Türkiye Electricity Review 2026

Wind and solar made up 22% of Türkiye's electricity generation in 2025. Meanwhile, coal remained the largest power source at 34%, with two-thirds supplied by imports

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About

Ember’s Türkiye Electricity Review, published for the fifth consecutive year, analyses Türkiye’s electricity generation data in 2025. The report also compares Türkiye’s electricity generation sources with those of European countries. The data used in the report is available through [Ember's Electricity Data Explorer]() and [Türkiye data tools]() pages.

Read the report online at:
https://ember-energy.org/latest-insights/turkiye-electricity-review-2026/

Highlights

22%

Wind and solar share in generation in 2025 in Türkiye

$1.8bn

Annual average economic cost of drought on electricity generation in Türkiye

33 GW

The battery project pipeline to be integrated with new wind and solar power plant projects in Türkiye

Contents

Wind and solar reach 22% of power generation, but coal leads at 34%

In Türkiye, electricity generation has shifted rapidly over the past three years, marked by accelerated growth in solar energy and record wind installations in 2025. Wind and solar combined generated 22% of electricity, helping to limit the pressure on natural gas imports caused by drought-driven declines in hydroelectric generation. However, coal remains the largest source of electricity generation at 34%, with two-thirds of this production relying on imports. While Türkiye still lags behind many European countries in renewable energy share, it stands out with its expanding battery project pipeline.

Key takeaways

01 Wind installations reach record levels as solar grows strongly for the third consecutive year

Solar installations reached a record 4.8 GW in 2023, and new installations have remained close to this level over the past two years. As a result, solar electricity generation has doubled in the last two years. Wind capacity additions hit a record 1.9 GW in 2025. However, combined wind and solar additions of 6.5 GW still fall short of the 8 GW required annually to meet the 2035 target.

02 Wind and solar reached a record 22% of electricity generation, but remain below the European average

Driven by record installation over the past three years solar generated 11% of electricity, nearly matching wind generation. Together, wind and solar now account for 22%. However, when compared with Europe's 24 highest electricity-generating countries, Türkiye ranks 15th for wind, 14th for solar, and 16th for renewable energy. By contrast, Türkiye is by far the leader compared to countries in the Middle East, Caucasus, and Central Asia.

03 Drought creates an average annual cost of $1.8 billion

Data from the past 30 years shows that drought has caused a persistent decline in hydroelectric generation in Türkiye. The average electricity production of the country's three largest dams — Atatürk, Karakaya, and Keban — was 29% lower over the past decade than in 1996–2005. This shortfall has been compensated by gas generation, increasing reliance on energy imports. As a result, drought leads to an average annual increase of $1.8 billion in fossil gas imports, rising further during energy crises and drier years. Supporting hydroelectric plants with hybrid solar installations is therefore crucial for supply security.

04 Two-thirds of coal electricity comes from imports

In 2025, coal accounted for 34% of electricity generation, with about two-thirds supplied by imports. No new coal plants have been commissioned since 2022, and none are under construction. As a result, growth in coal generation has slowed. After reaching a record 122 TWh in 2024, it declined slightly to 121 TWh in 2025. However, a purchase guarantee for domestic coal plants starting in 2026 may increase their utilisation rates and lead to a new record in coal generation.

05 Türkiye surpasses EU countries in battery project pipeline

Since 2022, new wind and solar plants with storage must install battery capacity that equals their installed capacity. The total allocated battery capacity for these projects has reached 33 GW. In comparison, EU countries with the largest battery capacity, including both operational capacity and project pipelines, have around 12-13 GW, less than half of Türkiye's. Türkiye's battery project pipeline corresponds to 83% of its current wind and solar capacity (40 GW).

"In recent years, Türkiye has achieved significant growth in wind and solar energy. However, when other renewable sources such as hydropower and geothermal are included, the share of renewables in electricity generation still lags behind European countries. On the other hand, Türkiye is by far the regional leader in wind and solar energy among countries in the Middle East, Central Asia, and the Caucasus. The global fossil fuel crisis experienced for the second time in the past four years has further highlighted the importance of the transition to clean energy. In this context, Türkiye—set to host the COP31 summit—has the opportunity to take on a leading role in the regional energy transition."

Ufuk Alparslan
Regional Lead, Türkiye and the Caucasus, Ember

Chapter 1: Wind and solar

Wind and solar reach 22% of electricity generation and surpass hydropower

In Türkiye, the momentum in capacity growth—initiated by record solar installations in 2023—has continued, while electricity generation from solar has doubled over the past two years. Wind installations also reached a new high in 2025. Although Türkiye still lags behind many European countries in wind and solar energy, it is clearly the leader among countries in the Middle East, the Caucasus, and Central Asia.

Wind installations hit records as solar maintains strong growth

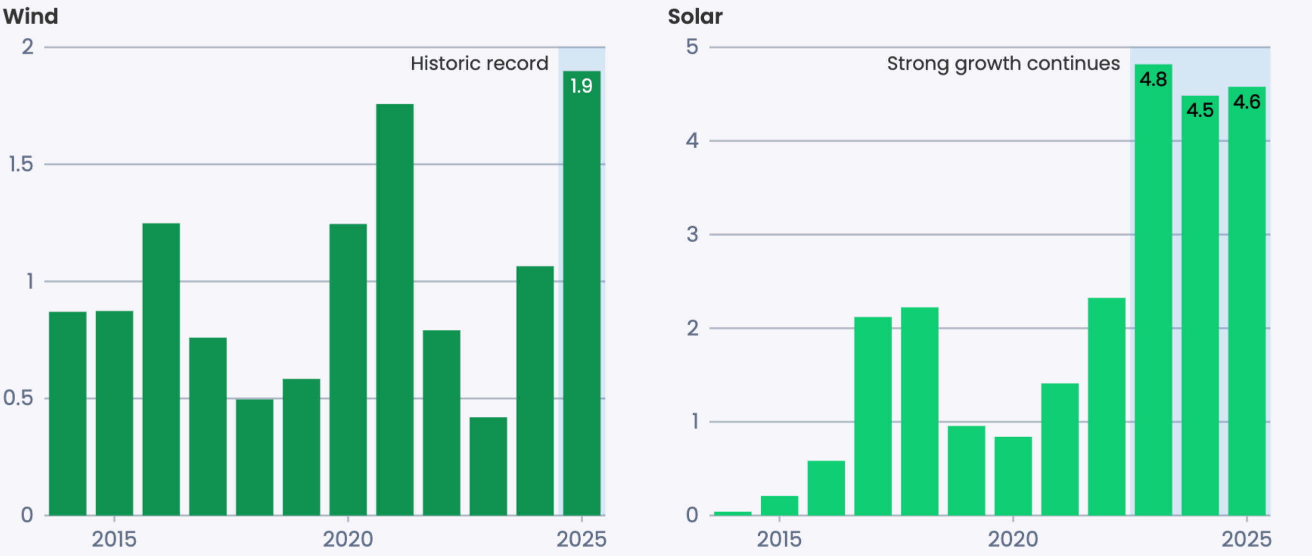
2023 marked a turning point for solar energy in Türkiye. Until then, annual solar installations had reached a maximum of 2.3 GW, but in 2023 they hit a record 4.8 GW. Since then, growth has remained strong, with solar installations holding around 4.5 GW for two consecutive years.

New wind capacity rose to a record 1.9 GW in 2025, surpassing the previous peak of 1.8 GW in 2021.

As a result, in 2025 Türkiye achieved a record 6.5 GW of new wind and solar capacity combined. By the end of 2025, total installed wind and solar capacity reached approximately 40 GW.

Historic record in new wind installations in Türkiye, while strong growth in solar continues

New wind and solar installations (GW)



Source: TEİAŞ

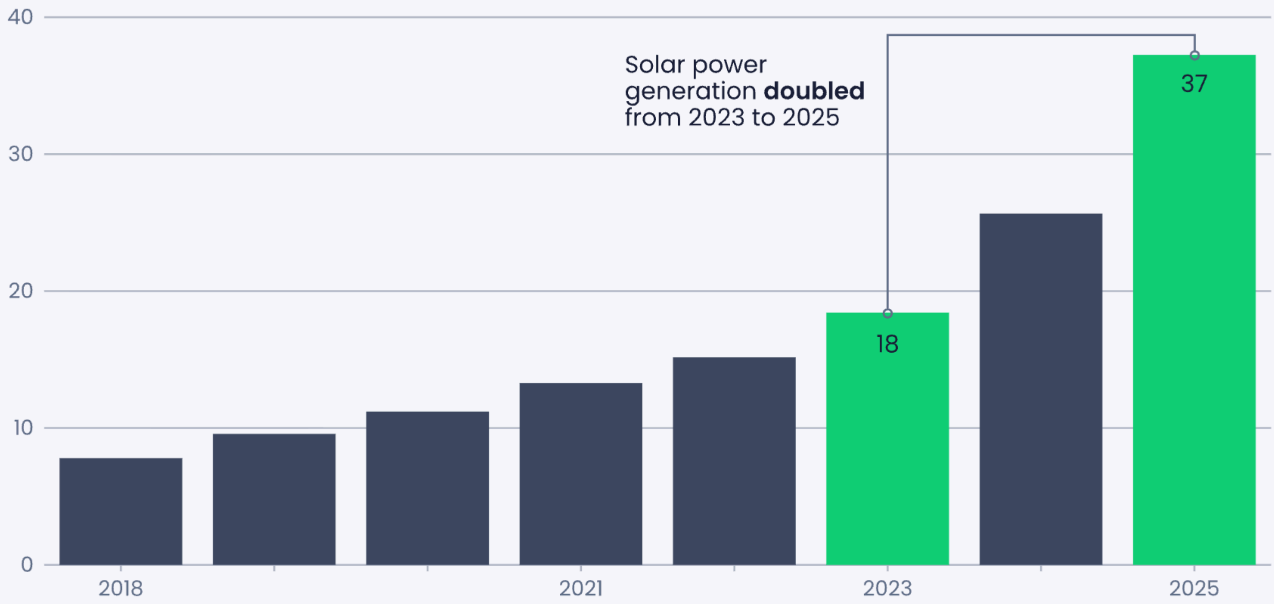
Despite record installations in recent years, Türkiye still has a long way to go to meet its renewable energy targets. The country aims to reach 120 GW of total wind and solar capacity by 2035—meaning it must triple its current capacity. Achieving this target will require annual installations of 8 GW, exceeding even the record level reached in 2025.

Solar electricity generation doubled in two years

Solar generation in Türkiye grew steadily between 2018 and 2023. Thanks to the strong capacity growth since 2023, generation has increased exponentially, doubling from 18.4 TWh in 2023 to 37.3 TWh in 2025.

Solar power generation doubled in two years in Türkiye

Electricity generation from solar power (TWh)



Source: EPİAŞ

Wind and solar growth reduces the share of natural gas

The rapid increase in solar capacity in recent years has significantly raised its share in electricity generation. Before the recent surge, solar accounted for only 4.7% in 2022; by 2025, despite rising electricity demand, this share increased to 10.5%.

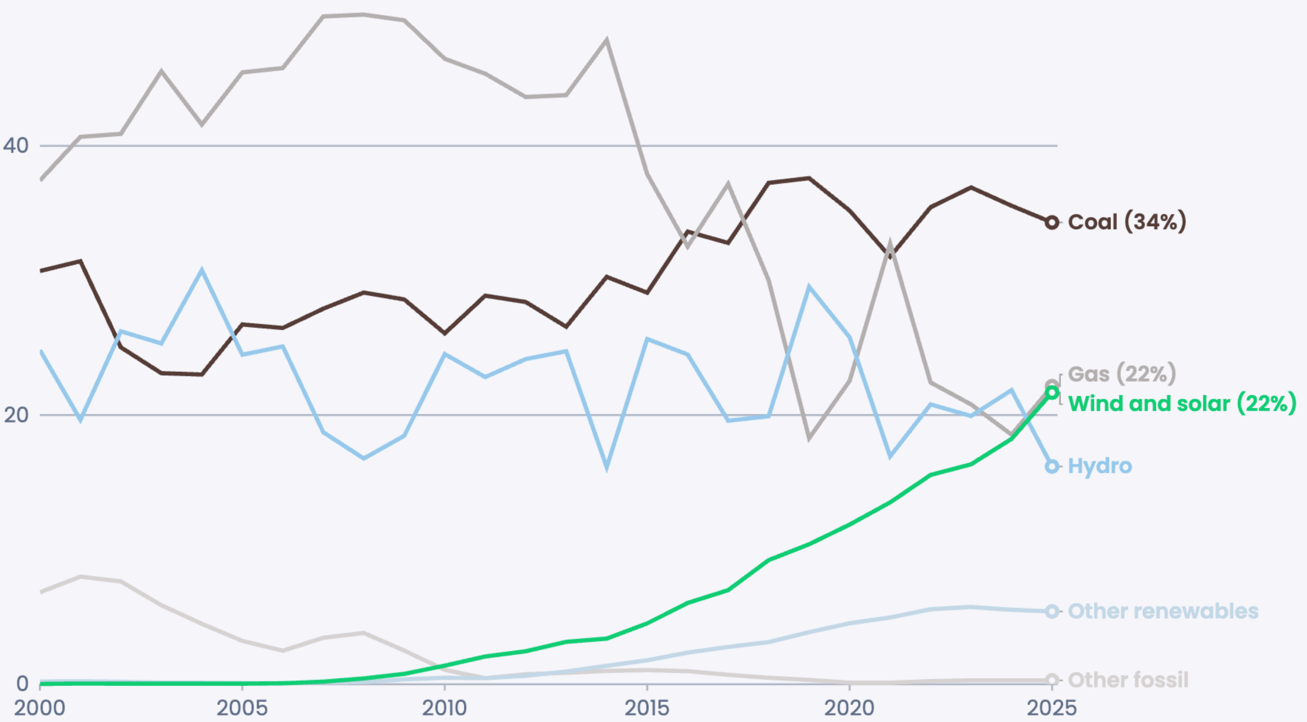
Meanwhile, growth in wind capacity has mainly offset rising electricity demand. While wind's share remained just below 11% between 2022 and 2024, it reached 11.1% in 2025.

Over the past decade, wind and solar energy in Türkiye have rapidly increased their share in electricity generation, reaching approximately 22% in 2025. For the first time, wind and solar surpassed hydropower in 2025, becoming the main drivers of growth among renewable energy sources.

The increase in wind and solar has also reduced the share of natural gas. In the early 2000s, natural gas accounted for over 40% of electricity generation. By 2014, its share had risen to 48%, while wind and solar together accounted for just 3.4%. By 2025, natural gas share had fallen to 22%. In the same period, coal's share increased from 30% to 34%.

Wind and solar reached 22% of Türkiye's electricity mix, yet coal still remains dominant at 34%

Share of electricity generation (%)



Source: EPİAŞ, TEİAŞ

Despite growth in wind and solar, Türkiye still trails Europe

In 2025, hydropower accounted for 16% of electricity generation in Türkiye, while other renewables such as geothermal and biomass contributed to 5%. Altogether, renewables made up about 43% of the country's total electricity generation. Although this is above the global average, it remains below the European Union average of 48%.

Türkiye ranks mid-table for renewable electricity among Europe's largest power consumers

Share of renewable electricity generation in Europe (%)

Source: Yearly electricity data, Ember

Total renewables includes other renewables. Includes countries with electricity generation above 25 TWh. Ukraine is excluded due to data disruption following the war.

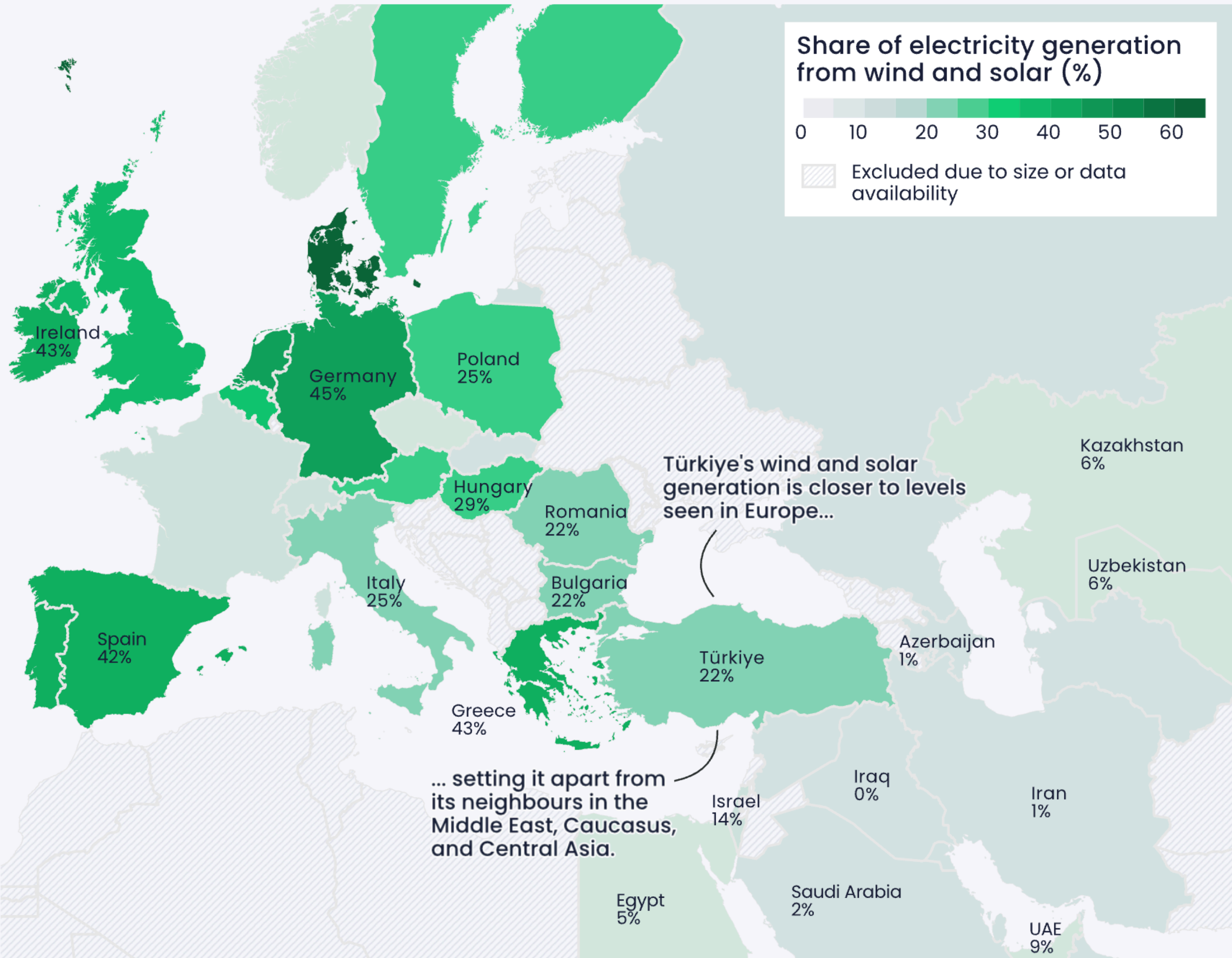
Across 24 European countries with electricity generation above 25 TWh, the share of renewables ranges from 17% to 99%. Norway, which generates 90% of its electricity from hydropower, has the highest share. Countries rich in hydropower resources—such as Austria, Portugal, Switzerland, and Sweden—also rank highly. Despite its strong hydropower potential, Türkiye ranks 16th among these countries in terms of renewable share in generation.

In terms of the share of renewable energy in electricity generation, Türkiye ranked 16th among European countries in 2023 and 2024 as well. The last year Türkiye placed in the top 5 in this ranking was 2004.

Denmark leads Europe in wind energy, generating 58% of its electricity from wind in 2025, followed by Ireland (38%) and the United Kingdom (30%). With an 11% share, Türkiye ranks 15th among European countries, although it remains ahead of Norway, Italy, and France, where wind accounts for about 8%.

Hungary has the highest solar share in Europe (27%), followed by Greece and Spain (22%). In Mediterranean countries with similar solar potential to Turkiye, such as Portugal and Italy, solar accounted for around 17% of the electricity mix, compared with 10.5% in Türkiye. Türkiye ranks 14th in solar share among European countries. Even Poland, with 11.4%, remains ahead.

Türkiye surpasses 20% wind and solar power in 2025, more closely resembling Europe than its neighbours



Source: Yearly electricity data, Ember, Electricity Data Explorer
Latest available data. Countries that generate below 25 TWh are excluded from this graphic. France, Switzerland and Norway generate most of their electricity from nuclear or hydro power.

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However, beyond Europe, Türkiye stands out as a leader in wind and solar electricity generation in its neighbouring regions. Among 16 countries in the Middle East, the Caucasus, and Central Asia with electricity generation above 25 TWh, no other country exceeds a 20% share of wind and solar. With 22%, Türkiye is clearly ahead of its regional peers.

Therefore, Türkiye has strong potential to serve as a role model for clean energy transition in the Middle East, the Caucasus, and Central Asia. Hosting the global climate summit COP31 in 2026 presents a significant opportunity for Türkiye to assume a regional leadership role in this area.

Chapter 2: Hydropower

Drought causes an annual cost of $1.8 billion in electricity generation

Based on 30-year averages, drought has had a persistent impact on hydroelectric generation in Türkiye. Both long-term and year-to-year declines in hydropower due to drought are compensated by natural gas power plants, increasing energy imports.

The impact of drought on hydropower is permanent

Hydropower has a long history in Türkiye. From the 1960s to the late 1990s, it accounted for up to 40% of electricity generation. Its share declined in the 2000s with the rise of natural gas. Nevertheless, hydropower continued to act as the backbone of renewable energy in Türkiye, maintaining a share between 16% and 30% during that period.

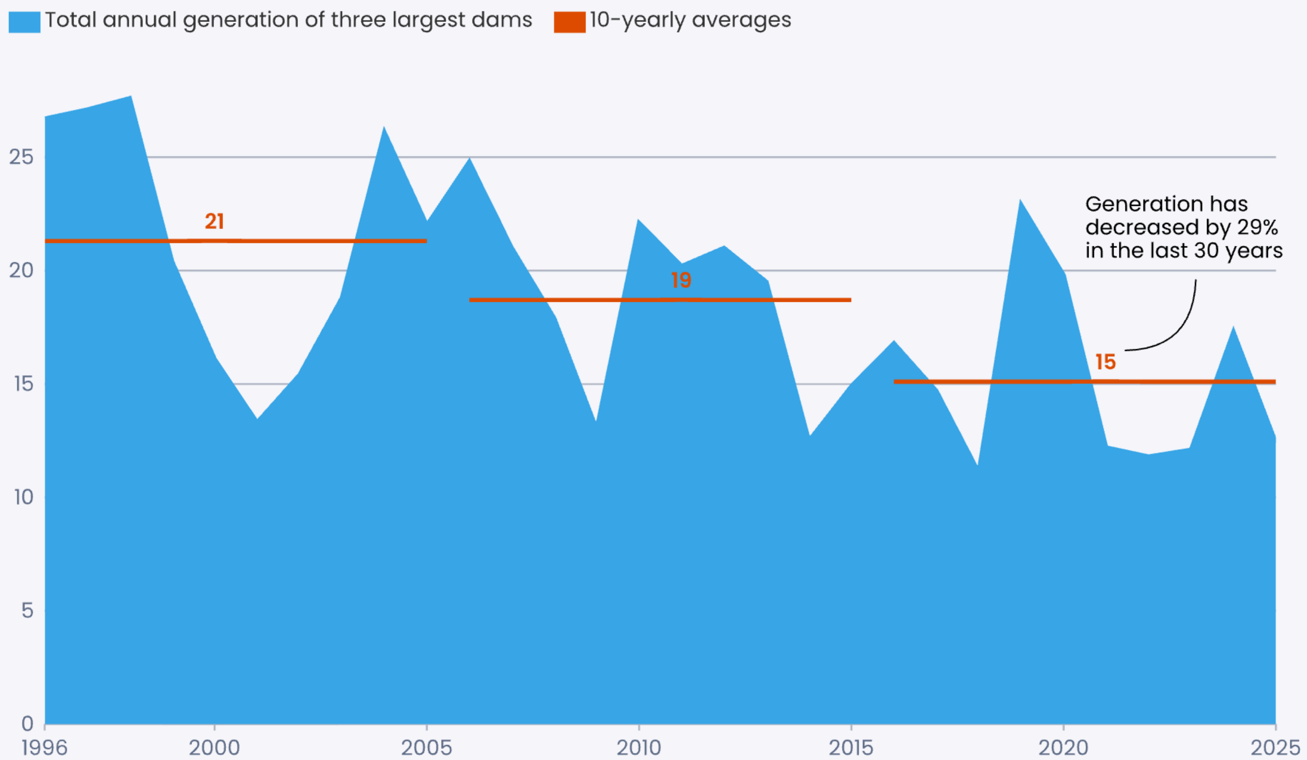
Over time, increasing electricity demand and the slowdown in new hydropower capacity additions have reduced its share in generation. In addition, drought has had a significant impact on power plants.

In Türkiye, drought has significantly reduced hydroelectric output over the past decade. Considering capacity utilisation rates over the last 30 years, the average capacity factor of hydroelectric plants fell from 38% in the 1996–2005 period to 26% over the past decade (See: Methodology).

A similar trend is observed in Türkiye's three largest hydroelectric plants: Atatürk, Karakaya, and Keban dams.

Drought has caused a longterm decline in hydropower generation in Türkiye

Annual generation and 10-year averages of Türkiye's three largest hydropower plants (TWh)



Source: EPİAŞ, Enerji Atlası
The three largest hydropower plants in Türkiye are Atatürk, Karakaya and Keban. Data starts in 1996 because Atatürk began generation in 1993.

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When examining total electricity generation over the past 30 years, these dams show a consistent decline in output across each decade. Their average annual generation was 21.3 TWh in 1996–2005, which decreased to 18.7 TWh (-12%) between 2011–2020. Over the last decade, the average annual generation fell further to 15.1 TWh—29% lower than 20 years ago.

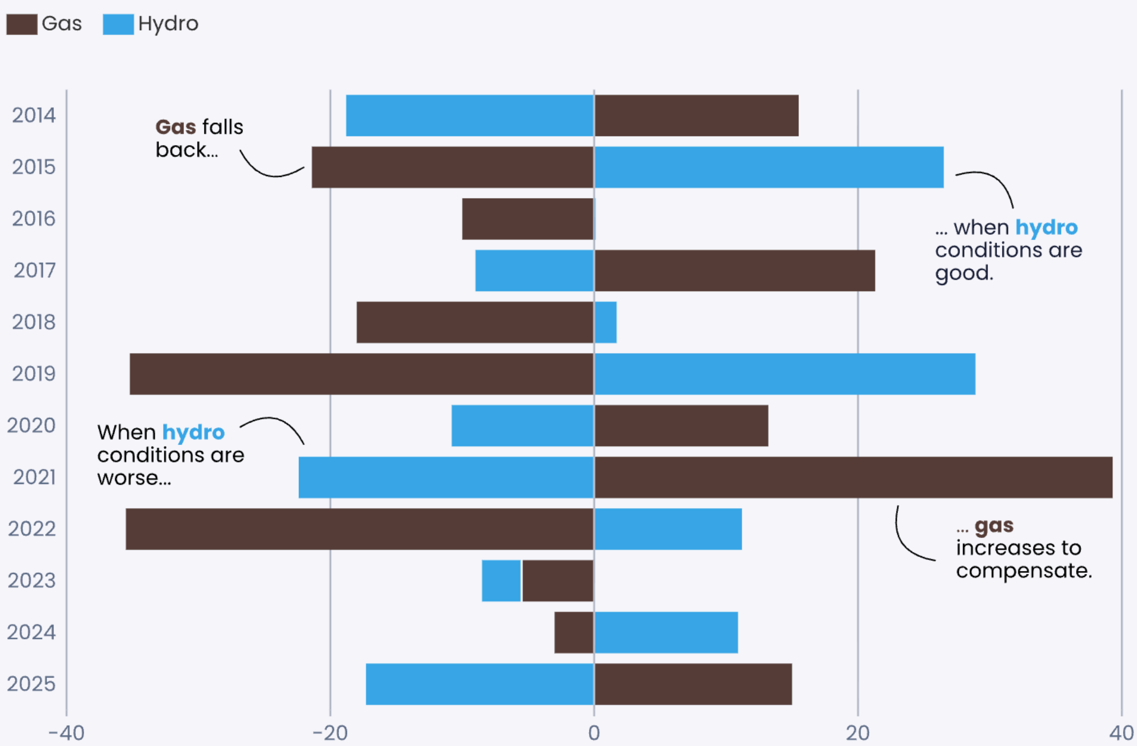
Decline in hydropower increases natural gas imports

In addition to its long-term effects, drought also causes short-term fluctuations in hydroelectric generation during dry years. These annual fluctuations can exceed 20 TWh, accounting for more than 5% of the country's electricity consumption. For comparison, even the doubling of solar generation over the past two years resulted in an increase of 19 TWh. Therefore, drought-related declines pose a risk to Türkiye's energy supply security.

In Türkiye, hydropower and natural gas plants effectively substitute for each other. When hydroelectric generation declines, natural gas plants compensate. When water availability is high, increased hydropower reduces the output of gas plants.

Tug of war: when hydropower dips, gas compensates

Year-on-year change in gas and hydropower generation in Türkiye (TWh)



Source: Yearly electricity data, Ember

Although domestic natural gas production has increased in recent years, Türkiye remains heavily dependent on imports. In 2025, domestic gas production covered only 5% of total consumption. At the same time, drought reduced hydropower generation, resulting in increased natural gas consumption and energy imports.

Over the past 30 years, the 29% decline in generation (-6.2 TWh) at just the three largest hydroelectric plants has required compensation through natural gas plants, leading to an additional $400 million in annual gas imports. If all hydroelectric plants in Türkiye are assumed to be similarly affected, the long-term impact of drought on energy imports reaches an average of $1.8 billion per year (See: Methodology).

Growth in coal generation has slowed, but has not yet reached its peak

In Türkiye, approximately two-thirds of electricity generated from coal relies on imported coal. Although the growth in coal electricity generation has slowed, it is still too early to say that it has reached its peak. A purchase guarantee announced in 2025 for domestic coal plants may increase their capacity utilisation rates and lead to a new record in coal-fired electricity generation in the coming years.

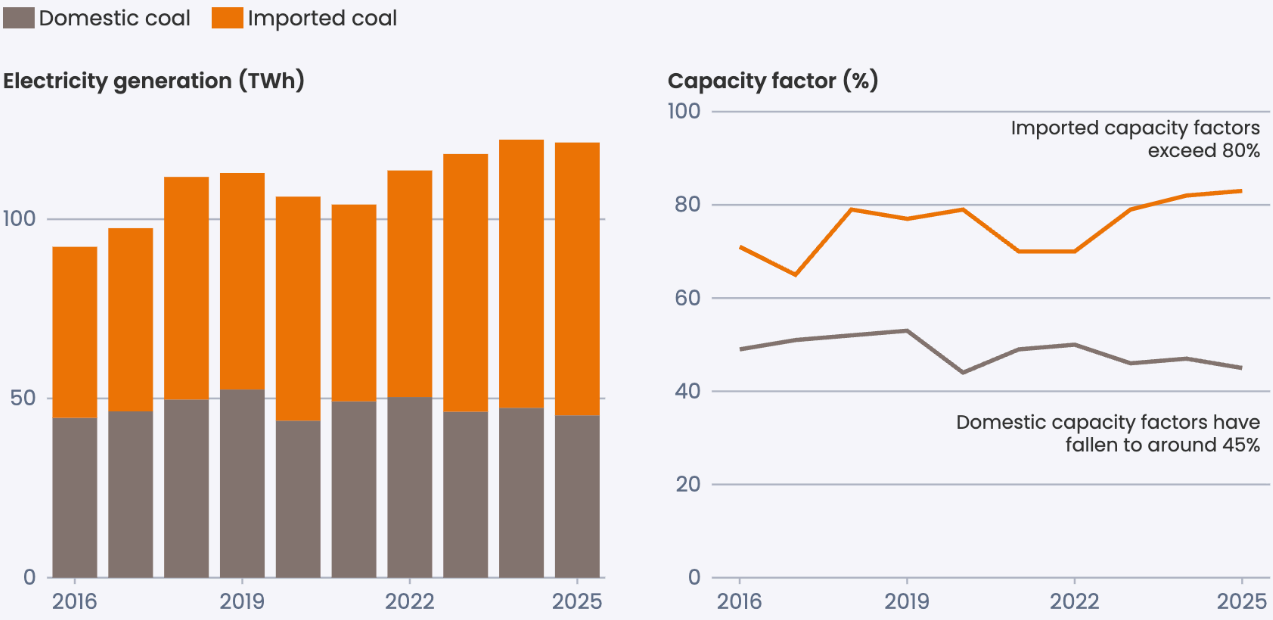
Two-thirds of coal electricity comes from imported coal

As of the end of 2025, Türkiye has a total installed coal capacity of 22 GW, consisting of 11.5 GW from domestic coal and 10.5 GW from imported coal. The last coal plant commissioned in Türkiye came online in 2022, and no new coal plant construction has started since then.

Over the past three years, electricity generation from domestic coal has remained relatively flat. In 2025, coal-fired electricity generation in Türkiye declined slightly from a record of 122 TWh in 2024 to 121 TWh in 2025.

Although domestic coal has a higher installed capacity, about two-thirds of coal electricity generation relies on imported coal. This is because imported coal plants operate at capacity utilisation rates above 80%, whereas domestic coal plants operate at around 45%.

Two-thirds of Türkiye's coal generation relies on imported coal, despite higher domestic coal power capacity



Source: EPİAŞ, TEİAŞ
Note: Installed capacity of domestic coal is 11.5 GW, while that of imported coal is 10.5 GW in 2025.

Purchase guarantee for domestic coal may increase generation

Coal generation in Türkiye could increase in the short to medium term following the introduction of a purchase guarantee for domestic coal plants from 2026.

In September 2025, Türkiye announced that domestic coal plants would receive a purchase guarantee from 2026 through the end of 2029. The guaranteed price, set at 75 USD/MWh, is 13% higher than the country's average electricity market price in 2025. The unit cost of electricity generation for all but one domestic coal plant is lower than this guaranteed price. When the wholesale electricity market price (PTF) exceeds 75 USD/MWh, the plants benefit from the PTF instead.

The purchase guarantee will apply to up to 60% of a plant's maximum potential generation. Therefore, a plant operating at a 60% capacity factor would be able to sell all of its production under the guarantee. Since the average capacity utilisation rate of domestic coal plants in Türkiye is below this level, many plants are expected to benefit from the guaranteed price for their entire output.

This purchase guarantee has the potential to improve the financial viability of domestic coal plants and increase their utilisation rates. As a result, less efficient plants may remain in operation for longer. Under current policies, coal-fired electricity generation in Türkiye is expected to peak between 2026 and 2029 and only begin to decline after 2030.

Chapter 4: Storage

Türkiye has a larger battery project pipeline than EU countries

Since 2022, a total of 33 GW of capacity has been allocated to new wind and solar power plants with storage in Türkiye. As these new plants are required to install battery capacity equal to their own capacity, this has resulted in a rapid expansion of battery projects. Türkiye now has one of the largest battery project pipelines in Europe, surpassing even countries with higher wind and solar capacity.

A 33 GW battery project pipeline

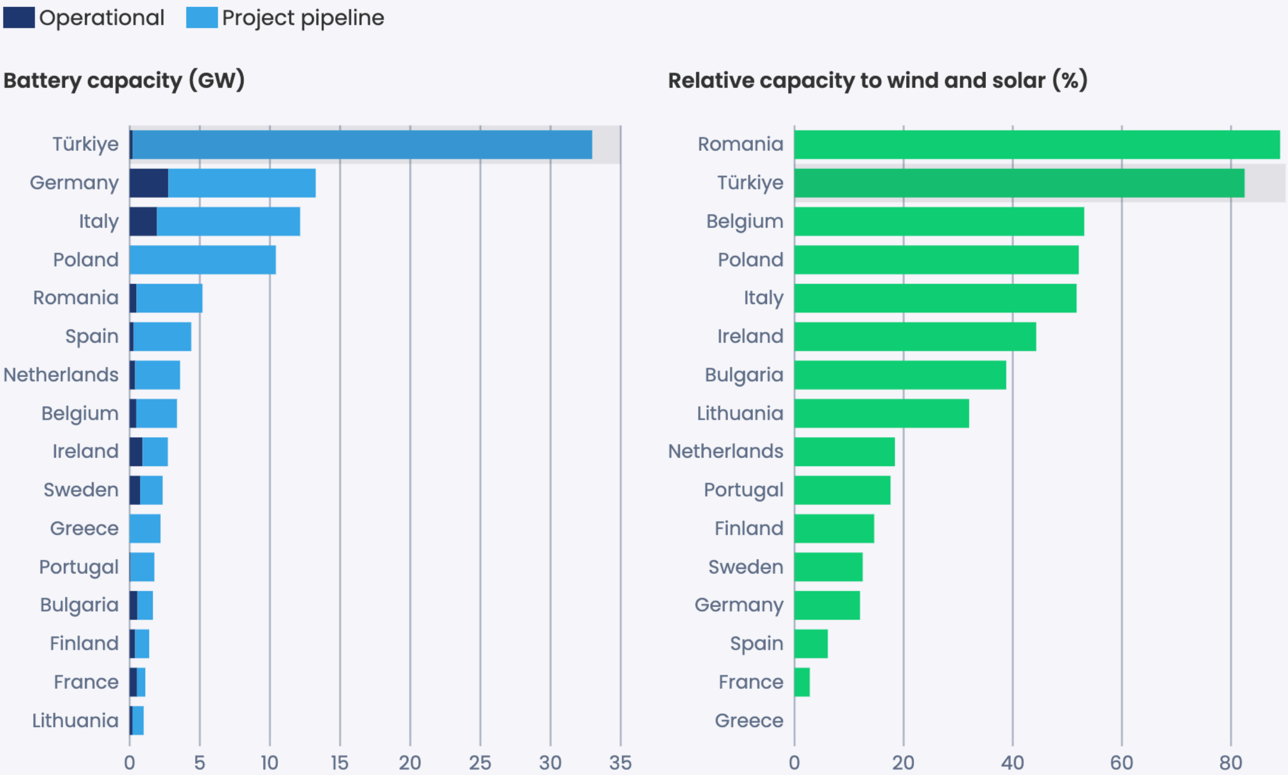
Toward the end of 2022, Türkiye introduced a regulation allowing grid capacity allocation for new wind and solar plants without the need for tenders or auctions. Under this scheme, projects are required to include battery capacity at least equal to the plant’s installed capacity.

Despite this battery requirement, limited grid capacity allocated for tenders and self-consumption projects led to a record 221 GW of applications within just a few months. Of these, 33 GW have been approved so far. Accordingly, these projects have created at least 33 GW of battery capacity.

Türkiye's battery project pipeline has reached 33 GW, exceeding that of any European Union (EU) country. Germany and Italy — the next largest — are at around 12–13 GW each, including operational capacity and project pipelines.

Türkiye has a higher battery capacity pipeline than any EU country

European countries ranked by grid-scale battery capacity (GW) and by battery capacity relative to installed wind and solar (%)



Source: Ember European Electricity Review 2026, EPDK (Türkiye data)
"Relative capacity to wind and solar" represents the ratio of total battery capacity (operational and pipeline) to installed wind and solar capacity. Solar includes utility-scale installations only.

As of the end of 2025, Türkiye's total installed wind and solar capacity reached 40 GW. Therefore, the 33 GW battery project pipeline corresponds to 83% of the country's existing wind and solar capacity.

Among EU countries, only Romania has a higher ratio of battery capacity (operational plus pipeline) to existing wind and solar capacity, at 89%. Other countries, such as Belgium, Italy, and Poland, have ratios around 52–53%, while Germany stands at 12% and the Netherlands at 18%.

Globally, batteries average 2.5 hours of storage

Türkiye has one of the largest battery pipelines in Europe (33 GW), but most projects have short storage durations of around one hour, limiting their support to the country's power system. The current total storage capacity of licensed and pre-licensed wind and solar projects with storage is 37 GWh, corresponding to an average duration of 1.1 hours.

However, global trends show that one-hour batteries are uncommon. Global battery capacity has reached 267 GW / 610 GWh, with average storage duration increasing each year. In 2025, global battery installations totalled 104 GW / 257 GWh, corresponding to an average duration of 2.5 hours.

While in Türkiye, the criteria applied for storage-integrated wind and solar projects have led investors to favour one-hour storage durations.

As a result, the Turkish 33 GW pipeline not only diverges from global trends but also from the country's long-term targets. Türkiye's 2035 battery capacity target is set at 7.5 GW with a two-hour storage duration.

As of February 2026, 208 MW of storage-integrated wind and solar projects have been commissioned in Türkiye. Since the regulation was first introduced in 2022, grid-scale battery installation costs have fallen by more than 50%, making projects financially viable under current electricity market prices. As the first pre-licenses began to be issued three years ago, this large project pipeline is expected to start materialising—or being reduced through cancellations—from 2026 onward.

Policy recommendations

The road to 2035

In recent years, Türkiye has made significant progress in wind and solar energy, but further policy improvements can help the country achieve its 2035 targets.

The problem of limited grid capacity

Türkiye targets 120 GW of wind and solar capacity by 2035, nearly triple current levels. To meet this target, the country will need to add around 8 GW of new capacity each year, exceeding the 6.5 GW record reached in 2025.

There are several ways to deploy wind and solar capacity in Türkiye: renewable energy auctions (YEKA), storage-integrated wind and solar projects, unlicensed installations aimed at self-consumption, such as solar, and hybrid solar installations additions to existing plants. Nonetheless, securing the connection capacity is a prerequisite for deploying wind and solar.

YEKA auctions are planned to allocate 1 GW per year each for wind and solar. However, 2 GW per year is not sufficient on its own to meet the target capacity.

No new capacity has been allocated for storage-integrated wind and solar projects since applications were halted in 2023. For unlicensed projects, no available capacity has existed in any province since July 2025. In March 2026, 3.5 GW of new capacity was announced. This includes 1.5 GW at the transmission level and 2 GW at the distribution level.

Hybrid solar projects reached 3.5 GW of capacity by 2024, but this increased by only 140 MW in 2025.

Freeing up grid connection capacity

As long as the 33 GW of storage-integrated projects already allocated are not finalised, new capacity allocations for wind and solar will remain limited. From 2026 onward, resolving permitting issues—without compromising environmental and social considerations—will be critical to accelerating these projects. At the same time, cancelling inactive projects and reallocating their capacity would free up space, resulting in an acceleration of wind and solar installations.

Attracting investment to expand grid capacity

Türkiye will need substantial investment in its electricity grid to meet its 2035 goals. According to government estimates, reaching 120 GW of wind and solar capacity requires extra $28 billion in grid investment alone. This level of funding will require external financing.

International financial institutions could support grid investments. Although Türkiye has held discussions with the World Bank, no agreement has yet been reached at this scale. The European Investment Bank (EIB), which resumed operations in Türkiye in 2026, the Asian Development Bank (ADB), which began operations in 2025, as well as the European Bank for Reconstruction and Development (EBRD), which has previously financed many energy projects, could all play a role.

Additionally, foreign investors could help expand grid capacity while supporting clean energy projects. Companies from Saudi Arabia and the United Arab Emirates, which invest in renewable energy globally, could invest in Türkiye through bilateral agreements. An example of such cooperation was reached in February 2026 with Saudi Arabia. It includes the construction of a 2 GW solar plant with a 25-year power purchase agreement.

Diversifying resources against drought

Hybrid solar installations can be expanded at hydroelectric plants that cannot fully utilise their connection capacity due to drought. Currently, plant owners must wait for new capacity allocations to install solar panels as a secondary source.

Reduced hydroelectric generation caused by drought can be compensated with solar energy. Combining complementary sources can also reduce energy security risks. Türkiye has at least 8 GW of economically viable hybrid solar potential at existing wind and hydro plants.

Accelerating permitting processes

Improving permitting processes—one of the main barriers to renewable energy projects—can accelerate the deployment of new installations each year. A legal reform adopted in 2025, known as the "super permit," aims to facilitate new wind and solar investments. This reform is expected to reduce permitting timelines from four years to 18 months for wind and from two years to 18 months for solar. Permitting remains the biggest bottleneck, especially for the 33 GW of storage-integrated projects.

To date, most solar installations in Türkiye have been utility-scale. Many unlicensed projects for self-consumption are also large, ground-mounted solar plants. In the coming years, Türkiye could tap into its estimated 120 GW rooftop solar potential, enabling electricity generation to align with demand.

Diversifying sources through different auction types

Until 2025, capacity in Türkiye was allocated through auctions only for onshore wind and solar. In 2025, a solar auction including a 35 MW floating solar project was held for the first time. A previous offshore wind auction in 2017 was cancelled due to lack of interest. Expanding auctions to offshore wind and large-scale floating solar could diversify clean energy sources and attract new foreign investors.

Türkiye has been preparing for offshore wind deployment for more than two years, including site selection and wind measurements. This means that an offshore wind auction could take place as of 2026.

Türkiye's state-owned hydroelectric dams also offer vast reservoir areas. Even if only 10% of their surface area is utilised, there is a potential for 53 GW of floating solar capacity. These areas could be allocated through auctions for large-scale floating solar projects.

Using limited resources efficiently

The $8.7 billion purchase guarantee announced in 2025 for domestic coal plants contradicts Türkiye's renewable energy goals. At a time when funding is needed for new energy projects and grid expansion, allocating resources to keep inefficient and ageing coal plants operational creates a policy mismatch.

Because these plants will operate regardless of market prices, they may complicate system management rather than enhance energy security. During periods of high solar generation and low demand—especially midday—excess electricity could increase further due to coal plants being forced to operate under the guarantee. Their inflexibility may make balancing the system more difficult.

Enhancing grid flexibility through regional cooperation

The growing share of wind and solar increases the need for flexible capacity that can quickly adjust output and maintain frequency and voltage stability. Batteries and hydropower plants with reservoirs or pumped storage can provide this flexibility. Cross-border interconnections can also play a key role.

As of 2025, Türkiye's interconnection capacity stands at 2.1 GW for exports and 1.35 GW for imports. According to its latest strategy, Türkiye aims to increase export capacity to 6.75 GW and import capacity to 6.6 GW by 2035. However, the plan doesn't specify which countries will be involved in these expansions.

Situated as a bridge between Europe, Central Asia, and the Middle East, Türkiye has a strategic advantage due to its wide interconnection options, diverse electricity generation mix, renewable potential, and access to multiple regional electricity systems with differing demand profiles.

Ongoing cross-border interconnection projects in the region also present an opportunity for Türkiye to become a central energy hub in the emerging regional electricity market. Regional cooperation can enhance grid flexibility, enable more efficient use of renewable energy potential, and generate export revenues. With its relatively high share of wind and solar compared to its eastern and southern neighbours, Türkiye can take a leading role in new interconnection projects and make its own targets more concrete.

Methodology

Installed capacity data

Installed capacity data in Türkiye is obtained from TEİAŞ YTBS (accessible only within Türkiye). Since the data in YTBS may be subject to retrospective revisions, discrepancies may occur between the data presented in the report and the database. This report reflects the data available in the system as of February 2026, when the analysis was conducted.

Hydroelectric capacity factor

When calculating the hydroelectric capacity factor across Türkiye, the total installed capacity of hydroelectric power plants at the end of the previous year is used. For example, the 2025 capacity factor is calculated by dividing the hydroelectric generation in 2025 by the hydroelectric capacity as of December 31, 2024.

Cost caused by drought

The long-term impact of drought on hydroelectric power plants has been calculated, as stated in the report, based on the decline in production over the past 30 years at Türkiye’s three largest hydroelectric power plants: Atatürk, Karakaya, and Keban. The production of these three plants corresponds to between 18% and 68% of Türkiye’s annual hydroelectric generation.

Although their share has decreased in recent years due to the increase in installed hydroelectric capacity, these plants have been used as a reference because long-term production data is available for them, as they are the country's oldest hydroelectric facilities.

The nationwide impact of drought has been estimated by assuming that the production decline observed in these three largest hydroelectric plants over the past 30 years has also occurred in other plants. For this purpose, the share of Atatürk, Karakaya, and Keban dams—22% of total hydroelectric generation over the past 10 years—has been scaled up to 100%. Although different river basins may be affected differently by drought, this assumption has been used considering the long-term decline in water inflows across all basins nationwide.

After calculating the drought-induced production loss for all hydroelectric plants, the cost that would arise if this entire amount were to be met by natural gas power plants has been calculated. In this calculation, the natural gas price from the BOTAŞ tariff for electricity generation as of February 2026 has been used, and plant efficiency has been assumed to be 55%. The increase in natural gas prices due to the global fossil fuel crisis that began on February 28, 2026, has not been taken into account in this calculation.

Battery capacities

Battery capacity in Türkiye has been obtained from the EPDK license database. Data related to pre-licensed and licensed storage-integrated wind and solar power plants in this database has been used. The data in the report was obtained in February 2026. Battery capacity in Europe has been sourced from the European Energy Storage Inventory database, with the data used in the report obtained in December 2025.

In calculating the ratio of battery capacity to installed wind and solar capacity, only grid-scale battery and solar installed capacities have been considered. For more information on this calculation, see the Ember European Electricity Review 2026 report. Total solar capacity in Türkiye (GWAC) is taken as grid-scale solar capacity.

Acknowledgements

Contributors

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Cover image

Solar power station in Türkiye.

Photo credit: BulentBARIS / Getty images