

EU solar and wind power growth displaced gas consumption worth half of Russian imports in August 2023

The growth in solar and wind electricity generated across EU countries resulted in a displacement of 18 terawatt-hours (TWh) of fossil gas consumption, which is equivalent to 54% of the total fossil gas imports from Russia (33 TWh) via pipeline and LNG in August 2023. This expansion of renewable energy production not only diversified the power generation mix but also reduced dependency on fossil fuels imported from external sources. The EU's progress in reaching low coal and gas consumption in power generation in 2023, as well as highs for solar and wind electricity generation, should be celebrated but much further investment in renewable energy sources (RES) is needed. The EU must implement further policies to speed up the clean energy transition as a way to reduce the reliance on Russian fossil fuels which finance Putin's war on Ukraine. The EU's continued investments in renewable energy will lower carbon emissions, lead to cleaner air quality, improved health outcomes, improve energy stability and curtail Putin's ability to finance the war.

Key findings

- RES power generation saved natural gas equivalent to 54% of the EU's imports of Russian gas in August 2023.
- Year-on-year power generation from solar and wind increased 9 TWh in August. Year-on-year additional power generation from wind and solar contributed to the EU's fossil gas savings of 18 TWh, equivalent to the combined annual fossil gas consumption of Latvia and Estonia in 2022.
- In August 2023, there was a 3% year-on-year decrease in total power generation in the EU, equating to a reduction of 6 TWh. The reduction was not accounted for by weather.
- Year-on-year, EU coal consumption witnessed a substantial decline in the power generation sector, dropping significantly by 39%, equivalent to a reduction of 14

TWh. Over the same time period, fossil gas used for power generation also experienced a decline of 22%, amounting to a reduction of 8 TWh.

- A decrease in monthly power generation from coal and fossil gas in August 2023 led to a significant reduction in carbon emissions, estimated at lowering CO₂ emissions from coal and gas by 45% compared to the same period last year.
- Year-on-year, combined EU solar and wind power generation experienced a substantial 22% increase (9 TWh) in August. Solar generation saw a 14% rise (3 TWh), while wind generation witnessed a 29% monthly increase (6 TWh).
- Demand for fossil gas outside the power sector decreased significantly in August 2023, registering a 27% decline when compared to the same period in 2021.

After Russia's full-scale invasion of Ukraine and the ensuing energy crisis, the EU witnessed a roller coaster in the EU's energy sector. In August 2022, natural gas day-ahead [prices](#) in the Dutch Title Transfer Facility (TTF) market soared to a record-high 343 EUR/MWh, due to Nord Stream 1 pipeline being shut off, [halting](#) natural gas supplies to Europe, and Member States banned Russian coal imports.

In contrast, this August showed that the expected resurgence of coal failed to materialize. Instead, a discernible transformation is underway, marked by numerous countries embracing coal phase-out policies and reaping the rewards of renewable energy sources (RES) investments. Nevertheless, there is still work to be done.

August revealed that any disruption in an LNG supply chain increases tension in the market and [raises](#) prices. It reminded us that the EU is still vulnerable because of its dependence on fossil fuel imports from third countries. Moreover, despite a reduction in the EU's reliance on Russian fossil fuels compared to 2022, there are lingering concerns. In August 2023, EU imports of fossil fuels from Russia [fell 87%](#) in monetary terms compared to the same month last year. However, the EU was still the [fourth largest](#) importer of Russian fossil fuels in August 2023, showing more must be done to stop funding Putin's war on Ukraine. EU Member States continue to procure fossil fuels from Russia however, especially gas. In August, EU Member States imported 33 TWh of Russian fossil gas (pipeline and LNG cargoes), posing a threat to the union's energy security and overall dependence on fossil fuels.

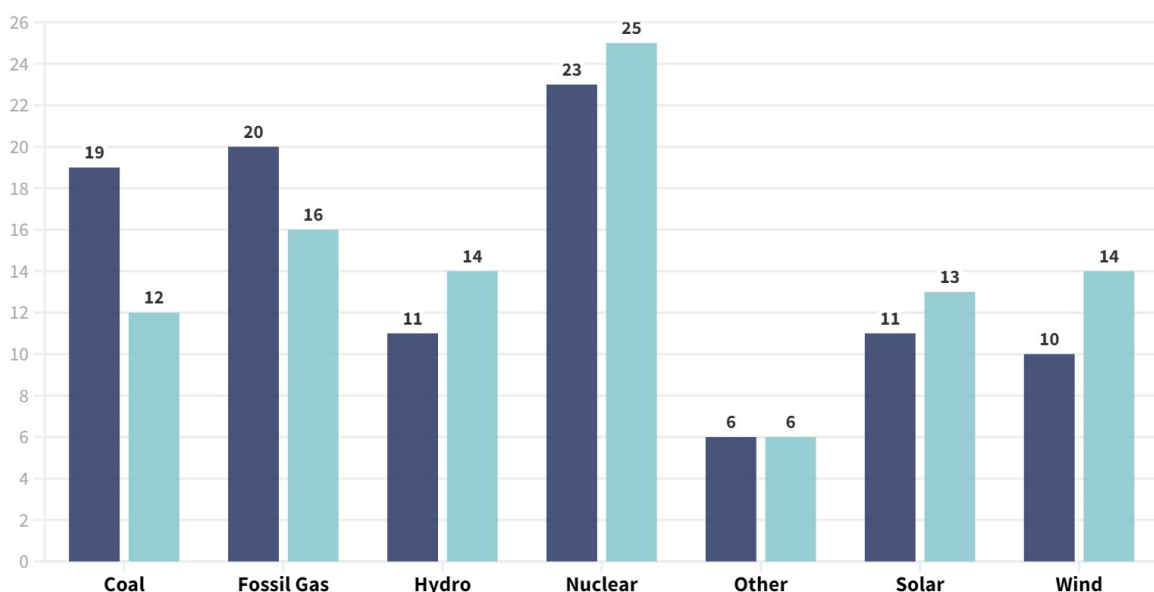
Solar and wind power supply 27% of EU's electricity demand

EU power generation share by type in August

Year-on-year changes in power generation

Value in percent

■ 2022 ■ 2023



Source: CREA analysis



In August 2023, there was an evident decline in power generation from fossil fuels. In 2022, coal and gas contributed to 39% of the EU's total electricity demand, which has decreased to just 28% year-on-year.

Conversely, there is a notable year-on-year increase in electricity generation from solar and wind sources. Last year, renewables solar and wind generated 21% of the EU's total demand, while this year, these sources combined account for 27% of the entire power generation.

Following last year's hot summer and [droughts](#) that impacted the EU, hydroelectric power generation has seen a significant increase. In contrast to the prior year, when hydro sources met only 11% of the EU's total electricity demand, this August, they accounted for 14% of the EU's total electricity supply.

Despite the temporary [shutdown](#) of one of the reactors at the Olkiluoto (Finland) nuclear power plant (NPP) at the end of August, year-on-year nuclear power generation increased. Nuclear power generation contributed 25% of the EU's total power generation this August, compared to 23% during the same period last year.

August solar and wind power surge, coal and gas decline

Power generation changes by type in the EU for August

Year-on-year changes in power generation

Value in percent



Source: CREA analysis



In August 2023, year-on-year combined coal and fossil gas power generation in the EU diminished by 31% (-22TWh). Specifically, coal power generation saw a significant decline of 39% (-14 TWh); in comparison, fossil gas generation decreased by 22% (-8 TWh).

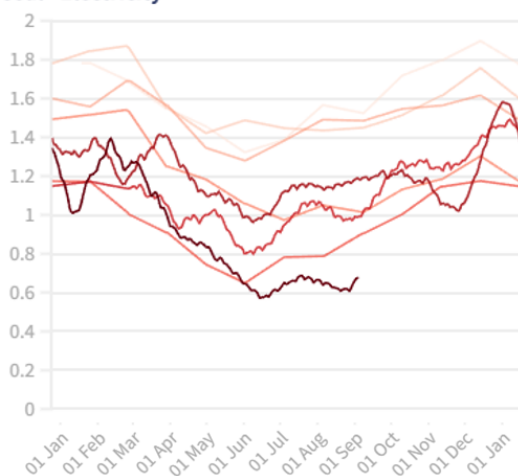
Simultaneously, combined solar and wind power generation experienced a notable increase of 22% (+9 TWh). Monthly wind power generation surged by 29% (+6 TWh) compared to August 2022, while year-on-year solar generation saw a respectable rise of 14% (+3 TWh).

Additional generation from RES in August helped save 18 TWh of natural gas which is equal to the [annual](#) gas consumption of Estonia and Latvia in 2022. Moreover, combined solar and wind power generation saved natural gas equivalent to 54% of the EU's gas imports from Russia in August.

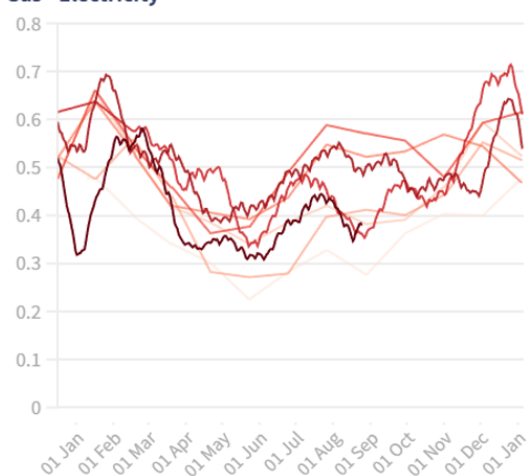
EU CO₂ emissions

Mt/day, 30-day running average

Coal - Electricity



Gas - Electricity



2016 2017 2018 2019 2020 2021 2022 2023

Source: CREA estimates based on EUROSTAT, ENTSOG and ENTSOE.



The advantages of a positive shift, where the proportion of fossil fuels is diminishing while the share of solar and wind power generation is rising, are evident in the reduction of CO₂ emissions. Year-on-year changes in CO₂ emissions from coal and gas fired power plants decreased by 45% (-24 Mt/month) in August. Specifically, the monthly decrease from coal-fired power plants was 50% (-18 Mt/month) and gas-fired power plants dropped by 33% (-5 Mt/month) in August 2023.

Fossil gas demand outside the power sector did not rebound after energy crisis

The energy crisis of 2022 profoundly impacted the supply and demand dynamics, resulting in historic highs and increased volatility in fossil gas prices. As a result, due to political

[agreement](#) between Member States to save fossil gas, the demand for fossil gas, including outside the power sector, dropped by 18% in 2022 compared to 2021.

EU Fossil gas demand outside power sector

Temperature-corrected

7-day running average



Source: CREA analysis.



Data from CREA indicates that in 2023, natural gas consumption has continued to decrease even further, driven by potential energy-saving measures and demand destruction.

In August 2023, the demand for fossil gas decreased significantly outside the power sector, registering a 27% decline when compared to the same period in 2021. However, there was a slight year-on-year increase of 2.6% in demand for gas outside of the power sector compared to August 2022.

Policy recommendations

- The EU Member States must continue reducing reliance on Russian fossil fuels. It remains crucial to persist in diversifying energy sources and supply routes. Reducing dependence on any single supplier, particularly in an unpredictable geopolitical landscape, bolsters the EU's energy security.

- Moving away from fossil fuels should remain a priority for the EU, extending beyond the immediate concern of Russian fossil fuel dependency. This commitment enhances energy security and aligns with the EU's climate objectives, ultimately mitigating greenhouse gas emissions.
- Governments and businesses should increase investments in renewable energy infrastructure and technologies, encompassing wind, solar, hydropower, and other clean energy sources.
- As the EU transitions towards electric vehicles, it will require a larger power generation capacity to meet the increased demand for electricity. This highlights the importance of continued investments in renewable energy sources, grid infrastructure, and energy storage to support the growth of the EV market.
- Improving energy efficiency across industries and households remains crucial to the energy transition. Energy-saving measures can help reduce overall energy demand and lower carbon emissions.
- The EU must ban pipeline gas and LNG imports from Russia to Europe to provide incentives for businesses to invest in solar and wind and stop the EU from funding Russia's invasion of Ukraine.

Methodology:

We use “fossil gas” throughout this briefing to refer to fossil methane, i.e. natural gas of fossil origin, and when we refer to renewable resources (RES), we specifically mean power generation from solar and wind sources.

The data used for power generation by fuel type and CO₂ emission is from CREA's platform that can be accessed [here](#). The charts can be viewed on our live [EU CO₂ emission tracker](#).

Gas-fired power generation is assumed to have an average net thermal efficiency of 50%. Therefore, an electricity output of 1 MWh implies a 2 MWh gas demand. Fossil gas imports from Russia to the EU are calculated for pipelines and liquefied fossil gas. Its imports into the EU are estimated on the basis of data from the ENTSOG and Kpler platforms. Gas prices are calculated using the CREA pricing model. CREA analysts use the conversion factor between cubic meters of LNG to terawatt-hours based on [Gasunie](#) metrics.



About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. CREA uses scientific data, research, and evidence to support the efforts of governments, companies, and campaigning organisations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the key to successful policies, investment decisions, and advocacy efforts. CREA was founded in December 2019 in Helsinki and has staff in several Asian and European countries. Our work is funded through philanthropic grants and revenue from commissioned research. In our statement of support for Ukraine, CREA absolutely condemns the Russian military's unprovoked and unjustified attack against another sovereign nation, Ukraine. The assault goes against the fundamental values of human well-being, safety, and dignity that our organisation seeks to advance. We urgently call for an end to the assault and stand in solidarity with the Ukrainian and Russian people calling for just peace.