of the resulting compost as fertiliser / soil improver which may also result in soil and water pollution due to contaminants in the compost. <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • In case of composting plants treating over 75 t/day, emissions to air and water are within the Best Available Techniques – Associated Emission Levels (BAT-AEL)⁵⁵⁰ ranges set for aerobic treatment of waste in the BREF for waste treatment.⁵⁵¹ • The site has a system in place that prevents leachate reaching groundwater.

⁵⁴⁹ For definition of bio-waste refer to Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (Article 1(3)(b)).

⁵⁵⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018D1147&from=EN>

⁵⁵¹ https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WT_Bref.pdf

	<ul style="list-style-type: none">• The resulting compost meets the requirements for fertilising materials in Regulation EU 2019/1009⁵⁵² and respective national rules on fertilisers/soil improvers for agriculture use.
(6) Ecosystems	

⁵⁵² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R1009&from=EN>

5.7 Material recovery from non-hazardous waste

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E38.3.2
Description	<p>“Material recovery from non-hazardous waste”</p> <p>Sorting and processing of separately collected non-hazardous waste streams into secondary raw materials involving a mechanical transformation process.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to the effectiveness of the material recovery as net GHG emission reductions can only be reached if a significant share of the collected non-hazardous waste is converted into secondary raw materials.</p> <p>Compliance with relevant EU and respective national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	The activity produces secondary raw materials suitable for substitution of virgin materials in production processes.
(3) Water	
(4) Circular Economy	
(5) Pollution	
(6) Ecosystems	

5.8 Landfill gas capture and utilization

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	<p>“Landfill⁵⁵³ gas capture and utilization”</p> <p>Landfill gas capture and utilization in permanently closed landfills using new (or supplementary) dedicated technical facilities and equipment installed during or post landfill closure.</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm linked to this activity is related to the emissions resulting from the energetic utilization of landfill gas, such as sulphur dioxide, nitrous oxide and particulates; Methane leakage which may offset the climate mitigation benefit of the landfill gas which is captured and utilized;</p> <p>Compliance with relevant EU and national law as well as consistency with national, regional or local waste management strategies and plans is a minimum requirement.</p>	
(1) Mitigation	Methane emissions from the landfill and leakages from the landfill gas collection and utilization facilities are controlled by a monitoring plan.
(3) Water	
(4) Circular Economy	
(5) Pollution	<ul style="list-style-type: none"> • The permanent closure and remediation as well as the after-care of old landfills, where the landfill gas capture system is installed, are carried out following the provisions on i), general requirements and ii) control and monitoring procedures specified in the Council Directive 99/31/EC.⁵⁵⁴ • Emissions to air (e.g. SO_x, NO_x) after combustion of landfill gas are controlled, abated (when needed) and within the limits set by EU and respective national legislation.

⁵⁵³ For definition of landfills refer to §2 (g) of the EU Landfill Directive (<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:31999L0031&from=EN>).

⁵⁵⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999L0031&from=EN>, amended by Directive (EU) 2018/850

(6) Ecosystems	
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5.9 Direct Air Capture of CO₂

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Direct Air Capture of CO ₂
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation 	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.	
(1) Mitigation	
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Follow all the requirements of EU Directive 2009/31/EC and in particular:</p> <ul style="list-style-type: none"> • Prevent release during operation by implementing permanent leakage detection systems. • Avoid loss of ammonia. • Minimize the formation of secondary aerosol and the production of tropospheric ozone. <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions

or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.

For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:

- a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- all necessary mitigation measures are in place to reduce the impacts on species and habitats; and
- a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.

5.10 Capture of Anthropogenic Emissions

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Capture of anthropogenic CO ₂ emissions
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main environmental impacts associated with Capture of Anthropogenic Emissions are due to chemicals/technologies used to capture carbon.</p>	
(1) Mitigation	Leakage factor of 1% of emissions on the basis that leakage of supposedly stored CO ₂ is significantly harmful.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<p>Select solvents based on environmental impact criteria and conducting full chemical risk assessments.</p> <p>Avoid hazardous waste from the amine solvent.</p> <p>Limit for nitrosamine concentration is 0.1 ppt.</p>
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent);</p> <p>Follow all the requirements of EU Directive 2009/31/EC and in particular:</p> <ul style="list-style-type: none"> • Select solvents based on environmental impact criteria and conducting full chemical risk assessments. • Prevent release during operation by implementing permanent leakage detection systems. • Avoid loss of ammonia. • Minimize the formation of secondary aerosol and the production of tropospheric ozone. <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>

(6) Ecosystems	<p>Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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5.11 Transport of CO₂

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Transport of captured CO ₂ by rail, ship and pipeline
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation 	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main environmental impacts associated with transport of CO ₂ are due to:	
<ul style="list-style-type: none"> • Construction phase of the transport network: all aspects have to be considered that are usually connected with construction, like terrestrial habitat alteration, loss of valuable ecosystems, land consumption, overburden disposal, negative impacts on biodiversity, emissions of particles and NO_x, noise and hazardous materials. An ESIA should be done. • Operation phase: Leakages should be kept at a minimum. Underground networks can have an impact on ground water systems and on local ecosystems. 	
(1) Mitigation	Leakage factor of 1% of emissions on the basis that leakage of supposedly stored CO ₂ is significantly harmful.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>A minimum requirement is the implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); Prevent release during operation by implementing permanent leakage detection systems.</p> <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment

	<p>(2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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5.12 Permanent Sequestration of Captured CO₂

Sector classification and activity	
Macro-Sector	E - Water supply; sewerage; waste management and remediation activities
NACE Level	4
Code	E39.0.0
Description	Permanent Sequestration of captured CO ₂
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main environmental impacts associated with Sequestration of CO₂ are due to:</p> <ul style="list-style-type: none"> • the risk of leakage • the long-term lack of geological containment of the reservoirs, central issues regarding the monitoring and the interrelation of carbon with physical, chemical and geological conditions in the reservoir is still a debated argument, however the safety of CO₂ storage may be assured with the implementation of specific rules and requirements. 	
(1) Mitigation	Leakage factor of 1% of emissions on the basis that leakage of supposedly stored CO ₂ is significantly harmful
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	
(5) Pollution	<p>Follow all the requirements of EU Directive 2009/31/EC and in particular:</p> <ul style="list-style-type: none"> • The implementation and adherence to a recognised environmental management system (ISO 14001, EMAS, or equivalent); • Prevent release during operation by implementing mobile and constant detection leakage detection systems. <p>Fans, compressors, pumps and other equipment, which is covered by the Ecodesign Directive and used must comply, where relevant, with the top class requirements of the energy label, and otherwise comply with the latest implementing measures of the Ecodesign Directive and represent the best available technology.</p>
(6) Ecosystems	Ensure an Environmental Impact Assessment (EIA) has been completed in accordance with the EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or in the

	<p>case of activities located in non-EU countries other equivalent national provisions or international standards for activities in non-EU countries (e.g. IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks) – including ancillary services, e.g. transport infrastructure and operations). Ensure any required mitigation measures for protecting biodiversity/eco-systems have been implemented.</p> <p>For sites/operations located in or near to biodiversity-sensitive areas (including the Natura 2000 network of protected areas, UNESCO World Heritage sites and Key Biodiversity Areas (KBAs), as well as other protected areas), ensure that an appropriate assessment has been conducted in compliance with the provisions of the EU Biodiversity Strategy (COM (2011) 244), the Birds (2009/147/EC) and Habitats (92/43/EEC) Directives or in the case of activities located in non-EU countries, other equivalent national provisions or international standards (e.g. IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources) – based on the conservation objectives of the protected area. For such sites/operations, ensure that:</p> <ul style="list-style-type: none"> • a site-level biodiversity management plan exists and is implemented in alignment with the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources; • all necessary mitigation measures are in place to reduce the impacts on species and habitats; and • a robust, appropriately designed and long-term biodiversity monitoring and evaluation programme exists and is implemented.
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6. TRANSPORTATION AND STORAGE

6.1 Passenger rail transport (interurban)

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.1.0
Description	Passenger Rail Transport (Interurban)
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main potential significant harm to other environmental objectives from the operation of rail transport activities are attributed to air pollution, noise and vibration, water use.. Direct emissions of air pollutants are not an issue of concern in the case of electrified rail, but only where (very efficient) diesel or hybrid engines would meet the CO ₂ e-threshold defined to ensure substantial mitigation of GHG emissions.	
(1) Mitigation	Emissions performance threshold of 95g CO ₂ e/pkm should not be exceeded.
(3) Water	
(4) Circular Economy	Ensure proper waste management both at the use phase (maintenance) and the end-of-life for the rolling stock, e.g. reuse and recycle of parts like batteries, in compliance with EU and national legislation on hazardous waste generation, management and treatment.
(5) Pollution	<ul style="list-style-type: none">• Engines for the propulsion of railway locomotives (RLL) and engines for the propulsion of railcars (RLR) must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation.• Minimise noise and vibrations of rolling stock, thresholds in line with Regulation 1304/2014 Noise TSI (also consider adjustment periods):<ul style="list-style-type: none">○ Electric locomotives <84dB at 80km/h & <99 at 250 km/h;○ Diesel locomotives <85 at 80km/h;○ Electric multiple units <80dB at 80km/h & <95 at 250 km/h;

	<ul style="list-style-type: none">○ Diesel Multiple Units <81dB at 80km/h & <96 at 250 km/h;○ Coaches <79dB at 80km/h;○ Wagons <83dB at 80km/h
(6) Ecosystems	

6.2 Freight rail transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.2.0
Description	Freight Rail Transport
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of rail transport activities are attributed to air pollution, noise and vibration pollution, and water use. Direct emissions of air pollutants are not an issue of concern in the case of electrified rail, but only where (very efficient) diesel or hybrid engines would meet the CO2e-threshold defined to ensure substantial mitigation of GHG emissions.</p>	
(1) Mitigation	<p>Fleets dedicated to the transport of fossil fuels are ineligible <u>and</u> Trains are ineligible if direct emissions per tkm (gCO2 e/ tkm) exceed the average reference CO2 emissions of HDVs as defined for the Heavy Duty CO2 Regulation.</p>
(3) Water	
(4) Circular Economy	Ensure proper waste management both at the use phase (maintenance) and the end-of-life for the rolling stock, e.g. reuse and recycle of parts like batteries, in compliance with EU and national legislation on hazardous waste generation, management and treatment.
(5) Pollution	<ul style="list-style-type: none"> • Engines for the propulsion of railway locomotives (RLL) and engines for the propulsion of railcars (RLR) must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation . • Minimise noise and vibrations of rolling stock, thresholds in line with Regulation 1304/2014 Noise TSI : <ul style="list-style-type: none"> ○ Electric locomotives <84dB at 80km/h & <99 at 250 km/h; ○ Diesel locomotives <85 at 80km/h; ○ Electric multiple units <80dB at 80km/h & <95 at 250 km/h; ○ Diesel Multiple Units <81dB at 80km/h & <96 at 250 km/h; ○ Coaches <79dB at 80km/h;

	<ul style="list-style-type: none">○ Wagons <83dB at 80km/h
(6) Ecosystems	

6.3 Public transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.3.1
Description	Urban and suburban passenger land transport (public transport)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of urban and suburban passenger land transport (public transport) are summarised as follows:</p> <ul style="list-style-type: none"> • Direct emissions to air⁵⁵⁵ from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions⁵⁵⁶; • Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle or rolling stock. 	
(1) Mitigation	Emissions performance threshold of 95g CO ₂ e /pkm should not be exceeded.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Regarding both maintenance and end-of-life management of vehicles or rolling stock, compliance with EU and national legislation on hazardous waste generation, management and treatment. • Compliance with Directive 2000/53/EC ("End-of-life of vehicles Directive") only for vehicle types M1 and N1 (busses are out of scope of the Directive)

555 ELV Directive 2000/53/EC (<http://ec.europa.eu/environment/waste/elv/index.htm>); Promotion of clean and energy-efficient road transport vehicles Directive (http://www.europarl.europa.eu/doceo/document/TA-8-2019-0427_EN.html?redirect), EU GPP criteria for road transport (http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm) and (https://ec.europa.eu/growth/sectors/automotive/environment-protection/noise-reduction_en)

556 Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

(5) Pollution	<ul style="list-style-type: none"> • Buses must comply with the current Euro VID and from 2022, the Euro VIE stage. Railcars, locomotives must comply with latest applicable standards (currently stage 5) of Non-Road Mobile Machinery Regulation⁵⁵⁷. • Where applicable, tyres must comply with the (revised) Tyre labelling regulation⁵⁵⁸. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration of all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible. • Where applicable, tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles⁵⁵⁹. • Vehicles must comply with Regulation (EU) No 540/2014⁵⁶⁰ on the sound level of motor vehicles and of replacement silencing systems. • Minimise noise and vibrations of rolling stock by applying thresholds on pass-by noise in dB in line with Regulation 1304/2014 Noise TSI⁵⁶¹: <ul style="list-style-type: none"> ○ Electric locomotives <84dB at 80km/h & <99 at 250 km/h; ○ Diesel locomotives <85 at 80km/h; ○ Electric multiple units <80dB at 80km/h & <95 at 250 km/h; ○ Diesel Multiple Units <81dB at 80km/h & <96 at 250 km/h; ○ Coaches <79dB at 80km/h; ○ Wagons <83dB at 80km/h
(6) Ecosystems	

557 Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.

558 Revision of the Tyre labelling regulation, https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3509962_en

559 Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor

560 Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems

561 Technical Specifications for Interoperability (TSIs, Regulation 1304/2014, also known as TSI NOI)

6.4 Infrastructure for low carbon transport (land transport)

Sector classification and activity	
Macro-Sector	F - Construction
NACE Level	4
Code	F42.1.1, F42.1.2, F42.1.3
Description	<p>Infrastructure for low carbon transport – land transport including NACE categories:</p> <ul style="list-style-type: none"> • Construction of roads and motorways • Construction of railways and underground railways • Construction of bridges and tunnels <p>Also includes categories of activities not covered by NACE including:</p> <ul style="list-style-type: none"> • Other infrastructure supporting transport activities not included above • Infrastructure and equipment for active mobility
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from infrastructure activities are attributed to noise and vibration pollution, water contamination, waste generation and impacts on biodiversity (habitat and wildlife) and land use consumption with ecosystem impacts specifically:</p> <ul style="list-style-type: none"> • Contamination of water during construction and unsustainable use of water during construction and operations • Unsustainable use of resources during constructions, e.g. generation of high amount of waste, no recycling/reuse of construction waste • Noise pollution can be relevant for both rolling stock and railway infrastructure as noise can be generated by both rolling stock and poor conditions of rail tracks.⁵⁶² • Construction of infrastructure can cause significant harm when taking place in protected areas or areas of high biodiversity values outside protected areas. • Infrastructure can cause fragmentation and degradation of the natural and urban landscape due to the “barrier” effects of the infrastructure and can involve risks of wildlife accidents caused by collisions. Railway infrastructure (in particular tunnels) can cause change and degradation of hydromorphological conditions of water bodies and therefore have impacts on aquatic ecosystems. 	
(1) Mitigation	Infrastructure dedicated to the transport and storage of fossil fuels are ineligible.

562 <http://www.diva-portal.org/smash/get/diva2:675304/FULLTEXT02>

(3) Water	<ul style="list-style-type: none"> Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <ul style="list-style-type: none"> In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<ul style="list-style-type: none"> Re-use parts and use recycled material during the renewal, upgrade and construction of infrastructure. At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list) generated on the construction site must be prepared for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials. This can be achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol⁵⁶³.
(5) Pollution	<ul style="list-style-type: none"> Minimise noise and vibrations from use of infrastructure by introducing open trenches/ wall barriers/ other measures and comply with the Environmental Noise Directive 2002/49/EC Minimise noise, dust, emissions pollution during construction / maintenance works.
(6) Ecosystems	<p>Infrastructure for low carbon transport is land use intensive and is a major factor of ecosystem deterioration and biodiversity loss. Projects should ensure that:</p> <ul style="list-style-type: none"> Environmental Impact Assessment (EIA) has been completed in accordance with EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or other equivalent national provisions. Such impact assessments should, at the very least, identify, evaluate, and mitigate any potential negative impacts of the designated activities, projects, or assets on ecosystems and its biodiversity and should be assessed and conducted in compliance with the provisions of the EU Habitats and Birds Directives. Invasive plants are appearing very often along transport infrastructure and are sometimes even spread due to transport infrastructure, which might negatively impact natural ecosystems (e.g. natural fauna). Care should be taken not to spread any invasive plants through proper maintenance. Wildlife collisions is a problem and should be considered. Solutions developed for should be applied for the detection and avoidance of potential traps that may cause the unnecessary death of animals. Mitigation options exist and different types of measures can be beneficial for wildlife, such as: Wildlife warning systems combined with heat sensors can reduce the number of collisions.

563 EU Construction and Demolition Waste Protocol. Available at https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en

- | | |
|--|---|
| | <ul style="list-style-type: none">• Fences along areas with high strike risk.• Viaducts, tunnels, overpasses and bridges, etc.• Warning signals that are triggered by approaching traffic, particularly in areas of high strike risk. |
|--|---|

6.5 Passenger cars and commercial vehicles

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	
Code	
Description	Passenger cars, light commercial vehicles and category L vehicles (this includes all M1, N1 and L category vehicles including where applicable NACE 49.32, 53.10, 53.20, 77.11)
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation 	
<p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>Key environmental aspects to be considered for investments on passenger cars and light commercial vehicles are the following:</p> <ul style="list-style-type: none"> • Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions • Indirect emissions to air from the production of fuels and energy carriers. However, this is out of the control of vehicles manufacturers and operators. • Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle. • Recycling of materials in order to reduce consumption of critical raw materials and impact on ecosystems and natural capital. 	
<p>The manufacture of vehicles, particularly batteries, is part of the scope of the sub-group "Manufacture of low carbon transport vehicles, equipment and infrastructure"</p>	
(1) Mitigation	Emissions performance threshold of 95g CO ₂ /km (passenger cars) and 147g CO ₂ /km (light commercial vehicles) should not be exceeded.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment. Special focus on critical raw materials recovery from batteries.

	<ul style="list-style-type: none"> • Compliance with Directive 2000/53/EC ("End-of-life of vehicles Directive")
(5) Pollution	<ul style="list-style-type: none"> • Vehicles must comply with the emission thresholds for clean light-duty vehicles in Table 2 in the Annex of Directive (EU) 2019/1161 of the European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles • Tyres must comply with the (revised) Tyre labelling regulation⁵⁶⁴. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible. • Tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles⁵⁶⁵. • Vehicles must comply with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems⁵⁶⁶.
(6) Ecosystems	

564 Revision of the Tyre labelling regulation, https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3509962_en

565 Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor

566 Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems

6.6 Freight transport services by road

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.4.1 (including where applicable NACE 53.10, 53.20)
Description	Freight transport services by road
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of freight road transport are summarised as follows:</p> <ul style="list-style-type: none"> • Direct emissions to air from the exhaust gases of internal combustion engine: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions . • Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle. 	
(1) Mitigation	<p>Fleets dedicated to the transport of fossil fuels are ineligible and</p> <p>Heavy-duty vehicles with specific direct CO₂ emissions (gCO₂/ km) of exceeding the reference CO₂ emissions of all vehicles in the same sub-group are ineligible.</p>
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment for both the use and the end-of-life phases of the vehicles. Particular focus on critical raw materials recovery from batteries. • Compliance with Directive 2000/53/EC ("End-of-life of vehicles Directive") for vehicle types M1 (passenger cars) and N1 (vans)
(5) Pollution	<ul style="list-style-type: none"> • Vehicles must comply with the current Euro VID and from 2022, the Euro VIE stage. Tyres must comply

	<p>with the (revised) Tyre labelling regulation⁵⁶⁷. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible.</p> <ul style="list-style-type: none"> • Tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles⁵⁶⁸. • Vehicles must comply with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems⁵⁶⁹.
(6) Ecosystems	

567 Revision of the Tyre labelling regulation, https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3509962_en

568 Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor

569 Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems

6.7 Interurban scheduled road transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H49.39
Description	Interurban scheduled road transport services of passengers
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of interurban scheduled road transport services of passengers are summarized as follows:</p> <ul style="list-style-type: none"> • Direct emissions to air from the exhaust gases of internal combustion engine⁵⁷⁰: nitrogen oxides (NOx), total hydrocarbon (THC), non-methane hydrocarbons (NMHC), carbon monoxide (CO), particulate matter (PM) and particle number, and from tyre abrasion and brakes friction and noise emissions⁵⁷¹. • Waste generation⁵⁷² (hazardous and non-hazardous) during maintenance and end-of-life of the vehicle. 	
(1) Mitigation	Emissions performance threshold of 95g CO ₂ e /pkm should not be exceeded.
(3) Water	
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment for both the use and the end-of-life phases of the vehicles. Particular focus on critical raw materials recovery from batteries.
(5) Pollution	<ul style="list-style-type: none"> • Buses must comply with the current Euro VID and from 2022, the Euro VIE stage. Tyres must comply with the (revised) Tyre labelling regulation. It includes noise labelling requirements but not requirements on tyre abrasion. However, the proposal of revision envisages a test method to be developed: A

570 570 Promotion of clean and energy-efficient road transport vehicles Directive (http://www.europarl.europa.eu/doceo/document/TA-8-2019-0427_EN.html?redirect), EU GPP criteria for road transport (http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm)

571 Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

572 EU Waste legislation: Directive 2008/98/EC, Decision 2000/532/EC (http://ec.europa.eu/environment/waste/hazardous_index.htm), ELV Directive 2000/53/EC (<http://ec.europa.eu/environment/waste/elv/index.htm>)

	<p>suitable testing method to measure tyre abrasion is not currently available. Therefore, the Commission should mandate the development of such a method, taking into full consideration all state-of-the-art internationally developed or proposed standards or regulations, with a view to establishing a suitable testing method as soon as possible.</p> <ul style="list-style-type: none"> • Tyres must comply with the noise requirements set by Regulation (EC) No 661/2009 on type-approval requirements for the general safety of motor vehicles. • Vehicles must comply with Regulation (EU) No 540/2014 on the sound level of motor vehicles and of replacement silencing systems.
(6) Ecosystems	

6.8 Inland passenger water transport

Sector classification and activity	
Macro-Sector	H – Transport and storage
NACE Level	4
Code	H50.3.0
Description	Inland passenger water transport
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of inland passenger and freight water transport are summarised as follows:</p> <ul style="list-style-type: none"> • Direct emissions to air of carbon dioxide (CO₂), hydrocarbons (HC), nitrogen oxides (NO_x), and particulate matter (PM), as well as noise emissions⁵⁷³. • Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vessel. • Direct and indirect emission of pollutants in water. 	
(1) Mitigation	Emissions performance threshold of 95g CO ₂ e /pkm should not be exceeded.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.
(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment during both the use and the end-of-phase of

⁵⁷³ Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

	a vessel ⁵⁷⁴ . Compliance with Regulation 1257/2013 ⁵⁷⁵ ("Ship recycling Regulation")
(5) Pollution	<ul style="list-style-type: none"> Engines in vessels must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation⁵⁷⁶ (including vessels meeting stage V without type-approved solutions such as through after-treatment).
(6) Ecosystems	<ul style="list-style-type: none"> The activity should not lead to releases of ballast water containing aquatic invasive species⁵⁷⁷

574 EU Waste legislation: Directive 2008/98/EC, Decision 2000/532/EC,
http://ec.europa.eu/environment/waste/hazardous_index.htm

575 Regulation (EU) No 1257/2013 of the European Parliament and of the Council of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC

576 Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.

577 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

6.9 Inland freight water transport

Sector classification and activity	
Macro-Sector	H - Transport and storage
NACE Level	4
Code	H50.4.0
Description	Inland freight water transport
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from the operation of inland passenger and freight water transport are summarised as follows:</p> <ul style="list-style-type: none"> • Direct emissions to air of carbon oxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulate matter (PM), as well as noise emissions⁵⁷⁸. • Waste generation (hazardous and non-hazardous) during maintenance and end-of-life of the vessel. • Direct and indirect emission of pollutants in water. 	
(1) Mitigation	<p>Fleets dedicated to the transport of fossil fuels are ineligible</p> <p><u>and</u></p> <p>Trains are ineligible if direct emissions per tkm (gCO2 e/ tkm) exceed the average reference CO2 emissions of HDVs as defined for the Heavy Duty CO2 Regulation.</p>
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. <ul style="list-style-type: none"> • In the EU, fulfil the requirements of EU water legislation.

⁵⁷⁸ Indirect emissions to air from the production of fuels and energy carriers are a further impact, however, one that is out of the control of vehicles manufacturers and operators.

(4) Circular Economy	<ul style="list-style-type: none"> • Compliance with EU and national legislation on hazardous waste generation, management and treatment during both the use and the end-of-life phases of a building⁵⁷⁹. • Compliance with Regulation 1257/2013⁵⁸⁰ ("Ship recycling Regulation")
(5) Pollution	<ul style="list-style-type: none"> • Vessels must comply with latest applicable standards (currently stage V) of Non-Road Mobile Machinery Regulation⁵⁸¹ (including vessels meeting stage V without type-approved solutions such as through after-treatment).
(6) Ecosystems	<ul style="list-style-type: none"> • The activity should not lead to releases of ballast water containing aquatic invasive species⁵⁸²

579 EU Waste legislation: Directive 2008/98/EC, Decision 2000/532/EC,
http://ec.europa.eu/environment/waste/hazardous_index.htm

580 Regulation (EU) No 1257/2013 of the European Parliament and of the Council of 20 November 2013 on ship recycling and amending Regulation (EC) No 1013/2006 and Directive 2009/16/EC

581 Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type-approval for internal combustion engines for non-road mobile machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC.

582 Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species

6.10 Infrastructure for low carbon transport (water transport)

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	4
Code	F42.9.1
Description	<p>Infrastructure for low carbon transport - water including the following category:</p> <ul style="list-style-type: none"> • Construction of water projects <p>Also includes categories of activities not covered by NACE including:</p> <p style="padding-left: 20px;">Other infrastructure supporting transport activities not included above</p>
Adaptation criteria	
<p>Depending on the primary objective of the activity, refer to:</p> <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation <p>Users of the Taxonomy should identify and explain which criteria they are responding to.</p>	
Do no significant harm assessment	
<p>The main potential significant harm to other environmental objectives from water infrastructure activities are attributed to the alteration of hydromorphology due to dredging, maintenance activities and construction of new infrastructures and waterways, as well as impact on biodiversity and ecosystems from such activities.</p>	
(1) Mitigation	Infrastructure dedicated to the transport and storage of fossil fuels are ineligible.
(3) Water	<ul style="list-style-type: none"> • Identify and manage risks related to water quality and/or water consumption at the appropriate level. Ensure that water use/conservation management plans, developed in consultation with relevant stakeholders, have been developed and implemented. • In the EU, fulfil the requirements of EU water legislation. <p>Canalisation and fragmentation of rivers should be avoided.</p>
(4) Circular Economy	<p>Re-use parts and use recycled material during the renewal, upgrade and construction of water projects.</p> <p>At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list) generated on the construction site must be prepared for re-use, recycling and other material recovery, including backfilling operations using waste to substitute other materials. This can be achieved by executing the construction</p>

	works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol ⁵⁸³ .
(5) Pollution	Minimise noise, vibration, dust, pollutant emissions during construction / maintenance works.
(6) Ecosystems	<p>Infrastructure for low carbon water projects is a major factor of marine ecosystem deterioration and biodiversity loss. Projects should ensure that:</p> <ul style="list-style-type: none"> • Environmental Impact Assessment (EIA) has been completed in accordance with EU Directives on Environmental Impact Assessment (2014/52/EU) and Strategic Environmental Assessment (2001/42/EC) or other equivalent national provisions. • Such impact assessments should, at the very least, identify, evaluate, and mitigate any potential negative impacts of the designated activities, projects, or assets on ecosystems and its biodiversity and should be assessed and conducted in compliance with the provisions of the EU Habitats and Birds Directives including the Marine Strategy Framework Directive, as well as the Water Framework Directive (in particular ensuring conditions outlined in article 4(7) of the WFD are met.

583 EU Construction and Demolition Waste Protocol. Available at https://ec.europa.eu/growth/content/eu-construction-and-demolition-waste-protocol-0_en

7. BUILDINGS

7.1 Construction of new buildings

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	2
Code	F41, F43
Description	Construction of new buildings. This relates to activities under NACE codes F41.1 - Development of building projects and F41.2 - Construction of residential and non-residential buildings.
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main potential for significant harm to the other environmental objectives associated with the construction of new buildings is determined by: <ul style="list-style-type: none">• Excessive energy consumption and operational carbon emissions.• Excessive water consumption due to inefficient water appliances.• Landfill and/or incineration of construction and demolition waste that could be otherwise recycled/reused.• Presence of asbestos and/or substances of very high concern in the building materials.• Presence of hazardous contaminants in the soil of the building site.• Inappropriate building location: impacts on ecosystems if built on greenfield and especially if in a conservation area or high biodiversity value area.• Indirect damage to forest ecosystems due to the use of timber products originating from forests that are not sustainably managed.	
(1) Mitigation	The building must comply with all applicable mandatory national/regional regulations regarding energy and carbon performance. To avoid lock-in and undermining the climate mitigation objective, the construction of new buildings designed for the purpose of extraction, storage, transportation or manufacture of fossil fuels is not eligible for the Taxonomy.
(3) Water	All relevant water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and flushing

	cisterns, bathtubs) must be in the top 2 classes for water consumption of the EU Water Label. ⁵⁸⁴
(4) Circular Economy	At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list ⁵⁸⁵) generated on the construction site must be prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials. ⁵⁸⁶
(5) Pollution	<p>5.a - It is ensured that building components and materials do not contain asbestos nor substances of very high concern as identified on the basis of the "Authorisation List" of the REACH Regulation.⁵⁸⁷</p> <p>5.b – If the new construction is located on a potentially contaminated site (brownfield site), the site must be subject to an investigation for potential contaminants, for example using standard BS 10175.⁵⁸⁸</p>
(6) Ecosystems	<p>6.a - The new construction must not be built on protected natural areas, such as land designated as Natura 2000, UNESCO World Heritage and Key Biodiversity Areas (KBAs), or equivalent outside the EU as defined by UNESCO and / or the International Union for Conservation of Nature (IUCN) under the following categories:</p> <ul style="list-style-type: none"> • Category Ia: Strict Nature Reserve • Category Ib: Wilderness Area • Category II: National Park <p>Buildings that are associated supporting infrastructure to the protected natural area, such as visitor centres, museums or technical facilities are exempted from this criterion.</p> <p>6.b - The new construction must not be built on arable or greenfield land of recognised high biodiversity value and land that serves as habitat of endangered species (flora and fauna) listed on the European Red List and / or the IUCN Red List.</p> <p>6.c - At least 80% of all timber products used in the new construction for structures, cladding and finishes⁵⁸⁹ must have been either recycled/reused or</p>

584 (<http://www.europeanwaterlabel.eu/>) Outside the EU, relevant water appliances will need to meet the flow rates identified by the EU Water Label as threshold for the top 2 classes of water consumption. Details on flow rates and testing method: <http://www.europeanwaterlabel.eu/pdf/scheme-march2019-en.pdf>

585 Commission Decision of 3 May 2000 replacing Decision 94/3/EC (2000/532/EC)

586 This requirement is achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol.

587 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

588 BS 10175:2011+A2:2017 - Investigation of potentially contaminated sites. Code of practice.

589 These products are categorised as follows according to the Combined Nomenclature set out in Annex I to Council Regulation (EEC) No 2658/87: 4407 Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or

	sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/PEFC standards or equivalent. ⁵⁹⁰
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end-jointed, of a thickness exceeding 6 mm; 4408 Sheets for veneering (including those obtained by slicing laminated wood), for plywood or for other similar laminated wood and other wood, sawn lengthwise, sliced or peeled, whether or not planed, sanded, spliced or end-jointed, of a thickness not exceeding 6 mm; 4409 Wood (including strips and friezes for parquet flooring, not assembled) continuously shaped (tongued, grooved, rebated, chamfered, V-jointed, beaded, moulded, rounded or the like) along any of its edges, ends or faces, whether or not planed, sanded or end-jointed; 4410 Particle board, oriented strand board (OSB) and similar board (for example, waferboard) of wood or other ligneous materials, whether or not agglomerated with resins or other organic binding substances; 4411 Fibreboard of wood or other ligneous materials, whether or not bonded with resins or other organic substances; 4412 Plywood, veneered panels and similar laminated wood; 4413 00 00 Densified wood, in blocks, plates, strips or profile shapes; 4418 Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes; 9406 00 20 Prefabricated buildings

⁵⁹⁰ To be reviewed after the upcoming publication of an EU study on forests

7.2 Building renovation

Sector classification and activity	
Macro-Sector	F – Construction
NACE Level	2
Code	F41, F43
Description	Building renovation: this relates to activities under NACE codes F41.2 - Construction of residential and non-residential buildings and F43 - Specialised construction activities.
Adaptation criteria	
Depending on the primary objective of the activity, refer to: <ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The main potential for significant harm to the other environmental objectives associated with the renovation of existing buildings is determined by: <ul style="list-style-type: none"> • Excessive energy consumption and operational carbon emissions. • Excessive water consumption due to inefficient water appliances. • Landfill and/or incineration of construction and demolition waste that could be otherwise recycled/reused. • Presence of asbestos and/or substances of very high concern in the building materials. • The unprotected handling of building components that are likely to contain substances of concern (e.g. asbestos containing materials) and of any hazardous construction and demolition waste arising from the building renovation; • Indirect damage to forest ecosystems due to the use of timber products originating from forests that are not sustainably managed (only for large buildings). 	
(1) Mitigation	The measures adopted to improve the resilience of the building must not increase the rates of operational carbon emissions of the building. Exceptions are allowed if it can be demonstrated that increase in emissions is necessary to carry out the measures, and there is a positive trade-off. To avoid lock-in and undermining the climate mitigation objective, the construction of new buildings designed for the purpose of extraction, storage, transportation or manufacture of fossil fuels is not eligible for the Taxonomy.
(3) Water	All relevant new water appliances (shower solutions, mixer showers, shower outlets, taps, WC suites, WC bowls and flushing cisterns, urinal bowls and

	flushing cisterns, bathtubs) must be in the top 2 classes for water consumption of the EU Water Label. ⁵⁹¹
(4) Circular Economy	At least 80% (by weight) of the non-hazardous construction and demolition waste (excluding naturally occurring material defined in category 17 05 04 in the EU waste list ⁵⁹²) generated on the construction site must be prepared for re-use or sent for recycling or other material recovery, including backfilling operations that use waste to substitute other materials. ⁵⁹³
(5) Pollution	5.a - It is ensured that building components and materials do not contain asbestos nor substances of very high concern as identified on the basis of the "Authorisation List" of the REACH Regulation. ⁵⁹⁴ 5.b - Before starting the renovation work, a building survey must be carried out in accordance with national legislation by a competent specialist with training in asbestos surveying and in identification of other materials containing substances of concern. Any stripping of lagging that contains or is likely to contain asbestos, breaking or mechanical drilling or screwing and/or removal of insulation board, tiles and other asbestos containing materials shall be carried out by appropriately trained personnel, with health monitoring before, during and after the works, in accordance with national legislation.
(6) Ecosystems	If the renovation project covers more than 1000 m² of floor area (over one or more buildings): at least 80% of all timber products used in the renovation for structures, cladding and finishes must have been either recycled/reused or sourced from sustainably managed forests as certified by third-party certification audits performed by accredited certification bodies, e.g. FSC/PEFC standards or equivalent. ⁵⁹⁵

591 (<http://www.europeanwaterlabel.eu/>) Outside the EU, relevant water appliances will need to meet the flow rates identified by the EU Water Label as threshold for the top 2 classes of water consumption. Details on flow rates and testing method: <http://www.europeanwaterlabel.eu/pdf/scheme-march2019-en.pdf>

592 Commission Decision of 3 May 2000 replacing Decision 94/3/EC (2000/532/EC)

593 This requirement is achieved by executing the construction works in line with the good practice guidance laid down in the EU Construction and Demolition Waste Management Protocol.

594 Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

595 To be reviewed after the upcoming publication of an EU study on forests

8. FINANCIAL AND INSURANCE ACTIVITIES

Background

According to the World Economic Forum Report (2020), more common extreme weather events could make insurance unaffordable or simply unavailable for individuals and businesses. Globally, the 'catastrophe protection gap' - what should be insured but is not – reached US\$280 billion (EUR€252 billion) in 2018⁵⁹⁶. The TEG is concerned to address the widening protection gap by classifying selected non-life insurance lines of business (LOBs) as substantially contributing to 'adaptation by'. The eligible economic activity substantially contributes to 'adaptation by' when it meets Principle B1.1 whereby:

"the activity reduces or facilitates adaptation to physical climate risks beyond the boundaries of the activity itself. This includes activities that:

- a) Promote a new technology, product, practice or governance process or innovative uses of existing practices (including those related to natural infrastructure); or,
- b) Remove information, financial, technological and capacity barriers to adaptation by others."

Non-life insurance eligible for the Taxonomy includes selected LOBs and insurance products and services that provide cover for climate-related hazards to activities and/or assets that are Taxonomy aligned.

As the number and range of sub-sectors eligible for the Taxonomy evolves arising from development of substantial contribution to the remaining four environmental objectives, additional activities will become eligible for Taxonomy aligned non-life insurance products. Furthermore, the TEG believes that economic activities that may not be screened for substantial contribution to any of the six environmental objectives, such as environmentally neutral activities (schools, hospitals, public administration services, etc.), which may nonetheless be impacted by climate change should be considered as potentially eligible for Taxonomy aligned non-life insurance. TEG recommends further consideration of DNSH criteria for non-life insurance activities to enhance the coverage of activities and improve usability of the criteria.

⁵⁹⁶ The Global Risks Report 2020, World Economic Forum Insight Report 15th Edition, In partnership with Marsh & McLennan and Zurich Insurance Group.

8.1 Non-life insurance

Sector classification and activity	
Macro-Sector	Financial services and insurance
NACE Level	4
Code	NACE code: 65.12 CPA codes: 65.12.49
Description	<p>Non-life insurance for activities and/or assets that are covered by the EU Taxonomy. Insurance against climate-related hazards identified as:</p> <p>Temperature related</p> <ul style="list-style-type: none"> • Heat stress, heat wave • Cold wave, frost • Temperature variability • Permafrost thaw • Wildfire <p>Wind related</p> <ul style="list-style-type: none"> • Changing wind patterns • Cyclone, hurricane, typhoon • Storm, including blizzard, dust and sand storm • Tornado <p>Water related</p> <ul style="list-style-type: none"> • Changing/Heavy Precipitation patterns and types (Rain, Hail, Snow / Ice) • Hydrologic variability • Ocean acidification • Saline intrusion • Sea level rise • Drought • Flood (Coastal, Fluvial, Pluvial, Groundwater) • Glacial Lake Outburst <p>Solid Mass related</p> <ul style="list-style-type: none"> • Coastal Erosion • Soil degradation • Soil erosion • Solifluction • Avalanche • Landslide • Subsidence <p>Such insurance represents an important element for climate change adaptation since it does not only support risk sharing but is also working throughout the risk management cycle (identify, analyse, plan, implement and evaluate) and the disaster management cycle (prevent and protect, prepare, respond and recover).</p>

	<p>Non-life insurance undertakings and activities potentially eligible for EU Taxonomy alignment include classes of non-life insurance set out in Annex I of the Solvency II Delegated Regulations and any future amendments^{597, 598}. The Groups of non-life insurance lines of business potentially eligible are:</p> <ul style="list-style-type: none"> • Motor vehicle liability insurance • Other motor insurance • Marine, aviation and transport insurance • Fire and other damage to property insurance • General Liability insurance
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none"> • Screening criteria for adapted activities • Screening criteria for an activity enabling adaptation 	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The specific activity or activities being insured must meet the DNSH criteria for those activities. That is, the non-life insurer (i.e. the primary insurance product provider) is required to validate that the activity and/or asset being insured is compliant with the relevant DNSH thresholds for the activity under cover.	

Example contributions

The table below provides examples of how non-life insurance can contribute to reduce physical climate risk of EU Taxonomy economic activities.

Climate-related hazards	Associated physical climate risk	How does the activity contribute to reduce physical climate risks

⁵⁹⁷ COMMISSION DELEGATED REGULATION (EU) 2015/35 of 10 October 2014 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II)

⁵⁹⁸ DIRECTIVE 2009/138/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II) (recast). file:///C:/Europe%20Sustainable%20Finance%20Legislation/Solvency%20II_CELEX_32009L0138_EN_TXT.pdf

Temperature-related Wind-related Water related Solid mass-related	<p>Damages and disruption to natural and built environment</p> <ul style="list-style-type: none"> • offering standard non-life insurance products against climate-related hazards; • offering multi-peril (yield) crop insurance against both annual yield variations in addition to extreme climate-related hazards; • incentivising adaptation behaviour, for example where insurers would offer premium discounts for homeowners who take steps to protect their houses from wildfires; • offering risk engineering expertise to their customers with proactive risk improvement action management programs or by sharing their expertise with new projects; • using insurers' data and knowledge in developing zoning and building code regulations, standards and construction requirements and local adaptation plans. <p>Insurers often have good information on which areas are at high risk and which measures can lower risk. This information is often used in designing zoning, flood defences, building code regulations and prioritising related adaptation investments;</p> <ul style="list-style-type: none"> • developing innovative risk transfer mechanisms as part of broader risk management solutions to help under-insured or uninsured communities to meet the challenges of a changing climate (for example the Caribbean Catastrophe Risk Insurance Facility or the African Risk Capacity); • requiring minimum building standards, or adherence to build-back-better principles, differentiated by risk level, as a standard element of insurance contracts; • developing online tools or early warning methods to allow people to detect risks to property from floods, storms and other climate related hazards; • helping improve natural catastrophe models for different climate-related hazards.
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⁵⁹⁹ Undertakings should follow specific requirements: i) be well capitalised (i.e. compliance with capital requirements, under Solvency II or equivalent regime); and (ii) demonstrate strong risk management (e.g. follow EIOPA's Technical Advice on integration of sustainability risks).

9. PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES

9.1 Engineering activities and related technical consultancy dedicated to adaptation to climate change

Sector classification and activity	
Macro-Sector	Professional, scientific and technical activities
NACE Level	3
Code	NACE code: 71.12 CPA codes: 71.12
Description	<p>Engineering activities and related technical consultancy dedicated to adaptation to climate change for activities and/or assets that are Taxonomy aligned.</p> <p>This class includes:</p> <ul style="list-style-type: none">engineering design (i.e. applying physical laws and principles of engineering in the design of machines, materials, instruments, structures, processes and systems) and consulting activities for:machinery, industrial processes and industrial plantprojects involving civil engineering, hydraulic engineering, traffic engineeringwater management projectsprojects elaboration and realisation relative to electrical and electronic engineering, mining engineering, chemical engineering, mechanical, industrial and systems engineering, safety engineeringelaboration of projects using air conditioning, refrigeration, sanitary and pollution control engineering, acoustical engineering etc.geophysical, geologic and seismic surveyinggeodetic surveying activities:land and boundary surveying activitieshydrologic surveying activitiessubsurface surveying activitiescartographic and spatial information activities.
Adaptation criteria	
Depending on the primary objective of the activity, refer to: <ul style="list-style-type: none">Screening criteria for adapted activitiesScreening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The specific activity or activities which are the subject of the engineering or related consultancy service must meet the DNSH criteria for those activities.	

That is, the service provider is required to validate that the activity and/or asset the service is being provided in relation to, is compliant with the relevant DNSH thresholds for the activity under cover.

Example contributions

The table below provides examples of how engineering activities and related technical consultancy can contribute to reduce physical climate risk of other economic activities.

Climate-related hazards	Associated physical climate risk	How does the activity contribute to reduce physical climate risks
Temperature-related Wind-related Water related Solid mass-related	Damages and disruption to natural and built environment	<p>Engineering activities associated with design, construction, retrofitting and reconstruction of infrastructure to enhance resilience to the climate-related hazards, through the implementation of the structural adaptation measures or ecosystem based approaches, contribute to the reduction of physical climate risk of other economic activities.</p> <p>Consulting and planning activities related to engineering activities that take into account climate-related hazards and enable adaptation of the built infrastructure (e.g. building codes; integrated management systems; delivering spatial information on changing risks and vulnerabilities due to CC) contribute to the reduction of physical climate risk of other economic activities</p>

Additional adaptation activities for future consideration

Earlier sections of this document provide the criteria for the economic activities covered to date in the TEG's Taxonomy recommendations. This section provides additional examples of activities enabling adaptation.

In addition, some extra information is provided throughout this report for the economic activities listed in the table below. These examples were selected on the basis of the following characteristics:

- They are among the sectors most vulnerable to the negative effects of climate change in Europe;⁶⁰⁰
- They represent a large share of gross value added (GVA) and employment in Europe;⁶⁰¹ and
- They allow for testing of the adaptation taxonomy approach in natural resource-based sectors (agriculture and water), service sectors (ICT and professional services) and asset-based sectors (electricity, gas, steam and air conditioning supply).

Not all of the activities selected are included in the Taxonomy at this stage, subject to further technical work. In particular, two activities, Research and development (natural sciences and engineering) and Provision of specialised telecommunications applications for weather monitoring and forecast, are considered to have the potential to make a substantial contribution to climate change adaptation and therefore a full evaluation of their environmental impacts should be prioritised.

The activities are as follows:

Activities included in the Taxonomy with additional guidance (see earlier sections).	Activities with additional adaptation guidance but not included in the Taxonomy (see below).
<ul style="list-style-type: none">•• Forestry (the guidance is applicable across a wide range of forestry activities)	<ul style="list-style-type: none">• Research and development (natural sciences and engineering)• Provision of specialised telecommunications applications for weather monitoring and forecast.

600 EEA Report No 15/2017, "Climate change adaptation and disaster risk reduction in Europe" (2017).

601 Based on EUROSTAT data available at <https://ec.europa.eu/eurostat/news/themes-in-the-spotlight/gva-employment>

- [Growing of non-perennial crops](#)
- [Production of Electricity from Hydropower](#)
- [Transmission and Distribution of Electricity](#)
- [Centralized wastewater treatment](#)
- [Error! Reference source not found.](#)
- [Engineering activities and related technical consultancy dedicated to adaptation to climate change](#)

Additional information is provided on the typical climate-related hazards that those activities tend to be sensitive to, and adaptation measures that may be taken to address those sensitivities. This is based on experience drawn from industry practice and existing sensitivity matrices used by development finance institutions. This additional information is provided simply as a starting point by users to assist in identifying physical climate risks to an activity and measures to address those risks. But it does not take the place of a context specific risk assessment given that relevant climate-related hazards and required adaptation measures will be location and context specific and will be identified through the application of the qualitative screening criteria described below.

10. PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES

10.1 Research and development (natural sciences and engineering)

This is an illustrative example and should not be considered Taxonomy-aligned at this stage.

Sector classification and activity	
Macro-Sector	Professional, scientific and technical activities
NACE Level	3
Code	NACE code: 72.1 CPA codes: 72.1
Description	This group comprises basic research, applied research, experimental development in natural sciences and engineering dedicated to adaptation to climate change. See example contributions for further examples.
Adaptation criteria	
Depending on the primary objective of the activity, refer to:	
<ul style="list-style-type: none">• Screening criteria for adapted activities• Screening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The DNSH assessment for this activity has not been fully completed. The TEG recommends that the Platform develops DNSH criteria for this activity as a matter of priority.	

Example contributions

The table below provides examples of ways this activity can contribute to reduce physical climate risk of other economic activities.

Climate-related hazards	Associated physical climate risk	How does the activity contribute to reduce physical climate risks
Temperature-related Wind-related	Damages and disruption to natural and built environment	Scientific research and experimental development on natural sciences and engineering dedicated to understand and model the climate system, and anticipate and manage physical climate risks lay foundations for adaptation in all economic activities. By providing data and information to, among others, assess how the climate may change, the potential impacts and vulnerabilities

<p>Water related</p> <p>Solid mass-related</p>	<p>associated with these changes, it facilitates adaptation of vulnerable activities, products and services.</p> <p>Examples of activities include:</p> <ul style="list-style-type: none"> • Development of climate models (e.g. high-resolution climate simulations / earth system modelling by HPC) and research for reducing uncertainty on climate change projections and impact assessments • Scientific research on the impacts of climate change and on resilience to the impacts of climate change on local, regional, global scales on natural and managed ecosystems (incl. model outputs as well as lab experiments, in-situ sampling, environmental observation and remote sensing) e.g. development of models for real-time visualisation of impacts • Scientific research on and development of adaptation technologies and solutions (incl. capacity building / introduction of pilot studies/ early warning systems etc.) • Scientific research on and development of methodologies for the evaluation of potential, effectiveness and efficiency of implemented adaptation solutions • Scientific research on and development of data processing methods, especially machine learning and statistics approaches, for solving environmental problems • Tailored training and targeted knowledge dissemination e.g. training of experts with interdisciplinary skills for tackling increasingly complex questions in environmental systems and resources management (e.g. PhD candidates, Post-docs)
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11. INFORMATION AND COMMUNICATION

11.1 Provision of specialised telecommunications applications for weather monitoring and forecast

This is an illustrative example and should not be considered Taxonomy-aligned at this stage.

Sector classification and activity	
Macro-Sector	Information and Communications Technology (ICT)
NACE Level	3
Code	NACE code: 61.9 CPA codes: 61.9
Description	<p>Other telecommunication activities: provision of specialised telecommunications applications for weather monitoring and forecast and early warnings (see example contribution):</p> <ul style="list-style-type: none">provision of specialised telecommunications applications, such as satellite tracking, communications telemetry, and radar station operationsoperation of satellite terminal stations and associated facilities operationally connected with one or more terrestrial communications systems and capable of transmitting telecommunications to or receiving telecommunications from satellite systems <p>Satellite communications can support monitoring, forecast, early warning, and emergency communications through extreme weather events and enhance climate resilience of other economic activities.</p>
Adaptation criteria	
Depending on the primary objective of the activity, refer to: <ul style="list-style-type: none">Screening criteria for adapted activitiesScreening criteria for an activity enabling adaptation	
Users of the Taxonomy should identify and explain which criteria they are responding to.	
Do no significant harm assessment	
The DNSH assessment for this activity has not been fully completed. The TEG recommends that the Platform develops DNSH criteria for this activity as a matter of priority.	

Example contributions

The table below provides examples of ways this activity can contribute to reduce physical climate risk of other economic activities.

Climate-related hazards	Associated physical climate risk	How does the activity contribute to reduce physical climate risks
Temperature-related Wind-related Water related Solid mass-related	Damages and disruption to natural and built environment	<p>The provision of specialised telecommunications applications for weather monitoring, forecast and early warning improves preparedness and response planning for small-scale and large-scale drought, floods, cyclones, storm surges, and other climate-related hazards, and reduce the risk of death, injury, asset loss and damage. By providing and delivering climate-related information to authorities and the general public, specialised telecommunications applications for weather monitoring, forecast and early warning empowers individuals, institutions and public and private organisations to adapt.</p> <p>These applications include:</p> <ul style="list-style-type: none"> • nowcast, short, medium and extended range, forecast of drought, flood, tropical cyclone, wind storms, hot spells, cold spells, and other climate-related hazards; • public weather local forecast; • long range forecast; • early warnings related to climate-related hazards; • sea and coastal zone forecasts; and • customized sector-based forecasts.

Sectoral climate sensitivity matrices

1. AGRICULTURE, FORESTRY

2. ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY

Economic Activity			Temperature-related					Wind-related			Water-related					Solid Mass-related													
Sector: Electricity, Gas, Steam and Air Conditioning Supply			Acute		Chronic			Acute		Chronic	Acute		Chronic			Acute		Chronic			Acute		Chronic						
NACE CODE	Parent	This sector includes...	Heat Wave	Cold Wave / Frost	Wildfire	Changing Temperature (Air, Freshwater, Marine Water)	Heat Stress	Temperature Variability	Permafrost Thawing	Cyclones, Hurricanes, Typhoons	Storms (Blizzards, Dust Storms, Sand Tornadoes)	Changing Wind Patterns	Drought	Heavy Precipitation (Rain, Hail, Snow / Ice)	Flood (Coastal, Fluvial, Pluvial, Groundwater)	Glacial Lake Outburst	Changing Precipitation Patterns and Types (Rain, Hail, Snow /	Precipitation, Hydrological Variability	Ocean Acidification	Saline Intrusion	Sea Level Rise	Water Stress	Avalanche	Landslide	Subsidence	Coastal Erosion	Soil Degradation	Soil Erosion	Solifluction
35.11	35.1	Production of electricity																											
35.12	35.1	Transmission of electricity		Yellow																									
35.13	35.1	Distribution of electricity																											
35.14	35.1	Trade of electricity																											
35.2	35	Manufacture of gas; distribution of gaseous fuels through mains	Yellow		Orange																								
35.21	35.2	Manufacture of gas																											
35.22	35.2	Distribution of gaseous fuels through mains	Yellow																										
35.23	35.2	Trade of gas through mains	Yellow																										
35.3	35	Steam and air conditioning supply	Orange						Yellow	Orange		Yellow																	
35.3	35.3	Steam and air conditioning supply	Orange	Yellow																									

3. INFORMATION AND COMMUNICATION

Economic Activity			Temperature-related				Wind-related		Water-related				Solid Mass-related			
Sector: Information and Communication		Acute	Chronic		Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic	Acute	Chronic

NACE CODE	Parent	This sector includes...	Heat Wave	Cold Wave / Frost	Wildfire	Changing Temperature (Air, Freshwater, Marine Water)	Heat Stress	Temperature Variability	Permafrost Thawing	Cyclones, Hurricanes, Typhoons	Storms (Blizzards, Dust Storms, Sand Storms)	Tornadoes	Changing Wind Patterns	Drought	Heavy Precipitation (Rain, Hail, Snow / Ice)	Flood (Coastal, Fluvial, Pluvial, Groundwater)	Glacial Lake Outburst	Changing Precipitation Patterns and Types (Rain, Hail, Snow / Ice)	Precipitation, Hydrological Variability	Ocean Acidification	Sea Level Rise	Water Stress	Avalanche	Landslide	Subsidence	Coastal Erosion	Soil Degradation	Soil Erosion	Solifluction
58.1	58	Publishing of books, periodicals and other publishing activities																											
58.11	58.1	Book publishing																											
58.12	58.1	Publishing of directories and mailing lists																											
58.13	58.1	Publishing of newspapers																											
58.14	58.1	Publishing of journals and periodicals																											
58.19	58.1	Other publishing activities																											
58.2	58	Software publishing																											
58.21	58.2	Publishing of computer games																											
58.29	58.2	Other software publishing																											
59	J	Motion picture, video and television programme production, sound recording and music publishing activities																											
59.1	59	Motion picture, video and television programme activities																											
59.11	59.1	Motion picture, video and television programme production activities																											
59.12	59.1	Motion picture, video and television programme post-production activities																											

4. FINANCIAL AND INSURANCE ACTIVITIES

5. WATER SUPPLY, SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES

Economic Activity			Temperature-related					Wind-related			Water-related					Solid Mass-related														
Sector: Water Supply, Sewerage, Waste Management and Remediation Activities			Acute		Chronic			Acute		Chronic	Acute		Chronic			Acute		Chronic		Acute		Chronic								
NACE CODE	Parent	This sector includes...	Heat Wave	Cold Wave / Frost	Wildfire	Changing Temperature (Air, Freshwater, Marine Water)	Heat Stress	Temperature Variability	Permafrost Thawing	Cyclones, Hurricanes, Typhoons	Storms (Blizzards, Dust Storms, Sand Storms)	Tornadoes	Changing Wind Patterns	Drought	Heavy Precipitation (Rain, Hail, Snow / Ice)	Flood (Coastal, Fluvial, Pluvial, Groundwater)	Glacial Lake Outburst	Changing Precipitation Patterns and Types (Rain, Hail, Snow / Ice)	Precipitation, Hydrological Variability	Ocean Acidification	Saline Intrusion	Sea Level Rise	Water Stress	Avalanche	Landslide	Subsidence	Coastal Erosion	Soil Degradation	Soil Erosion	Solifluction
36	36	Water collection, treatment and supply																												
37	37	Sewerage																												
38	E	Waste collection, treatment and disposal activities; materials recovery																												
38.1	38	Waste collection																												
38.11	38.1	Collection of non-hazardous waste																												
38.12	38.1	Collection of hazardous waste																												
38.2	38	Waste treatment and disposal																												
38.21	38.2	Treatment and disposal of non-hazardous waste																												
38.22	38.2	Treatment and disposal of hazardous waste																												
38.3	38	Materials recovery																												
38.31	38.3	Dismantling of wrecks																												
38.32	38.3	Recovery of sorted materials																												
39	39	Remediation activities and other waste management services																												