



# Türkiye Electricity Review 2024

Türkiye overtook Poland to become the second largest coal-fired power generator in Europe. Meanwhile, Türkiye's dependence on imported coal for electricity generation continued to increase.

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## About

Ember's Türkiye Electricity Review presents full-year electricity generation and demand data for 2023 in Türkiye. It reviews highlights of the country's electricity system over the year and compares Türkiye's progress in transitioning from coal to clean energy with other European countries. Our [data is free and easily downloadable](#).

## Highlights

36%

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Share of coal power in  
Türkiye's total generation

12%

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Share of the European  
Union's coal power in total  
generation

73%

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Share of Russian coal  
imports for electricity  
generation

## Executive Summary

# Electricity generation from coal reaches a record high

In 2023, Türkiye generated record high electricity from coal with 118 TWh. This made Türkiye the second largest coal generator in Europe, overtaking Poland. The driving force behind the increase in coal generation was imported coal power plants.

After the EU's ban on Russian coal in August 2022, coal prices dropped more than gas, which led gas to lose its cost advantage over coal. Thus, gas generation fell for the second year in a row, marking its lowest generation over four years in Türkiye. Meanwhile, coal share rose to 36% in total generation, which meant that Türkiye's carbon emissions from electricity generation remained high.

Türkiye could reduce its reliance on imported fossil fuels by accelerating wind and solar installation. With huge potential for both wind and solar, Türkiye could meet its clean energy targets and reverse its coal import trend.

## 01 Türkiye overtook Poland to become second largest coal electricity generator in Europe

For the first time, Türkiye overtook Poland in 2023 to become Europe's second largest generator of coal-fired electricity. Türkiye generated 118 TWh of power from coal, ahead of Poland's 97 TWh and almost reaching Germany's 121 TWh. In 2013, 25% of power was from coal in both Türkiye and the EU. In 2023, this was down to a record low 12% in the EU, but reached 36% in Türkiye.

The rise in coal-fired electricity generation was driven by imported coal. In 2023, both generation from imported coal (72 TWh) and its share in total electricity generation (22%) reached all-time highs. Almost three-quarters (73%) of this coal was imported from Russia. Türkiye paid a total of \$3.7 billion USD for imported coal for electricity generation in 2023.

## 02 Poland overtook Türkiye for solar share, while wind generation fell for the first time

Türkiye added 2 GW of solar power capacity in 2023, increasing solar's share of total electricity generation from 4.9% in 2022 to 5.7% in 2023. In June, solar share reached its highest monthly level, accounting for 8% of national electricity production – an all-time high. Europe's top-ranking country for solar share in total generation was Greece in 2023 with 19%, while Poland (7.3%) and Bulgaria (8.8%) overtook Türkiye. The United Kingdom (4.6%) and Switzerland (6.6%), which have significantly lower solar energy potential, were Türkiye's closest competitors.

In addition, year-on-year wind installations in Türkiye fell to the lowest level in 13 years with 411 MW of new added capacity in 2023. 2023 was also the first year with a year-on-year decline (-0.9 TWh) in electricity generation from wind. Last year, wind produced 34 TWh of Türkiye's electricity, reaching a 10.5% share of total electricity production. Although Türkiye was ahead of France (9.5%), Norway (9.3%) and Italy (9%) in terms of wind share, it was overtaken by Austria (12%) and Estonia (11%).

## 03 Türkiye's electricity consumption continued to fall

An annual downward trend in electricity consumption, which occurred in 2022, continued in 2023. The 2 TWh decrease in electricity consumption compared to 2022 was largely due to slowed industrial activity. The industrial sector's contribution to GDP decreased from 43.5% in 2022 to 42% in 2023. As a result, industrial electricity consumption decreased by approximately 4.5 TWh compared to 2022.

"Türkiye generated a record-high electricity from coal, positioning itself as the second largest coal generator in Europe. Regarding current progress of coal electricity generation, Türkiye could overtake Germany by 2025 and reach first spot in Europe. Türkiye's growing reliance on fossil fuels in electricity generation pushes Türkiye further from the path of clean energy transition. Türkiye can accelerate its clean energy transition by realising its excellent solar potential, especially on rooftops. "

**Bahadır Sercan Gümüş**  
Energy Analyst, Ember



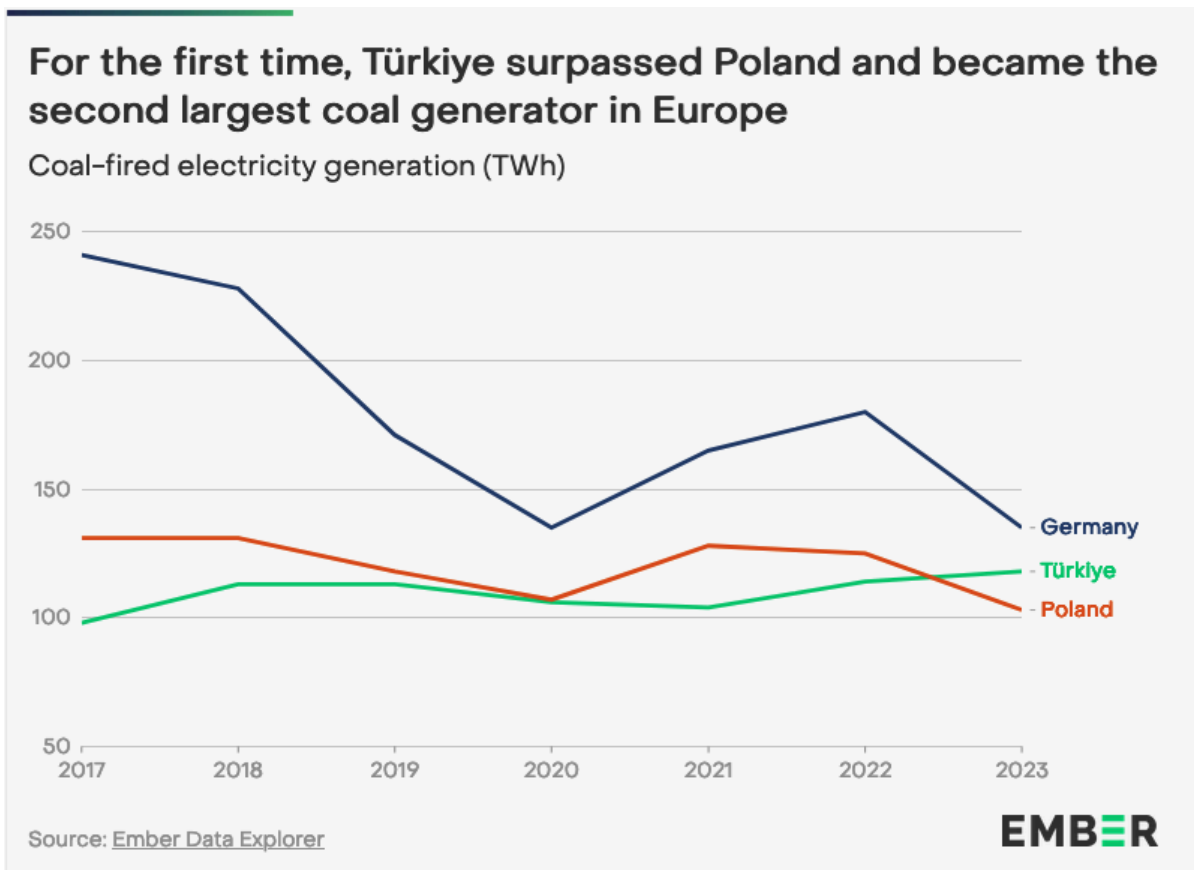
## Coal

# Türkiye and the EU are moving in opposite directions in coal power

Record-high electricity generation from imported coal as Russia consolidates its position as Türkiye's largest supplier.

### **Türkiye is now Europe's second biggest producer of coal-fired electricity**

Electricity generation from coal increased by 4% compared to the previous year, reaching a record level of 118 TWh in 2023. This generation also made Türkiye the [second largest coal-fired power generating](#) country in Europe, overtaking Poland (97 TWh). Additionally, with this production, Türkiye has nearly closed the gap with Germany (121 TWh), the leader of Europe in electricity generation from coal in 2023. Given this trend, Türkiye's trajectory could lead it to become the largest coal generating country in Europe by 2025.



More than one-third (36%) of Türkiye's electricity generation (322 TWh) in 2023 came from coal-fired power plants. In 2023, 72 TWh was generated from imported coal, surpassing the record in 2022 of 63 TWh and an all-time high in terms of the amount of electricity generated annually from imported coal. The share of imported coal in total electricity generation also reached a record high of 22%. Hunutlu Thermal Power Plant, which uses imported coal and was commissioned in 2022, contributed 10 TWh alone.

As coal-fired electricity generation continues to increase, the share of imported coal in the mix also continues to rise. In 2015, imported coal began to dominate coal-fired electricity generation in Türkiye for the first time instead of domestic coal. In 2023, the share of imports in coal-fired electricity generation reached 60%, with imported coal-fired power plants generating 50% more electricity than domestic coal-fired power plants. Over the last decade, the amount of electricity generated from imported coal doubled, while generation from domestic coal increased by 12%.

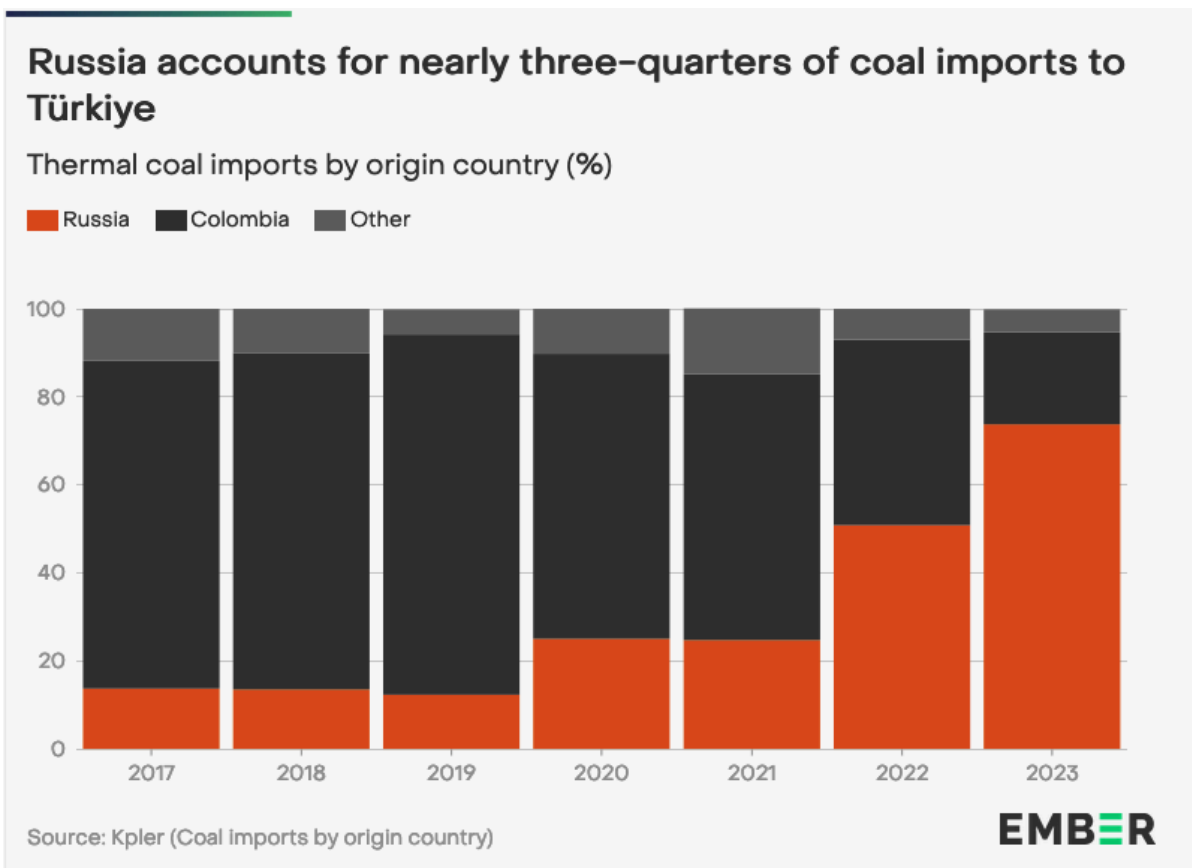


**Russia consolidates its leading position in the supply of imported coal**

In 2022, Russia overtook Colombia to become [Türkiye's largest coal supplier](#) for the first time. That year, Russia's share of coal imports for electricity generation was 49%. However, in 2023 [Russia's share surged to 73%](#), consolidating its position as Türkiye's main supplier.

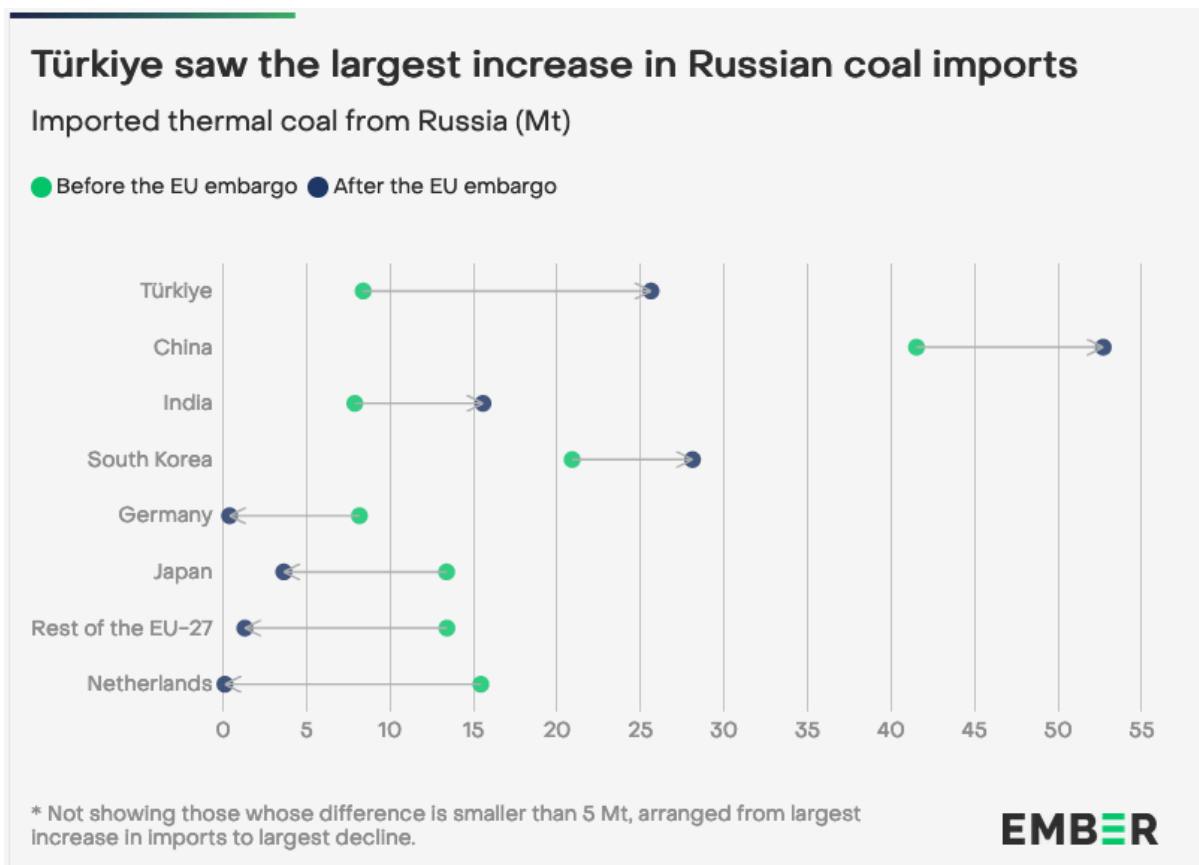
In 2022, coal prices on international markets reached a record high of more than [\\$450 USD per tonne](#), more than double the January prices before the Russian invasion of Ukraine. In 2023, prices fell back to [\\$120 USD per tonne](#), lower than before the war. It was noted that there were [additional price discounts](#) in coal shipped from Russia's Black Sea ports, especially after the embargoes imposed by the EU.

As of August 2022, the EU [banned](#) coal imports and announced that it would gradually reduce the flow of Russian natural gas to Europe via pipelines. As a result, coal prices fell more than natural gas prices. This was reflected in the Turkish electricity market, which saw an increased share of imported coal in total electricity generation.



Prior to 2022, Türkiye imported 4 million tonnes (Mt) of Russian coal per year for electricity generation, based on the average values over the previous five years. This figure more than tripled to 12.4 Mt in 2022 and continued to increase to 17.4 Mt in 2023. Despite the price decline, Türkiye paid [\\$3.7 billion](#) USD for imported coal for electricity generation in 2023 due to increased [imports](#).

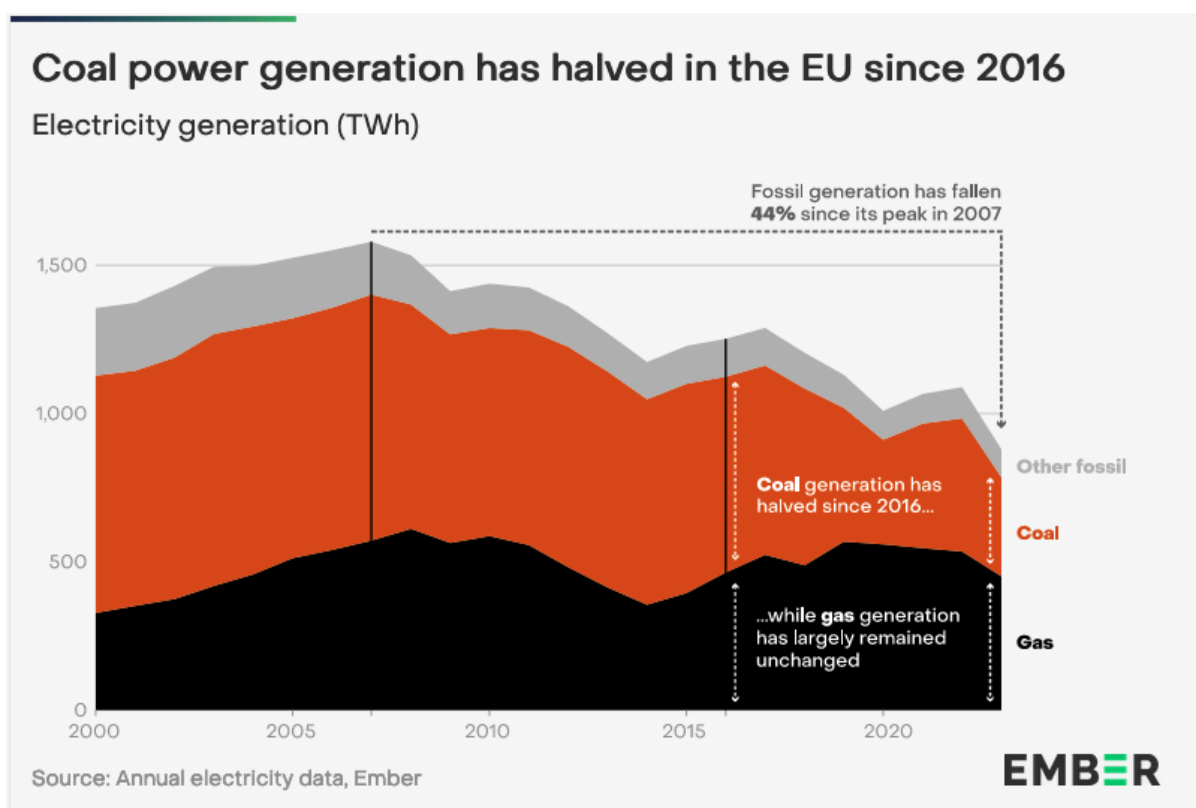
The EU implemented its ban on Russian coal imports in August 2022. When comparing the 17 months before and after the sanction came into force, Türkiye emerged as the country with the largest increase in thermal coal imports from Russia (+17 Mt). Türkiye was followed by China (+11 Mt), India (+7.6 Mt) and South Korea (+7.2 Mt). In the 17 months following the embargo, EU-27 countries [reduced](#) their total imports of Russian thermal coal [by 35 Mt](#) compared to the 17 months preceding it. The Netherlands made the largest reduction of 15 Mt in this period. However, Türkiye alone offset the decline in Russian coal imports to Germany, Italy, Spain, Ireland and Belgium.



### EU halved electricity generation from coal compared to 2016

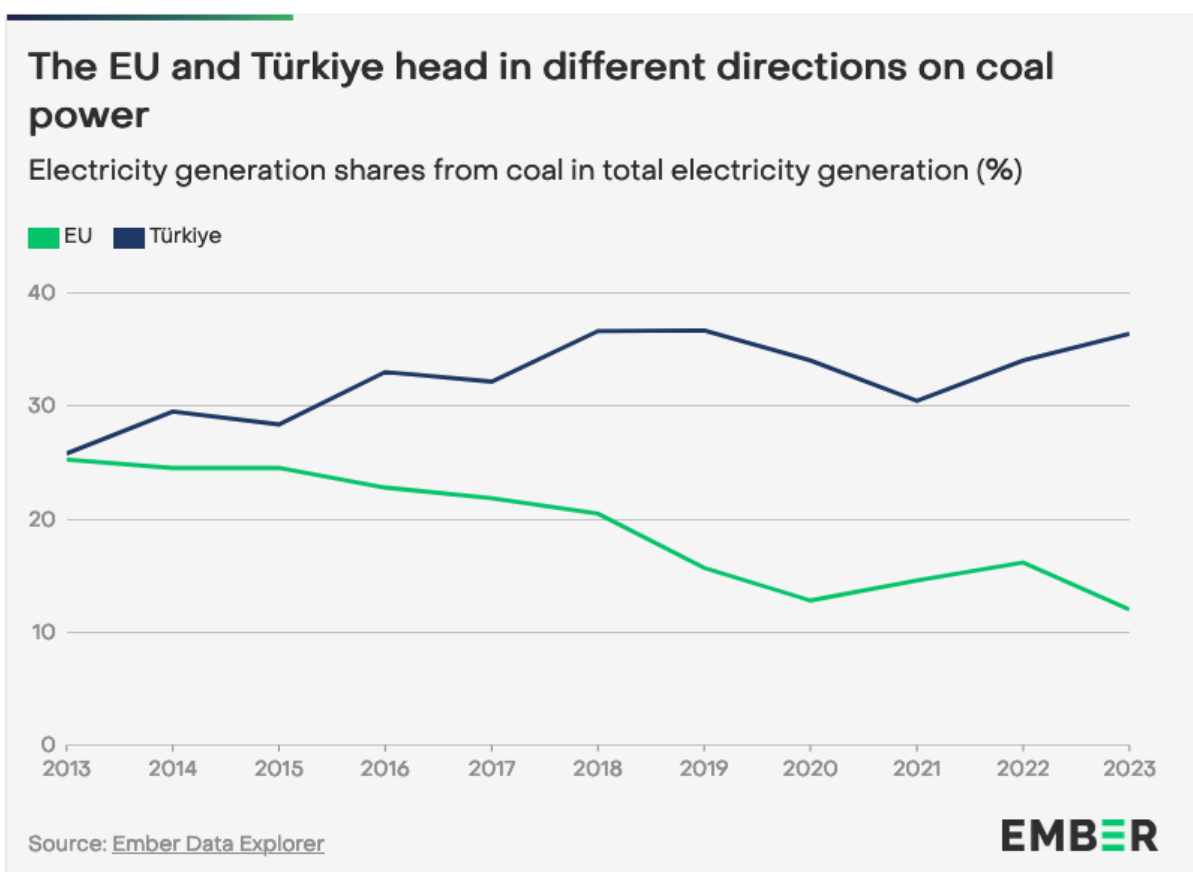
Although electricity generation from coal in the EU increased in 2021 following the COVID-19 pandemic and in 2022 after the Russian invasion of Ukraine, electricity generation from coal during these two years was below the [level in 2019](#). As the energy crisis unfolded globally, EU countries took additional [measures to minimise](#) the impact of the crisis, such as postponing the decommissioning of coal plants and keeping some coal-fired power plants at idle capacity. Even so, these measures did not prevent a decline in coal-fired electricity generation in the EU.

In 2023, the EU generated 333 TWh of electricity from coal, [halving](#) its production compared to 2016. At the same time, the decline in electricity generation from coal did not lead to a rise in electricity generation from natural gas, thanks to increased wind and solar generation (+354 TWh). On an annual basis, the amount of electricity generated from natural gas fell by a record 15% compared to 2022. In other words, contrary to popular belief, the war has accelerated the EU's transition to clean energy, not its return to fossil fuels.



In 2023, the EU reduced its coal generation by 26% compared to 2022 (449 TWh), reaching levels even below the generation during the pandemic period (352 TWh in 2020). As of 2023, coal accounted for only 12% of total electricity generation in the EU, the [lowest annual production](#) ever. With the decline in electricity generation from coal and natural gas, the EU's carbon dioxide emissions from electricity generation also fell by 19% compared to 2022, setting [a new year-on-year record](#).

However, Türkiye and EU countries seem to be moving in different directions regarding electricity generation from coal. In 2013, the share of coal in electricity generation was approximately 25% in both the EU and Türkiye. In the last decade, the share of coal in electricity generation fell to 12% in the EU, whereas in Türkiye, the trend went in the opposite direction, reaching 36%.

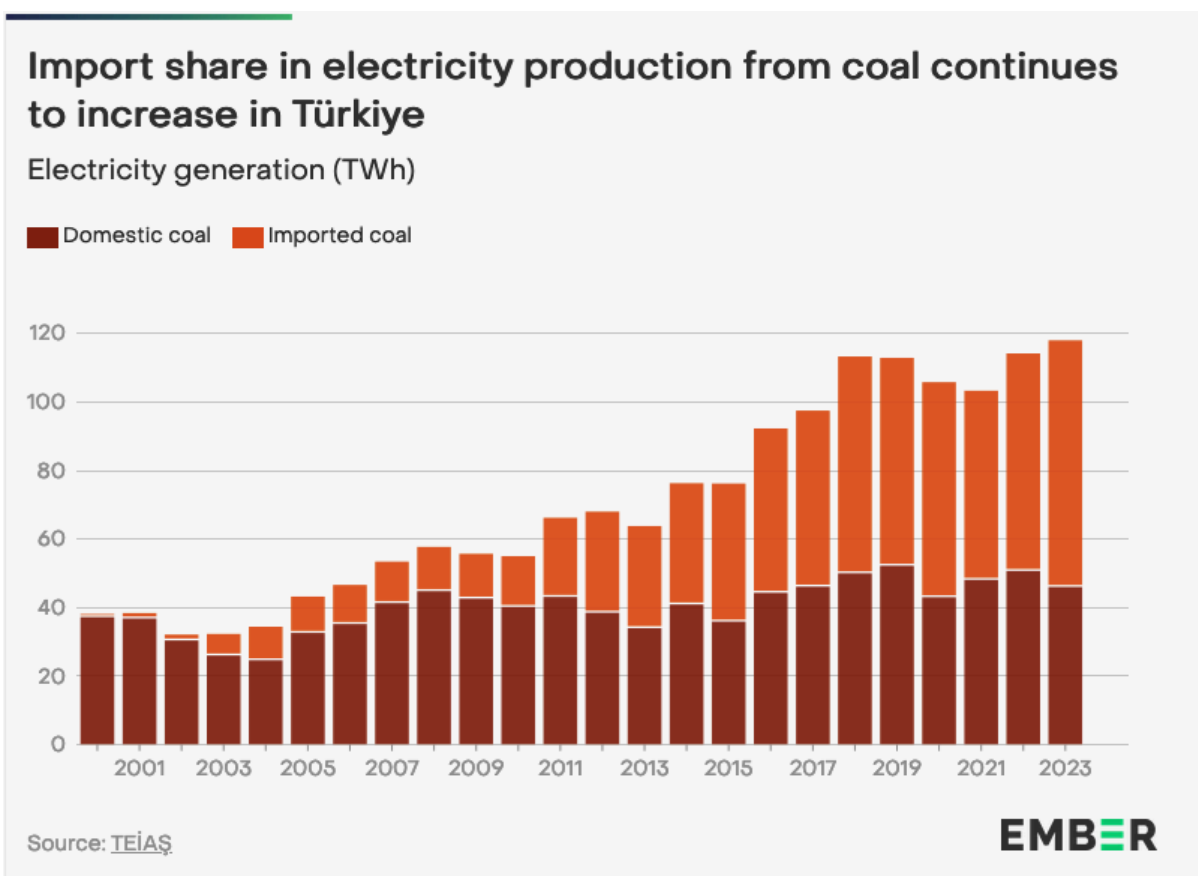


#### Imported coal power plants drove the increase in coal share

In the past decade, Türkiye has built [8.6 GW](#) of additional coal power plants, [6.4 GW](#) of which are fueled by imported coal, leading to an increase in annual electricity production from coal

from 64 TWh to 118 TWh. With the newly commissioned imported coal power plants, the share of electricity generated from imported coal in total electricity generation increased from 12% in 2013 to 22% in 2023.

The share of electricity generation from domestic coal in total generation remained constant compared to 2013 (14%). In other words, while electricity generation from domestic coal and electricity demand increased at the same rate in the 2013-2023 period (+35%), the rate of increase in electricity generation from imported coal was about four times higher (+143%), increasing the share of coal in Türkiye’s electricity generation.



## Wind and Solar

# Solar leads renewables as wind installations hit a 13-year low

Solar's growing contribution increased the share of wind and solar power in electricity generation to 16%.

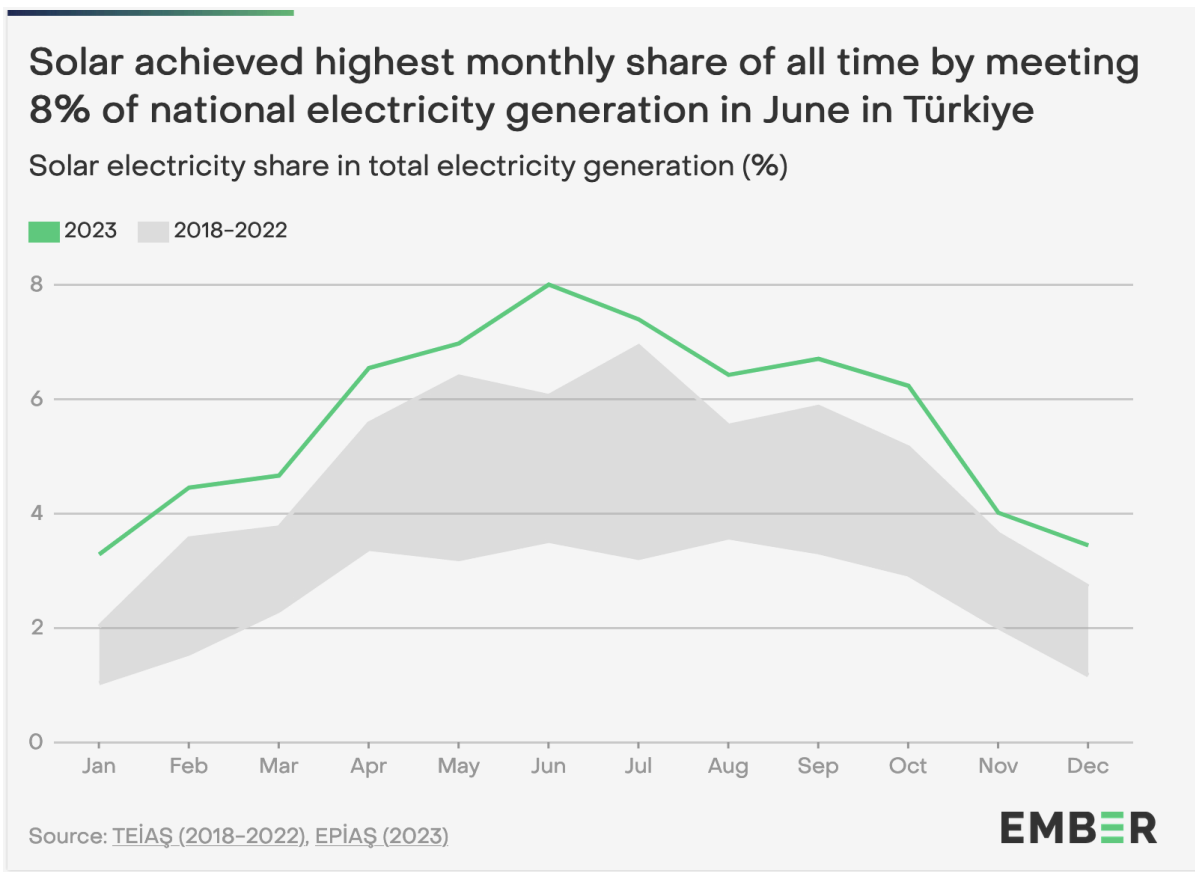
### **The share of solar energy in electricity generation increased to 5.7%**

In 2023, Türkiye's total installed solar capacity exceeded 12 GW, surpassing wind for the first time. This figure includes both the 2 GW of new solar power plants commissioned in 2023 (bringing the total installed solar capacity to 11.7 GW) and those installed as a secondary source at hybrid power plants. The rise in solar capacity was also reflected in generation, ensuring that the share of solar energy in electricity generation continued to grow. Solar energy contributed 18 TWh to total generation in 2023, increasing its share from 4.9% in 2022 to 5.7%. Solar energy reached an all-time monthly high in June, accounting for 8% of national electricity generation.

While the annual capacity factor of power plants generating electricity from solar was 18%, this value was calculated as 20% in licensed plants –excluding Karapınar YEKA Solar Power Plant – and 17% in unlicensed plants. The capacity factor of the Karapınar YEKA Solar Power Plant, which constitutes the majority of licensed solar capacity with an installed capacity of 1 GW, reached 30% with the use of [bifacial solar panels and solar tracking systems](#) at the facility.

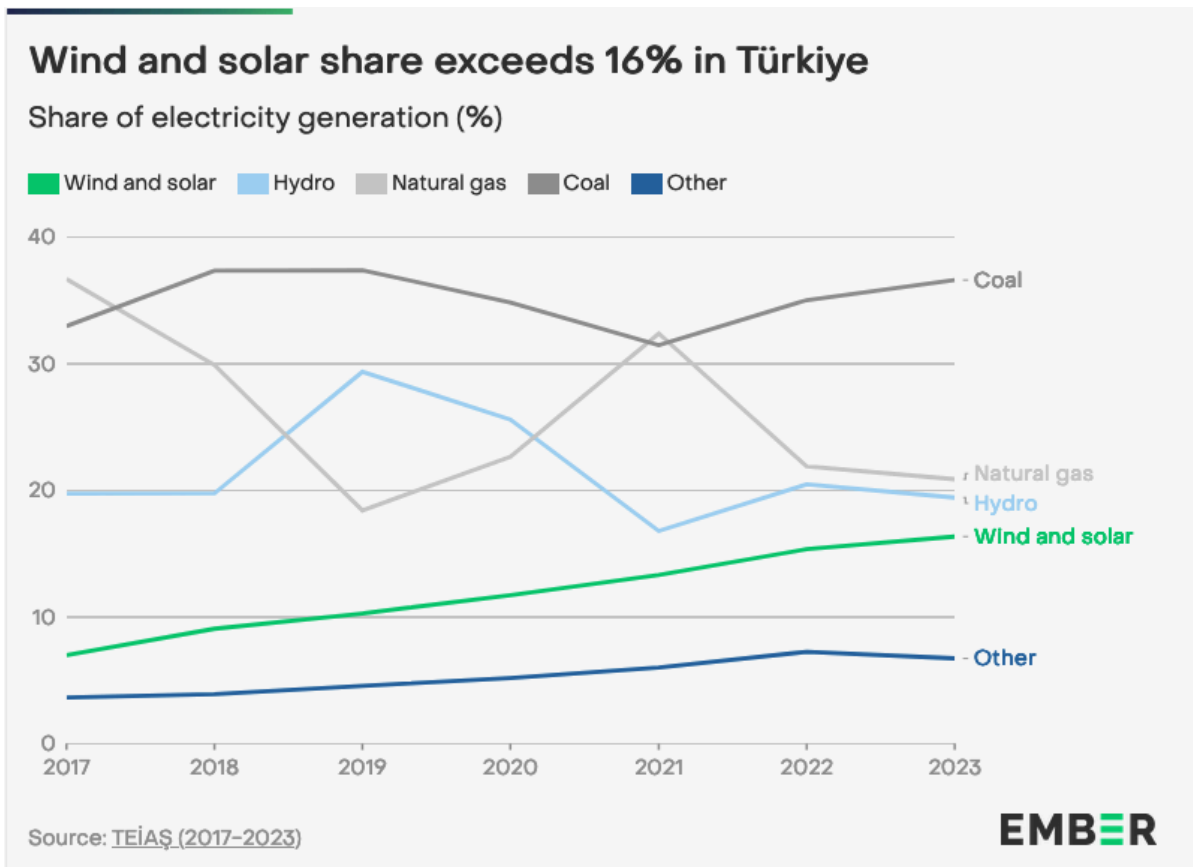
The [Energy Market Regulatory Authority reports](#) the electricity supplied to the national grid by unlicensed power plants as "surplus purchased energy". This value, which indicates the surplus electricity production after meeting the plants' self-consumption needs, tends to underestimate the actual production of unlicensed power plants. This situation leads to the capacity factor of unlicensed solar power plants being lower than licensed ones.

Consequently, not only the capacity factor but also national electricity production statistics are underestimated.



The [increase in fossil fuel](#) prices in the aftermath of the Russian invasion of Ukraine also affected Türkiye, leading to a change in electricity tariffs applied to end-use consumers. At the end of 2022, industrial companies paid about two and a half times more for each kWh of electricity consumed compared to the first month of the year. Although the kWh price of electricity subsequently declined, as of early 2024, prices were about [twice as high](#) as in January 2022.

Fluctuations in electricity costs, the implementation of the EU’s Carbon Border Adjustment Mechanism under the EU Green Deal framework, and a regulatory change - allowing unlicensed renewable plants to be built in [different electricity distribution districts](#) located away from consumption points - contributed to increased interest in unlicensed production in 2023. As of the end of 2023, [85% of the existing solar power plant capacity consisted of unlicensed power plants](#), while 90% (1.8 GW) of the new installations in 2023 were unlicensed power plants.



In 2023, the increasing share of solar power lifted the combined share of wind and solar in total electricity generation to more than 16%, while the share of fossil generation was 58%. The monthly share of wind and solar reached a [record high of 21%](#) in July 2022. The highest level in 2023 reached 19% in September with the help of low electricity demand.

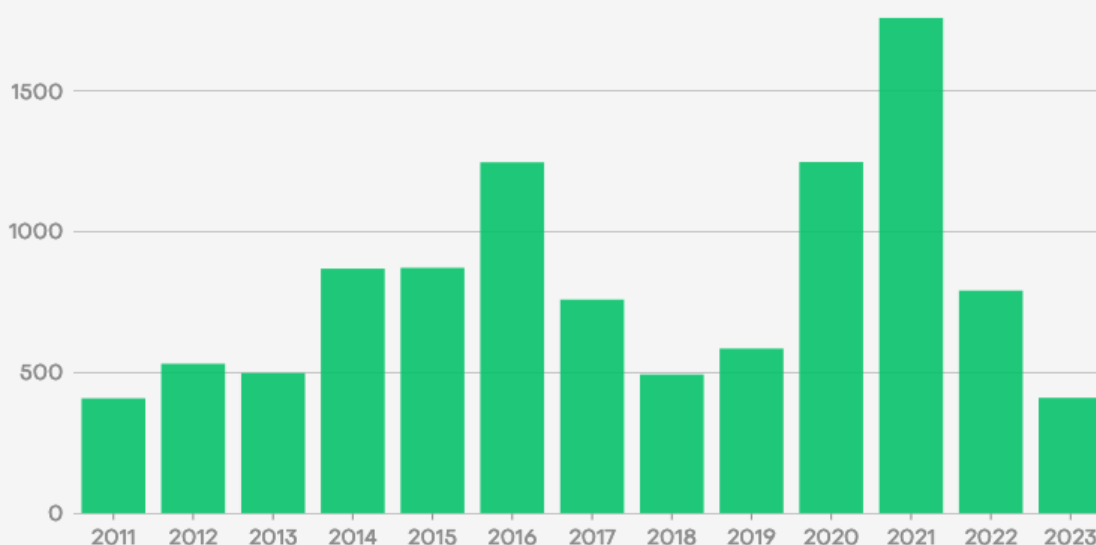
#### Wind generation declines for the first time

Since 2008, Türkiye has installed an average of 730 MW of wind power plants (WPPs) per year. Following a record 1.7 GW of new installations in 2021, the sector has experienced a rapid slowdown over the past two years and added only 411 MW of new capacity in 2023 – the [lowest level for 13 years](#).



## Türkiye recorded lowest wind capacity installation in 13 years

Yearly added capacity (MW)



Source: TEİAŞ

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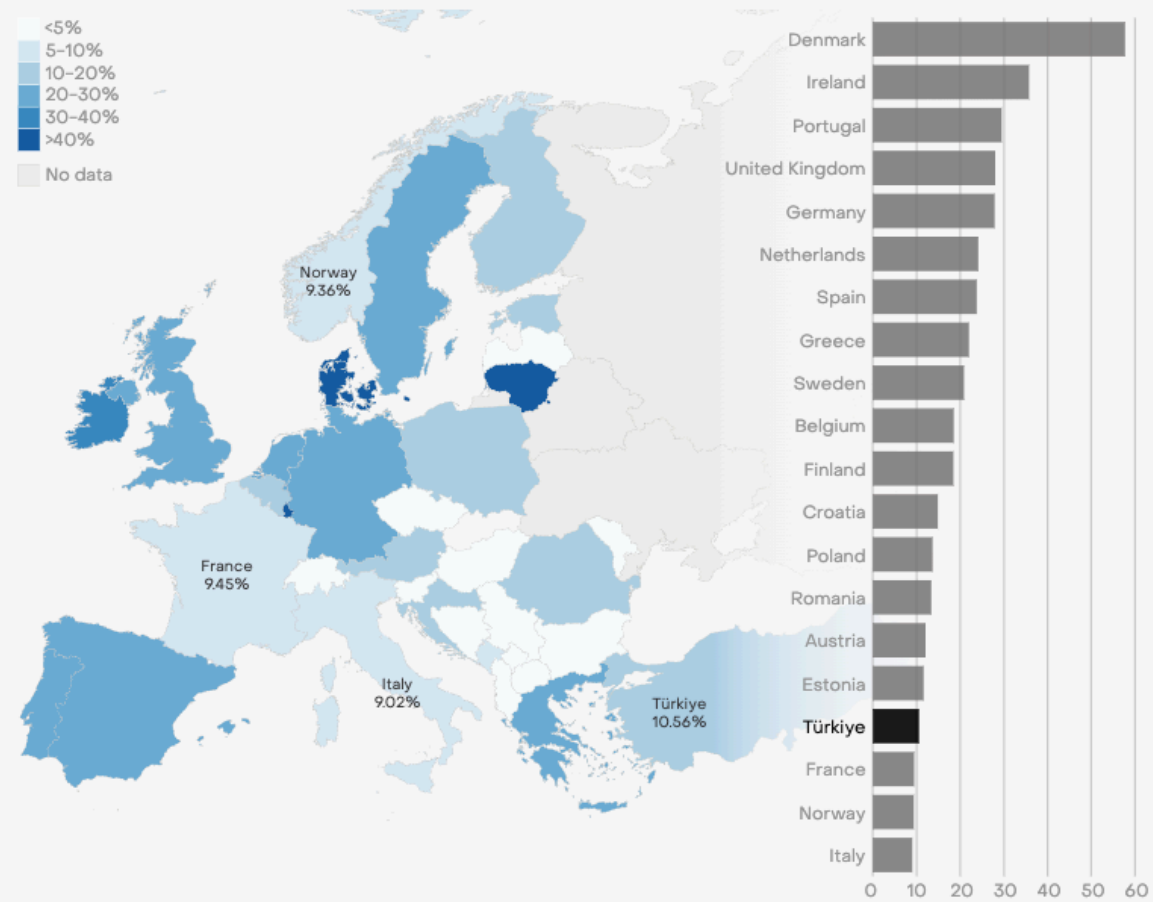
In 2023, total wind capacity increased by only 3.6% year-on-year to 11.8 GW, while year-on-year wind-generated electricity fell for the first time (-0.9 TWh). Wind contributed about 34 TWh to electricity generation in 2023, accounting for 10.5% of the total electricity generation. On the other hand, the capacity factor of wind power plants remained close to the average over the last five years, closing the year with an average of 33%. In September 2023, the [capacity factor](#) of wind power plants reached 40%, the highest September value in the last five years.

### Austria and Estonia overtook Türkiye in wind

In Europe, Türkiye maintained its position ahead of France, Italy, and Norway in the share of wind power in total electricity production, [as it did last year](#). However, it was overtaken by Austria and Estonia, slipping two places. At the current rate of development, Türkiye (10.5%) could fall behind France (9.5%) and Italy (9%) in terms of the share of wind in electricity generation in the future.

## Türkiye outranks France, Italy and Norway in wind share in total electricity production

Share of wind in total generation, 2023 (%)



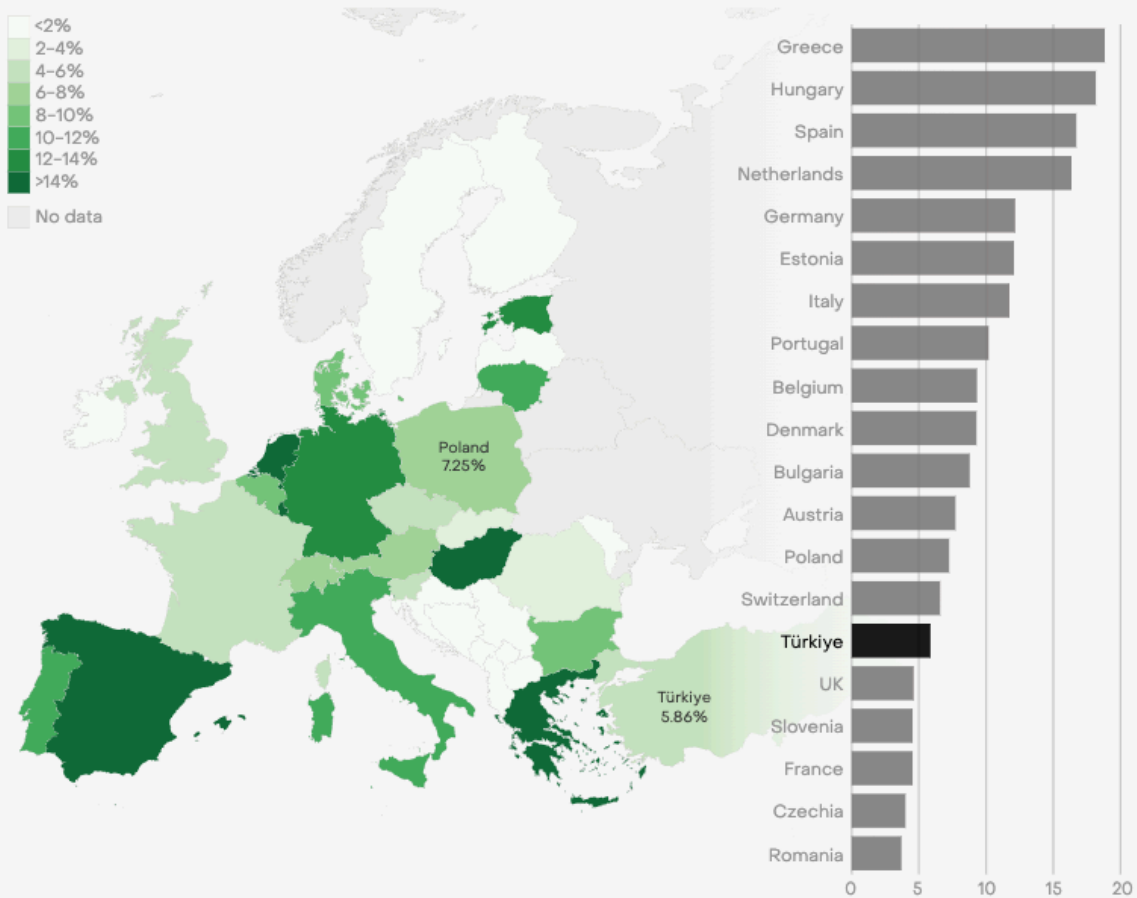
Source: Ember Türkiye Electricity Review 2024  
 Only countries with electricity consumption above 7 TWh were included. Lithuania was excluded due to imports covering the majority of the demand.

## Poland surpassed Türkiye in the share of solar electricity generation

Türkiye lags behind other European countries in utilising its high potential in solar energy. Among European countries, Türkiye dropped four places in the ranking of solar share in total electricity generation compared to the previous year. Greece, which has similar [solar energy potential](#) to Türkiye, ranked first in Europe with a share of 19%, while other Mediterranean countries like Spain and Italy ranked third and seventh, respectively.

## Poland surpasses Türkiye in solar share in total electricity production

Share of solar in total generation, 2023 (%)

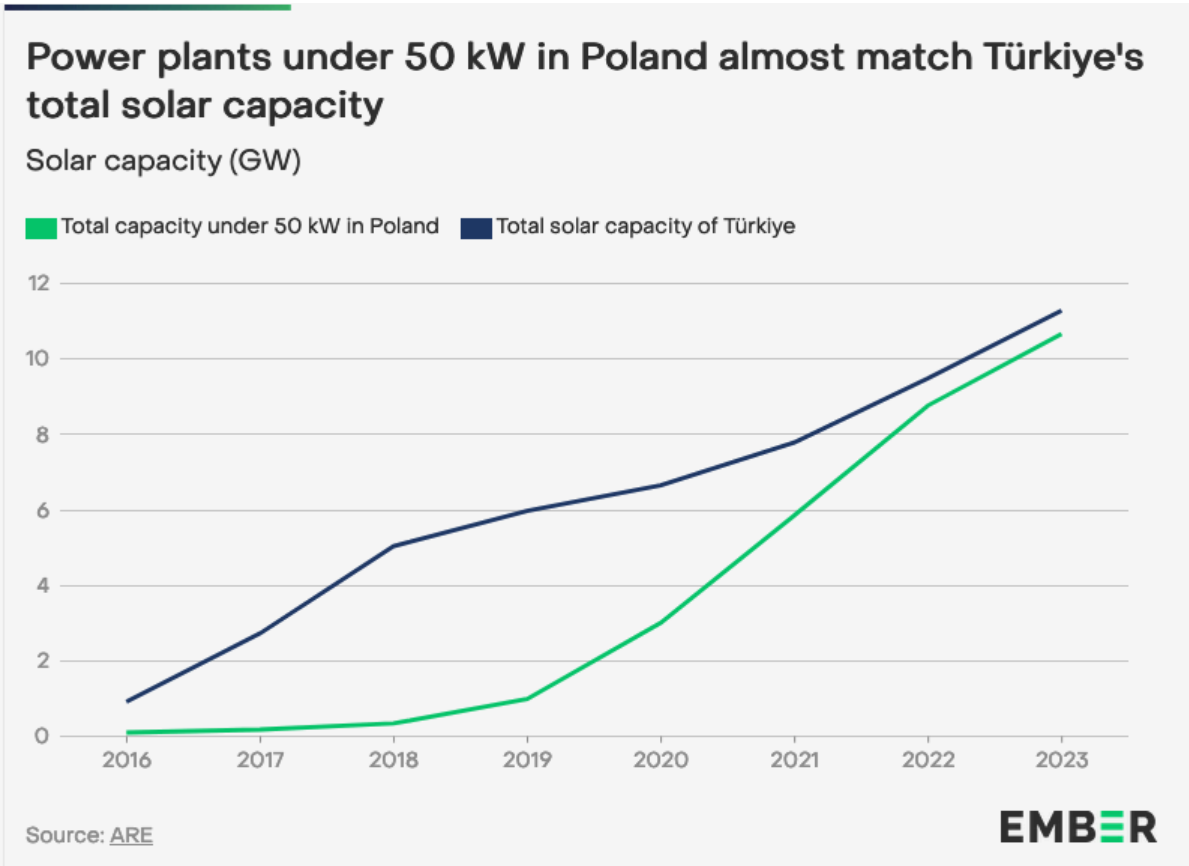


Source: Ember Türkiye Electricity Review 2024  
 Only countries with electricity consumption above 7 TWh were included. Lithuania was excluded due to imports covering the majority of the demand.

Countries such as the Netherlands and Germany, which lead the ranking, show the [importance of rooftop solar applications](#). In 2023 alone, Germany commissioned 7 GW of new capacity on residential rooftops and 2.5 GW on rooftops of commercial buildings. Meanwhile, the Netherlands maintained its leadership position [in installed capacity per capita](#), with 41% of new capacity installed on rooftops. Bulgaria made big strides in solar, rising seven places and overtaking Türkiye at 9%. Türkiye’s share of solar power in total generation is close to that of the United Kingdom (4.6%), Switzerland (6.6%) and Poland (7.3%) – countries with much less solar potential.

Poland, which is known as a “coal country”, reduced its coal dependency in electricity generation by successfully implementing programmes that incentivise rooftop solar, such as a direct [financial support](#) programme, [value added tax reductions](#), and deduction of [purchased equipment and installation costs in income tax calculations](#).

With the right incentives and policies, Poland increased its solar energy production by 47% from 8 TWh in 2022 to over 12 TWh by 2023. Thus, the share of solar in total electricity generation in Poland increased from 4.6% to 7.3%. Poland reduced its electricity generation from coal by 22 TWh in 2023, with an increase of 7 TWh in solar and wind generation and a decrease in electricity consumption compared to 2022. The share of solar and wind in total electricity generation, which was 16% in 2022, exceeded 20% for the first time in 2023. The driving force behind Poland’s surging share was the growth in installations of small-scale solar plants. While Poland’s installed capacity of solar power plants below 50 kW was 0.3 GW in 2018, this capacity [increased to 10.5 GW](#) in 2023, approaching Türkiye’s total solar capacity.



## Gas and Hydro

# Electricity generation from natural gas at four-year low

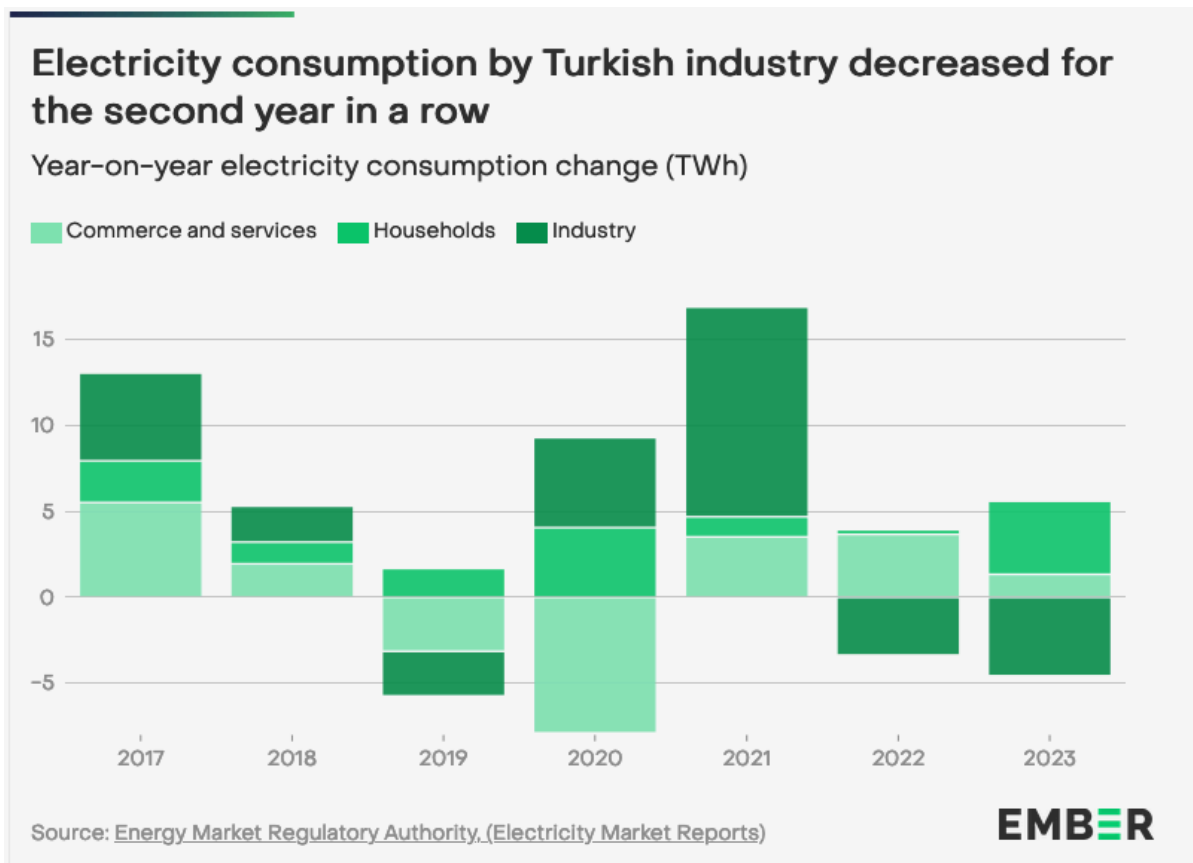
Electricity generation from natural gas fell as coal prices retreated and demand declined.

### Electricity demand has declined over the past two years

Although the [National Energy Plan \(NEP\)](#) anticipates that electricity demand will reach 380 TWh in 2025, electricity consumption has fallen over the past two consecutive years. The decline in demand, higher cost of electricity generation from natural gas compared to imported coal, and increased rainfall boosting hydroelectricity generation in the second half of the year resulted in electricity generation from natural gas dropping to its lowest level in the past four years.

In 2021, Türkiye saw a year-on-year peak in electricity demand rise at 8%, resulting in a 25 TWh increase. The rise in electricity demand and the impact of a dry year led to a 49 TWh gap between electricity supply and demand in 2022 compared to 2021. To meet the demand during that period, electricity production from natural gas increased by 40 TWh compared to 2020 while imported coal generation fell by 8 TWh due to the lower cost of electricity generation from natural gas at that time.

In 2022, mild weather and the [increasing share](#) of the service sector in the economy reduced demand by approximately 0.2 TWh. In 2023, demand declined by approximately 2 TWh compared to 2022, largely due to the slowdown in industrial sector activities. The industrial sector's share in Gross Domestic Product (GDP) decreased from 43.47% in 2022 to 42.09% in 2023. Meanwhile, the share of electricity consumed by industry decreased from 43% to 41%, with the sector's [invoiced electricity consumption](#) dropping by approximately 4.5 TWh compared to 2022. The overall decrease in consumption was also influenced by [improved energy efficiency](#) and the increasing contribution of the agricultural sector to GDP, up from 5.8% to 6.2%.



In 2023, [warmer winter weather](#) (compared to 2022) suppressed electricity demand in the residential and service sectors. The [heating degree days](#), a measurement used to compare how much heating is needed during a certain time period, [decreased by more than 20%](#) in January 2023 compared to the same month the previous year, resulting in a 1 TWh decrease in total electricity consumption by the residential and service sectors compared to the same month in 2022.

May and June saw a fall in the number of [cooling degree days](#), with a 70% and 30% drop, respectively, compared to the same months the previous year, prompting a significant reduction in cooling demand. However, July and August were 15% warmer on average than in 2022 and residential consumption increased by about 2 TWh compared to the same period in 2022. In months with above-average temperatures, higher cooling demand led to an increase in electricity consumption in the residential and service sectors compared to the previous year. There was no significant change in electricity consumption for agriculture and public lighting compared to 2022.

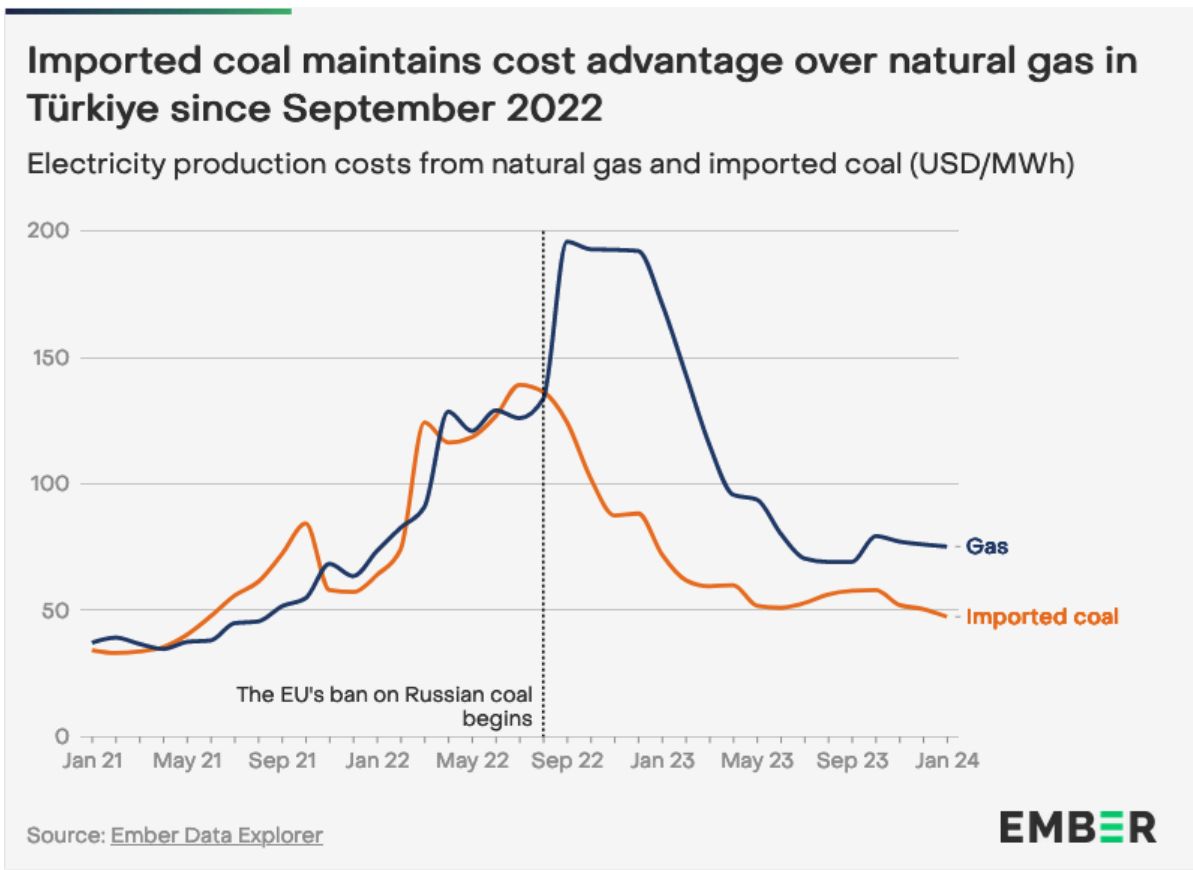
### Hydro generation decreased due to the dry start to the year

In 2023, hydroelectricity had a 20% share of total generation at 64 TWh, of which 69% came from power plants with dams. The [dry first few months](#) of 2023, led to a decrease in hydroelectricity generation by approximately 3 TWh compared to the previous year. Hydroelectric power plants saw [capacity factor values](#) drop to the lowest levels of the past five years during January and February.

However, in the latter half of 2023, rainfall increased compared to the five-year average. The autumn of 2023 was [70% wetter across the country than the previous year](#), with the highest regional increase in Eastern Anatolia, where hydroelectric capacity is high compared to other regions. The increase reached 84% in November and 89% in December, with double the amount of water entering the dams compared to the same period in 2022 and [80% compared to the five-year average](#). As a result, the share of hydroelectricity in generation rose to 25% in December 2023 – the highest level for December in five years. The annual capacity factor of hydroelectricity was 23%, but in December the capacity factor reached 30%.

### Gas-fired electricity generation lost its cost advantage over imported coal

At the beginning of 2022, the [wholesale price of natural gas](#) for electricity generation in Türkiye stood at 5.5 TL per standard cubic metre (Sm<sup>3</sup>). However, by the last quarter of the year it had nearly quadrupled to over 20 TL/Sm<sup>3</sup> because of the Russian invasion of Ukraine. In 2023, natural gas prices halved to 10 TL/Sm<sup>3</sup>, and electricity generation from natural gas fell by 5 TWh compared to the previous year.



As a result of the EU’s ban on Russian coal and a [gradual reduction](#) of natural gas imports, coal prices fell more than natural gas. Consequently, Türkiye witnessed a reduction of approximately 50% in the cost of electricity generation from imported coal in 2023 compared to the previous year. The price of natural gas did not fall at the same rate, meaning natural gas lost its cost advantage over imported coal as of September 2022.

In 2023, alongside the declining demand, electricity production from natural gas decreased due to the higher cost of generating electricity compared to imported coal. In the last three months of 2023, hydroelectricity generation increased, as [78% more water](#) reached the power plants with dams compared to the same period of the previous year. Due to the increased rainfall, the marginal cost of electricity generation from natural gas fell below wholesale electricity market prices in the last two months of 2023, limiting electricity generation from natural gas. Thus, the share of electricity generation from natural gas in total generation fell to 16% in December – the lowest level in December for five years.



## Conclusion

# Renewable energy installations need to accelerate to meet targets

Although Türkiye has added 11 GW of wind and solar capacity in the last five years, other European countries have proved this is possible in a single year.

### **Rooftop solar potential can help Türkiye reach its targets**

According to the NEP, solar energy capacity is set to reach 52 GW in 2035. To meet this target, an annual average of 3.4 GW of new solar capacity is foreseen to be added. To date, the highest annual installation for solar power plants was 2.3 GW, reached in 2018, and the average annual new capacity over the past five years was 1.3 GW. In 2023, Türkiye installed 2 GW of new solar power plants. However, the country needs to double its current solar power plant installation rate by two and a half times and install 5.3 GW in the next two years alone in order to reach its targets.

EU countries have demonstrated that this rate of deployment is achievable. In 2023, Germany increased its solar installations by 85% compared to the previous year and installed [14.5 GW of new capacity](#). Similarly, in 2023 alone, Spain built approximately [2 GW of solar installations aimed at self-consumption](#) and a total of 8.2 GW solar capacity. Meanwhile, Italy and Poland added 5.2 and 4.1 GW of new capacity respectively. The total EU solar market grew by 40% compared to last year and 100% compared to two years ago, [reaching a record of 56 GW](#) of new installations in 2023. Türkiye can utilise its rooftop solar potential to catch up with installation rates in EU countries and get on track to meet its clean energy targets. Rooftops in Türkiye have a [technical potential of 120 GW](#) and can meet 45% of the country's total electricity demand.

### Wind power target is far from ambitious

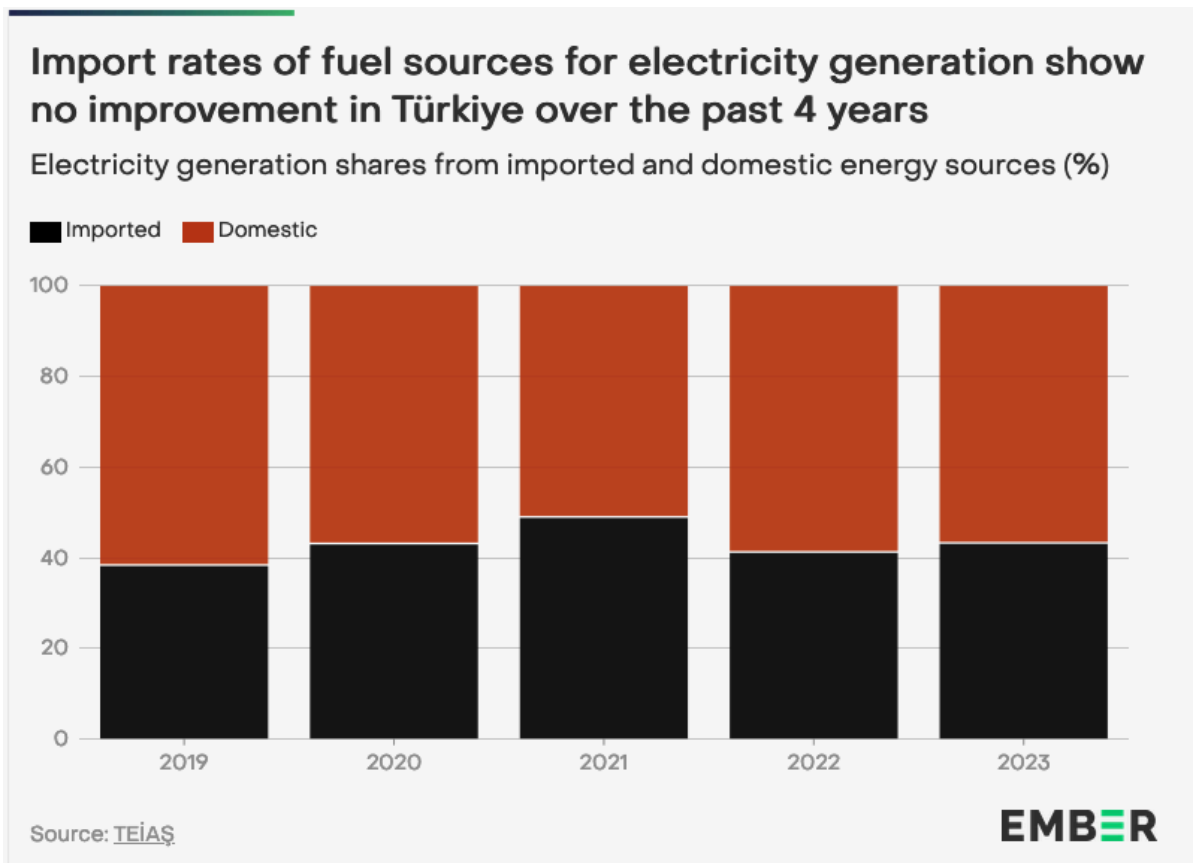
As of the end of 2023, Türkiye had an installed wind power capacity of 11.8 GW, while the NEP's 2035 forecast for wind power plants is 30 GW. Regarding Türkiye's 150 GW of [wind potential](#), the target seems to be falling behind. Considering that the target is 24 GW by the end of 2035, excluding offshore installation target in the same period -which is 5 GW- it is aimed that only 1 GW of new onshore wind capacity will be added annually. Despite the low capacity installed in 2023, Türkiye has an average installation of 960 MW over the last five years, thus, it is evident that the set target is far from ambitious.

On the other hand, within the scope of the [Renewable Energy Zones \(YEKA\)](#) model, which entered into force in 2016, the Ministry of Energy and Natural Resources has finalised tenders for [more than 6 GW of capacity](#) to date. By the end of 2023, only 1.3 GW of this capacity ([Karapınar solar power plant](#), [Bor 2-3 solar power plant](#), [Akköy WPP](#)) was realised. Although 2.9 GW of wind capacity was allocated under YEKA, only 25 MW of this capacity was commissioned by the end of 2023. The realisation of the capacities allocated under the YEKA model should be closely monitored and the commissioning process must be accelerated.

Additionally, in August 2023, the Ministry of Energy and Natural Resources [updated](#) the offshore wind YEKA that had been announced in 2016 but later cancelled. It plans to initiate the investment process for the offshore wind YEKA located in the offshore areas in Bandırma, Bozcaada, Karabiga, and Gelibolu, after taking into account relevant technical studies and the opinions of public institutions. In the NEP, the installed capacity of offshore wind is set as 5 GW until 2035. Considering the low rate of realisation of onshore wind YEKAs, it is predicted that the commissioning of offshore YEKAs will take place over longer periods due to technical and financial challenges.

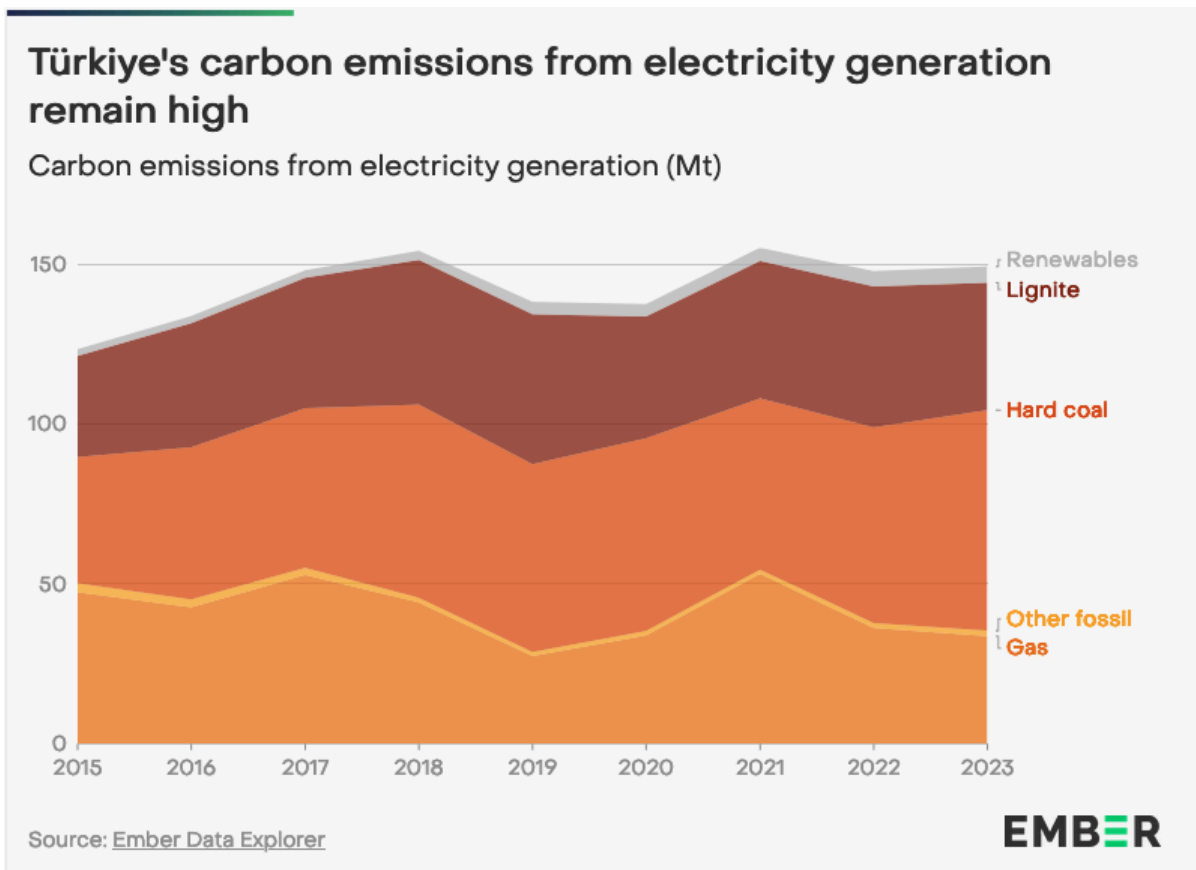
### How to achieve climate goals remains unclear as dependency grows

Türkiye's dependence on imported fuels for electricity generation increased from 41% to 43% in 2022, with [no improvement in the dependency ratio for the last four years](#). The increase in import dependency is due to the rising share of fossil fuels in electricity generation. At the same time, reliance on imported fossil fuels for electricity generation is also contributing to a rise in carbon emissions. Despite the rising share of renewable energy in total electricity generation, carbon emissions from electricity generation are at 2017 levels.



2021 was also the year when carbon emissions from electricity generation peaked in Türkiye, as electricity demand increased while hydroelectricity generation decreased. Thus gas power rose trying to meet the demand. However, in the future, carbon emissions may exceed 2021 levels in years with dry conditions and increased electricity demand during heat waves. This situation could be prevented with the acceleration of new wind and solar capacity.

Setting a target of [net zero emissions](#) by 2053 is a major step forward for Türkiye, yet there is no clear plan on how to reach this target. Increasing dependency on imported fuel sources in electricity generation, the increase in coal generation which reached a historic peak over the last three years, the lack of a roadmap to transition away from fossil fuels and the failure to realise renewable energy investments at the desired pace emerge as the main challenges that Türkiye needs to overcome in the short and medium term.



Additionally, despite Türkiye's energy transition commitments, the NEP states that 2.5 GW of new coal and 10 GW of new natural gas power plants will be built by 2035. This negatively impacts the perception of commitment to achieving the transition to clean energy. Adhering to Türkiye's clean energy targets, preparing a clear and transparent roadmap and promptly implementing it will not only reduce the burden on the economy but also bring Türkiye closer to meeting its environmental and climate targets.

## Supporting Materials

# Methodology

For Türkiye's 2023 licensed electricity generation data ["/production/real-time-generation"](#) and for unlicensed generation ["/production/renewable-unlicenced-generation-amount"](#) EPIAŞ Transparency API web services were used. Historical electricity generation data, installed capacity and electricity consumption data for the period 2000-2022 were obtained from TEİAŞ's [electricity generation-transmission statistics](#) and [Load Dispatch Information System](#). TEİAŞ [Daily Water Status Reports](#) were used to calculate the amount of water supplied to hydroelectric power plants with dams.

Electricity generation data for EU countries is taken from Ember's European Electricity Review 2024 report, which brings together data sets from ENTSO-E, Eurostat and national transmission system operators. For more details, please refer to [Ember's European Electricity Review 2024](#) report. Data for non-EU countries, excluding Türkiye, are taken from Ember's global annual dataset. For more information on this dataset, please visit Ember's [web page](#).

While the data source for Türkiye's coal import bill is the official statistical institute [TÜİK](#), coal import data by country of origin is taken from Kpler.

# Acknowledgements

## Thank you

We would like to thank Ufuk Alparslan for his contribution to the content, Eva Mbengue, Rosamond Hutt and Alison Candlin for reviewing the English translation and their valuable feedback. Also, we would like to thank Reynaldo Dizon for his contribution on data visualisation.

## Links

Access to government data via the hyperlinks may be restricted outside Türkiye.

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