European Commission

Study on energy technology dependence

Executive summary

Independent Expert Report

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Research and Innovation

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1 Introduction

The deliverables of this study include a set of relevant definitions on the concept of energy technology dependence (ETD), a methodology for assessing energy technology dependencies, and policy recommendations for addressing such dependencies. The following definitions were applied.

In the context of European energy technology dependence, we define ***dependency*** as:

> *Reliance on an energy technology good, service, component or input that is primarily supplied from outside Europe.*

We further define a ***critical dependency*** as:

> *Where the extent of the external dependence is assessed as high (>70% reliance on non-EU suppliers) and where the supplier market is concentrated in the hands of few firms or countries (market share of four largest countries or companies >70%), giving them market power and the ability to influence availability and price.*

A critical dependency creates the conditions for potential *threats* to European energy technology interests, defined as:

- Increasing the cost of meeting European climate and energy objectives.
- Reducing productivity and employment in the European energy industry.
- Limiting the potential for European technology leadership.

The methodology developed and applied consists of a broad brush assessment for an initial review of critical dependencies and a detailed assessment for a more thorough understanding on critical dependencies and the associated risks. The broad-brush assessment has been conducted for 13 energy technology families[1]. Based on the results, three energy technologies were selected for a detailed assessment: wind energy, solar PV and battery storage. Potential mitigation measures and policies for the critical dependencies were examined and recommendations for a further strengthening of existing EU policies were provided.

This executive summary is structured into the following chapters:

1. Introduction
2. Broad brush assessment: methodology and results
3. Detailed assessment: methodology and results
4. Policy recommendations

[1] Bioenergy, CO2 capture, CO2 storage, CO2 utilisation, Energy storage, Flexible conventional thermal power plants, Geothermal energy, Hydropower, Hydrogen & fuel cells, Ocean energy, Solar energy, Wind energy, Heat pumps

For more detailed information on the results of this study, please refer to the separate deliverable reports that will be made available at the website of the European Commission.

2 Broad brush assessment

2.1 Methodology

The broad brush assessment aimed to identify critical dependencies for the 13 energy technology families in scope and to assess the importance of these dependencies for EU energy objectives, in particular security of supply and industrial competitiveness. Our methodology consisted of three stages:

1. **Identification and assessment of critical dependencies**: a literature review conducted by technology experts to identify dependencies and provide a high level assessment on the criticality of these dependencies based on import dependence and market concentration.
2. **Assessment of importance for EU security of supply and industrial competitiveness:** a quantitative analysis on installed capacity (EU and global), expected capacity additions until 2030 (EU and global), EU share of global patent applications and EU share of global publications. Technologies with high current and expected capacities in the EU and globally as well as a strong EU knowledge position justify stronger efforts to mitigate critical dependencies than technologies with only limited capacities and /or a weak knowledge position, because of the former technologies' higher relevance for the security of supply and industrial competitiveness objectives.
3. **Prioritisation of energy technologies:** an expert assessment to prioritise the energy technologies in terms of the need for managing dependencies. This assessment was built on the outputs of stage 1 and 2 while recognising that some degree of expert judgment would be needed to arrive at a prioritisation of energy technologies.

Based on this assessment, a selection of energy technologies to be studied in detail in the next stage of the project was proposed.

2.2 Results

The broad brush assessment resulted in a firm recommendation for a detailed assessment on the following three technologies:

1. **Wind energy** stands out as a technology with relatively high current installed capacities and high expected capacity additions both for the EU and worldwide. Furthermore, the EU knowledge position for wind energy is very strong with approximately 50% of publications originating from Europe, signalling a sound basis to maintain a position of global leadership for this technology. Furthermore, the dependency on neodymium and dysprosium poses a significant dependency risk, in particular for offshore wind.
2. **Solar PV** stands out as a technology with high installed capacities and capacity additions and a relatively high external dependence on components such as solar cells and modules. The shares of global publications and patents do not indicate for the EU such a strong knowledge position as for wind energy, but still provide a strong knowledge basis to build a globally competitive industry on.
3. **Battery energy storage** stands out as having several potentially critical raw material dependencies and also a critical dependency on cell manufacturing

capacities. Combined with the uncertain but potentially strong increase in capacities, an in-depth assessment of critical dependency issues was firmly recommended.

3 Detailed assessment

3.1 Methodology

The detailed assessment for wind energy, solar PV and battery energy storage technologies aimed to:

- validate the critical dependencies identified in the broad brush assessment;
- identify additional critical dependencies; and,
- assess the risks associated with these critical dependencies.

This assessment has been performed through literature review, data analysis and by interviewing industry representatives within the three sectors. Resulting inputs have been used to identify additional dependencies and to assess all identified dependencies based on the following six criteria:

1. **EU external dependence**: measures the percentage of imports compared to total EU consumption and thereby provides an indication of the reliance on supply from outside the EU. Dependencies are only considered critical if the EU relies on non-EU suppliers for a more than 70% of the EU consumption.
2. **Market concentration**: measures the market share of the four largest countries and/or companies to provide an indication of the level of concentration of the supplier market. Dependencies are only considered critical if the EU relies on a limited number of companies or countries for its supply. If the market share of the four largest countries or companies (CR4) is higher than 70%, the market concentration is considered high.
3. **Political risk**: measures the risk of foreign exchange shortages, wars, revolutions, natural disasters and arbitrary government actions in the main supplying countries. High political risk increases the risk of supply disruptions and therefore increases the risk associated with the dependency.
4. **Ease of market entry**: measures the ease with which new companies can enter the market. A higher ease of market entry reduces the risk of dependencies as additional sources of supply can be developed more easily in case of supply disruptions.
5. **Availability of substitutes**: measures the availability of substitutes for the good, service, component or input for which a dependency exists. If appropriate substitutes are available on the market, it is easier to switch to these substitutes in case of supply disruptions, reducing the risk of the dependency.
6. **Competitiveness trends**: measures the evolution of the competitiveness of the EU industry for the dependency. If the EU industry consistently loses market share, the dependency is expected to become worse, leading to a stronger need for mitigation measures and policy intervention.

3.2 Results: wind energy

The broad brush assessment for wind energy suggested critical dependencies for the raw materials neodymium and dysprosium. The interviews with industry representatives suggested additional potentially critical dependencies for high voltage direct current (HVDC) insulation materials, fibreglass and insulated gate bipolar transistors (IGBTs). The results of the detailed assessment for these (potential) dependencies are presented in Table 3-1 below.

Table 3-1 Summary of detailed assessment on dependencies for wind energy

Dependency	EU external dependence	Market concentration (CR4)	Political risk	Ease of market entry	Availability of substitutes	Competitiveness trends
Neodymium	>99%	99%	Low	Low	No/limited	Not applicable
Dysprosium	>99%	99%	Low	Low	Yes - in progress	Not applicable
HVDC insulation materials	Low	91%	Low	Medium	Yes - in progress	Stable
Fibreglass	>35%	87%	Low	Medium	Yes - available	Declining
IGBTs	Low	70%	Low	High	No/limited	Stable

Based on these results, we draw the following conclusions:

Neodymium and dysprosium are the main critical dependencies for the EU in the wind energy sector

The criticality of the dependencies for neodymium and dysprosium is confirmed. For both materials the EU is fully reliant on non-EU suppliers that are heavily concentrated in a few countries. The risk is somewhat alleviated by the low political risk associated with the main supplying countries. However, barriers to market entry and the lack of suitable substitutes, in particular for neodymium, result in a high risk of these dependencies overall. This holds in particular since China is in both cases by far the dominant supplier. Whereas the political assessment for this country gives an overall low political risk, past market conflicts regarding solar PV (with the EU) and rare earth metals (with Japan) suggest that additional mitigation measures for these two raw materials might be appropriate.

For fibreglass, current dependencies give some reason for concern, but there is no urgent need for action

For fibreglass there is a limited external dependence but a declining competitive position of the EU industry which may result in an increasing reliance on imports. But since there are good substitutes available (e.g. carbon fibre) that could become the new standard in the future, at present there is no need to manage this dependency actively.

HVDC insulation materials and IGBTs are not considered critical dependencies

The suggested dependencies on HVDC insulation material and IGBT suppliers are not considered critical per the criteria used in this study, because both materials/components are primarily supplied from EU-based factories and there is no sign of declining competitiveness of the EU industry.

3.3 Results: solar PV

The broad brush assessment for solar PV suggested critical dependencies for solar cells and solar modules. Interviews with industry representatives suggested that a potential additional critical dependency for inverters may be emerging. The results of the detailed assessment for these (potential) dependencies are presented in Table 3-2 below.

Table 3-2 Summary of detailed assessment on dependencies for solar PV

Dependency	EU external dependence	Market concentration (CR4)		Political risk	Ease of market entry	Availability of substitutes	Competitiveness trend
		Country	Firm				
PV Cells	> 90%	93%	<40%	Low	Low	High	Stable
PV Modules	65-80%	87%	34%	Low	Medium	High	Stable
PV Inverters	0%	78%	50-60%	Low	Medium	High	Stable

Based on these results, we draw the following conclusions:

Solar PV cells are confirmed as a critical dependency

The criticality of the dependency for solar cells is confirmed. The EU imports most of its solar PV cells and despite the minimum import prices that were in effect between 2013 and 2018 and the resulting diversification of countries supplying the EU, the global supplier market for solar cells remains concentrated in a few countries (China and Taiwan in particular). The detailed assessment further reveals some factors that reduce the risk of this dependency, such as the lower concentration in terms of companies, the low political risk associated with the supplying countries and the high availability of substitutes, but also some factors that increase the risk of the dependency such as the low ease of market entry. Overall, we conclude that solar cells are a critical dependency with a medium risk associated with it.

Solar PV modules are also a critical dependency, albeit slightly less critical than solar cells

For solar modules, the results are largely similar to solar cells.[2] The main difference that the EU has a slightly stronger position in module manufacturing and hence a lower external dependence. Furthermore, the market concentration for modules is slightly lower and it is easier to enter the market. Overall, we conclude that solar modules are a critical dependency per the definitions used in this study, but with a relatively low risk associated with it.

For solar inverters there is a strong EU industry and no dependency on external suppliers

For solar inverters the potential dependency or emergence of a dependence reported by industry experts was not confirmed by our analysis. The EU has no external dependence for inverters and retains a strong competitive position in this market. Hence, there is no critical dependency and no need for policy intervention.

[2] Important to note is that the dependency on cells and modules is highly linked as module manufacturing is primarily the process of assembling cells into a larger module. The main effect of increasing the EU share of module manufacturing without increasing the EU share of cell manufacturing would therefore be to shift the dependence from cells to modules, without much of a significant impact on the overall EU critical dependency risks.

3.4 Results: battery energy storage

The assessment for battery storage focused on Li-ion technology due to its dominance in terms of performance, maturity, market share and predicted market growth. In the broad brush assessment, critical dependencies for cobalt and battery cells were suggested. Furthermore, interviewees mentioned cathode substrate and battery recycling as potential dependencies and a potential dependency on lithium was considered due to its essential role for Li-ion technology. But after an initial review the criticality of these potential dependencies (i.e. the EU external dependence and the market concentration), no evidence for a critical dependency was found and it was therefore decided that there was no need for a full detailed assessment on lithium, cathode substrate, and battery recycling.

The detailed assessment of the dependency for cobalt was carried out for raw and refined cobalt separately to pinpoint more accurately where critical dependencies exist. The results of these assessments and the battery cells assessment are presented in Table 3-2 below.

Table 3-3 Summary of detailed assessment on dependencies for battery storage

Dependency	EU external dependence	Market concentration (CR4 Country)	Political risk	Ease of market entry	Availability of substitutes	Competitiveness trend
Raw Cobalt	>99%	72%	High	Low	Low	Not applicable
Refined Cobalt	32%	71%	Low	Low	Low	Not available
Battery Cells	High	95%	Low	Low	Medium	Stable

Based on these results, we draw the following conclusions:

Raw cobalt is a critical dependency for the EU battery storage sector

The detailed assessment confirms the criticality of the dependency on raw cobalt that was suggested in the broad brush assessment. The EU is completely reliant on non-EU suppliers that are strongly concentrated in a few countries. The risk is heightened by the political risk associated with the main supplying country (Democratic Republic of the Congo) along with the difficulties to enter the market and the lack of suitable substitutes for the current battery technologies.

Refined cobalt is no critical dependency but maintaining the EU industry is of strategic importance

The detailed assessment showed that EU production capacities for refined cobalt are sufficient for meeting the EU demand. Finland and Belgium have considerable refining capacities, ranking 2nd and 6th globally. Hence, there is no critical dependency for refined cobalt. Maintaining this strong position is of strategic importance for the EU battery storage industry, as the global market is relatively concentrated and substituting cobalt with other materials has substantial downside in terms of performance and safety.

Battery cells are a critical dependency but with a relatively low risk

The critical dependency for battery cells is confirmed through our detailed assessment, as the EU imports a large share of its consumption from a relatively concentrated market.

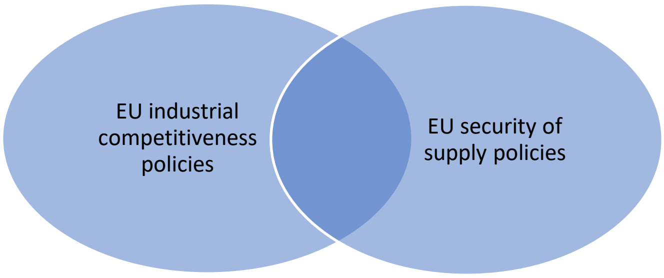
However, the high market concentration ratio in terms of countries (95%) is somewhat misleading, since there are large capacities in the top 4 countries (China, Japan, South Korea and the US), all of which are politically stable. In conclusion, we consider the risk of this critical dependency relatively low.

4 Policy recommendations

As a final step in the project, we conducted an analysis of existing EU technology dependence mitigation policies. The aim was to identify the need for additional EU policies to mitigate the critical dependencies and their associated threats that were identified in this project.

Two main areas of EU mitigation policies were examined, by means of an analysis of existing EU policies and by an analysis of academic literature on these topics: EU security of supply policies on one hand, and EU industrial competitiveness policies on the other hand. It was found that potential policies in these two areas largely, but not completely, overlap (Figure 4-1). Furthermore, within the field of security of supply policies a distinction was found between preventive policies aimed at the mitigation of potential dependency threats before they could occur, and crisis management and containment policies directed at emergency measures in the case of acute supply disruptions.

Figure 4-1 Schedule of energy technology dependence mitigation policies



The identification of potential dependency mitigation measures therefore led to a framework for analysis distinguishing between four main categories of possible policies:

- measures directed at industrial competiveness only;
- measures directed at industrial competiveness and security of supply;
- preventive measures directed at security of supply only; and,
- crisis management measures directed at security of supply only (Table 3-1).

Based on this framework, possibilities for mitigating the critical dependencies found for wind energy, solar PV and battery storage technologies were examined.

Table 4-1 Main dependency policies in relation to EU technology leadership and security of supply

EU industrial competitiveness only	EU industrial competitiveness and security of supply	Security of supply only - prevention	Security of supply only - crisis management
○ Demand support, price measures, subsidies, taxation; ○ Trade measures, export support	○ EU-based research, development & innovation (RD&I) for substitution; ○ EU-based assembly and production; ○ EU-based recycling facilities; ○ Increased efficiency / produce for re-use; ○ Improving EU access to global markets	○ EU-based primary materials production; ○ Diversification of countries of origin	○ Emergency stocks; ○ Diversity of energy sources, flexible infra-structures; ○ Crisis preparation plans

4.1 Policy recommendations for wind, solar PV and battery storage

Detailed assessment of possible policy measures resulted in several policy recommendations to mitigate the main critical dependencies found for wind, solar PV and battery storage. In these policy recommendations, a distinction was made between *main recommendations* that are considered to provide EU industrial competitiveness and security of supply benefits, and *secondary recommendations* with only security of supply impacts.

4.1.1 Wind

The European Union at this moment holds an important position in the global wind turbine market, with Vestas, Siemens Gamesa, Enercon and Nordex as European companies ranking among the top-10 turbine manufacturers. For the sake of European technology leadership it is important that this position is retained and, if possible, strengthened. For that purpose, the key dependencies found in this study should be addressed.

Our **main recommendations** to address the identified dependencies in the wind energy area are:

– Expand EU RD&I for neodymium and dysprosium substitutes, most urgently for neodymium. Possibly this could be done in cooperation with Japan and the US as partners **(neodymium/dysprosium)**;
– Examine low-cost opportunities for small-quantity recycling, in particular for neodymium and dysprosium **(neodymium/dysprosium)**;
– Strengthen the Raw Materials Initiative by implementing separate expert groups on neodymium and dysprosium **(neodymium/dysprosium)**;
– Stimulate the development of RD&I and EU markets that can provide an alternative to fibreglass, in particular carbon fibre **(fibreglass)**;
– Stimulate further development of domestic offshore wind energy markets and favourable market conditions for EU based suppliers of high-voltage insulation materials **(HVDC/IGBT)**; and,

- Stimulate the continued development of possible substitutes for Cross-Linked Polyethylene (XLPE) such as Ethylene Propylene Rubber (EPR) and P-laser **(HVDC/IGBT)**.

Our **secondary recommendations** for wind energy are:

- Further examine mining options within the EU, in particular considering strict EU environmental legislation, addressing possible local and national public resistance and investigating possibilities for stop-and-go mining **(neodymium/dysprosium)**;
- Strengthen multilateral and bilateral trade policy efforts to balance the market power of China as a near-monopoly supplier of neodymium and dysprosium **(neodymium/dysprosium)**;
- Expand trade relations with neodymium and dysprosium suppliers other than China, for instance Australia **(neodymium/dysprosium)**; and,
- Consider stockpiling of neodymium and dysprosium, but only as a last resort option to reduce current dependencies **(neodymium/dysprosium)**.

4.1.2 Solar PV

Although the EU solar PV industry has lost considerable market share in the past decade, there are opportunities for rebuilding the industry. These opportunities exist in parts of the value chain and market segments where differentiation plays a relatively large role, such as equipment and inverter manufacturing and tailored PV products, such as building integrated PV. Furthermore, the commercialisation of novel PV technologies could offer opportunities to rebuild the industry.

Our **main recommendations** to address the identified dependencies in the solar PV area are:

- Stimulate RD&I focused on the development of improved materials efficiency in solar cell and module technology, with a focus on developing EU competitive advantage. This may include supporting the development of complementary technologies, such as High Concentration Photovoltaics **(solar cells/modules)**;
- Increase public support for solar PV design-for-recycling RD&I, with a focus on developing EU competitive advantage in this area **(solar cells)**;
- Increase public support for the development of cutting-edge niche innovations in the solar PV sector, including substitutes such as perovskite **(solar cells)**; and,
- Stimulate industry policy supporting the retention of EU inverter supply and reversal of the expected shift of inverter production towards Asia, including diversification of the current EU supply base of only two major suppliers **(solar inverters)**;

Our **secondary recommendations** for solar PV are:

- Establish a supportive governance framework to stimulate diversification and upscaling of EU solar cell and module manufacturing and assembly, in particular focusing on improving ease of market entry within the EU while at the same time guaranteeing the supply from diverse Asian partners **(solar cells/ modules)**;
- Strengthen the implementation of EU Competition Law to prevent the emergence of dominant market players **(solar cells/ modules/ inverters)**.

4.1.3 Battery Energy Storage Technology

Battery Energy storage technologies represent a crucial market in which the EU should be involved for future EU energy technology leadership, in particular since this sector will be indispensable for balancing the future low-carbon electricity grid and for the electrification of transport. The European Battery Alliance launched in 2017 and the Strategic Action Plan for Batteries highlight the importance assigned by the EU to this prospective 250-billion-euro market.

Our main recommendations to address dependencies in the field of battery storage technology are:

- Increase the collaboration between the EU and other regions (e.g. the US) on sharing knowledge on mapping raw materials reserves, as well as investigate economic approaches to expanding mineral sources in other countries **(cobalt)**;
- Consider including cobalt in the EU's Conflict Minerals Regulation, to further enhance attention to the reduction of supply chain risk **(cobalt)**;
- Increase EU funding for the development of alternatives to the current status-quo in battery design, potentially allowing for alternative raw materials to be used **(battery cells/ cobalt)**;
- Strengthen the current EU Battery Alliance by stimulating an Airbus/ITER like technology coalition on battery storage **(battery cells)**;
- Dedicate regulatory and policy attention to the growth of cell producers in Eastern Europe, particularly with regard to ensuring equal distribution of the benefits of investments in this sector throughout the EU **(battery cells)**;
- Develop structured EU investments to ensure open data sharing in the battery sector and to help ensure that intellectual property aspects do not constrain developments in the sector, particularly for new market entrants **(battery cells)**;
- Provide further support to private investors and new potential entrants to battery cell manufacturing **(battery cells)**; and,
- Stimulate EU incentives for and investment in battery recycling industry to avoid future dependency on Asia (or other regions) for battery recycling **(battery cells)**.

Our secondary recommendations regarding battery storage dependencies are:

- Develop a legally binding form of the EU Strategic Action Plan on batteries to ensure longevity of strategic actions, particularly with regard to the sourcing of materials and the eventual waste flow **(battery cells)**;
- Increase EU financing for the development of recycling centres in the EU **(battery cells)**; and,
- Increase EU investment in specialist battery research centres particularly on the subject of recycling, for example the Munster University 'MEET' centre **(battery cells)**.

4.2 General recommendations and actions

4.2.1 There is an increasing role for EU industry policies in energy technology dependence mitigation

We see 3 main trends to set the scene for future low-carbon energy technology dependency mitigation policies:

1. a gradual replacement of imported fossil fuels by locally available flow commodities like hydro, wind and solar power,

2. a shift from bulk and relatively low-tech to high-tech energy supply applications,
3. a shift in policy attention from crisis management to preventive policies.

We believe that the process of change towards a low-carbon energy sector in the EU and elsewhere provides an unique opportunity for the EU energy industry to obtain a leading position in future energy markets that can, at the same time, substantially contribute to mitigating future energy technology dependencies.

4.2.2 Circular economy should be the design principle for energy technology dependence mitigation

It is clear that the integrated assessment of security of supply and EU industrial competitiveness also shows that **many future low-carbon energy technology dependencies are likely to be found not only in the raw materials, but also in the components and pre-assembly stage**. Setting up appropriate collection, re-use and recycling facilities not only for raw materials but also for components is likely to substantially contribute to mitigating future energy dependencies. Here, a crucial difference with fossil fuel energy dependency becomes apparent: whereas fossil fuels are burnt and are therefore single-use by nature, all critical components in a low-carbon energy sector can in principle be re-used or recycled. **Stimulating a circular economy with as high as possible re-use and recycling rates is therefore a crucial design principle for mitigating future energy dependencies.**

4.2.3 We should develop Integrated energy dependency assessments

Our recommendation is to develop an **integrated low-carbon energy technology dependency mitigation strategy** consisting of:

- **Foresight:** Making a strategic and forward-looking energy technology dependence assessment as carried out in this study part of the already existing reporting obligations for the EU under the Better Regulation Guideline;
- **RD&I measures:** Focusing future Horizon Europe calls as well as SET Implementation plans on energy dependency RD&I in all value chain phases, particularly also on on-site integration, re-use and recycling, as well as on upscaling and EU industry development and employment aspects of innovations;
- **Demand-side measures:** Contributing to a stable home market for EU-based energy technologies by more strongly promoting and branding 'made in Europe' low-carbon energy technology;
- **Supply-side measures:** Expanding tailored clustering support and market differentiation per industry segment building on the examples of the European Battery Alliance and the Energy Technology & Innovation Platforms;
- **Trade measures:** Stimulating the development of open energy technology markets and multilateral trade agreements and addressing existing public resistance against these;
- **Other dependency mitigation measures (without benefits for EU industrial competitiveness):** Stimulating transparency of resource flows and promoting environmentally and socially responsible mining inside and outside the EU as well as strategic assessment on an EU level of Member States' contingency planning for future energy dependency crises.

4.2.4 Policy coordination and action

As many actors and networks are already involved in the mitigation of energy technology dependence there is a need for policy coordination and action.

Action 1: Strategic energy technology dependence foresight

Integrated strategic energy technology dependence foresight as carried out in this study is an EU internal strategic action that serves to inform the DGs about trends and changes regarding critical energy dependencies. The action can be carried out as an Impact Assessment as outlined in the Better Regulation Guidelines and could be based on existing reporting obligations under the EU Energy Union Governance Regulation.

Action 2: Targeted energy dependency RD&I and upscaling

Addressing specific RD&I actions for mitigating energy technology dependence, such as more focus on the critical raw materials identified, on opportunities for improved re-use and recycling in general and on upscaling that considers product differentiation into sheltered (e.g. building-integrated) markets with wider employment impacts, could best be done by DG RTD.

Action 3: Branding 'made in Europe' energy technology

Branding 'made in Europe' energy technology is an action that could help to generate a stable home market for energy technologies produced in the EU, next to all actions to stimulate an EU low-carbon energy technology market that are already in place. The Secretariat General could coordinate such a wider campaign after political consultation of the MS Governments.

Action 4: Airbus-like industry coalitions and networking

The European Battery Alliance is considered by the Commission to be an 'Airbus-like' initiative[3] that brings together all relevant parties in this very important market for EU industrial competitiveness. In order to stimulate the development of new, differentiated markets that are not only based on cost competition in other energy technologies as well, similar initiatives could be stimulated that bring together parties that do not automatically find each other.

Action 5: Stimulating open markets and addressing public concerns against free trade

Against global trends that seem to indicate coming times of more market protection and trade conflicts, the European Union is still a proponent of reducing global trade barriers. Many multilateral and bilateral actions are already undertaken in this respect, which also help to reduce energy dependencies by improving market access for European companies.

[3] http://europa.eu/rapid/press-release_STATEMENT-17-3861_en.htm

The overarching objective of this study was to better understand the dependence of the European Union on energy technologies and to specifically consider the impact of this dependence on the security of energy supply in the EU and on the EU objective of becoming a world leader in renewable energy technologies. The deliverables of this study include a set of relevant definitions on the concept of energy technology dependence (ETD), a methodology for assessing energy technology dependencies, a broad brush and detailed assessment of current energy technology dependencies, and policy recommendations for addressing such dependencies. This document is the executive summary of the full study.

Studies and reports

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