European Environment Agency

8th Environment Action Programme

Share of energy consumption from renewable sources in Europe

8TH EAP HEADLINE INDICATOR, 2025

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Share of energy consumption from renewable sources in Europe

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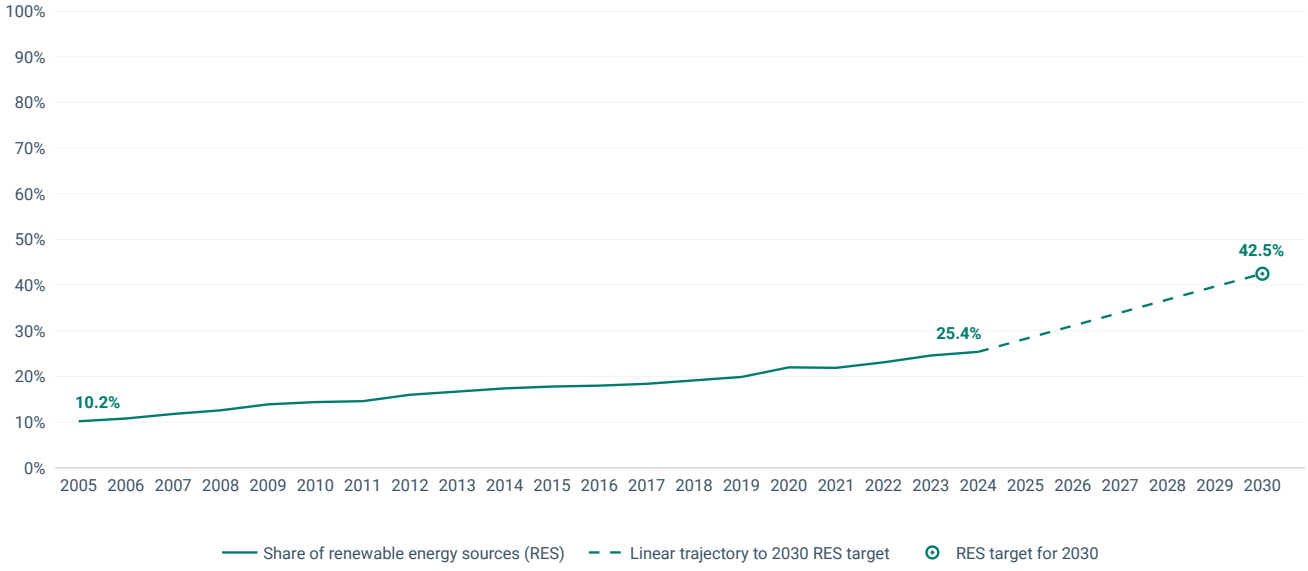
In 2024, 25.4% of all final energy consumed in the European Union was obtained from renewable sources, about one percentage point more than in 2023. This increase was largely driven by growth of solar and wind power, followed by heat pumps. The share of renewables in Europe is expected to grow further. Meeting the new minimum EU target for renewable sources of 42.5% by 2030 will require doubling the rates of renewables deployment seen over the past decade, and a deep transformation of the European energy system.

Figure 1. Progress towards renewable energy source targets for EU-27



Renewable energy sources (RES) have multiple **benefits** for society compared with fossil fuels, such as mitigating climate change, reducing the emission of air pollutants and improving energy supply security. The revised Renewable Energy Directive increases the binding target for 2030 from 32% to a minimum of 42.5% share of renewables in EU energy consumption, with the aim of achieving 45%. Each Member State will contribute to this common target. No binding national targets have been set.

At 25.4% in 2024, the share of renewables in the EU is estimated to have **increased** by almost one percentage point from 2023. The increase is slightly lower than the average annual pace of growth recorded in the previous five years. The Fit-for-55 EU policy package and higher EU ambitions introduced by the RepowerEU plan, leading to the adoption of the revised Renewable Energy Directive, are especially relevant to eliminate the EU's dependency on Russian fossil fuels, in response to Russia's invasion of Ukraine.

In absolute values, the gross final consumption of renewables grew by an estimated 8.7 million tonnes oil equivalent (Mtoe) between 2023 and 2024, driven by a substantial increase in solar power (by 19%) and wind power generation (by 6%).

Non-renewables saw a smaller reduction than in previous years, of only 1%, linked to lower energy supply from coal and higher output from nuclear energy.

The electricity system continued to lead decarbonisation efforts in 2024, with 47% of all EU power generated from renewable sources. It was followed by heating and cooling (27%) and transport (11%), where renewable energy from heat pumps (+6%) and renewable electricity consumption in road transport (+27%) increased notably, compared to 2023.

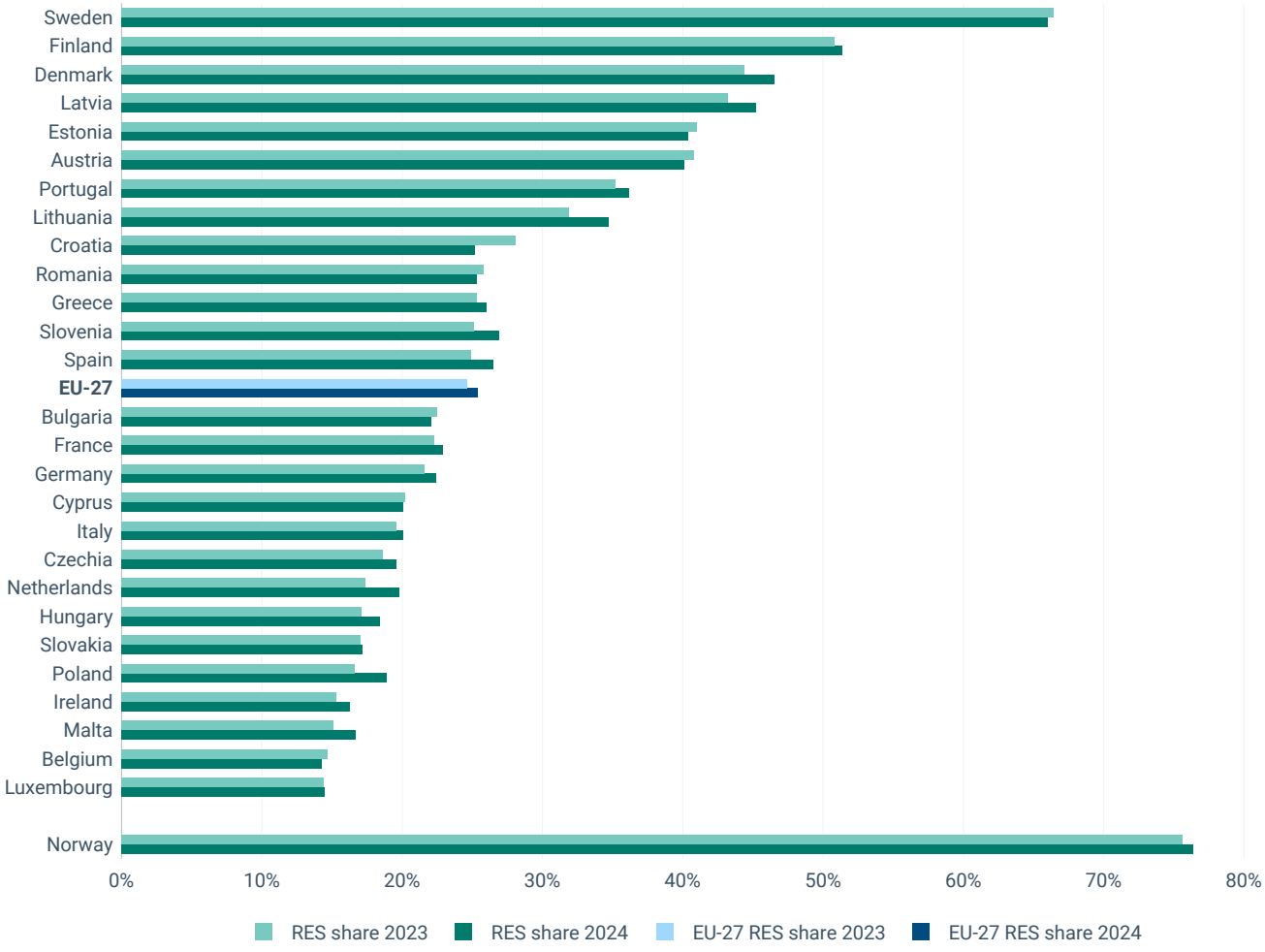
Solid, gaseous and liquid biomass fuels together formed the **largest category** in 2024, totalling 46% of all renewable energy consumption (49% when including municipal solid waste) [1].

Wind (18%), hydro power (12%) and solar photovoltaics (11%) were the other three largest renewable energy sources, followed by heat pumps and liquid biofuels (both with 8% share of all renewable energy use). Other renewables sources were biogases, renewable waste, geothermal and solar thermal.

Looking at **long-term trends**, the RES share more than doubled between 2005 and 2024. This was driven by dedicated policies and support schemes, as well as increased economic competitiveness of renewables. The increase represents a compound annual growth rate (CAGR) of 4.0% over the last decade (4.9% since 2005).

Modelling by the IEA and Ember shows that reaching the **2030 target** of a 42.5% share of renewables is feasible if fast action is taken to improve access to capital for investments in renewables and energy efficiency. This EEA report echoes these findings and outlines levers to enhance the energy transition[2].

Figure 2. Share of energy from renewable sources, by country



Sweden, Finland and Denmark had the **highest RES shares** among Member States in 2024 due to strong hydro industries (Sweden and Finland), wind power and wide use of solid biofuels for district heating. By contrast, Luxembourg and Belgium reported the lowest deployment of renewables (15% and 14% respectively) in 2024.

Over time, Denmark, Sweden, Estonia and Finland have shown the highest growth in RES shares, with more than 23 percentage points increase since 2005. However, Croatia, Slovenia and Romania have seen an increase of less than eight percentage points since 2005.

In the short-term, renewable energy shares are estimated to have increased in 18 Member States between 2023 and 2024. Lithuania, Poland, the Netherlands and Denmark top the list, increasing their RES share by two percentage points or more in 2024.

In the European Economic Area, Norway and Iceland both have RES shares above 75%. The two countries generate most of their electricity from hydropower, while in Iceland, geothermal energy provides most of the heating.

Supporting information

Definition

This indicator measures the EU's progress towards achieving its 2020 and 2030 renewable energy targets. Gross final renewable energy consumption is the amount of renewable energy consumed for electricity, heating and cooling, and transport in the 27 EU Member States, and is expressed as a share of gross final energy consumption.

The Renewable Energy Directive (2009/28/EC) defines gross final energy consumption as the energy commodities delivered for energy purposes to final consumers (industry, transport, households, services, agriculture, forestry and fisheries), including the consumption of electricity and heat by the energy branch for electricity and heat production, and including losses of electricity and heat in transmission and distribution.

Figure 1 shows consumption of energy from renewable sources (including only certified biofuels complying with the Renewable Energy Directive (RED) sustainability criteria) as a proportion of gross final energy consumption and the recently adopted 2030 target.

Figure 2 shows the consumption of energy from renewable sources as a proportion of gross final energy consumption by country. It illustrates the progress made by the EU and its Member States in the last year.

For more information, please refer to the EEA's annual Trends and projections in Europe, Eurostat's page on renewable energy statistics, and the Commission's Energy Union reports and Climate Action Progress reports.

Methodology

Eurostat data

The renewable energy share data used for 2005-2023 were taken directly from the Eurostat SHARES tool. The SHARES tool focuses on the harmonised calculation of the share of energy consumption from renewable sources among the 27 EU Member States. This is done in accordance with the RED guidelines and is based on national energy data reported to Eurostat. The SHARES tool detailed results and manual are available online: (https://ec.europa.eu/eurostat/web/energy/database/additional-data).

Electricity generation from hydropower and wind power must be normalised to smooth the effect of weather-related variations. In the case of hydropower, the normalisation is based on the ratio of electricity generation to the installed capacity averaged over 15 years; in the case of wind power, a similar normalisation formula is applied over five years. The SHARES tool takes into account all biofuels consumed in transport between 2005 and 2010, and only biofuels certified as being in compliance with the RED sustainability criteria for the years starting from 2011.

With regard to the calculation of the gross final energy consumption for Cyprus and Malta, the derogation in RED was used. This derogation allows these countries to consider the amount of energy consumed in aviation, as a proportion of their gross final energy consumption, to be no more than 4.12%.

The discussion on individual renewable energy sources was based on Eurostat energy balances, since the SHARES tool focus on sectors, rather than individual sources. The comparison is made based on their primary energy supply.

Proxy data

Values for 2005-2023 are compiled by Eurostat and reported by Member States. An update of this indicator with EEA estimates for the previous year takes place every autumn.

Targets

The 2030 target presented in this indicator was adopted in October 2023 and is defined as a share of renewable energy in the EU's gross final energy consumption of 42.5% by 2030 with an additional "aspirational" 2.5% indicative top up that would allow to reach 45%.

Policy/environmental relevance

This indicator is a headline indicator for monitoring progress towards achieving the aims of the 8th Environment Action Programme (8th EAP). It contributes mainly to monitoring progress towards sustainable energy aspects of Article 2.f of the 8th EAP which requires: 'promoting environmental aspects of sustainability and significantly reducing key environmental and climate pressures related to the Union's production and consumption, in particular in the areas of energy, industry,

buildings and infrastructure, mobility, tourism, international trade and the food system'[3]. The European Commission Communication on the 8th EAP monitoring framework specifies that this indicator should monitor the achievement by 2030 of the EU target of 42.5% renewable energy share in gross final energy consumption[4].

The RED (2009/28/EC) and its recast directive RED II (2018/2001/EU) establish an overall policy for the production of energy from renewable sources and the promotion of its use in the EU. The RED III was adopted in 2023, introducing stronger measures and a new 2030 target for renewables, aimed at achieving climate neutrality by 2050.

Achieving the 2030 target will depend on the fast implementation of the reinforced policy and legal framework in the Member States, especially via speeding up permitting procedures, better visibility of auctions for renewables and a better integration of the different sectors. Implementation needs to be accompanied by accelerated grid developments in order to absorb more renewables and the full implementation of a guarantee-of-origin system with energy purchase agreements to allow further development of the renewable consumer market. In addition, better and more integrated planning will be required to ensure not only a high efficiency of investment and an accelerated pace of development, but also that the market penetration of these renewable sources takes into account other policy objectives such as environment protection.

The share of renewable energy consumption in final energy consumption is a broad indicator of progress towards reducing the impact of energy consumption on the environment (i.e., through decreased greenhouse gas emissions and air pollutant emissions). At the same time, impacts of increasing renewable energy consumption on landscapes, habitats and ecosystems, namely from construction, the use of water, the use of fertilisers and pesticides for biomass and biofuel crops, and the extraction of heavy metals for photovoltaic cells must also be considered.

Replacing fossil fuels with renewables results in lower carbon emissions. However, total carbon emissions are not necessarily determined by the share of renewable energy in final energy consumption, but by the total amount of energy consumed from fossil sources.

Accuracy and uncertainties

Methodology uncertainty

Officially reported renewable energy data were compiled by Eurostat using annual joint questionnaires, which are shared by Eurostat and the International Energy Agency, following a well-established and harmonised methodology. Methodological information on the annual joint questionnaires and data compilation can be found on Eurostat's web page on metadata on energy statistics.

Values concerning the prevoius year, which normally are published by EEA during the autumn, are approximate (proxies) and have been estimated by the EEA. These proxies were not obtained following the formal collection process for official statistics and are therefore less accurate and reliable than official statistics.

Notes on uncertainties in the underlying statistics and methodology:

Biomass and bio-waste, as defined by Eurostat, cover organic, non-fossil material of biological origin, which may be used for heat production or electricity generation. They comprise wood and wood waste, biogas, municipal solid waste (MSW) and biofuels. MSW comprises biodegradable and non-biodegradable wastes produced by different sectors. Non-biodegradable municipal and solid wastes are not considered renewable, but current data availability does not allow the non-biodegradable content of wastes to be identified separately, except in industry. Large data-gaps also exist regarding the energy use of wood, which further adds to the methodological uncertainty.

The electricity produced from hydropower storage systems is not classified as a renewable source of energy in terms of electricity production, but is considered part of the gross electricity consumption of a country. Hydropower and wind power generation are calculated as actual generation and normalised generation. Normalised generation is calculated using the weighted average load factor over the last 15 years for hydropower and the last five years for wind power.

The indicator measures the consumption of energy from renewable sources relative to total energy consumption for a particular country. The share of renewable energy could increase even if actual energy consumption from renewable sources falls. Similarly, the share could fall despite an increase in energy consumption from renewable sources.

Electricity consumption within a national territory includes imports of electricity from neighbouring countries. It excludes electricity produced nationally but exported abroad. In some countries, the contribution of electricity trade to total electricity consumption and the changes observed from year to year need to be looked at carefully when analysing trends in electricity from RESs. Impacts on the (national) environment are also affected, since emissions are taken into account for the country in which the electricity is produced, whereas consumption is taken into account for the country in which the electricity is consumed.

Data sets uncertainty
No uncertainty has been specified.

Rationale uncertainty
No uncertainty has been specified.

Data sources and providers

- Share of energy from renewable sources, Eurostat - European statistics
- Approximated estimates for the share of gross final consumption of renewable energy sources in 2023 (EEA 2023 RES share proxies), European Environment Agency (EEA)

Metadata

DPSIR

Response

Topics

Climate change mitigation # Energy # Renewable energy

Tags

renewable energy # Energy # 8th EAP # ENER028 # hydropower

Temporal coverage

2005-2030

Geographic coverage

Austria
Belgium
Bulgaria
Croatia
Cyprus
Czechia
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Norway
Poland
Portugal
Romania
Slovakia
Slovenia
Spain
Sweden

Typology

Policy-effectiveness indicator (Type D)

UN SDGs

SDG7: Affordable and clean energy, SDG13: Climate action

Unit of measure

Share of renewable energy in gross final energy consumption (%);

Share of energy from renewable sources (%)

Frequency of dissemination

Once a year

References and footnotes

1. More than two-thirds of bioenergy is produced from solid biomass, of which the majority is related to forest biomass. The most common uses of solid biomass are for residential heating and district heating, followed by electricity generation and (thermal) energy use in industrial processes. Increasing primary demand of forest biomass, including for supplying energy, represents one driver for decreasing forest carbon sinks in Europe (see also 'GHG emissions from LULUCF in Europe' | https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-land). Gaseous biomass (biogas) is used to replace fossil gas uses, either for combined heat and power, balancing the electricity grid, or upgrading to biomethane. Liquid biofuels are mainly used directly or blended with gasoline and diesel in transport. EU policies define sustainability and GHG emission saving criteria for bioenergy to be eligible for state aid and count towards national and the EU's renewable energy targets.
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2. The trends in the deployment of solar photovoltaics and heat pumps also provides reasons for optimism. However, reaching the target will require a challenging CAGR of 8% on the EU renewables share until 2030, which is almost twice as high as the observed rate over the past decade. Considering this, the EU must allocate more resources for a deep transformation of the energy system in line with targets for 2030 and beyond.
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3. EU, 2022, Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a General Union Environment Action Programme to 2030, OJ L.
↲
4. EC, 2022, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the monitoring framework for the 8th Environment Action Programme: Measuring progress towards the attainment of the Programme's 2030 and 2050 priority objectives. COM(2022) 357 final
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