1. EU targets, actions and aspects of transition (*Making our energy system fit for our climate targets*
2. GHG emissions: The Climate Law[[1]](#footnote-1):

* the objective of achieving a climate-neutral EU by 2050[[2]](#footnote-2): no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use (Fit for 55)
* an ambitious 2030 climate target of at least 55% reduction of net emissions of greenhouse gases as compared to 1990, with clarity on the contribution of emission reductions and removals (also in Green New Deal)[[3]](#footnote-3).

1. Renewables:

* The revised Renewable Energy Directive EU/2023/2413 raises the EU's binding renewable target for 2030 to a minimum of 42.5%, up from the previous 32% target, with the aspiration to reach 45%. It means almost doubling the existing share of renewable energy in the EU. The directive entered into force in all EU countries on 20 November 2023.[[4]](#footnote-4)

1. Energy efficiency

The Energy Efficiency Directive requires Member States to collectively ensure that energy consumption is reduced by at least 9% by 2030 compared to the 2020 reference scenario. This 9% target is equivalent to the 39% and 36% energy efficiency targets for primary and final energy consumption included in the Climate Target Plan, but is simply measured against updated baseline projections made in 2020.

**Member States will contribute to achieving the overall EU target through indicative national contributions based on benchmarks of a combination of criteria, which reflect each country's national circumstances.** These include energy intensity, GDP per capita and energy savings potential to complement the fixed rates of energy reduction. Enhanced ‘gap-filling mechanisms' will be triggered when countries fall behind in delivering their national contributions.

1. Energy Security: In terms of external energy security, the EU remains dependent on imports for half of its primary energy consumption, but has diversified its supply routes, notably for natural gas. Regional cooperation is crucial in this respect. In their NECPs, seven Member States (Bulgaria, Italy, Estonia, Germany, Poland, Croatia, and Ireland) are considering or planning further LNG capacities to ensure supply security or increase competition on the gas markets
2. More specific sectoral targets in **Renewable Energy Directive:**

* It increases the renewable targets:
  + for transport (13% greenhouse gas intensity reduction)
  + for heating and cooling (annual binding increase of 1.1 percentage point at national level)
* It establishes indicative targets:
  + for industry (1.1 percentage point annual increase in renewable energy use)
  + for buildings (at least 49% renewable energy share)
* The Directive also gives an additional push to advanced biofuels and introduces sub-targets for renewable hydrogen and hydrogen-based synthetic fuels:
  + in transport (2.6% for renewable fuels of non-biological origin)
  + in industry (50% renewable share in hydrogen consumption)

1. **Socioeconomic impacts (as in Assessment of national energy plans)[[5]](#footnote-5)**
   1. **Jobs in renewables – technology and infrastructures**
   2. **Brown jobs**
      1. **Extractive industries:** hard coal, lignite, peat or oil shale)
      2. **Carbon-intensive industries (also: energy-intensive industries):** cement, steel, aluminium, fertiliser or paper production
   3. Research, innovation and competitiveness
   4. **Biodiversity, pollution and environmental policies**
2. **How to achieve it?**

*The energy sector accounts for 75% of the EU's greenhouse gas emissions. Saving energy through energy efficiency measures and the massive scale up of renewable energy are key to decarbonising the economy – whether in buildings, industry, transport or other sectors. Both measures directly reduce emissions, air pollution and dependency on fossil fuels.*

Going C L I M A T E - N E U T R A L by 2050. The European Commission’s vision outlines seven main strategic building blocks:

1. maximise the benefits of energy efficiency, including zero emission buildings;

2. maximise the deployment of renewables and the use of electricity to fully decarbonise Europe’s energy supply;

3. embrace clean, safe and connected mobility;

4. a competitive EU industry and the circular economy as a key enabler to reduce GHG emissions;

5. develop an adequate smart network infrastructure and interconnections;

6. reap the full benefits of bioeconomy and create essential carbon sinks;

7. tackle remaining CO2 emissions with Carbon Capture and Storage (CCS).

**Pathways:**

• achieve GHG emissions reductions between 80 % and 100 % compared to 1990, the latter representing a climate-neutral economy by 2050;

• build on ‘no regret’ policies like strong use of energy efficiency and renewable energy but varying the intensity of the application of electrification, hydrogen and e-fuels, as well as end-user energy efficiency and the role of the circular economy;

• show that a vibrant EU economy can be combined with ambitious climate policy targets, even with existing technologies.

**Transition in GND. Aspects:[[6]](#footnote-6)**

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**Old strategies:**

* Energy 2020: *With its Energy 2020 strategy for competitive, sustainable and secure energy COM/2010/0639), the EU aimed to reduce greenhouse gas emissions by at least 20%, increase the share of renewable energy to at least 20% of consumption and achieve energy savings of 20% or more by 2020. All EU countries should also achieve a 10% share of renewable energy in their transport sector. In their national renewable action plans, they explained how they intended to achieve these goals by 2020.*
* Asessment of NECPs[[7]](#footnote-7)

1. **Major dimensions of transition: in each specific chances and threats**
   1. Energy generation (sources mix, infrastructure, efficiency)
   2. Production sector (its energy requirements, resources and productivities, employment structures, competitiveness)
   3. Consumption (level, patterns, distribution)
2. **Factors of vulnerability / opportunities:**
3. Total emissions per capita (alternatively: emissions except for the energy and industry sectors – since these sectors are included in other variables)
4. Energy-mix – source of domestically produced energy: (i.e. how far an economy is from EU targets)
   1. Share of renewable energy in energy mix
   2. Share of fossil fuel energy in energy mix
   3. Also: *climate conditions potential for renewables* – number of sunny or windy days
   4. To consider: *share of nuclear* – as a potential carbon-free stabilizer of renewables)
5. Energy productivity (the higher, the lower the share of GDP necessary to devote to transition itself)
   1. GDP per capita (in PPP or in EUR) per unit of energy
6. Energy security: (need to pay other countries for domestically consumed energy)
   1. *Share of net-imported energy – trade balance in energy quantities, as percentage of energy consumption*
   2. ~~Share of imported fossil fuels~~
7. Existing assets and labor (and their income requirements):
   1. Workers in fossil extraction as % of total employment
   2. Workers in carbon-intensive industries, as in: <https://cedelft.eu/wp-content/uploads/sites/2/2021/03/CE_Delft_180046_Carbon_intensities_energy_intensive_industries_DEF.pdf>
   3. To some extent also: fixed assets (or even better: equity) in brown industries
8. Necessary infrastructure (machinery, appliances) to introduce transition to renewable energy:
   1. Capacity to produce and export such goods (or: need to import) – employment and revealed comparative advantage in exports (or better: in net exports) of:
      1. Narrow: renewable energy goods
      2. Broad: green goods (also: circular economy, electric mobility etc.).
   2. Technological capacity (patents) – green patents per capita.
9. Broader view – potential adjustments in the sphere of production and trade (capacity to “purchase the transition” by means of country’s exports)
   1. *Average productivity (GDP per capita ppp)*
   2. *Position in International Division of Labor*
      1. *Real effective exchange rate*
      2. *Technology advantages (economy-wide)*
      3. *Economic-complexity index*

1. [**https://climate.ec.europa.eu/eu-action/european-climate-law\_en**](https://climate.ec.europa.eu/eu-action/european-climate-law_en) [↑](#footnote-ref-1)
2. <https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en> [↑](#footnote-ref-2)
3. <https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF> [↑](#footnote-ref-3)
4. [**https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets\_en**](https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en) [↑](#footnote-ref-4)
5. [**https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0564**](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0564) [↑](#footnote-ref-5)
6. <https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF> [↑](#footnote-ref-6)
7. The assessment of NECPs shows that the share of renewable energy could reach, under existing and planned measures, a range of 33.1 to 33.7% in 2030 at Union level surpassing the target of at least 32% in 2030. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0564> [↑](#footnote-ref-7)