# Monthly electricity generation from non-combustible renewables - statistics

Statistics Explained

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Data extracted in February 2021 No planned article update " In the EU, hydro, wind and solar are the most significant non-combustible renewables in electricity production. "

## " In the EU, pure hydro, onshore wind and solar PV are the key technologies for producing electricity from non-combustible renewable sources. "

Renewable energy sources, hereafter called renewables, are of particular interest as they can replenish themselves without using up natural resources. In this category, **electricity can be produced either by combusting renewables** such as wood, liquid biofuels and biogas, or **by non-combustible renewables** such as wind, hydro and solar. Hydro, wind and solar are the most important non-combustible renewables in electricity production, pure hydro, onshore wind and solar PV being the key technologies. The production of electricity from these renewable sources varies throughout the year. The capacity and the production of electricity from wind and from solar PV has increased significantly and steadily in recent years. This article focuses on the production of electricity from non-combustible renewables in the European Union .

## Share of non-combustible renewables in total electricity production

The share and production of electricity of the different fuels, including renewables, varies throughout the year (see Figures 1 and 2). Hydro, wind and solar are the main non-combustible renewables used to produce electricity. The production of electricity using geothermal and other renewable energies is stable over time but these renewables represent only a minor share in comparison to wind, hydro and solar (see Figure 2), which show a seasonal pattern.



## Net monthly electricity generation by type of fuel in EU (%)





Net monthly electricity generation from non-combustible renewables in the EU (GWh)

## Figure 2: Net monthly electricity generation from non-combustible renewables in the EU (GWh) Source: Eurostat (nrg\_cb\_pem)

## Technologies used to produce electricity from main non-combustible renewables Hydro

Hydro electricity is split into pure hydro (renewable) and pumped hydro (not always renewable). Pure hydro electricity is generated in run-off-river power plants. Pumped hydro is a way of 'storing' superfluous electricity by pumping water back into reservoirs above the power plant. Superfluous electricity can be 'stored' in dams retaining river water (= mixed plants), where water can be pumped for electricity generation or in artificial lakes built

specifically as a reservoir for pumped water (= pure pumped plants). Pumping water uphill consumes electricity and it is not always known whether the electricity used for this is generated from renewable or non-renewable sources. Therefore, electricity generated from pumped water is not con-

sidered in this article (mixed hydro or pumped hydro) but only electricity produced in pure hydro plants (see Figure 3).



## Net monthly electricity generation from pure hydro (GWh)

## Figure 3: Net monthly electricity generation from pure hydro (GWh) Source: Eurostat (nrg\_cb\_pem)

## Wind

Wind energy refers to the kinetic energy of wind converted into electricity through wind turbines. The production of electricity from wind varies throughout the year and relies mainly on onshore installations, while offshore wind infrastructures account for roughly 15 % (see Figures 4 and 5).

# Average proportions in net monthly electricity generation for wind in 2021 (%)



Source: Eurostat (nrg\_cb\_pem)



Figure 4: Average proportions in net monthly electricity generation for wind in 2021 (%) Source: Eurostat (nrg\_cb\_pem)



## Net monthly electricity generation from wind (GWh)

## Figure 5: Net monthly electricity generation from wind (GWh) Source: Eurostat (nrg\_cb\_pem)

## Solar

Solar energy can be transformed into electricity using two different technologies: either solar photovoltaic (PV) or solar thermal using parabolic mirrors to generate steam, which is sent through a turbine to produce electricity. Solar thermal technology has so far played only a minor role compared to solar PV. The production of electricity from solar PV varies throughout the year (see Figures 6 and 7).

# Average proportions in net monthly electricity generation for solar in 2021 (%)



Source: Eurostat (nrg\_cb\_pem)



Figure 6: Average proportions in net monthly electricity generation for solar in 2021 (%) Source: Eurostat (nrg\_cb\_pem)



## Net monthly electricity generation from solar (GWh)

Figure 7: Net monthly electricity generation from solar (GWh) Source: Eurostat (nrg\_cb\_pem)

## Source data for tables and graphs

• Download Excel file

## **Data sources**

The monthly electricity data used for this article come from Eurostat's joint data collection with the IEA (International Energy Agency). Data are available for all EU countries and the methodology is harmonised for all reporting countries, ensuring data comparability across countries.

## Context

Over the last decades, the effects of global warming caused relevant impacts in many sectors. Given the previsions, this tendency is expected to persist at least until the end of this century. Identifying climate-related impacts and assessing how important these impacts are is an important element of any effective strategy for managing future climate risks. Weather-related energy consumption for heating and cooling buildings indicators such as heating degree days (HDD) and cooling degree days (CDD) can contribute to monitor energy demand for cooling and heating buildings under climate change.

Energy statistics are in the spotlight due to their strategic importance, and provide crucial information for policy makers. Becoming the world's first climate-neutral continent by 2050 is the greatest challenge and opportunity of our times. To achieve this, the European Commission presented the European Green Deal (COM (2019) 640 final) on 11 December 2019. In this context, production of energy from renewables is of particular importance.

The Energy statistics Regulation (EC) No 1099/2008 is the legal basis for the reporting of annual energy questionnaires.

#### **Other articles**

· Energy sources and other topics

## **Tables**

• Energy - selected datasets (nrg) , see:

Energy Statistics - main indicators (t\_nrg\_indic)

Final energy consumption by product (ten00123)

## Database

• Energy - detailed datasets (nrg) , see:

Energy statistics - quantities (nrg\_quant)

Energy statistics - quantities, annual data (nrg\_quanta)

Production of electricity and derived heat by type of fuel (nrg\_bal\_peh) Energy infrastructures and capacities (nrg\_inf)

## **Dedicated section**

• Energy

## **Publications**

- Energy, transport and environment indicators 2017 edition
- Energy balance in MS Excel file format 2019 edition

## Methodology

Questionnaires and methodology for data collection

#### Legislation

- Regulation (EC) No 1099/2008 of 22 October 2008 on energy statistics
- EUROPE 2020: A strategy for smart, sustainable and inclusive growth
- · Summaries of EU legislation: Europe 2020: the European Union strategy for growth and employment
- Summaries of EU legislation: Common system for the production of energy statistics

## **Visualisations**

Sankey Diagrams