Energy Policy Review

Türkiye 2026

INTERNATIONAL ENERGY AGENCY

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Executive summary

Türkiye's energy sector is at a pivotal juncture, shaped by domestic energy and climate ambitions, strong demand growth, structural import dependence and its strategic role as a regional energy corridor. As a major link between Europe, the Middle East and the Caspian region, Türkiye plays an important role in regional energy markets, while managing internal energy system pressures. Strong economic and population growth are driving sustained increases in energy demand, impacting security of supply, affordability and emissions. Türkiye has made progress in modernising its energy infrastructure, strengthening its integration with regional markets and expanding cleaner energy sources such as renewables and nuclear power. However, high reliance on imported fuels and exposure to global energy price volatility remain persistent challenges along with a need for coherent regulatory frameworks.

Türkiye established a comprehensive energy and climate policy framework that aligns a long-term strategic vision with shorter-term implementation instruments. The first National Energy Plan (TNEP), developed by the Ministry of Energy and Natural Resources (MENR) and adopted in 2022, set targets for 2020-2035, incorporating sectoral, demographic and economic projections from other state bodies. The 12th Development Plan (2024-2028), was prepared within the framework of the government's 2053 vision, and established targets for a five-year implementation period. MENR's Strategic Plan (2024-2028), and the Second National Energy Efficiency Action Plan (2024-2030), provide nearer-term targets, performance measures and delivery mechanisms.

Türkiye's adoption of its first-ever Climate Law in July 2025 marked a major milestone that strengthens climate governance and creates a framework for carbon pricing. This broad-reaching law translates Türkiye's international climate commitments and 2053 net zero emissions target into domestic legislation and

establishes the legal framework of a national emissions trading system. This new framework and the opportunities for complementary measures elevate the importance of a more integrated approach to industrial competitiveness that promotes policy coherence across Türkiye's energy security, climate and economic objectives.

Managing rapid demand growth while ensuring affordability and energy system resilience is a central challenge for Türkiye's energy policy. Energy demand increased steadily over the past decade and is expected to continue rising under the TNEP, requiring sustained investment across the system. For example, a fast-growing economy and population have steadily increased electricity demand at an average annual rate of almost 5% from 2005 to 2024 – the fastest rate of growth in IEA's membership – and the TNEP forecasts this growth to continue until 2035, albeit at a slower pace, driven primarily by industry and household consumption. Such demand growth amplifies vulnerabilities to external shocks, particularly given Türkiye's reliance on imported fossil fuels. Continuing existing efforts to ensure transparent, market-based end-user pricing, paired with targeted measures for vulnerable consumers, would strengthen incentives for efficiency and investment without undermining social objectives.

The power sector will help determine the pace and scale of Türkiye's transition and must balance rapid renewables growth with reliable system operation. Ambitious plans to expand wind and solar capacity are central to the TNEP, with renewables expected to supply a growing share of electricity demand. Renewables supplied 43% of electricity generation in 2025, and the TNEP foresees renewable generation rising to 55% of electricity supply by 2035. Nuclear energy is expected to contribute around 10% of capacity once Akkuyu nuclear power plant is fully operational in the coming years, further diversifying the energy mix. Delivering this transformation requires not only adding capacity, but also improving system operations, ensuring reliability and keeping total system costs manageable.

Scaling up variable renewables places growing demands on grid infrastructure, system operations and flexibility. While Türkiye has made significant investments in transmission and distribution networks, its plans for a major expansion of transmission, substations and battery storage capacity by 2035 underscore the scale of the challenge. System flexibility is currently provided mainly by hydropower and thermal generation but rising shares of wind and solar will increase the need for storage, demand-side response, digital solutions and regional grid interconnections. Clear locational signals, market rules and regulatory frameworks will be essential to mobilise investment in flexibility and grids, encourage consumer engagement in demand-side response and ensure secure system operation.

Nuclear power is intended to be a cornerstone of Türkiye's future decarbonised electricity system, but delivery depends on robust financing and a credible approach to emerging technologies. Beyond the Akkuyu nuclear power plant, the government is planning to build additional large-scale nuclear power plants, which will require viable financing frameworks and co-ordinated policy action. In parallel, small modular reactors (SMRs) could offer a potential flexible and modular solution for decarbonising hard-to-abate industrial sectors, but clear strategic and regulatory frameworks are needed to enable credible, private-sector-led applications.

Coal remains prominent in the energy mix, raising long-term economic and environmental challenges that point to the need for a just and orderly transition. In 2024, coal supplied one-quarter of total energy supply and generated more than one-third of electricity. Türkiye consumed around 120 million tonnes (Mt) of coal in 2025, making it the largest coal consumer in Europe. Although it has declined over the past decade, Türkiye's carbon intensity of power generation remains among the highest in IEA's membership. While coal plants contribute to adequacy and price stability, continued reliance on coal risks higher emissions, exposure to future carbon pricing and growing fiscal costs through support mechanisms such as capacity payments. Establishing a policy framework to ensure an orderly, well planned coal transition would help manage these risks, support affected communities and redirect resources toward cleaner alternatives.

Energy efficiency is one of Türkiye's most cost-effective levers to reduce import dependence, improve affordability and strengthen competitiveness. Türkiye's policy push began with the Energy Efficiency Law in 2007 and has expanded through successive strategies, including the Energy Efficiency 2030 Strategy and the second action plan for 2024-2030, which is supported by substantial investment intentions. A range of initiatives has been introduced, such as measures to promote building retrofits, industrial process optimisation and efficient appliances. Nevertheless, Türkiye's full energy efficiency potential remains untapped. Barriers such as limited access to finance, the need for improved implementation, and insufficient public awareness persist. Strengthening monitoring mechanisms, enhancing capacity-building efforts, and fostering public-private partnerships are critical next steps to accelerate progress and maximise impact.

Buildings policy sits at the intersection of affordability, energy security and resilience, and requires a step change in renovation delivery and finance. The expansion of the building stock is a key driver of rising energy demand and emissions in the sector. Moreover, Türkiye is highly prone to earthquakes, and although resilience efforts have accelerated, the building stock needs further strengthening. Energy efficiency upgrades can offer financial returns that help improve the

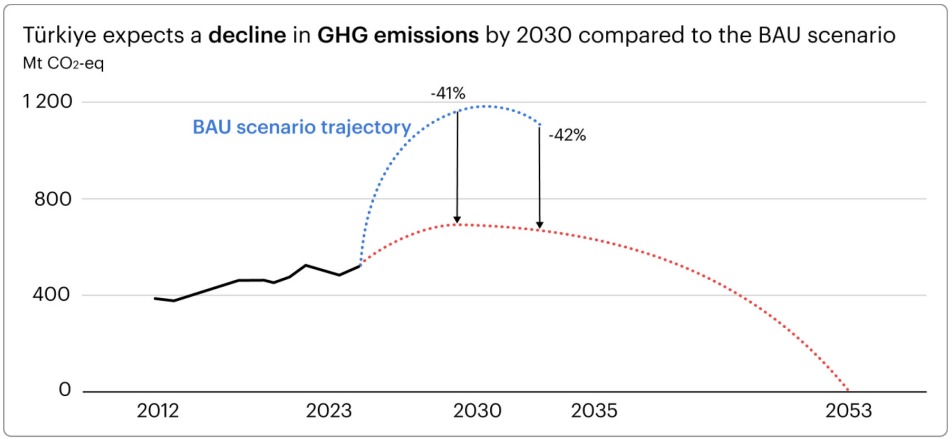
bankability of retrofit projects. Combining energy efficiency with seismic upgrades can reduce costs. Prioritising residential renovations through scalable financing solutions, while integrating seismic resilience upgrades, can lower household bills, manage system demand growth and strengthen resilience, provided that programmes are designed to reach vulnerable households effectively.

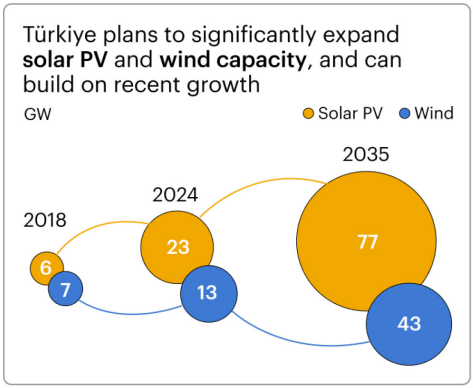
Decarbonising heat requires a clearer "heat market" pathway that leverages Türkiye's geothermal strengths and enables investable local delivery models. Türkiye is assessing the role of district heating as a solution for decarbonising space heating, the largest energy end use in residential buildings, and existing geothermal-based systems, which are presently concentrated in resource rich regions, suggest scope to expand low-emissions heat where it is cost effective. Moreover, the requirement for buildings above a certain size to source 10% of their energy consumption from renewable energy could be fulfilled through the direct use of geothermal heat. Nonetheless, Türkiye is still at the early stages of legislation and policies dedicated to district heating.

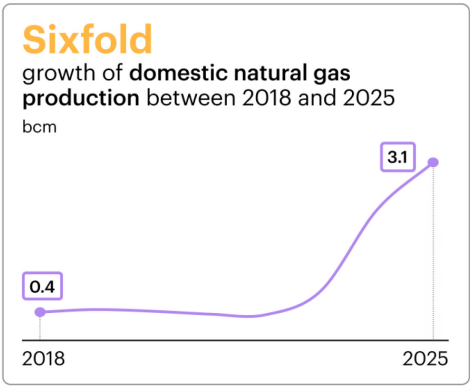
The transport sector accounts for a significant and growing share of energy demand and emissions in Türkiye, requiring stronger policy action to diversify fuels, improve efficiency and shift towards lower-emission modes of transport. In 2023, the transport sector accounted for around 30% of total final energy consumption and one-quarter of energy-related emissions, with road transport overwhelmingly dominant and almost entirely dependent on oil products. Despite relatively low car ownership compared with European peers, rapid growth in vehicle stock and travel demand is driving increased fuel consumption and emissions. Under the Energy Efficiency Strategy 2024-2030 and other policies, Türkiye introduced a range of measures to address this challenge, including support for electric vehicles, expansion of charging infrastructure and policies to promote public transport and modal shift towards rail and maritime transport.

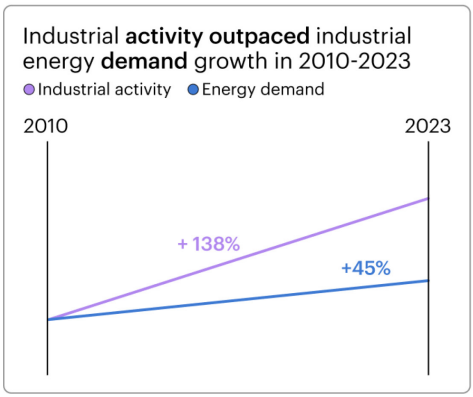
Ensuring Türkiye's industrial competitiveness in a carbon-constrained global economy will depend on combining efficiency delivery, carbon pricing and integrated infrastructure planning. Organised industrial zones can act as practical "one-stop shops" to scale energy efficiency in less energy intensive industries that often lack capacity to participate in programmes independently, while strengthening access to finance and implementation support. At the same time, an emissions trading system focused on large energy consumers – complemented by a carbon tax or charge for firms outside the Emissions Trading System (ETS) – can support emissions reductions and alignment with external market pressures, especially if revenue recycling and infrastructure planning (electricity, gas, hydrogen and CO_2 networks) are integrated into a coherent competitiveness strategy.

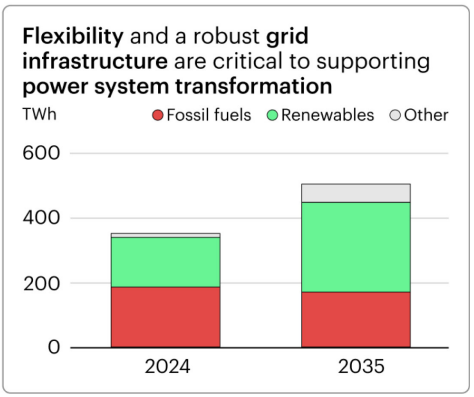
Türkiye's efforts to modernise its energy sector, meet climate commitments, and improve efficiency are commendable, yet require sustained momentum and coherent action. The recommendations in this report offer a roadmap for policy makers and stakeholders to navigate the complexities of the transition, capitalise on emerging opportunities, and deliver a secure, sustainable and inclusive energy future for Türkiye. Looking ahead, success will depend on the alignment of strategic objectives, robust governance, and active engagement across all segments of society. By embracing innovation, fostering collaboration, and prioritising long-term resilience, Türkiye can position itself as a regional leader in a secure global energy transition.











Sources and notes for this infographic can be found in the annexes.

Policy recommendations for Türkiye

Energy policy landscape

1. Prioritise the renovation of residential buildings to improve energy efficiency, thermal performance and seismic resilience by scaling up financial solutions.
2. Accelerate the deployment of a heat market, leveraging domestic geothermal resources, to decarbonise heating systems and strengthen energy security.
3. Complete energy market reform by carefully transitioning end-user prices to a transparent, market-based pricing mechanism.
4. Ensure a viable financing framework for large nuclear power plants while establishing a clear strategic framework for small modular reactors.
5. Establish a policy framework to initiate a just and orderly transition for local communities relying on the coal industry.

Expansion and integration of variable renewables — Focus area

6. Ensure market rules provide clearer locational signals to improve system operation and ensure grid stability during the transition.
7. Expand participation in the electricity spot market and encourage investment in system flexibility.

Energy performance and competitiveness of industry — Focus area

8. Leverage organised industrial zones to drive energy efficiency actions in less energy-intensive industries.
9. Introduce an emissions trading system for large energy consumers to encourage efficiency and emissions reductions while introducing a carbon tax for companies falling outside the ETS.
10. Adopt a more integrated approach to industrial competitiveness and support energy security and climate goals.

Energy policy landscape

Climate and energy strategy

Energy targets

Türkiye outlined its long-term energy targets in its first National Energy Plan (TNEP) in 2022. The TNEP, developed by the Ministry of Energy and Natural Resources (MENR), includes targets for the period 2020-2035 and incorporates sectoral, demographic and economic projections from the Presidency of Strategy and Budget and TurkStat. To support Türkiye's energy transition, the 12th Development Plan (2024-2028), the MENR's 2024-2028 Strategic Plan and the Second National Energy Efficiency Action Plan (2024-2030) provide short-term targets, performance measures and strategies for increasing domestic energy production, improving energy efficiency and achieving green transformation of the economy.

The MENR's 2024-2028 Strategic Plan defines goals for meeting Türkiye's energy needs based on reducing import dependency and enhancing energy security. Expanding renewable energy is a central pillar: Türkiye aims to more than double its renewable capacity, from 70 gigawatts (GW) in 2024 to nearly 160 GW by 2035. By 2030, renewable installed capacity is projected to reach 91 GW. In addition to increasing the renewable energy supply, exploration and production of domestic fossil fuels is set to enhance the self-sufficiency of the energy supply. Oil production is expected to almost double, rising from 125 thousand barrels per day (kb/d) in 2025 to 210 kb/d in 2028, equivalent to a fifth of oil demand (over 1 000 kb/d) in 2024. Natural gas production will also expand, increasing almost fivefold from 3.1 billion cubic metres (bcm) in 2025 to 15.5 bcm in 2028, or around 29% of gas demand (53 bcm) in 2024. Underground gas storage capacity will more than double, from

5.8 bcm in 2024 to 12 bcm by 2028, further enhancing security of supply. In addition, Türkiye plans to expand coal production, increasing by almost 50%, from around 662 petajoules (PJ) in 2024 to 965 PJ in 2028. This increase is driven primarily by increased lignite production, from almost 600 PJ to 906 PJ, while hard coal production is projected to rise from 56 PJ to 59 PJ. While greater levels of energy production align with Türkiye's goal of reducing external energy dependency, the increase will also contribute to rising domestic emissions.

The Energy Efficiency Strategy and 2nd National Energy Efficiency Action Plan (2024-2030) highlight the importance of energy efficiency. Between 2011 and 2022, Türkiye surpassed its 2023 energy intensity improvements target of 20% ahead of schedule. The government aims to reduce energy intensity by 15% in the period 2024-2030, at an annual average rate of 2.3%. While Türkiye's energy intensity improvements averaged 1.4% per year between 2014 and 2024, it demonstrated a 3.1% improvement between 2020 and 2024, suggesting potential to accelerate progress.

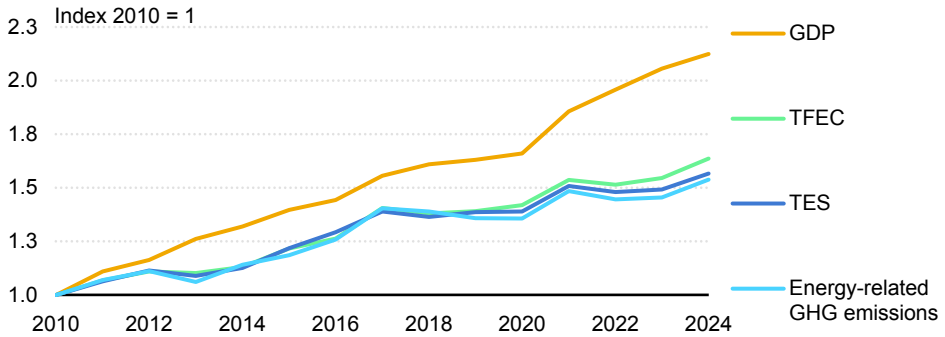
Climate targets

Türkiye ratified the Paris Agreement in 2021 and submitted a first updated Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2023, committing to achieve net zero greenhouse gas (GHG) emissions by 2053. Türkiye's 2030 GHG emissions reduction targets are measured against the business-as-usual scenario (BAU) projection to 2030. The first NDC raises the target to 41% economy-wide reduction, compared to 2030 BAU levels, using 2012 as the base year for the BAU projection. This marks a more ambitious goal compared to the target from the intended NDC (2015), which vowed to reduce emissions by 21% from the BAU scenario. Under the BAU scenario, emissions increase by 101% from 2024 to 2030, reaching 1 175 million tonnes carbon dioxide equivalent (Mt CO_2-eq), while under Türkiye's first updated NDC, they only increase by 20%, to almost 700 Mt CO_2 in 2030. The first updated NDC also highlights Türkiye's pledge to a peak in emissions by 2038. In November 2025, Türkiye submitted its second NDC, introducing a new emissions target for 2035 aiming to limit emissions to 643 Mt CO_2-eq.

The continued rise in emissions through 2038 is a result of increased energy demand, driven by economic growth. According to the 12th Development Plan 2024-2028, gross domestic product (GDP) will grow by almost 50% between 2023 and 2028 and GDP per capita by 41% (in current prices, USD). GHG emissions (excluding LULUCF)

in 2024 were 585 Mt CO_2-eq, covering around 1.1% of global GHG emissions. Türkiye's per capita CO_2 emissions are considerably lower than the OECD average: in 2023, they were 4.6 tonnes of carbon dioxide (t CO_2), compared to the OECD average of 7.5 t CO_2 per capita. They have been increasing, however, growing by 38% from 2005 to 2023.

Select indicators in Türkiye, 2010-2024

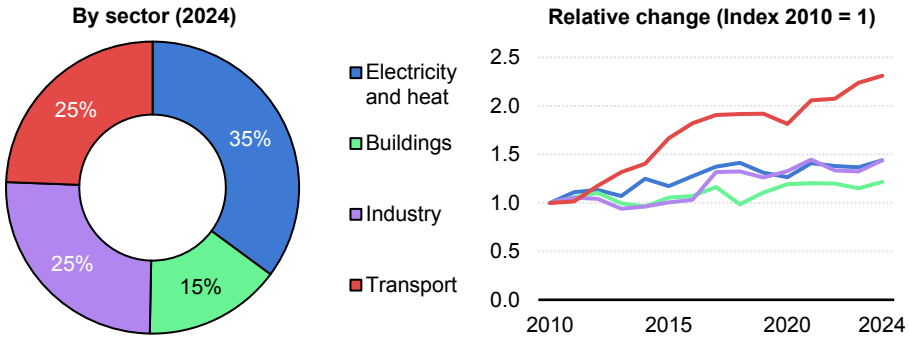


Note: TES = total energy supply; TFEC = total final energy consumption.
Source: IEA (2026), World Energy Balances.

Despite the absolute increase in energy-related emissions, a relative decoupling of emissions from GDP growth has taken place over the past two decades. From 2010 to 2024, GDP increased by roughly 110% while total energy-related emissions increased by 50%. Further, Türkiye recorded energy efficiency improvements with primary energy intensity reducing by 26% between 2010 and 2024.

Within the energy sector, electricity and heat generation accounted for 35% of GHG emissions in 2024. The next-largest emitting sector was industry (25%) – including manufacturing, construction, agriculture and fishing – followed by transport (24%) and buildings (15%). From 2010 to 2024, the largest increase in emissions in absolute terms has come from transport, more than doubling, as car ownership rates have risen. Both emissions from electricity and heat generation and industry increased by around 45%, and emissions from buildings increased by 22%.

Energy-related emissions by sector in Türkiye (2024) and relative change, 2010-2024



Source: IEA (2026), Greenhouse Gas Emissions from Energy.

Climate resilience

Türkiye's average temperature has been climbing since 1994 and is likely to continue to do so, boosting energy demand for cooling in the upcoming decades. This will put additional pressures on the energy system, which has already seen rapid increases in electricity demand. Türkiye's observed average annual mean temperature increased by more than 2°C from 1901 to 2020, a rate of warming in the past two decades that is significantly higher than the world average.

More severe weather events are also likely to affect the country's energy infrastructure. The frequency of extreme climate events has increased over the past two decades, setting a new record every year since 2018, according to Turkish State Meteorological Services. Furthermore, climate projections indicate an increase in drought frequency, duration and severity by the end of the century. In 2020, for example, droughts caused electricity generation from hydropower plants to fall by 12% while heavy rainfalls with flash floods in the Black Sea region led to power outages in the same year. Furthermore, Türkiye is in an active volcanic zone and exhibits an overall high exposure to natural disasters.

These factors underscore the necessity for an appropriately designed and protected energy infrastructure. Türkiye formulated its Climate Change Mitigation and Adaptation Strategy and Action Plans 2024-2030 in March 2024 to strengthen

economy-wide resilience to climate change. It sets out sector-specific targets and mitigation/adaptation activities aligned with the country's NDC. Notably, the Strategy introduced the Climate Portal, an online monitoring system managed by the Directorate of Climate Change (DoCC). By 30 June each year, the DoCC compiles a progress-evaluation report for the Climate Change and Adaptation Co-ordination Board (CCACB) working groups, ensuring accountability. The 12th Development Plan (2024-2028) stipulates the preparation of a Disaster Management Strategy to better respond to natural disasters, including the heightened risks resulting from global warming. This Plan envisions Türkiye as an environmentally friendly, disaster-resilient, high value-added economy.

Climate policy framework

Following Türkiye's ratification of the Paris Agreement in October 2021, Presidential Decree No. 85 established the DoCC to lead and co-ordinate national climate policies, strategies and actions. To facilitate stakeholder representation and ensure inclusive and participatory climate governance, the government established the CCACB, comprising representatives from ministries, the private sector and civil society. First and foremost, the CCACB approves climate planning documents and reviews progress to maintain transparency and accountability in achieving Türkiye's climate goals. Furthermore, CCACB working groups provide input to sectoral strategies.

In February 2022, Türkiye convened its first Climate Council, bringing together participants from government, industry, academia and civil society. The Council presented 217 recommendations and 76 priority actions, which directly inform Türkiye's long-term climate strategies. The 2053 Long-term Climate Strategy, submitted to the UNFCCC in November 2024, serves as the overarching climate roadmap towards net zero emissions. These actions are complemented by several recent planning documents with short-term energy targets and green transformation measures, of which the most relevant are the TNEP, the 12th Development Plan (2024-2028), the 2024-2028 Strategic Plan and the Second National Energy Efficiency Action Plan (2024-2030).

The Climate Law, adopted on 2 July 2025, marks a major milestone in Türkiye's environmental policy and its commitment to achieving net zero emissions by 2053. It represents the country's efforts to align its climate governance with the Paris Agreement and establish a legally binding framework for reducing GHG emissions. The Climate Law also provides for a domestic Emissions Trading System (ETS) modelled on the European Union's (EU) ETS, expected to cover installations in the

major industrial sectors such as energy, cement and steel with annual emissions above thresholds to be defined in secondary legislation, potentially 50 000 t CO_2-eq. The new law aims to prevent carbon leakage and protect domestic industry and establishes a governance structure led by the Climate Change Directorate and the National Advisory Committee.

Taxation and carbon pricing

The new Climate Law provides the legal framework for combating climate change, establishing a national ETS and reinforcing the authority of the DoCC. Türkiye's ETS design aligns closely with that of the European Union, in anticipation of impacts from the EU Carbon Border Adjustment Mechanism (CBAM). The implementation of the CBAM is set to significantly affect Türkiye's major carbon-intensive export sectors, notably iron and steel. In response to this challenge, a 2023 study commissioned by the Ministry of Environment, Urbanization and Climate Change found that Türkiye could counteract the impact of the CBAM by introducing a domestic ETS. The newly adopted Climate Law establishes the legal foundation for the country's climate action, providing for the creation of a national ETS and strengthening the DoCC's authority.

Currently under development, Türkiye's ETS is designed in alignment with the EU ETS, while taking into account Türkiye's circumstances, and is intended to support Türkiye's goal of achieving net zero emissions by 2053. Under the Climate Law, installations covered by the ETS have been granted a transitional exemption period, allowing them until 2028 to obtain their greenhouse gas (GHG) emissions permits. As planned by the Directorate of Climate Change (DoCC), the TR ETS will be launched with a two-year pilot phase, a decision that was formally endorsed at the first meeting of the Carbon Market Board. Following its publication in the Official Gazette in December 2023, a grant agreement with the World Bank's Partnership for Market Implementation programme came into effect. The Partnership supports Türkiye in modelling different ETS design options, assessing the potential socio-economic impacts of the ETS, preparing for the pilot phase and assisting with the initial implementation stages. The pilot ETS is expected to cover a limited number of installations in the energy and industrial sectors, on the order of 180 facilities. Modelled on the EU ETS, Türkiye's pilot ETS will use data from its monitoring, reporting and verification system, in place since 2015. Monitoring, reporting and verification legislation established an installation-level system for CO_2 emissions for approximately 800 entities, covering the energy sector (total rated thermal input >20 megawatts [MW]) and several industry sectors. Regulated entities submitted their first monitoring plans by October 2014 and have been submitting verified annual

emissions reports to the Directorate of Climate Change every year since 2015. The Climate Law also provides a framework for the free allocation of allowances in the ETS; however, the Climate Law does not yet specify the timeline for introducing auctions. Detailed regulation and technicalities will be developed through secondary legislation. Complementing the ETS, the Climate Law also establishes a framework for the generation and trading of carbon credits through voluntary offsetting projects, to be registered in a national offset registry.

Energy research and development

The government aims to expand research and development (R&D) activities for both energy and critical minerals, a recurring objective in the 2024-2028 Strategic Plan, the 12th Development Plan and the Medium-Term Program (2025-2027). Priorities focus on clean energy technologies to strengthen energy security, economic growth and environmental sustainability, with renewables and energy efficiency receiving the largest support. While energy efficiency spending rose between 2014 and 2019, it declined sharply in 2020 and remained well below pre-pandemic levels in 2024.

The Turkish Energy, Nuclear and Mineral Research Agency (TENMAK) leads innovation by funding R&D in clean energy, advanced systems and critical materials, supporting collaboration, commercialisation and technology roadmaps. TENMAK prepared the Hydrogen Technologies Strategy (2023) and is developing plans for CCUS, critical materials, digitalisation, solar, wind and energy storage.

Hydrogen is a growing focus, with ambitions to become a technology provider leveraging renewable potential for domestic use and export. R&D also targets cleaner use of domestic coal, alongside CCUS, to decarbonise heavy industry. The 2030 Industry and Technology Strategy supports domestic manufacturing in solar and wind, as well as deployment of electrolysers, fuel cells and storage, while promoting digitalisation, smart grids and green transformation of industrial zones.

Energy efficiency

Türkiye began strengthening energy efficiency policy in 2007 with the implementation of an Energy Efficiency Law. Since then, it has introduced comprehensive efficiency policies covering energy production through to final consumption across all major

sectors. These measures have delivered strong results, as evidenced by improvements in energy intensity – a key metric for measuring the energy efficiency of the overall economy.

Like many countries, Türkiye was heavily impacted by recent geopolitical turmoil. The 2022 energy crisis saw energy demand decline that year by 1.5% even as the economy expanded by 5.4%, yielding an exceptional year of energy intensity improvement of 7%. This energy shock contributed to the first National Energy Efficiency Plan (NEEAP) slightly overachieving on its initial targets, delivering just over 1 000 PJ of cumulative energy savings as a direct result of the additional USD 8.5 billion in investments over the period. This investment also helped generate almost 45 000 new jobs and reduced emissions by almost 70 Mt CO_2-eq between 2017 and 2023. As a result of these programmes, the government estimates each dollar of investment yielded a four-dollar return.

Targets from Türkiye's energy efficiency strategies

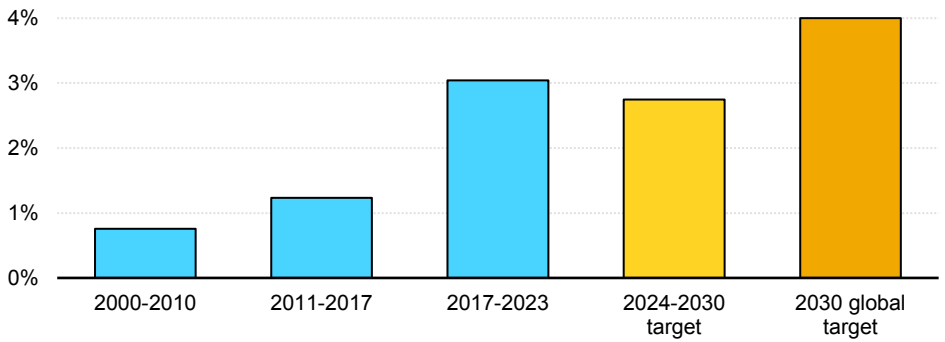
	2017-2023		2024-2030
	Target	Actual	Target
Energy savings (PJ)	1 001	1 030	1 553
Emissions reduction (Mt CO_2)	66.6	68.6	100
Investment (USD billion)	10.9	8.5	20.2
Jobs created		44 880	

Sources: IEA analysis based on MENR (2024), Energy Efficiency 2030 Strategy and 2nd National Energy Efficiency Action Plan (2024-2030), (accessed October 2025).

The boost in investment combined with policy actions initiated during the first NEEAP period contributed to more than a doubling of the rate of energy intensity progress, from 1.2% per year in the period 2011-2017 to 3% per year from 2017 to 2023. To put this in perspective, had energy intensity progress remained steady at 2017 levels averaging 1.2% per year through to 2023, an extra 870 PJ of energy would have been needed in 2023 to produce the same GDP, equivalent to 13% more energy each year.

In 2024, Türkiye launched its Energy Efficiency 2030 Strategy and second NEEAP for the period 2024-2030 with 61 actions identified across 7 sectors involving 266 activities. This includes a plan to boost energy efficiency investment to USD 20.2 billion between 2024 and 2030, USD 5 billion of which will be publicly sourced through taxes and incentives; the remainder will be financed by the private sector. These investments are expected to yield a cumulative reduction in energy consumption of over 1 500 PJ by 2030, lower emissions by around 100 Mt CO_2 and generate even more employment than the first phase of the NEEAP.

Annual improvements in primary energy intensity in Türkiye (2000-2023) and 2030 targets



Sources: IEA analysis based on IEA (2026), World Energy Balances; IEA (2025), Energy Efficiency Progress Tracker; MENR (2024), Energy Efficiency 2030 Strategy and 2nd National Energy Efficiency Action Plan (2024-2030), (accessed October 2025).

The targeted 15% reduction in energy intensity in the period 2024-2030 implies annual improvements of around 2.3%. This would represent a substantial increase compared with the 2011-2017 baseline (almost tripling), but a slowdown relative to the faster progress achieved in recent years (around 3% annually in 2017-2023).

End-use sectors

Industry

The industrial sector, including manufacturing, refining and mining, plays a central role in Türkiye's economy, contributing around one-quarter of GDP and accounting for roughly 35% of total final energy consumption in 2024. It is also responsible for 22% of energy-related GHG emissions. The sector more than doubled in size since 2010, up almost 120%, with industrial value added growing at an average of 5.4% per year between 2010 and 2025. According to the IEA's Energy Efficiency Progress Tracker, Türkiye improved its industrial energy efficiency faster than global benchmarks and comparable countries. Türkiye's industrial energy intensity improved at a rate of 2.6% per year from 2010 to 2019 compared to an annual improvement rate of 1.8% globally.

Manufacturing dominates industrial energy use, representing around 80% of total consumption, ranging from energy-intensive industries such as steel, cement and petrochemicals to less energy-intensive sectors including automotive, textiles and food production. Their differing economic structures shape their energy-use patterns and decarbonisation challenges. Energy-intensive industries correspond to the majority of consumption (67% of energy consumption in 2024), while less energy-intensive industries play a larger role in employment, value added and exports (Focus Area 2).

Energy-intensive manufacturing is particularly dependent on direct use of fossil fuels (74% in 2024), especially for high-temperature processes. Coal made up 35% of energy use in energy-intensive sectors. Natural gas accounted for 23%, oil for 15% and electricity use for 21%, the largest share of which is used in ferrous metals. Energy consumption in less-intensive manufacturing sectors more than doubled to 460 PJ in 2024 from 181 PJ in 2010. Among less energy-intensive industries, coal consumption grew the most in percentage terms, almost tripling over the period, followed by electricity and natural gas.

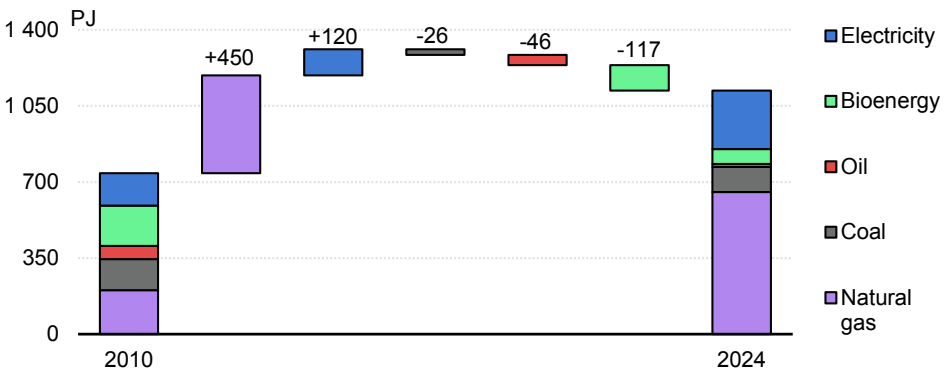
Industrial growth and decarbonisation of industry are both priorities for the government. The 12th Development Plan targets to increase the share of manufacturing in GDP from 22% in 2022 to 27% by 2028, positioning Türkiye among the top 10 global manufacturing economies, while the Long-Term Climate Strategy sets out plans for the manufacturing industry sector to reach Türkiye's net zero by 2053 goals. Existing policies, including energy efficiency obligations, financial support programmes and planned carbon pricing, provide a framework to improve industrial efficiency and reduce emissions (see Focus Area 2).

Buildings

The expansion of the buildings stock is a key driver of rising energy demand in the buildings sector. In 2022, the buildings stock reached approximately 9.5 million units (an 8% increase in five years), around 90% of which are residential buildings. The World Bank projects this number to reach 17 million units in 2050. Meanwhile, the number of households rose from 20 million to 27 million between 2012 and 2025. As the floor area increases, more energy is required to heat and cool these spaces.

In 2024, buildings accounted for 36% of Türkiye's total final energy consumption and 15% of energy-related GHG emissions. Since 2010, energy demand grew by 2.7% annually, resulting in a 45% increase. Energy use reached over 1 750 PJ in 2024, driven primarily by residential demand. Fossil fuels continue to dominate, with natural gas covering half of the sector's total energy consumption in 2024, up from 22% in 2010, having displaced coal (-18% from 2010) and bioenergy (-11%). Electrification stood at 33% in 2024, well below the IEA average (47%), as the penetration of electric systems, especially in heating, is lower. Direct renewable energy use remained limited, with bioenergy at 3.9% in 2024, solar at 2.3% and geothermal at 4.2%. Türkiye, however, ranks among the top IEA Member countries for geothermal consumption in buildings.

Energy use by fuel in residential buildings in Türkiye, 2010 and 2024



Note: The change in energy use from geothermal and solar between 2010 and 2024 is not included in the figure due to its small amount (an increase of 23 PJ).

Source: IEA (2026), World Energy Balances.

Many existing buildings were constructed before the introduction of more stringent building energy performance and seismic requirements. Consequently, a significant share of the existing building stock may not reflect current standards, highlighting the importance of renovation and urban transformation programmes.

Türkiye has strengthened minimum energy performance requirements for new buildings through amendments to the Regulation on Energy Performance in Buildings. Since 2025, buildings larger than 2 000 m² are required to achieve at least energy performance class B and meet 10% of their energy needs from renewable energy sources. The regulation introduced the concept of nearly zero-energy buildings and applies these requirements in a phased manner. Amendments adopted in 2026 also introduced mandatory life-cycle assessment and a low-carbon building certificate for buildings above a construction area of 10 000 m², taking effect in 2027.

The Air Quality Improvement Programme is a Ministry of Environment, Urbanization and Climate Change scheme that provides grants to local governments to reduce air pollution from residential heating and improve overall air quality. Since 2021, approximately 20 000 residences received grants to convert from coal-fired heating to natural gas-fired heating systems or geothermal systems. The Air Quality Improvement Programme will continue by increasing the number of residences receiving grants.

Main features of the most recent building codes in Türkiye

Year	**2000** (general code)	**2007** (general and earthquake codes)	**2018** (earthquake code)	**2023** (general code)
Key features	First modern building code	Stricter seismic rules, structural requirements, updated zoning regulation	Introduced performance-based design, seismic-resilience elements	Focused on zoning, inspections, structural safety, permits and incentives
Enforcement	Limited, at the local level; frequent amnesties	Earthquake code mandatory for new buildings	All new buildings nationwide; all existing non-compliant buildings	Centralised. Improved inspections
Compliance	Limited. First buildings to be covered	Mainly in public buildings, frequent amnesties	Limited despite a strong code	Tightened

Sources: IEA analysis based on Turkish Earthquake Regulation (2007), Turkish Building Earthquake Code (2018), Law on the Transformation of Areas Under Disaster Risk (Law No. 6306).

There is a financing gap for programmes targeting the renovation of residential buildings as much of the current focus is on public buildings. In 2023, the government increased the 2019 energy-savings target for public buildings from 15% to 30%. The World Bank and International Bank for Reconstruction and Development invested USD 200 million in the project. The government implemented incentives and support mechanisms for energy efficiency improvements in existing buildings, such as low-interest loans for thermal insulation of residential buildings. Energy performance certificates became compulsory for buying and selling property in 2020, but no minimum rating is required. Over two-thirds of households live in buildings constructed before the introduction of the 2011 regulation on the energy performance of buildings.

Furthermore, the Savings Target and Implementation Guide (2024-2030) for Public Buildings explains possible energy efficiency measures and presents three different approaches for investments. Public institutions may undertake energy efficiency investments using their own funds, through energy performance contracts, or by seeking support from national or international projects. With the enactment of energy performance contract legislation, public institutions and organisations are permitted to enter such contracts for energy-saving projects for up to 15 years. Furthermore, MENR in 2022 launched a residential thermal insulation financing scheme to support energy efficiency improvements in homes. The programme offers loans of up to TRY 50 000 (Turkish liras) per dwelling unit with a 60-month repayment period and a fixed interest rate of 0.99%, helping households invest in energy-saving building upgrades.

The Ministry of Energy and Natural Resources and the Ministry of Environment, Urbanization and Climate Change, with support from the World Bank, jointly developed the KABEV Project for renovating public buildings with a budget of USD 200 million. Alongside the KABEV Project, the government also established the KADEV project (addressing earthquake resilience and efficiency) with a budget of USD 250 million, and the KAYEP project (for Solar Energy Power Plant installation) with a budget of USD 450 million. The second phase of the KABEV Project, with a budget of USD 300 million, was initiated by the Ministry of Environment, Urbanization and Climate Change.

New buildings must comply with 2023 Nearly-Zero Energy Buildings guidelines, focusing on energy efficiency, thermal performance, and renewable energy use. Following a two-year transition period with relaxed rules from 2023 to 2025, from 1 January 2025 a minimum energy performance rating of B is mandatory for all new buildings exceeding 2 000 m^2 of floor area, as well as a minimum share of 10% of renewable energy consumption.

Seismic and energy efficiency retrofits should be addressed together. Türkiye is highly prone to earthquakes, and a significant share of the building stock is not earthquake resistant. The February 2023 earthquake struck the southeast regions of the country, resulting in over 53 000 deaths and displacing millions. Another 200 000 buildings were heavily damaged. The Turkish Building Seismic Code of 2018 updated previous codes and promoted earthquake-resilient construction practices and an earthquake-resistant design. The World Bank found that integrating seismic and efficiency renovations is not only beneficial but often essential.

In countries with strong regulatory frameworks for buildings renovation, combining energy-efficiency and seismic upgrades within the same renovation project can reduce transaction costs, facilitate co-ordinated investment and extend the useful life of the building. Meaningful energy savings will only be made if the structural integrity is strengthened. Additional benefits included shared labour and resources across both renovation streams, co-ordinated investment planning and an improved payback period due to the extended lifetime. Furthermore, incorporating rooftop solar installations enhances energy security by ensuring continued power supply even when energy systems are disrupted following an earthquake.

Energy efficiency upgrades can offer financial returns that help improve the bankability of retrofit projects. Combining energy efficiency with seismic upgrades can reduce transaction costs. Seismic and energy efficiency interventions are often implemented separately, however, unless buildings are fully demolished and rebuilt.

District heating

Türkiye is assessing the role of district heating as a solution for decarbonising space heating, the largest energy end use in residential buildings. Space heating represented 60% of residential buildings' demand in 2024, dominated by natural gas (71%), followed by coal (15%) and bioenergy (8%). The latest governmental data available report that district heating capacity stands at 3 500 MW, serving approximately 336 000 housing equivalents, primarily relying on geothermal and waste heat sources. The 2021 buildings and dwelling census found that almost 50% of households used household-level central heating as their primary heating method, and only around 11% used district heating or centralised heating systems for one or more buildings.

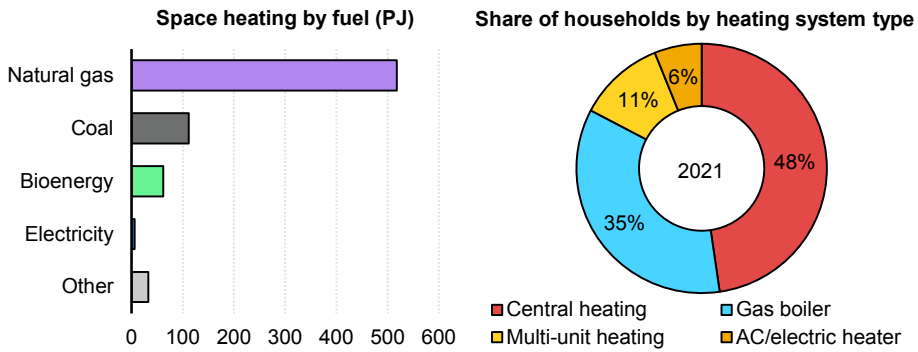
While the government aims to establish a functioning heat market to promote the expansion of district heating and cooling systems, Türkiye is still at the early stages when it comes to legislation and policies dedicated to district heating. A draft heating law is being considered, generically targeting the expansion of district heating and the

identification of new settlements, but no further information is available. A 2022 project estimated Türkiye's waste heat assessment potential, which derives from industry (42% of the potential), thermal power plants (40%) and commercial buildings (18%). The calculated potential from industry is estimated at 160 000 terajoules/year, enough to heat 3.8 million homes. It would generate USD 735 million savings per year and require an upfront investment of USD 16 billion.

Thermal power plants over 20 MW must complete a waste heat audit by September 2026 to assess potential for district heating and efficiency improvements. Co-generation plants are exempt from licensing if they meet specific efficiency standards and use energy for self-consumption. To date, 231 certificates have been issued, covering about 703 megawatts electrical (Mw_e) and almost 740 megawatts thermal for industry and buildings, including co-generation, waste heat and micro co-generation projects.

There are 19 geothermal-based district heating systems in Türkiye: the government should look for ways to leverage this renewable source to expand district heating. The district heating network is mostly developed in the western part of the country, where geothermal activity is more abundant, particularly in the Izmir region. Around 90% of Türkiye's geothermal resources are classified as low- to medium-temperature, which is ideal for direct heat applications. The requirements for public buildings, mandating that 10% of energy use of buildings that exceed a specified floorspace footprint should be renewable, could be satisfied by the direct use of geothermal-based heat.

Energy use in residential space heating by fuel (2024) and share of households by heating system type (2021) in Türkiye

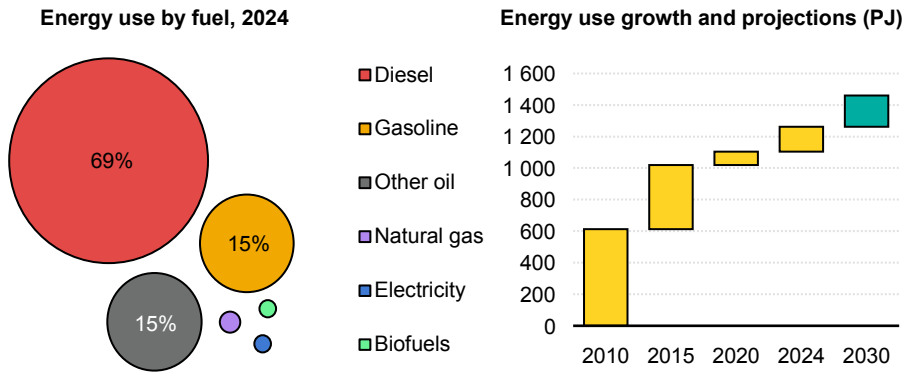


Sources: IEA analysis based on IEA (2026), Energy End-uses and Efficiency Indicators; TurkStat (2022), Survey on Building and Dwelling Characteristics, 2021, (accessed in July 2025).

Transport

In 2024, transport accounted for 29% of total final energy consumption and 24% of energy-related emissions, mainly from road transport. Oil fuels provided 98% of the energy use in transport in 2024, a share which has not changed in the past decade. Of this, diesel fuels take up 69% of the consumption. Energy use in transport is expected to grow by 17% from 2024 to 2035.

Energy use by fuel (2024) and growth in the transport sector (2010-2030 projection) in Türkiye



Note: On the left-side chart, unmarked fuels include natural gas, electricity and biofuels, respectively 0.8%, 0.5% and 0.5%.

Sources: IEA analysis based on IEA (2025), World Energy Balances; MENR (2022), Türkiye National Energy Plan, (accessed January 2026).

The Energy Efficiency Strategy 2024-2030 outlines several key policies for the transport sector in the medium term. The government aims to shift towards energy-efficient modes of transport, notably by increasing the share of rail and maritime transport, while reducing dependence on road transport. Furthermore, the government is promoting public transport solutions, particularly in urban areas, by developing multimodal transportation options and expanding bicycle lanes and pedestrian-friendly pathways.

Türkiye introduced special incentives, including tax reductions, for electric and alternative fuel vehicles to curb fossil fuel consumption. It also signed a Memorandum of Understanding on Zero-Emission Medium- and Heavy-Duty Vehicles, which aims to achieve 100% zero-emission new truck and bus sales by 2040 with an interim goal of 30% by 2030. While electrification will be the main decarbonisation option for light-duty vehicles and parts of heavy road transport, biofuels produced in Türkiye from waste have the potential to decarbonise various parts of the transport sector, including heavy road transport. In 2024, Türkiye was amongst the four-lowest IEA members in terms of biofuels' share of energy consumption in the transport sector, with just 0.5%. Given Türkiye's abundant bioenergy resources, such as biogas, this presents a significant opportunity to advance its decarbonisation goals.

Road transport

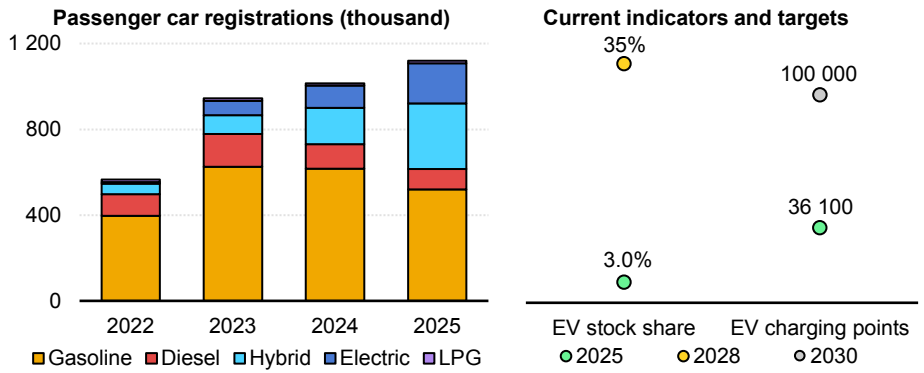
In April 2026, there were 17.7 million registered cars in Türkiye, corresponding to a car ownership rate of around 200 cars per 1 000 people. While this figure is lower than any EU country, it is increasing at a fast rate. In 2025, the number of new road vehicles registrations decreased by 8.9% compared to the previous year. With an average age of 14.2 years, the stock of road vehicles is relatively old and inefficient (higher than most EU countries), contributing to higher emissions and air pollution. The share of motorcycles among newly registered vehicles is significant in Türkiye, representing more than one-fifth of new vehicles in December 2025, with the stock of motorcycles growing at a faster rate than passenger cars since 2010. In 2024, Turkish drivers covered 383 billion kilometres, an increase of 43% compared to 2016. Over half of these kilometres were made in passenger cars. Given the demand for short-distance travel, there is significant potential to reduce reliance on private automobiles by improving urban and suburban public transport systems, such as buses, light rail and metro networks.

Electric vehicles

Türkiye's electric vehicles (EV) market is nascent and has only begun to expand very recently, thanks to the creation of a legal and policy framework for EV use and EV manufacturing and charging infrastructure. The EV sales share grew from 1.3% in 2022 to 7.2% in 2023 and 22% in 2025. From 2024 to 2025, EV sales more than doubled. The government's target is for EVs to make up 35% of the automobile market by 2030, with a total of 2.5 million EVs on the road, up from 420 000 cars and two/three wheelers in 2025.

Türkiye's ambitious goals in terms of EV deployment are supported by the establishment of favourable incentives for EVs. Car purchases in Türkiye are impacted by the Special Consumption Tax, a one-off tax applied to new vehicles only, ranging from 70% to 220% of the price and based on the engine size. In 2025, Türkiye supported EVs with special consumption tax rates ranging from 25% to 75%, depending on engine power and the vehicle's tax category. In terms of value-added tax (VAT), battery electric vehicles are generally subject to the standard 20% rate. Furthermore, vehicle credit limits have been increased for EVs. Customers can access a loan of up to TRY 1.75 million (USD 38 400) to finance EV purchases, which is four times the regulated limit for non-EV vehicles. Cities such as Istanbul and Izmir offer parking privileges and licence plate benefits for battery electric vehicles.

Passenger car registrations by powertrain (2022-2025) and EV stock share, charging points (2025) and targets in Türkiye



IEA. CC BY 4.0.

Note: LPG = liquefied petroleum gas. EV charging points for 2025 refer to publicly available chargers; for 2030, the value refers to the sum of AD and DC charging points in the medium scenario.

Sources: IEA analysis based on TurkStat (2025), Motor land vehicles, December 2025, (accessed May 2026); MENR (2024), 2024-2028 Strategic Plan, (accessed in September 2025); IEA (2026), Global EV Data Explorer; EMRA (2026), Charging Network Infrastructure Projection, (accessed August 2026).

Since 2023, the new Türkiye-based EV car manufactured by the automotive company Togg has been driving EV car sales. Established in 2018, Togg began selling its first model, a battery electric vehicle, in March 2023. It sold 20 000 units in 2023, 50 000 in 2024 and 40 000 in 2025, surpassing domestic sales by Tesla and BYD,

with plans to expand production further to one million cars by 2030. Togg created a joint venture with Farasis Energy, a Chinese battery company, in April 2023, securing close collaboration to support beneficial supply chain integration.

To incentivise domestic EV production, in 2024 the government launched the High Technology Investment Programme, to which it allocated USD 5 billion, as well as USD 4.5 billion for battery production. The government also aims to attract foreign investment to the EV sector and continues to work with Chinese EV manufacturer BYD on a USD 1 billion investment in a production plant in Türkiye. However, in September 2024, Türkiye announced strict conditions on the import of plug-in hybrid EVs from certain countries, including the People's Republic of China (hereafter, "China").

A key strategy to increase the roll-out of EVs is the installation of public EV charging points around the country. Türkiye's Medium-Term Program (2025-2027) and 2024-2028 Strategic Plan emphasise strengthening EV charging infrastructure, integrating smart grids and ensuring widespread access to public charging stations. The country implemented the Charging Service Regulation (2022), which introduced licensing procedures and operational rules for charging networks. Following this Regulation, the number of licensed charging operators rose from 5 in 2021 to around 170 in 2024. By March 2026, Türkiye had installed almost 42 000 charging points. The goal is to install 100 000 EV charging points by 2028 by adding 20 000 units per year from 2024.

Rail, air and maritime transport

Transport planning, involving railway and maritime transport, can contribute to enabling modal shift from road transport to less energy-intensive modes of transport. The 2053 Türkiye National Transportation and Logistics Master Plan identifies alternatives to road and air transport, such as rail transport. Türkiye has heavily invested in rapid and high-speed railway lines, increasing the railway network from almost 12 000 kilometres (km) in 2010 to 14 000 km in 2024, 16% of which is high-speed lines. The government plans to expand the high-speed network further.

Air transport, notably domestic transport, has increased rapidly over the past two decades, partly driven by deregulation and lower taxes. Continuous policy support for air transport development boosted passenger and freight air travel, mainly domestic. Türkiye is a major hub for international aviation: it aims to reduce the carbon footprint

of its airports by introducing various criteria on energy management, energy efficiency and sustainability to accelerate investments in sustainable energy resources and to create the appropriate infrastructure for the supply of green energy to the terminal facilities and apron areas.

Sustainable aviation fuels (SAFs) are essential for Türkiye's 2053 net zero emission target and aviation sector decarbonisation. Legislation regulating SAF production and supply was introduced in 2025, aligning Türkiye with International Civil Aviation Organization and European Commission goals. By 2030, all airlines must cut emissions by 5% using SAFs. Fuel producers and suppliers are investing, securing international agreements and developing materials to meet mandatory usage rates effective from 2026. Efforts also continue to expand domestic Carbon Offsetting and Reduction Scheme for International Aviation-compliant materials and explore alternative feedstocks.

The maritime sector, which accounts for 0.8% of transport sector energy demand, offers potential for improved energy efficiency and emissions reductions. The 2023 IMO Strategy on Reduction of GHG Emissions from Ships targets a 40% carbon intensity reduction by 2030 (compared to 2008) and net zero emissions "by or around 2050". Maritime passenger transport is mostly used for urban passenger transport in Istanbul, Izmir and Çanakkale provinces. The government's Transport and Logistic Master Plan foresees the construction of 38 new ports for freight transport by 2053. Alternative fuels are one of the key measures to ensure that the GHG emissions reduction targets are achieved.

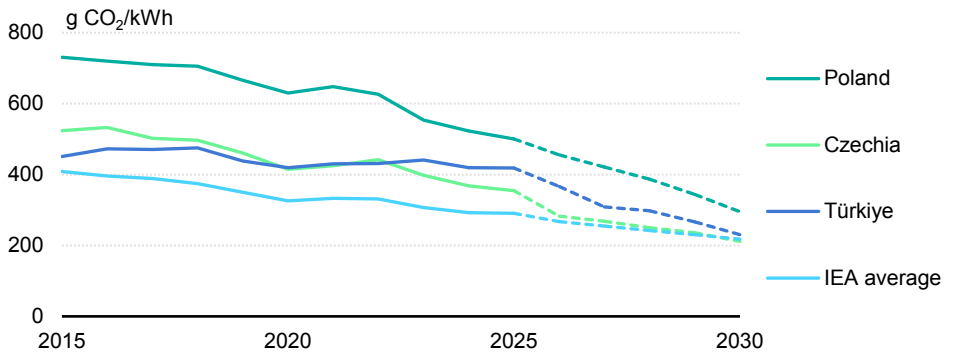
By the end of 2025, Türkiye's fleet of vessels over 1 000 gross tonnage reached 51.8 million deadweight tonnage, ranking it 11th globally, with an average age of 26 years. To improve energy efficiency, the Ministry of Transport and Infrastructure's Directorate General for Maritime Affairs provides incentives to build newer and more efficient ships by scrapping older vessels. The financial support for constructing fossil-fuel powered ships to replace scrapped vessels is set at 1.5 times the scrap cost per tonne. If the newly built ship uses an alternative environmentally friendly energy source, liquefied natural gas (LNG) or a hybrid system, however, the support increases to 2.5 times the scrap cost per tonne. Additionally, shipowners who convert the main engines of an existing vessel from fossil fuels to an alternative eco-friendly energy source will receive a grant covering 25% of the transformation cost.

Under the Regulation on Issuance of Green Port Certificates for Port Facilities (Official Gazette, 18 November 2023, No. 32373), new port facilities must meet green port standards, while existing facilities can choose to comply. Applicants for a Green Port Certificate must meet energy-efficient requirements, including operating at least 50% of main cargo handling equipment on electricity and providing shore-side power infrastructure at a minimum of one terminal, quay or pier.

Electricity

Türkiye's electricity demand is the fastest growing among IEA countries. It grew at an average annual rate of 4.5% from 2005 to 2024, driven by a fast-growing economy and population. Electricity demand grew by 3% from 2024 to 2025, largely driven by a surge in cooling needs during an intense heatwave. Türkiye's power and heat generation sector is among the most carbon-intensive among IEA countries (the sixth-highest in 2024) measured in grammes of carbon dioxide per unit of kilowatt hour (g CO_2/kWh) generated. Although Türkiye has improved the carbon intensity of power generation over the past decade (-7.3% from 2015 to 2025), it continues to trail behind several IEA Member countries: as of 2025, Türkiye had reached the average carbon intensity observed by IEA countries in 2015, around 420 g CO_2/kWh. Nevertheless, Türkiye's CO_2 intensity of electricity generation remains lower than that of other countries with significant coal-fired power, such as Poland, while exceeding the level in Czechia.

Carbon intensity of electricity generation and projections in selected countries and IEA average, 2015-2030



Source: IEA (2025), Electricity 2026.

In 2025, coal accounted for 33% of electricity generation and natural gas for 23%. In the same year, coal recorded a decline (-0.9% y-o-y) and natural gas a strong increase (+24% y-o-y). Variable renewable energies such as wind and solar photovoltaics (PV) are increasing: solar generation grew at a record speed (+24% from 2024 to 2025), supported by the Renewable Energy Resource Areas tender mechanism. Among other renewable energies, hydro, in 2025, declined by 23% y-o-y because of low rainfall and subsequent droughts, while geothermal reached almost 12 TWh.

Türkiye's National Energy Plan foresees electricity generation increasing 25% by 2030 and by 40% by 2035, compared to 2025 levels. As for solar PV, Türkiye already surpassed the level of electricity generation expected by 2025 in the TNEP, reaching 38 TWh. Under the TNEP, this will grow to 52 TWh by 2030. Wind is in line with the projections, reaching over 39 TWh in 2025, and the plan projects a growth to 53 TWh in 2030. Nuclear will enter the market over the next years, later than initially planned.

Electricity demand and generation growth

The TNEP forecasts electricity demand to grow until 2035 but at a slower pace than in the preceding decades, driven by demand from industry and services. In residential buildings, for example, demand increased by 14% from 2023 to 2024 driven by greater use of air conditioning and electric appliances and electrification of heating and cooking in some regions. The TNEP projects electricity demand to reach 510 TWh in 2035. End-use sector electrification is expected to reach 25% in 2035, from 22% in 2024. Installed generation capacity is expected to increase by around 60% from 2024 to 2035. The TNEP outlines at what stage capacity from each technology will be introduced, as well as shares and capacities by technology over time. Türkiye's peak electricity load has been rising steadily in recent years, driven primarily by increased summer cooling demand and economic and population growth, with peak demand reaching a new high of 59.5 GW during a summer heatwave in July 2025.

The TNEP foresees strong growth in renewable energy generation, which is crucial to achieving Türkiye's climate targets, as it is expected to contribute to 55% of electricity generation in 2035 (up from 43% in 2025). Renewable energy capacity is expected to grow to 65% (up from 59% in 2024). Nuclear power will provide over 10% of total electricity supply by 2035 once the Akkuyu nuclear power plant is fully operational, according to the TNEP.

Electricity market operation

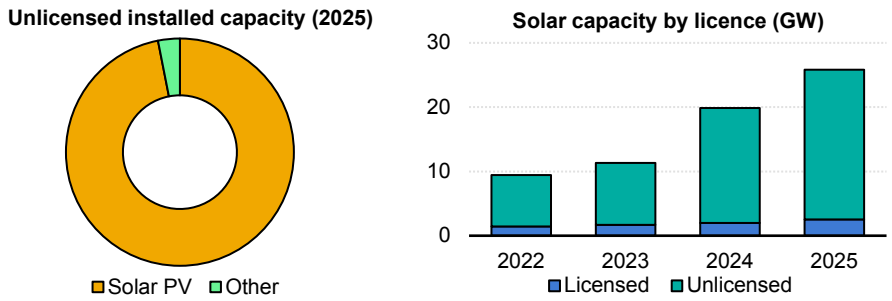
Türkiye is one of the largest electricity markets in Europe and is poised to keep growing. The sector's key challenges are boosting domestic production to cut reliance on imported fossil fuels, meeting rising energy demand, keeping prices stable and affordable, and supporting renewable integration (Focus Area 1).

Liberalisation of the electricity market began in 2001 with the Electricity Market Law, which was updated in 2013. Initially, the Electricity Market Law introduced elements of competition and unbundling of the vertically integrated market structure, and the generation, distribution and retail markets were opened to private sector investment. The Electricity Market Law is broadly consistent with EU regulations, notably in areas such as market liberalisation, aggregator participation and balancing. However, regulatory harmonisation is still underway, particularly on topics such as cross-border integration and consumer rights. EÜAŞ, the state-owned Electricity Generation Corporation, operated 50% of capacity in 2010: by late 2024 its share had dropped to 19%, as independent power producers accounted for more than 80% of installed capacity.

Prosumers, known in Türkiye as unlicensed producers, are consumers producing electricity to satisfy their own needs. They do not require a licence from the Energy Market Regulatory Authority (EMRA) and provide a growing share of electricity generation. This framework is designed to encourage small-scale, decentralised energy production, especially from renewable sources such as solar PV and wind. Unlicensed producers are exempt from obtaining a generation licence, simplifying the process for households, co-operatives and small businesses. The electricity generated can be used for self-consumption and the surplus energy can be fed into the grid subject to a maximum limit. Unlicensed producers are compensated by means of net metering or offsetting mechanisms.

The process is governed by the Unlicensed Electricity Generation Regulation issued by EMRA. Producers are obliged to comply with technical standards and safety regulations. Installed capacity is typically limited to 25 kilowatts for residential systems, though higher capacities are allowed for commercial and industrial users operating under specific conditions. Solar PV has benefited the most from the unlicensed generation regime. It led to a boom in rooftop solar PV installations in the residential and agricultural sectors. Solar PV accounted for 97% (or almost 23 GW) of unlicensed capacity at the end of 2025.

Unlicensed installed capacity by technology (2025) and solar capacity by licence (2022-2025) in Türkiye



Note: Unlicensed capacity refers to the capacity produced by prosumers.

Sources: IEA analysis based on EMRA (2025), Annual Report 2024, (accessed in January 2026); EMRA (2026), Monthly Report January 2026, (accessed in May 2026).

As of mid-2025, Türkiye had 15 electricity interconnections with neighbouring countries. Interconnections are managed by the transmission system operator, the Turkish Electricity Transmission Company (TEİAŞ), and the amount of electricity trade fluctuates from year to year depending on hydro seasonality variations. Volumes are small compared to overall generation.

TEİAŞ oversees transmission activities and operates the real-time management and the balancing and ancillary services. In 2013, TEDAŞ, the state-owned electricity distribution company, was unbundled into 21 regional electricity distribution companies, all of which were privatised by the end of that year. The retail market, with 21 privately owned retail companies, reflects this regional structure. Energy Exchange Istanbul operates the wholesale electricity market, including the day-ahead, the intraday and the futures market.

Türkiye introduced an electricity capacity mechanism in 2018, primarily to ensure system reliability and resource adequacy in the electricity market. The capacity mechanism was designed to guarantee payments to power plants that meet certain criteria, ensuring they remain available to generate electricity when needed. The mechanism rewards eligible power plants with monthly capacity payments. In 2024, TEİAŞ allocated TRY 13 billion (approximately USD 285 million) through the capacity mechanism, up from USD 92 million in 2023. Natural gas has received the most support since 2022, accounting for 64% of capacity payments in 2024, with coal accounting for the remainder.

Grid reliability and resilience

Grid-related outages impose costs on the economy and are generally the result of technical failures, for example those associated with ageing equipment. Only a relatively small but consistent share (~10%) can be attributed to uncontrollable nature-related factors, such as extreme weather events and earthquakes.

Türkiye's average temperature is rising and is likely to continue to do so, boosting energy demand for cooling in the upcoming decades. Although total annual precipitation across the country has neither increased nor decreased significantly, greater regional and seasonal disparities are projected. The incidence of extreme precipitation patterns involving droughts and heavy rainfall with flash floods is expected to increase. Overhead transmission and distribution lines are vulnerable to climate hazards, such as wildfires and floods. Underground transmission and distribution cables represent an alternative but require higher upfront costs and are exposed to other risks, such as heatwaves. The National Climate Change Action Plan proposes incorporating climate change impacts into plans for planning renewable energy resources. Updates to the Action Plan could highlight energy sector resilience and help raise the climate resilience profile in the TNEPs, which currently focus on climate change mitigation.

Electricity tariffs

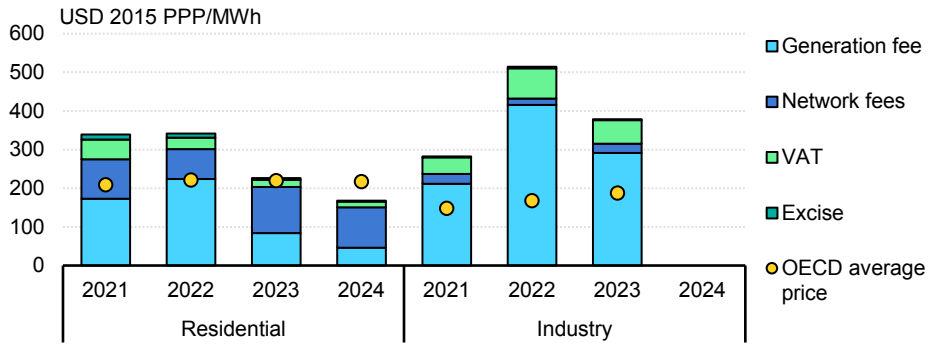
A large share of consumers, under a certain consumption threshold, are subjected to regulated electricity tariffs. Tariff regulation depends on annual consumption, which determines the eligibility threshold. Consumers whose electricity use exceeds this threshold are classified as eligible consumers and may negotiate bilateral supply contracts. The others remain on regulated tariffs (on retail tariffs or on last-resort supply tariffs) determined by the regulator, EMRA. Given the volume of residential consumers' consumption, they generally qualify for regulated tariffs, while industrial users generally exceed the threshold and qualify as eligible consumers, allowing them to choose their electricity supplier and negotiate a contract.

Based on voltage levels and usage types, there are five different levels of regulated tariffs, distinguishing between residential and industrial consumers, agriculture and public/private or commercial use. EMRA is progressively moving towards a cost-based tariff system, pushing smaller consumers to enter the liberalised market.

In 2025, EMRA determined the limit at 750 kWh annually. In 2018 and 2021, rising electricity prices led several suppliers to terminate bilateral contracts with eligible consumers as they were unable to meet their obligations. As a result, many consumers gave up their eligible status and returned to regulated pricing.

Measured at constant prices and purchasing power parity (PPP), residential electricity tariffs in Türkiye have been lower than the OECD average since 2023. Türkiye introduced measures in 2022 to protect consumers from energy price inflation. Policies included VAT reductions and direct payments to consumers with a focus on the less well-off. Direct payments to consumers cost around TRY 10 billion a year, with vulnerable households receiving extra compensation. Subsidies were mostly lifted in February 2025 for large residential consumers, including EV owners, consuming over 417 kWh per month (equivalent to a large household or a household with several air conditioners).

Industry and residential electricity prices in Türkiye and the OECD, 2021-2024



Notes: The residential price components refer to a low-tier residential consumer. The 2024 industry price is not yet available.

Sources: IEA analysis based on IEA (2025), Energy Prices; EMRA, Electricity Market Annual Sector Report, (accessed in July 2025).

Until 2023, the largest price component for residential consumers was the energy cost or generation fee, which mainly reflects the cost of energy, includes a renewable support component and others. The generation fee declined between 2022 and 2024, when it was lower than the network fee. The network fee includes distribution and

transmission fees. EMRA operates a price equalisation mechanism, which enables cross-subsidisation between the 21 Turkish regions, to ensure a unitary nationwide distribution tariff. The taxes and levies paid by residential consumers in Türkiye are among the lowest in Europe, to reduce the burden on consumers. Given that industrial consumption is generally above the eligibility threshold, industry prices are not regulated and are, on average, higher. The largest component in the industry price is the energy cost (75% in 2024). EMRA announced tariff increases in April 2025.

Renewables

In 2024, the 2035 Renewables Roadmap announced more ambitious targets for renewable energy, setting a goal of 120 GW for installed solar PV and wind capacity combined by 2035. According to data from TEİAŞ, there were 32.7 GW of installed solar PV and wind by the end of 2024, suggesting an almost fourfold increase by 2035. By 2035, generation from solar and wind is expected to exceed hydropower output, although this remains highly sensitive to drought conditions.

Introduced in 2005, the Renewable Energy Support Mechanism or YEKDEM provides financial support to licensed renewable energy projects by means of feed-in tariffs and local content premiums. Producers receive extra incentives for using locally made equipment and the rate depends on the energy source. Between 2011 and 2023, around TRY 65 billion (USD 1.5 billion) was allocated, supporting nearly half of Türkiye's installed renewable capacity. To complement YEKDEM, the government introduced the Renewable Energy Resources Areas (YEKA) tender programme in 2016 to develop large renewable energy projects via a competitive bidding process open to privately owned companies. YEKA tenders will switch to a competition-based model to accommodate the new, ambitious target for renewable capacity, including a super permission mechanism to cut permitting times to less than two years. Beyond domestic support schemes and competitive tenders, Türkiye is also pursuing large-scale renewable energy projects through international partnerships, including an agreement with ACWA Power to develop 5 GW of solar and wind capacity.

Solar PV

Türkiye has experienced considerable growth in solar energy over the last two years and has surpassed its target for 2025. In 2025, solar contributed to 38 TWh of electricity generation, reaching over 10% of the total. This increase in solar development has led to higher renewable energy installed capacity and record expansion in 2024 when solar energy accounted for 90% of the total new capacity,

with more than two-thirds represented by unlicensed facilities serving industrial needs. According to the Long-Term Climate Strategy, the largest capacity additions will come from solar PV, with installed capacity increasing from 20 GW in 2024 to 77 GW by 2035. According to IEA projections, Türkiye is among the seven countries that will contribute the most to Europe's cumulative installed capacity of solar PV up to 2030. Türkiye enjoys around 110 days of sunlight per year which, combined with its large surface area, gives it a higher solar energy potential than most of Europe. Most existing solar farms are in the southern regions owing to the higher irradiation levels. Türkiye is already home to one of the world's largest solar farms, the 1 350 MW Kalyon Karapinar Solar Park, located in the central Konya region, which began operations in 2023.

Türkiye is the largest solar panel manufacturer in Europe, well positioning it to accelerate deployment of both utility-scale and distributed solar PV to reach its targets. Türkiye is one of the countries which has introduced high import taxes (25 USD/kg) and antidumping duties (25 USD/m^2) on solar modules from China, starting in 2017. In 2023, Türkiye set a minimum import price per kilogramme for solar cells and for blue wafer to support domestic cell manufacturers. The price was updated yearly and raised to 170 USD/kg in July 2025.

In 2024, the Ministry of Industry and Technology launched the HIT-30 programme. This investment initiative provides comprehensive support and incentives for projects focused on high-priority technology areas, with customised solutions designed to address specific requirements. Solar, wind and battery storage technologies are designated as priority areas in green energy, and qualifying investments in these sectors will be eligible for support under HIT-30. The HIT-Solar call aims to develop cell production capabilities within Türkiye's panel production industry. Total support budget amounts to USD 2.5 billion, with the objective of establishing an annual cell production capacity of 15 GW, which includes investments in high local content and R&D centres. The programme supports five investments in cell production beginning at the ingot stage, each with a minimum annual capacity of 5 GW.

Coastal Law No. 3621 was amended in May 2024 to enable the establishment of renewable power plants on reservoirs, dams, and both artificial and natural lakes, subject to conditions defined in the law. Several small-capacity floating solar power plants have been constructed and are expected to become more common.

Expanding rooftop solar PV while decentralising energy production and reducing reliance on subsidies offers a means to increase solar penetration. Based on estimations, rooftops in Türkiye hold the potential to install 120 GW of solar PV, which

would allow the country to meet 45% of electricity demand from rooftop solar alone. The three provinces with the largest solar rooftop potential are home to the most populous Turkish cities of Izmir, Istanbul and Ankara.

Despite the potential benefits from rooftop solar over large-scale solar parks, deployment faces regulatory and practical hurdles. In 2019, Türkiye introduced monthly net metering, allowing residential solar users to sell excess power at consumer rates. Adoption remains slow, however, owing to lengthy processes, which require approval from multiple authorities and a 27-week timeline from application to installation. Türkiye is launching reforms and investments to meet its 2035 wind and solar PV goals. With the legal changes on 24 July 2025, regulations are now finalised, reducing the permitting process for wind and solar plants from about 48 months to 18 months. Improving application processes and mandating rooftop solar for new and public buildings could help Türkiye meet its energy and self-sufficiency targets while allowing consumers to generate affordable electricity.

Wind

Wind accounted for 11% (39 TWh) of total electricity generation in 2025, making it the second-largest source of renewables after hydro power. Wind capacity is projected to increase from 13 GW in 2024, to 43.1 GW in 2035. All currently installed wind is onshore, with the highest wind generation output found in the western regions, including Izmir, Balikesir, Istanbul and Çanakkale. Promoted by government incentives, Türkiye developed a strong supply chain with more than 70 companies involved in the manufacturing of wind turbine generators and onshore wind components. It is Europe's fifth-largest manufacturer of wind technology and exports 75% of its production.

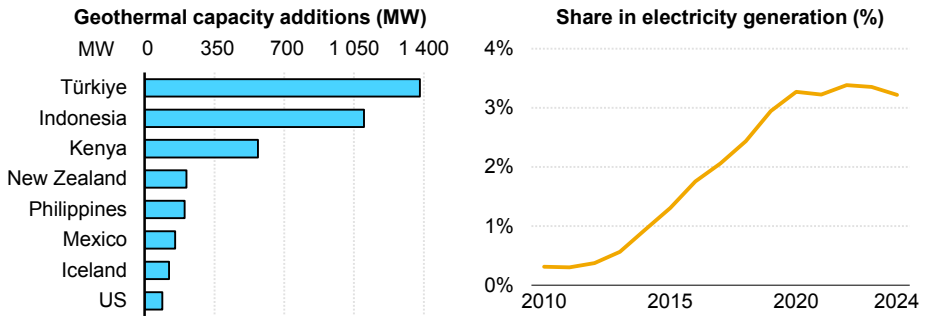
In 2024, an Offshore Wind Roadmap for Türkiye published estimates of the technical capacity of offshore wind at 75 GW. Potential is the highest along the west coast where wind speeds exceed 9.5 m/s. This region is also home to the country's most populous areas and demand centres, making offshore wind a strategic solution for meeting energy needs without extensive new transmission infrastructure. The most promising areas are the Aegean Sea near Çanakkale and Ayvalık, the Sea of Marmara, and parts of the Black Sea, where floating wind technology is suited for deeper waters. Türkiye's robust supply chain, competitive ports and proven shipbuilding capabilities position it well to develop domestic offshore wind and supply regional projects. Measures to lower market and project risks would help the offshore sector grow.

In 2018, Türkiye announced plans for an offshore wind farm with a capacity of up to 1.2 GW. The tender was not completed owing to a combination of tender-specific and macroeconomic conditions which reduced investor interest. The Offshore Wind Roadmap recommends developing derisking mechanisms, such as guarantees and hedging, to help access lower cost international finance. Furthermore, improving permitting procedures and site-specific data on wind and undersea conditions is essential. The government has invested in preliminary site surveys, inspired by the Danish model, which will reduce risks for the first offshore projects.

Geothermal

Türkiye is one of the world's ten largest consumers of geothermal energy. In 2024, geothermal accounted for 2.4% (119 PJ) of total final energy consumption. It is mainly used for heating (directly and through district heating networks) in the tourism/wellness and agriculture sectors, as well as in electricity generation. Geothermal accounted for 4.2% (74 PJ) of energy consumption in buildings in 2024, mainly applied as direct heating for residential and commercial use.

Geothermal capacity additions across leading countries (2013-2023) and geothermal share in electricity generation in Türkiye (2010-2024)



Sources: IEA (2025), Electricity Information; IEA (2024), The Future of Geothermal Energy; IEA (2025), World Energy Balances.

Of the 25 district heating systems installed in Türkiye, 19 are geothermal based. These are in the west of the country, which has the greatest geothermal activity. Globally, Türkiye added the most geothermal power capacity between 2013 and 2023. Over the same period, electricity generation from geothermal grew

more than eightfold, from 1.4 TWh to 11 TWh, and reached 3.1% of total electricity generation in 2024. Türkiye, which views geothermal as a high-potential energy resource to reduce import dependency, plans to increase the capacity of geothermal and biomass to 5.1 GW by 2030, from 3.9 GW in 2024.

Geothermal energy offers significant potential as a dispatchable and flexible source of clean electricity. It can replace fossil-fuel based heat generation in co-generation plants or boilers. Expanding and leveraging domestic geothermal resources could reduce Türkiye's reliance on coal for industrial processes as well as in electricity generation. Minimising drilling costs, which constitute 60-80% of total construction costs, could increase private investment appetite and tap into Türkiye's geothermal resources. In addition, the 12th Development Plan intends to increase geothermal R&D activities.

Several schemes are in place to derisk investment costs for geothermal exploration and drilling. A Risk-Sharing Mechanism provides partial coverage of exploration drilling costs in case of unsuccessful wells. A total of USD 37 million is available under the mechanism, funded by a grant from the World Bank's Clean Technology Fund. Second, exploration studies led by the General Directorate of Mineral Research and Exploration have been ongoing since 2005. The state-led discoveries, in combination with private sector activities, increased Türkiye's apparent heat capacity from 3 000 megawatt hours (MWh) to 40 000 MWh in 2023. Since 2008, a total of 103 fields, 16 of which are suitable for electricity generation, have been transferred to private investors through tenders which came into effect with Law No. 5686.

According to government sources, 78% of geothermal potential sits in the western part of the country, close to industrial and consumer demand centres. About 90% of resources are low and medium temperature, suitable for direct applications (heating, thermal tourism and industrial applications); the remaining 10% is suitable for indirect applications (electricity generation). Areas with high geothermal resources are linked to volcanic activities, which makes this energy infrastructure vulnerable to earthquakes, and should be considered in the government's expansion plans.

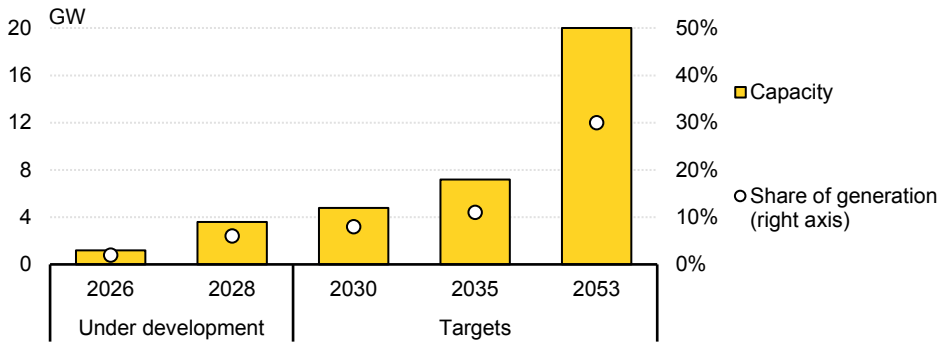
Nuclear power

Nuclear power, part of Türkiye's national energy discussion for more than half a century, is now becoming a reality. At the 2024 United Nations Climate Change Conference (COP29), Türkiye joined more than 30 countries as a signatory to the Declaration to Triple Nuclear Energy Capacity. The TNEP envisages 7.2 GW of nuclear power capacity by 2035. Türkiye developed the full scope of the institutional, regulatory and legal infrastructure to support and oversee its nuclear programme and sees the development of its ambitious nuclear power programme as a low-carbon tool

to: increase energy independence by reducing fossil fuel imports while strengthening energy security; support grid stability and provide part of the flexibility required by the rise of the share of variable wind and solar that supports the country's decarbonisation and electrification goals; and develop a local nuclear industry and expertise supporting potential future participation in international nuclear supply chains.

The Akkuyu project is based on a unique structure to support the launch of the nuclear programme. In 2010, Türkiye and the Russian Federation (hereafter, "Russia") entered into an intergovernmental agreement to construct the Akkuyu nuclear power plant with four units of 1 200 MW_e each and utilising the VVER-1 200 pressurised water reactor design. Situated on the south-eastern coast of Türkiye along the Mediterranean Sea, first nuclear concrete was poured in 2018. The initial plan projected commissioning of the first unit in 2025, with a total estimated cost of USD 20 billion. Due to project delays, however, the first unit is now expected to be commissioned in 2026, with subsequent units following annually. The expected service life of the reactors is 60 years, extendable up to 80 years.

Under development and targeted nuclear capacity and share in electricity generation in Türkiye, 2026-2053



Source: IEA analysis based on MENR (2023), TNEP, (accessed January 2026).

This project, which is led and financed by Rosatom, is based on a "build-own-operate" model. The owner and operator is Akkuyu Nuclear Joint Stock Company (Akkuyu Nuclear JSC), currently fully owned by Rosatom. Rosatom will remain the majority owner of Akkuyu Nuclear JSC and will provide the fuel during the entire lifetime of the

plant. The spent fuel will be stored on site during the operation of the plant, and the operator will contribute to a secured fund to finance radioactive waste management and decommissioning.

The Turkish Electricity Trade and Contracting Corporation (TETAŞ) secured a power purchase agreement that would allow it to purchase a guaranteed 70% of the power generated by the first two units, and 30% of the other two units, over a 15-year period. According to Decree Law No. 703, published in Official Gazette No. 30473 (bis) on 9 July 2018, TETAŞ and EÜAŞ were merged under EÜAŞ. The duties, authorities and responsibilities previously held by TETAŞ are now carried out by EÜAŞ. Electricity is to be purchased at a weighted average price of 0.1235 USD/kWh, exclusive of VAT. During this period, excess electricity will be sold by Akkuyu Nuclear JSC to the market and after this 15-year period all the output will be sold on the electricity market.

The unique project structure allowed Türkiye to secure financing for the project without requiring Turkish state funds or debt, while offering a risk-sharing mechanism approved by the parties involved. Construction and operational risks are entirely with Rosatom and its subsidiaries. With the power purchase agreement covering approximately half of the electricity produced during the first 15 years of operation, both sides are partially exposed to electricity market risk. As the power purchase agreement was negotiated in US dollars, this exposes EÜAŞ to a significant exchange rate risk, especially considering the depreciation of the Turkish lira since the signature of the intergovernmental agreement underlying this project.

Efforts were made to ensure a degree of localisation and the development of a local workforce and expertise. According to the agreement, Turkish engineers are expected to account for 20% of the technical staff at the start-up of the plant. This is made possible by an ambitious training programme supported by both sides. A minimum of 40% of the construction work is expected to be carried out by Turkish companies. It is estimated that, so far, 57% of the project budget has been spent in Türkiye (e.g. for material, equipment, services, salaries, etc.).

Two other large-scale nuclear power plant projects are under discussion, mainly in a government-to-government format. The Turkish government aims for these subsequent projects to be structured in a way that increases localisation and Turkish industry involvement and control over the plant compared to the Akkuyu project. Yet it is also a priority to have a viable financing scheme that does not place an excessive burden on the public budget or create debt.

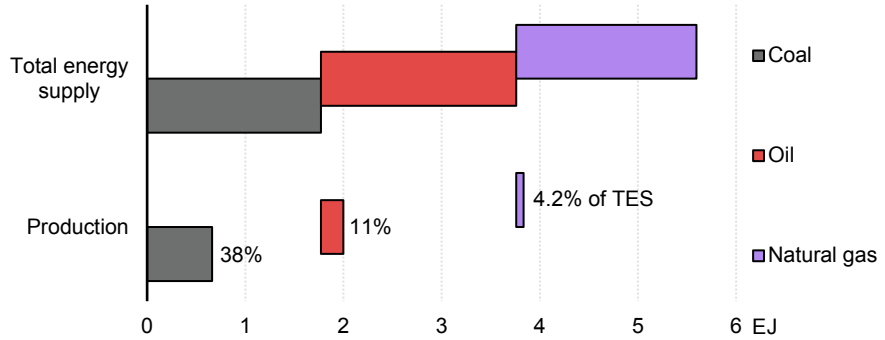
Türkiye's second nuclear power plant, planned to be built in the Sinop province, would allow it to meet the goal of 7.2 gigawatts electrical (GW_e) of nuclear power by 2035 and, depending on the type of reactors chosen and the number of units, to further add nuclear capacity to the electricity mix. The environmental impact assessment decision and site approval for a nuclear power plant at Sinop site was granted and Türkiye is currently in discussions with potential vendors for this project. A third nuclear power plant is expected to be located on the Black Sea coast in the Thrace region, north-west of Istanbul. Intergovernmental discussions with vendors and investors are ongoing.

Small modular reactors (SMRs) offer potential for greater involvement of the private sector and to decarbonise hard-to-abate sectors. SMRs are gaining global interest for their potential for flexibility, lower upfront costs, shorter deployment times, and suitability for industrial applications and hydrogen production. Across the globe, more than 70 SMR concepts are under active development in more than 30 countries, with a variety of maturity levels and deployment plans. Türkiye plans to build 5 GW of SMR capacity as part of its mid-century target for nuclear power. Discussions with several SMR vendors have been initiated and the government is preparing an incentive mechanism for the deployment of SMRs. These projects are likely to be driven by the private industrial sector in line with recent developments in other OECD countries where industry is financing SMR projects to secure a supply of power and/or heat.

Fuels

Fossil fuels provide over 80% of Türkiye's primary energy: much of this energy is imported and energy imports were equivalent to 11% of Türkiye's GDP in 2022. Even with projected increases in domestic coal and natural gas production, Türkiye will continue efforts to decrease its dependence on imports and vulnerability to market volatility and price fluctuations in the future. Türkiye plans further investments in fossil fuel exploration and production activities, including non-conventional resources such as shale oil and methane gas. Oil and gas exploration and production account for over 54% of the TRY 260 billion (USD 5.7 billion) investment in the energy and mining sector announced in the 2025 investment programme.

Total energy supply and share of production by fuel in Türkiye, 2024

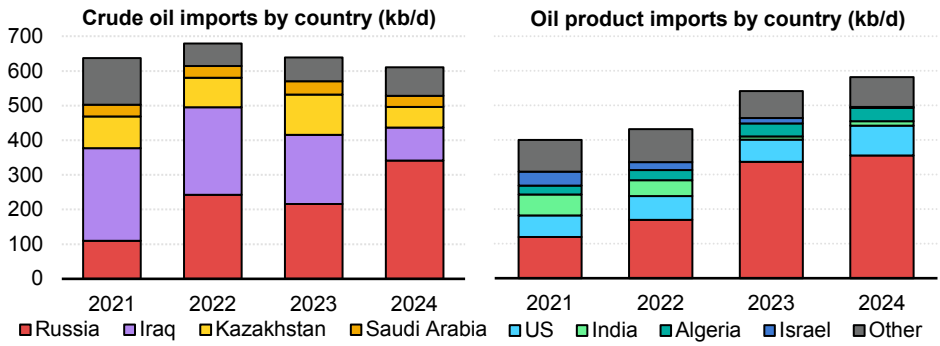


Notes: EJ = exajoule; TES = total energy supply.
Source: IEA (2026), World Energy Balances.

Oil

Türkiye is a net importer of both crude oil and oil products. While it is increasing its efforts to expand oil production in the Gabar Mountain region, dependence on crude oil imports remained constant at almost 90% of total energy supply (TES) in 2024. Its main trading partners in 2024 were Iraq and Russia, together accounting for 72% of its imports.

Türkiye's crude oil and oil products import by country, 2021-2024



Source: IEA (2026), Oil Information.

The opening of the STAR refinery in late 2018 added 214 kb/d to Türkiye's crude processing capacity but also contributed to an increase in crude oil imports. While the commissioning of the refinery significantly reduced oil products import dependency between 2019 and 2020, gross imports are increasing, reaching approximately 580 kb/d in 2024, or the equivalent of 2018 levels. Oil remains the largest energy source, accounting for 35% in total final energy consumption in 2024, and was the largest source in TES, at 29%. Oil product demand and final consumption have remained relatively constant over the years, with mainly consumption from transport showing an upward trend.

The transport sector is the main consumer of oil products, followed by industry and buildings. Türkiye is one the world's largest markets for LPG in transport, with 30% of registered cars fuelled by LPG. This is reflected in the high share of LPG in the total oil product demand of 15%, or 131 kb/d in 2024, with domestic demand largely met through imports.

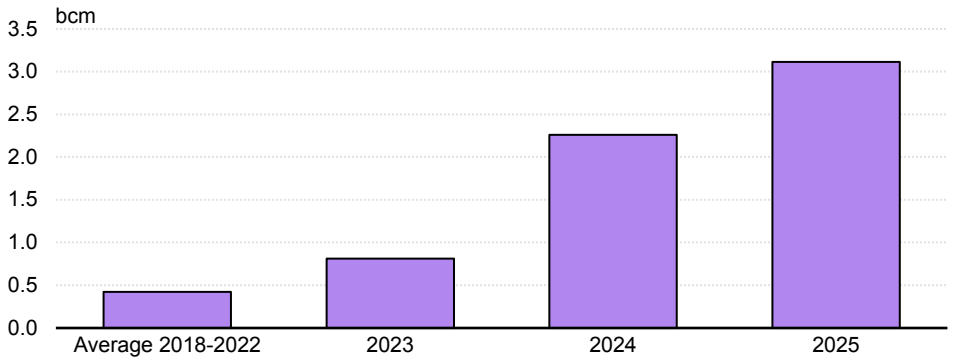
Natural gas

Natural gas plays a major role in the Turkish energy system: it accounted for over one-quarter of TES in 2024, with demand amounting to 53 bcm. Natural gas, largely imported from Russia, is used mainly in the buildings (65% of TFEC in 2024) and industry (34%) end-use sectors, with buildings' use predominantly for heating. Natural gas also fuelled 23% of electricity generation in 2025, although the 12th Development Plan projects a drop in natural gas-fired electricity generation to 15% of output in 2028.

Natural gas production

Recent investments in offshore exploration have resulted in several discoveries. The Sakarya gas field in the Black Sea, which was discovered in 2020, is owned and operated by Turkish Petroleum Corporation, the state-owned oil and gas company. The gas field will deliver 16.5 bcm per year at full capacity, fulfilling more than a quarter of domestic consumption (at 2024 levels). The government provides support for the development through tax benefits and exemptions. The field began its first phase of operations in 2023, gradually ramping up production for Phase 2 to start in 2026. Expected daily production in 2026 is 20 million cubic metres (mcm) and Phase 3 is expected to bring total production to 45 mcm/d by 2028. As of mid-2025, Türkiye's Black Sea proven natural gas reserves amounted to 785 bcm, primarily attributable to discoveries in the Goktepe-3 and Sakarya gas fields.

Natural gas production in Türkiye, 2018-2025



Source: IEA (2026), Monthly Gas Data Service.

Natural gas infrastructure

Türkiye produces natural gas and imports from abroad via long-term purchase contracts with Algeria, Azerbaijan, the Islamic Republic of Iran and Russia, as well as spot and long-term LNG imports. The country is crossed from east to west by the Trans-Anatolian Natural Gas Pipeline (TANAP), part of the Southern Gas Corridor delivering gas from Azerbaijan to Europe. TANAP's import capacity is 16 bcm and there are plans to double it by 2028. The Blue Stream Gas Trans-Black Sea pipeline from Russia also crosses Türkiye, with an annual import capacity of 16 bcm. By December 2024, Russia was Türkiye's largest source of natural gas imports. The Trans-Adriatic Pipeline connects to TANAP and enables export to Europe of about 10 bcm annually.

In May 2024, Türkiye and Azerbaijan signed a co-operation agreement to expand pipeline capacity, including the South Caucasus Pipeline and potentially TANAP, to enhance exports to Europe. Türkiye is also connected to regional gas networks through several interconnections, including links with Greece, Bulgaria and the South Caucasus, as well as planned projects to expand supply routes. The TurkStream pipeline system has a total capacity of 31.5 bcm, supplying both Türkiye and European markets.

Türkiye operates five LNG terminals, including three floating storage regasification units. LNG accounted for 24% of imports in 2024, declining due to increased domestic production. Türkiye's natural gas storage capacity reached 5.8 bcm in 2024, equivalent to 11% of demand in 2024. Capacity is expected to increase to 13 bcm by 2028, driven mainly by the expansion of the Tuz Gölü facility, providing high injection and withdrawal rates.

Market structure

BOTAŞ is the main importer and retailer of natural gas. It also operates the gas transmission system. An amendment to the Law on Organized Industrial Zones from April 2023 re-emphasised the need for legal unbundling, by separating BOTAŞ' responsibilities for import, transmission and distribution activities into distinct legal entities. In 2024, BOTAŞ provided almost all the country's total natural gas supply. Distribution system operators carry out their activities under licences conferred by EMRA, maintaining regional monopolies for distribution and retail. There are 73 distribution system operators and 120 000 km of pipelines covering all 81 provinces. At the retail level, BOTAŞ remains the largest supplier to end users.

The natural gas spot market operated by Energy Exchange Istanbul was established in 2018 and a continuous Trade Platform enables day-ahead and intraday operations. The Platform enables shorter term transactions with daily spot prices and the physical delivery of the traded volumes. As of August 2024, the volume of traded gas in the organised market was almost 9 bcm and 46 companies held wholesale trading licences. In October 2021, a Natural Gas Futures Market was established, enabling trading of natural gas futures, to enhance transparency, predictability and hedging of natural gas contracts. Energy Exchange Istanbul acts as the sole counterpart to minimise the counterparty risk for participants.

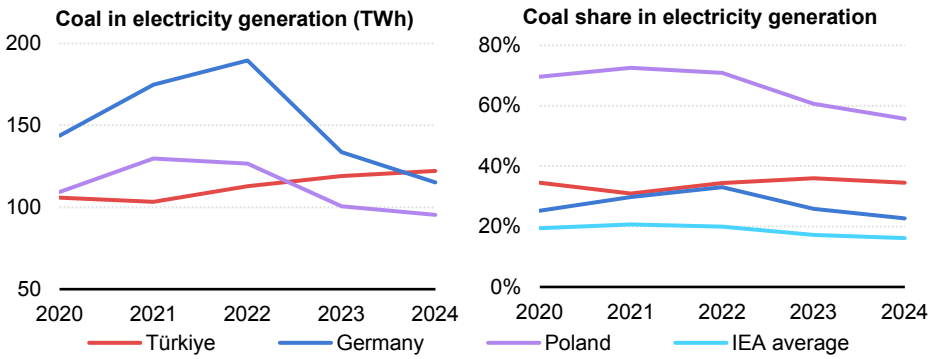
Like the electricity market, consumers are divided into eligible and non-eligible, based on annual consumption. Since 2015, the eligibility threshold was >75 000 m^3/year for residential consumers. Customers above this threshold – eligible consumers – are allowed to purchase natural gas from any company: they negotiate unregulated bilateral contracts in the wholesale market. In 2024, there were more than 800 000 eligible customers.

Coal

In 2024, coal accounted for 26% (1 769 petajoules) of Türkiye's total energy supply and was the largest energy source in electricity generation (34%). Although total

energy supplied from coal increased by 89% from 2005 to 2024, its share of TES decreased. In 2025, Türkiye consumed almost 120 Mt of coal, surpassing Germany and Poland to become the largest consumer of coal in Europe. Coal demand in Türkiye is expected to remain around 90 Mt by 2030. Türkiye reached a record level of coal-fired electricity output of 120 TWh in 2024, slightly surpassing Germany.

Coal in electricity generation and its share in electricity generation among European countries, 2020-2024

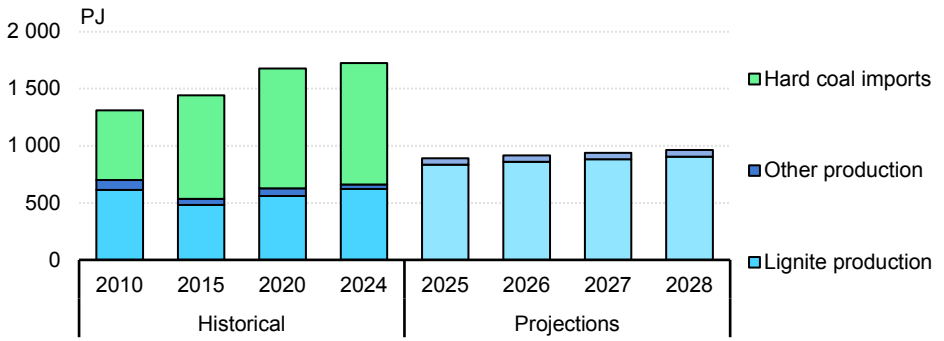


Sources: IEA (2026), World Energy Balances.

Production and imports

The 12th Development Plan expects the 2053 net zero target to impact coal policy in the future. Around 90% of Turkish coal reserves consist of lignite, and the government promotes the exploration, mining and development of existing mines. Domestic lignite has low calorific value and requires large volumes to satisfy demand. Imports of hard coal have almost doubled in the past 15 years. Since 2022, Türkiye's largest trade partner has been Russia, overtaking Colombia, as imports from Russia increased by 24% from 2022 to 2024, reaching 25 Mt, after peaking at 29 Mt in 2023.

Coal production and import by type (2010-2024) and projections (2025-2028) in Türkiye

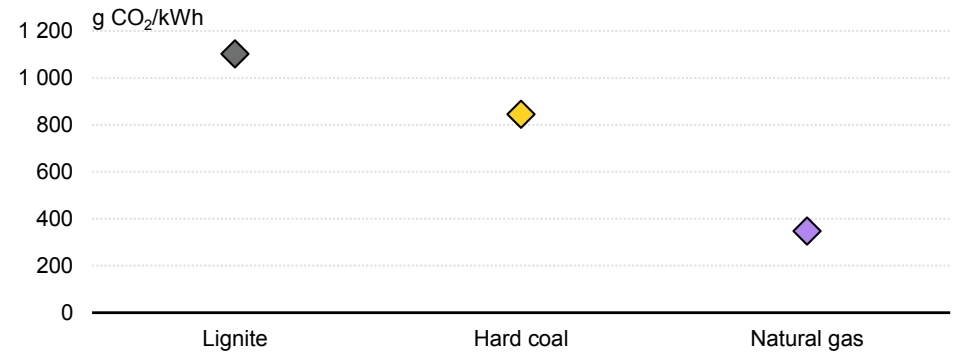


Note: Projections are not available for imports.

Sources: IEA (2026), World Energy Balances; MENR (2024), 2024-2028 Strategic Plan, (accessed in October 2025).

The expansion of coal-fired power capacity over the past decade was part of a strategy to exploit domestic lignite resources and reduce reliance on imported natural gas for power generation.

Average emission factors of selected fuels in Türkiye, 2014-2024



Source: IEA (2025), Emission Factors 2025; IEA (2026), World Energy Balances.

As of 2026, Türkiye hosts 69 coal-fired power plants, including unlicensed plants and auto-producers. In 2024, coal-fired plants provided 21 GW of capacity. According to Global Energy Monitor, the average age of coal-fired units is 24 years, with 29% older than 30 years and another 27% built in the last decade. Some plants hold licences extending beyond Türkiye's 2053 net zero target. Additionally, 96 GW of proposed coal plant capacity between 2010 and January 2026 was cancelled, while less than 11 GW of capacity was added over the same period. No coal-fired capacity is planned for retirement between 2026 and 2040.

The case for the coal transition

Despite the government's plan to operate the coal power plants to the end of their technical lives, economic factors and climate goals build the case for an orderly transition of the coal industry. This transition includes plant repurposing and early retirement of unabated coal-fired power plants. Postponing a technically feasible coal transition can result in higher costs while an orderly transition helps minimise social disruptions, which could arise from unplanned closures, in coal-dependent regions.

Türkiye is hesitant to move away from coal-powered electricity generation owing to concerns about security of supply and energy costs. Coal plants currently generate electricity, contribute to the adequacy of power systems and participate in capacity markets. Rather than relying on coal for continuous generation, shifting the focus to flexibility services and keeping coal capacity available for periods of system needs, would reduce electricity generation from unabated coal power plants over the year. This approach would also preserve some employment and mitigate the loss of revenue associated with a full closure.

Plans to expand wind and solar offer clean, low-cost alternatives to meet rising electricity demand: the generation costs of new solar PV and onshore wind power plants is lower today than new and existing fossil fuel plants in almost all cases. Nonetheless, the introduction of an ETS could raise the price of coal-fired electricity.

Lignite-fired generation and domestic coal production depend significantly on state support mechanisms, placing a burden on the national budget, that could instead be redirected to finance the energy transition. A key support instrument is the capacity mechanism introduced in 2018. It provides monthly payments to reward available capacity. The mining sector also receives financial support to pay miners' wages to compensate for the hardship of the profession, as well as support in the form of a tax expenditure for lignite exploration.

Türkiye plans to develop a CCUS roadmap, which will include proposals to retrofit newer coal plants. This could preserve existing assets and jobs and ensure more time to absorb the transition costs. Türkiye is also advancing efforts to improve the environmental performance and value-added utilisation of domestic coal resources. Current projects include the development of advanced carbon materials, such as graphene, carbon nanotubes and carbon fibre, as well as the recovery of rare earth elements and other critical minerals from coal-processing wastes. These initiatives aim to support innovation, enhance resource efficiency and contribute to domestic critical mineral supply chains.

Türkiye's 12th Development Plan focuses on upskilling and preparing the workforce for the digital and green transitions. The number of employees in the coal and lignite mining sector has fluctuated in recent years but is generally declining compared to 2015 (-20%), resulting in a total of around 32 000 employees in 2024. This is partially because of productivity gains – and employment reductions differed among regions, highlighting the importance of targeted regional policies while progressing towards the net zero target. An effective people-centred transition focuses on workers, offering direct payments and compensation, mindful of the wage premium coal workers receive to work in this sector.

A workers' transition needs to consider different retirement ages; workers farther away from retirement should benefit first from reskilling and education programmes. In terms of upskilling, Türkiye offers vocational training, with a focus on renewable energy and on providing equal opportunities within the energy sector. Establishing a regional skills-mapping exercise would help identify the transferable skills of coal workers and specific training required for new emerging employment sectors and enable the implementation of targeted reskilling initiatives while mitigating employment disruptions.

Hydrogen

Türkiye released its first hydrogen strategy in January 2023. The aim of the Hydrogen Technologies Strategy and Roadmap is to establish a domestic low-emission hydrogen supply chain, targeting 2 GW of electrolysers by 2030, 5 GW by 2035 and 70 GW by 2053. It also seeks to reduce the low-emissions hydrogen production costs to below 2.4 USD/kg by 2035 and to 1.2 USD/kg by 2053. Türkiye is preparing a Hydrogen Action Plan in co-operation with the World Bank to operationalise the National Hydrogen Technologies Strategy and Roadmap. The Plan is expected to define priority actions, investment needs and implementation arrangements across

the hydrogen value chain. Achieving the Strategy's hydrogen cost-reduction targets will be important for strengthening the competitiveness of domestic production and supporting wider adoption in key sectors.

For comparison, the global hydrogen costs were 4.5-6.5 USD/kg in 2023, and the IEA estimates production costs from renewable-based electrolysis could fall to 2-9 USD/kg H_2 by 2030 under the net zero emissions scenario. The strategy includes support for demonstration projects using natural gas as a transition pathway. It also foresees blending hydrogen into the gas system, with a target share of 12% in the gas mix by 2053. Industry is expected to be the main sector for hydrogen deployment.

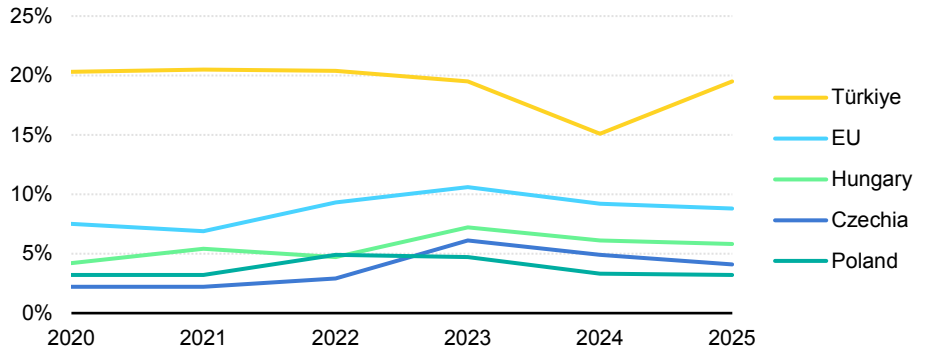
To date, there is no legal provision for hydrogen use in the energy sector and in 2022 the Change and Adaptation Co-ordination Board recommended either establishing a stand-alone hydrogen market law or including provisions for a hydrogen regulatory framework in existing laws such as the Natural Gas or Electricity Market Laws. According to the IEA Global Hydrogen Review 2024, Türkiye received over USD 400 million in funding from multilateral development banks for the development of hydrogen projects in the period 2022-2024.

Affordability

Following the global energy crisis in 2022, government support measures helped shield households in Türkiye from rising energy costs. These measures, including subsidies and tariff regulation, contributed to relatively stable natural gas and electricity prices compared with many other countries.

As a result, the share of household income spent on energy appears relatively low on average (3% in 2025). However, this masks significant disparities across regions and income groups. Low-income households spent almost twice as much on energy as in 2021 and a notable share of households continues to struggle to adequately heat their homes (20% in 2025, compared to the European Union average of 9%), particularly in lower-income regions in eastern Türkiye.

Households' inability to keep their home adequately warm in selected countries, 2020-2025



Source: IEA analysis based on Eurostat (2026), Data Browser Inability to Keep Home Adequately Warm, (accessed in May 2026).

Türkiye remains highly dependent on imported natural gas, exposing consumers to future price volatility. While regulated tariffs have helped limit short-term impacts on households, they may also weaken incentives for energy efficiency and investment.

Transport costs also weigh significantly on household budgets in Türkiye. While nominal diesel prices are below the OECD average, they are high in purchasing power terms, contributing to affordability pressures, particularly for lower-income households. Improving vehicle efficiency is therefore key to limiting transport-related fuel poverty. At the same time, electric vehicles remain concentrated among higher-income households, and with the vehicle fleet ageing (around 14 years on average), reducing upfront costs will be important to support a more equitable transition.

Energy investment and financing

The transition to a low-carbon economy in Türkiye requires significant investment in renewable energy, grids and energy efficiency. In 2025, around 7.6% of the public investment budget was allocated to energy projects. The government estimates investment needs of USD 80 billion for renewable capacity, USD 28 billion for grid infrastructure and USD 20 billion to meet energy efficiency targets by 2030, highlighting the importance of mobilising private capital.

Financial flows are gradually shifting towards renewables. Turkish banks increasingly view coal investments as unattractive due to long investment horizons and growing transition risks, while loan performance in renewable energy projects remains stronger than in fossil fuel assets.

However, several structural barriers constrain the scale-up of energy finance. Limited availability of long-term financing, low domestic savings and the absence of a fully developed green finance framework, including a national taxonomy and carbon market, hinder investment. These challenges are compounded by macroeconomic factors such as inflation, exchange rate volatility and high interest rates, which increase the cost of capital and deter investment in capital-intensive projects such as renewable energy and grid infrastructure.

The government has introduced policy frameworks to support sustainable finance, including the development of a national green taxonomy aligned with the European Union, and initiatives to integrate sustainability considerations into the financial sector. This initiative is particularly relevant as Turkish energy-intensive industry exports will be impacted by the European Union's CBAM. Türkiye also benefits from international climate finance, particularly from multilateral development banks, supporting renewable energy deployment, energy efficiency and grid integration.

In May 2024, Türkiye signed a new USD 1 billion programme with the World Bank and Turkish development banks to support the installation of 53 GW of solar and 7.5 GW of battery storage by 2035. Furthermore, in 2024 Türkiye, the World Bank (International Bank for Reconstruction and Development and the International Finance Corporation), and the European Bank for Reconstruction and Development developed a Renewable Energy Integration Investment Plan. The Plan aims to facilitate the transformation of the country's transmission system to allow for additional renewables capacity by 2035 and to deploy flexibility and stability mechanisms.

Recommendations

1 Prioritise the renovation of residential buildings to improve energy efficiency, thermal performance and seismic resilience by scaling up financial solutions

Türkiye aims to renovate 40% of existing residential buildings by 2033. More than 31% of households reside in residential buildings built before 2000 and over three-quarters were built before the adoption of building codes. Large areas of Türkiye are earthquake-prone, including Istanbul, which accounts for the largest number of buildings. A significant share of buildings in the country is not earthquake-proof, and the latest major earthquake (2023), in addition to its devastating human impact, damaged almost 40 000 buildings.

To achieve the ambitious urban renovation and transformation, the government should include residential buildings in efficiency programmes. Country-specific circumstances such as the age structure of the building stock, the high share of multi-family dwellings and the shared ownership of these buildings should be taken into account in the design of target-oriented schemes to enhance the building renovation rate. Furthermore, the current decision-making requirements in multi-apartment buildings present a barrier to energy efficiency renovations. It is important to ensure that vulnerable and less well-off householders are part of the energy transition. Incentive schemes should help low-income families reduce energy consumption, improve comfort, and lower heating and cooling costs while also contributing to energy efficiency and reducing carbon emissions. In high-risk seismic zones, Türkiye should fast-track the renovation of buildings at risk and provide incentives for owners to demolish and rebuild unsafe structures under safer, modern standards. Where possible, earthquake proofing should accompany building retrofits.

2 Accelerate the deployment of a heat market, leveraging domestic geothermal resources to decarbonise heating systems and strengthen energy security

Türkiye should address a policy gap by providing a coherent set of incentives to promote renewable heating, cooling and co-generated power, adding dispatchable capacity to the grid in the most resource-efficient way. It should build on existing efforts to map out geothermal resources and heating and cooling needs; engage with municipalities, promoters and the banking sector to identify and promote adequate business and financing models; and promote innovation to sustain Türkiye's technological leadership. The IEA estimates that geothermal energy could provide up to 15% of global electricity demand growth to 2050. Boosting this sector in Türkiye could spur economic growth and reduce dependencies through the creation of new jobs in the manufacturing, installation and maintenance of geothermal energy systems for the domestic market and potentially for export markets over time.

3 Complete energy market reform by carefully transitioning end-user prices to a transparent, market-based pricing mechanism

Retail gas and electricity prices in Türkiye are protected by regulatory measures to prevent significant tariff increases owing to fluctuations in international energy markets and exchange rate variations. In early 2022, EMRA introduced tiered tariffs for residential and commercial consumers with the upper limit for low-tier residential consumers increased to benefit a greater number of consumers. While wholesale power prices returned to near normal after the crisis, retail tariffs remained at a lower level. These low tariffs, while beneficial to Turkish consumers in the short term, pose longer term challenges to the energy sector and hinder efforts to reduce energy consumption and energy imports.

Artificially low gas and electricity prices offer consumers little financial motivation to reduce their consumption. As a result, energy efficiency measures, such as investing in energy-efficient appliances or retrofitting homes, become less attractive. Artificially low energy prices drive up energy demand and place a further strain on scarce resources and domestic energy security. To achieve its energy efficiency and climate goals, a balanced approach to tariff setting is essential, where prices reflect the cost

of energy and encourage responsible energy use. The gradual implementation of a tariff reform will need to be carefully communicated and managed to support public acceptance and must be accompanied by complementary measures to protect less well-off and vulnerable households from energy poverty.

4 Ensure a viable financing framework for large nuclear power plants while establishing a clear strategic framework for small modular reactors

Nuclear power is seen as a cornerstone of Türkiye's future decarbonised electricity system: it will provide dispatchable, carbon-free power and enhance system stability and flexibility, thereby supporting and complementing the expected large-scale deployment of wind and solar. In addition to the Akkuyu nuclear power plant, the government is planning to build two more nuclear power plants. Security of supply, reducing dependencies, localising technology transfer and a viable financing framework should be a central focus for Türkiye in negotiations to build and finance these plants.

Small modular reactors (SMRs) offer a potential flexible and modular solution for decarbonising hard-to-abate industrial sectors. These reactors could provide both low-carbon electricity and potentially high-temperature heat to energy-intensive industries such as steel, cement, chemicals and fertilisers. This would help achieve national decarbonisation goals for these key economic sectors while ensuring they remain competitive on export markets where carbon content is increasingly factored in. While several SMR concepts are moving toward demonstration, Türkiye should finalise its legal and administrative framework for SMRs to include a transparent, time-bound process for technology selection and project development.

To enable private sector-led deployment, the government should work with key industrial stakeholders to assess demand, define viable project structures and develop an appropriate risk-sharing mechanism that provides predictability to investors without relying on direct public financing. Early engagement with potential end users, long-term visibility (on energy strategy and the regulatory environment), and a co-ordinated policy framework can help make SMRs a strong element of Türkiye's industrial decarbonisation and clean growth strategy.

5 Establish a policy framework to initiate a just and orderly transition for local communities relying on the coal industry

The coal industry brought considerable benefits to Türkiye's economic development, but its influence is likely to decline in the coming years owing to sustainability and competitiveness pressures. Türkiye's speed in securing its energy supply will depend on how well it integrates variable renewable energy and nuclear power. While the energy transition will benefit the economy, the process needs to be carefully steered to ensure that local communities that rely on coal industries are not left behind.

The policy framework should include indicative time frames for the decommissioning of a first set of older coal-fired power plants and local governance mechanisms involving relevant stakeholder groups. It should ensure that communities are adequately prepared, promote innovation and offer reskilling opportunities to the workforce according to the potential of new economic activities in each region, in the energy sector and beyond. The framework should incorporate mechanisms for direct participation of workers, youth, women and local communities in policy design, drawing on local knowledge to tailor solutions for each region. The expected implementation of a domestic emissions trading system, paired with electricity market reforms, is likely to push out older inefficient power plants.

Evidence from other countries' transitions demonstrates that coal-producing regions can suffer long-term effects if the transition is not anticipated. Measures to help manage the transition include support for workers and companies; the development of alternative industries; and investment in local infrastructure and public services, including digital connectivity, healthcare and education. Early engagement with private sector partners and local entrepreneurs is essential for accelerating new business opportunities and broadening the range of quality employment options beyond the energy sector.

Focus areas

Expansion and integration of variable renewables

Realising the full potential of Türkiye's solar PV and wind power will require proactive integration strategies. Between 2019 and 2025, the shares of solar PV and wind power in electricity generation doubled. The government identified these sources as key pillars for decarbonising the energy sector, and capacity is expected to continue expanding rapidly towards 2035, supported by cost reductions in solar PV and wind power technologies and backed by an emerging and supportive policy environment.

Maximising the benefits from increased solar PV and wind capacity requires effective integration into the power system. While power systems have always managed demand variability, variable renewable energy (VRE) sources introduce supply variability depending on the weather. This variability will require increasing the flexibility of the entire power system, by leveraging dispatchable generation, grid enhancements, increased storage and demand response. Successful integration maximises the amount of energy that can be sourced securely and affordably, minimises costly system stability measures, and reduces dependency on fossil fuels.

VRE sources are not only crucial for power sector decarbonisation but also offer benefits that extend far beyond the environment. By reducing fossil fuel consumption, renewables enhance energy security and improve affordability, providing a hedge against volatile fuel markets. Nonetheless, realising these multifaceted benefits requires more than simply installing renewable capacity: it needs VRE to be effectively integrated into existing power systems. Effective integration ensures that renewable electricity can be reliably delivered when and where it is needed, maximising its value to the grid and consumers alike. System integration of solar PV and wind power involves the technical, institutional, policy and market adjustments

necessary to ensure their secure and cost-effective incorporation into the power grid. To do so, Türkiye must enhance system flexibility and strengthen the supporting infrastructure. Successful integration will maximise the benefits of renewable energy, minimise the need for costly interventions to maintain system stability and reduce reliance on fossil fuels.

Understanding variable renewable electricity integration

The IEA developed its VRE integration framework to understand the challenges grid operators face as they expand their networks to accommodate increasing volumes of VRE. The IEA analysis outlines six phases of impacts on the power system resulting from increasing loads of solar PV and wind. Each phase presents new challenges requiring targeted measures to enable the secure and cost-effective uptake of VRE. Phases 1 to 3, which are considered low phases of VRE integration, experience relatively low impacts, with most challenges addressable through straightforward modifications to existing assets or operational improvements. Phases 4 to 6 are considered high phases requiring a fundamental transformation of the power system.

Türkiye is currently in Phase 2 and is expected to reach Phase 3 by 2030 should it meet its targets. Phase 2 is when VRE has a minor to moderate impact on the system. As more VRE capacity is added, changes between load and net load become more noticeable with a minor to moderate impact on the system, such as faster and more frequent ramping of generators. Upgrades to operating practices, such as integrating forecasting into dispatch and making better use of existing system resources, are usually sufficient to achieve system integration. In Phase 3, VRE determines the operation pattern of the power system. Greater swings in the supply-demand balance prompt the need for a systematic increase in flexible operation of the power system that often goes beyond what can be readily supplied by existing assets and operational practice.

Conventional power plants, networks and pumped storage hydropower have historically been the primary sources of flexibility. Operational improvements in VRE power plants and networks and the advent of affordable distributed energy resources and battery energy storage systems are enabling a wider set of flexibility options. As power systems transition towards higher phases of system integration, these flexibility resources can work together to enhance system flexibility in a cost-effective, reliable and environmentally sound manner. A combination of technical enhancements, institutional reforms, market design updates and policymaking will be necessary in

Türkiye if the system is to accommodate the projected volumes of solar PV and wind. All these requirements contribute to a secure and cost-effective electricity system while maximising the use of renewable energy.

Policy framework

Türkiye set out its ambitious policy goals for the renewable energy sector in its 2053 Long-Term Climate Strategy, published in November 2024. The Strategy sets out a comprehensive approach to achieving the country's net zero emissions target by 2053. The provision of a sustainable, high-quality, secure, uninterrupted and affordable energy supply is to be achieved by maximising the use of domestic and renewable energy sources and improving energy efficiency. The government aims to transform electricity generation by means of renewable energy, electrification, energy efficiency, low-carbon hydrogen, energy storage, and the establishment of nuclear power plants and SMRs.

Key incentives to support this transition include YEKDEM, which promotes local production by offering long-term purchase guarantees to effectively use renewable energy resources and increase investments, and the YEKA model, which facilitates large-scale projects and supports domestic energy production.

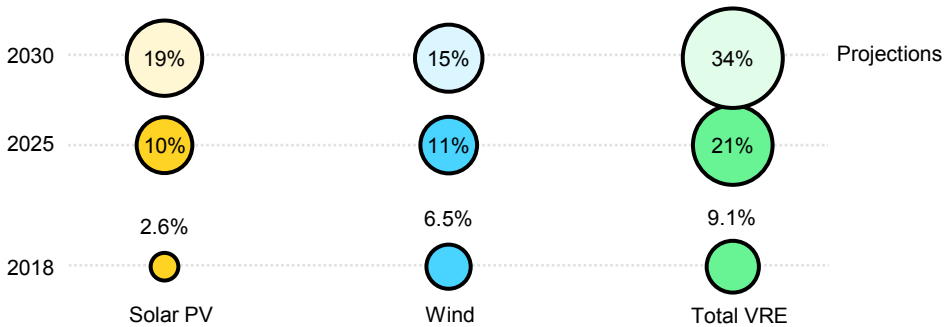
More than TRY 65 billion (USD 1.5 billion) was allocated to renewable energy projects between 2011 and 2023 under YEKDEM. As a result, renewable electricity capacity more than tripled, meeting growing energy demand while curbing emissions growth. Türkiye aims to more than double its existing renewable energy capacity (2024), reduce energy intensity by 35%, and integrate clean energy technologies into the energy system as part of its short- and medium-term targets for 2030 and 2035.

The share of renewable energy sources in electricity generation, 43% in 2025, is expected to rise to nearly 70% in 2053. Solar PV and wind power along with geothermal energy are expected to play a crucial role in transitioning to a low-carbon electricity generation system. The aim of increasing renewable electricity capacity is twofold: enhance energy supply security and reduce external dependency. Existing renewable energy potential will be maximised, and new innovative technologies such as hybrid power plants and floating solar and offshore wind energy systems will be expanded, even if they are not yet fully commercialised today. The use of Renewable Energy Guarantee of Origin (YEK-G) certificates is encouraged. Efforts to reduce dependency on imported renewable energy technologies and increase global competitiveness will require investments in R&D to strengthen local production capacity.

Türkiye's renewable electricity targets

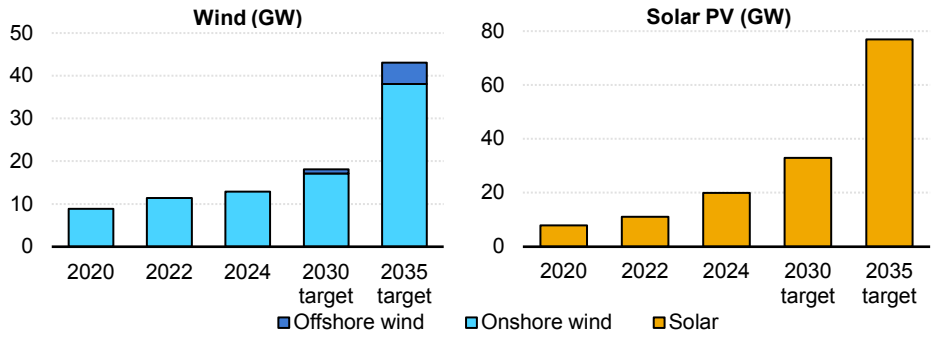
Hydropower accounted for 16% of Türkiye's electricity generation in 2025 and the share of VRE in electricity generation increased to 21% with projections of reaching 34% by 2030 (see next section).

Solar PV, wind and total variable renewable energy share in electricity generation, historical (2018 and 2025) and 2030 projections in Türkiye



Sources: IEA (2025), World Energy Balances; IEA (2025), Electricity 2025; IEA (2025), Renewable Energy Progress Tracker, Türkiye, Ministry of Environment, Urbanization and Climate Change (2024), Türkiye, Ministry of Environment, Urbanization and Climate Change (2024), 2053 Long Term Climate Strategy.

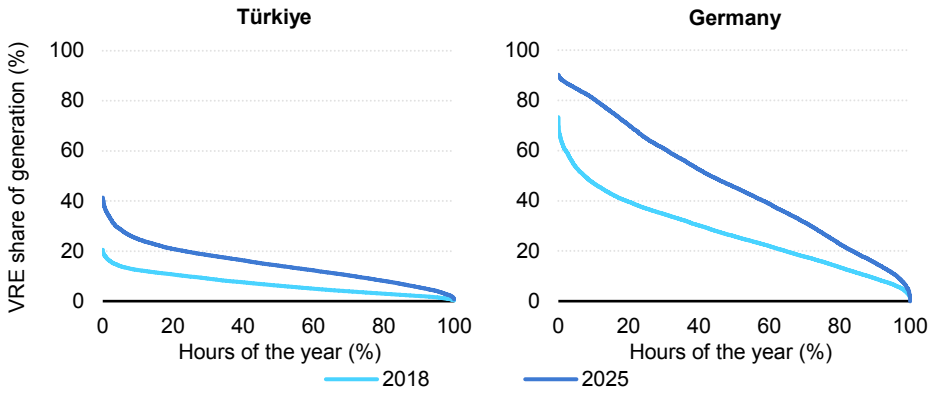
Wind and solar capacity and targets in Türkiye, 2020-2035



Sources: IEA analysis based on IEA (2025), Electricity Information; EMRA (2025), 2024 Electricity Market Development Report (accessed January 2026); Türkiye, Ministry of Environment, Urbanization and Climate Change (2024), 2053 Long-Term Climate Strategy, (accessed October 2025).

In November 2024, the new Long-Term Climate Strategy updated Türkiye's targets for wind and solar PV capacity. While the 2030 targets remained unchanged, the target for 2035 greatly increased. Solar capacity is expected to almost quadruple from 2024 to 2035 and wind capacity is expected to triple.

Cumulative distribution of hourly solar PV and wind generation shares in Türkiye and Germany, 2018 and 2025



Source: IEA analysis based on EPIAS (2026), collected through the IEA Real-time Electricity Tracker, (accessed July 2026).

For around 97% of 2018, the electricity system operated with a VRE share below 15%: in 2025, it was above 15% for over half of the time. From 2018 to 2025, the average hourly generation from wind and solar combined increased from 6.8% to 15%, rising to above 30% in 2025 for part of the year. By way of comparison, in a more mature and developed market such as Germany, VRE generation in 2024 was above 30% for over 70% of the time.

Grid expansion

Electricity grid expansion, modernisation and upgrades allow solar PV and wind energy to serve growing demand. Grids need to grow and be strengthened to connect the new solar PV and wind power plants, transport the generated electricity to consumers, and balance electricity supply and demand securely. Furthermore, grids support solar and wind integration by facilitating geographical smoothing of their

generation profiles, improving the power system's flexibility. Türkiye's 2025 Investment Programme allocated TRY 42 billion (USD 970 million) to electricity transmission infrastructure and TRY 9.5 billion (USD 220 million) to support capacity increases and repurposing of power generation infrastructure.

Between 2014 and 2024, Türkiye's electricity transmission and distribution networks underwent significant expansion and modernisation. Total investment in electricity networks in that period is estimated to be USD 350-375 million. These expansions and investments have aimed to improve network reliability, operational efficiency and quality of service, supporting Türkiye's growing electricity demand and its transition towards more sustainable energy sources.

As of the end of December 2025, Türkiye's electricity transmission system included more than 76 000 km of transmission lines, almost 800 high-voltage substations and 15 interconnections with neighbouring countries. Transmission system planning considers current consumption patterns, industrial zone development, large user and distribution company demands, and supply security when determining new substations and transmission corridors. The Electricity Strategic Plan 2024-2028, published by the Ministry of Energy and Natural Resources, outlines several key network development targets aimed at enhancing energy security, sustainability and efficiency. The Plan's key elements include expansion and modernisation of the electricity transmission and distribution infrastructure to meet growing demand and improve reliability, the development of energy storage technologies to support grid stability and renewables integration, and the expansion of EV charging infrastructure and cross-border interconnections. The Plan also contains proposals to roll-out smart meters and digital platforms and increase the use of data analytics and artificial intelligence to optimise grid operations and demand-side management.

By 2035, Türkiye plans to install around 14 700 km of high-voltage direct current (HVDC) lines to strengthen cross-border electricity links and improve system stability along with around 90 500 km of new alternating current lines and around 950 substations. This expansion is crucial for integrating the increasing capacity of VRE sources into the grid. The country also plans a significant increase in battery energy capacity, with a target of adding 7.5 GW of battery storage by 2035. This will help balance supply and demand and ensure a stable electricity supply.

System flexibility

System flexibility can be understood as the ability of a power system to manage the variability and uncertainty of supply and demand reliably and cost-effectively across all relevant timescales. Maintaining the supply-demand balance is achieved by adjusting generation and demand. Flexibility can extend across several timescales, for example managing hourly changes in the supply-demand balance or dealing with extended periods of lower resource availability, such as droughts affecting hydropower. High shares of VRE can create operational challenges, particularly short-term flexibility related to power system stability on the sub-second timescale. System inertia, a property derived from synchronous generators, acts to mitigate the rate of change of frequency following a contingency event in the power system. VRE generators do not have a direct, electromechanical coupling to the grid, which makes them different to traditional, synchronous generators.

Most of the flexibility required to maintain power system reliability in Türkiye today is provided by hydropower and dispatchable thermal power plants. Rising flexibility needs and changes in the composition of the power plant fleet, such as the addition of nuclear power and retirement of coal-fired plants, increase the need for alternative sources of flexibility to maintain grid stability and security of supply. Reinforced power grids and additional interconnections can help even out fluctuations in the supply of weather-dependent variable renewables, within and between countries and regions; they can also connect additional providers of flexibility to the system. Grid assets, such as HVDC interconnections, can also provide flexibility services such as voltage control directly.

The 12th Development Plan identifies an energy storage system as a possible solution to Türkiye's flexibility needs, along with the installation of pumped hydropower plants, the expansion of the interconnection capacity with neighbouring countries, the roll-out of smart meters and the development of supervisory control and data acquisition systems. The flexibility and storage capabilities of reservoir plants and pumped storage hydropower facilities are unmatched by any other technology. With low operational costs and large storage capacities, existing reservoir hydropower plants are the most affordable source of flexibility today. The increasing need in many markets for system flexibility and storage to facilitate the integration of higher shares of VRE is expected to drive record growth of pumped storage projects worldwide between 2021 and 2030.

Battery storage technologies

Türkiye plans to meet part of its flexibility needs with battery storage technologies. As of 2024, the country did not have any battery storage capacity, but it plans to increase battery storage capacity to 2.1 GW by 2030 and to 7.5 GW by 2035, assuming a two-hour charging time. Domestic regulations define three types of storage systems: independent storage systems, united storage systems and power generators with storage systems. Batteries are the preferred option for daily storage, owing to their capital cost, which Türkiye expects to decrease consistently. Batteries are charged at noon, absorbing excess electricity from solar PV.

The regulatory framework to integrate storage facilities into the system was strengthened in 2022 (Law No. 7417). With the update, EMRA will grant a pre-licence for the establishment of a solar or wind facility to entities committing to set up an electricity storage facility up to the capacity of the planned battery. In turn, entities holding licences for the generation of such renewable energy and applying to establish a storage facility will have the right to expand it up to the capacity of their generation facility. The Law introduced new types of facilities, such as storage facilities integrating generation and vice versa. By June 2023, EMRA received applications for 275 GW of storage capacity but halted the amendment in October 2023.

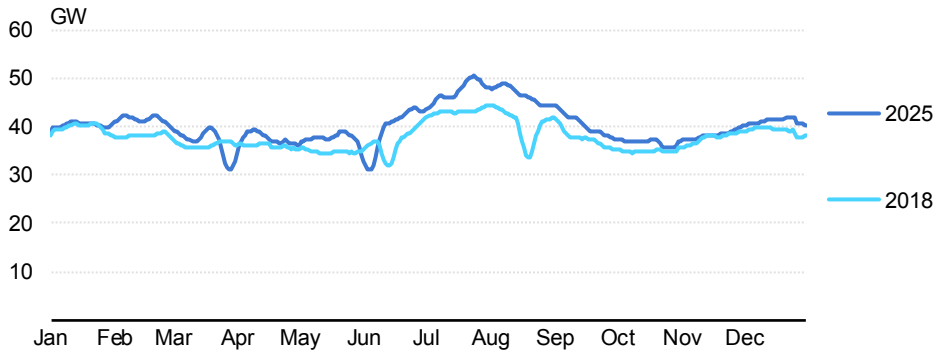
Sector coupling has the potential to play a key future role in long-duration flexibility and making the best use of VRE. Hydrogen production is an alternative that contributes to that regard. Electrolysers, which are expected to function in times of high VRE generation, add additional system flexibility. While the flexible operation of electrolysers as part of integrated energy systems does not yet present a fully viable business case, their proven ability to operate with varying loads highlights their potential to provide long-duration flexibility. Owing to their fast response time, electrolysers can provide increased short-term flexibility to the grid, enabling the integration of renewables and seasonal flexibility when coupled with large-scale storage. A hybrid configuration could potentially combine the best of both, using a small share of electricity from the grid (with GHG emissions tracking) to provide firm capacity and increase the use of the assets while limiting the increase in GHG emissions. Electrolyser capacities are projected to reach 5 GW in 2035 and 70 GW in 2053.

Demand-side flexibility

In 2024, Türkiye accounted for a quarter of Europe's electricity demand growth, pushed by cooling needs in the country's hottest summer in 54 years. Demand-side

participation is one of the main options to provide flexibility to the power system. Demand-side participation is mostly achieved by the transport sector, by means of smart charging of EVs at times when electricity supply is high in the system. The residential sector also holds significant potential for system flexibility through demand-side participation.

Daily peak load (7-day moving average) in Türkiye, 2018 and 2025



Source: IEA analysis based on ENTSO-E (2026), Transparency platform, collected through the IEA Real-time Electricity Tracker, (accessed June 2026)

Most EV charging is expected around noon, taking advantage of high solar energy production. Demand for charging is minimised during the peak hours of transport activity. As a result, the electricity load is expected to decrease in the afternoon. Since charging is also performed partly at night, load stays at higher levels compared to the actual profile. In households, demand-side participation will be enabled, notably by load shifting (e.g. by changing the operating hours of electrical appliances such as dishwashers and washing machines). However, there is no contribution to grid flexibility via space heating in the residential sector.

Türkiye also established a regulatory framework for electricity aggregation and demand-side flexibility as part of broader efforts to enhance power system flexibility and integrate higher shares of variable renewable energy. Aggregation activities were incorporated into the Electricity Market Law, and implementing regulations entered into force in December 2024, with aggregator licences being issued from February 2025 onwards. In parallel, new regulations enable TEİAŞ to procure

demand-side flexibility through competitive tenders, allowing eligible consumers to participate through aggregators that manage and adjust electricity consumption in response to system needs. During the first procurement period (December 2025 to February 2026), TEİAŞ secured 200 MW of flexible demand capacity, increasing to 873 MW for the second procurement period covering July to September 2026.

Distribution system flexibility

As they are mainly connected to distribution grids, the increasing volume of distributed energy resources is pushing distribution system operators to explore the flexibility services these resources can provide rather than only seeing them as an additional complexity to manage. Rather than exacerbating problems such as grid congestion, outages and voltage violation, distributed energy resources can be adopted to provide crucial support to address these network issues.

To access the value of distributed energy resources, incentives for their uptake must be assessed in the context of broader system objectives to ensure they respond to actual system needs and do not internalise the benefits solely to the end user. Distributed energy resources can provide services to the system by voluntarily adjusting generation and/or consumption in response to an external signal, which can be a price signal or direct activation, e.g. by an aggregator. They can be targeted at a defined time and duration at a specific location within a specific portion of the grid to enhance security of supply and service quality in the most efficient way, thereby reducing costs for consumers.

Türkiye's Smart Grid 2023 Vision and Strategy Roadmap Summary Report outlines Türkiye's objectives and strategic plan for developing a smart grid infrastructure by 2035. It assesses the current state of Türkiye's electricity distribution network and proposes a detailed roadmap with short- and medium-term milestones across various technical components, such as grid management, IT infrastructure, renewable energy integration and cybersecurity. The Report also addresses the regulatory framework, budget and financing to achieve this vision, seeking a more efficient, sustainable and secure energy system.

Overall, smart meters are envisioned as a key enabler for a more informed, engaged and potentially cost-effective electricity experience for Turkish consumers. They will provide greater control over energy consumption, facilitate participation in emerging

energy markets and support the integration of renewable energy sources at the household level. The successful deployment and integration of smart meter infrastructure are critical to realising these benefits.

The Smart Grid Roadmap sets several targets, which are aimed to align with national energy policies and enable the transition to a smarter and more sustainable electricity grid. The Principles and Procedures on the Widespread Deployment and Use of Smart Meter Systems, which regulate the use of smart meters in the electricity distribution system and the replacement of existing electricity meters with smart meters, entered into force following their publication in the Official Gazette No. 33098, 5 December 2025. Türkiye introduced a regulatory framework to support the deployment of smart electricity metering as part of efforts to modernise the power system and strengthen demand-side participation. The Principles and Procedures on the Widespread Deployment and Use of Smart Meter Systems entered into force in December 2025, establishing the framework for the installation of smart meters in the electricity distribution network and the replacement of conventional meters. The roll-out of smart metering is expected to improve system monitoring, facilitate consumer participation in electricity markets and support the development of demand-side flexibility services.

Smart meters will promote the development of small-scale distributed and renewable grid infrastructure, with a specific focus on establishing the infrastructure to support rooftop solar power plants. The overall aim is to introduce 35 GW of flexible sources into the system, comprising 10 GW rooftop solar plus storage, 10 GW of large-scale storage, 5 GW of grid management and 10 GW of demand-side management. The Roadmap also targets:

- a 20% improvement in the capacity utilisation rates of current grid assets
- reducing power system losses to 8% (including transmission and generation)
- providing resilience against attacks or natural disasters that can be carried out on the electric infrastructures of smart grids
- encouraging the use of advanced grid equipment and technologies such as superconductors, amorphous transformers and power electronic-based switching equipment
- creating a market structure and regulatory framework that triggers and supports the transformation of the sector and new business models

- providing support for target areas for technology development and export, including storage, the Internet of Things, data analysis, grid management software, smart meters and solar panels
- ensuring that smart meter and communication units are supplied from local resources.

Interconnections

Türkiye's electricity strategy focuses on expanding regional co-operation, increasing renewable energy capacity and enhancing grid resilience to meet growing demand, reduce import dependency and achieve carbon neutrality. Türkiye plans to triple interconnection capacity with neighbouring markets by 2035, which will increase export capacity threefold to 6.75 GW and import capacity fivefold to 6.6 GW. HVDC lines spanning 14 700 km will be installed to strengthen cross-border electricity links. Türkiye currently supplies electricity to Iraq and plans to expand supply to the Syrian Arab Republic, aiming to contribute to regional stability and mutual development.

Türkiye's interconnection strategy aligns with its broader energy policy goals of diversifying routes and resources for energy security while reducing reliance on hydrocarbons. Regional interconnections are seen as vital for promoting stability, mutual growth and resilience against disruptions such as the nationwide blackout in 2015. Türkiye's interconnection strategy is a multifaceted approach combining renewable energy expansion, infrastructure modernisation and regional co-operation to achieve sustainable growth and energy security.

Transmission network technologies are evolving

Digital technologies play a significant role in modern transmission grids. They can increase capacity and enhance the efficiency, reliability and flexibility of the grid, allowing it to handle higher loads and transmit electricity more effectively. This can help avoid the construction of new lines or assist in cases where line extension deployment is not fast enough. Dynamic line rating involves real-time monitoring of weather conditions and line temperatures to adjust the current carrying capacity of transmission lines accordingly. This technology allows lines to operate closer to their thermal limits safely instead of using fixed values, optimising and increasing transmission capacity.

Flexible alternating current transmission systems such as fast-acting reactive power support or static synchronous compensators enable real-time control of power flows, voltage levels and other stability characteristics. They modulate the generation of reactive power depending on need, further enhancing power transmission capacity and grid stability. In 2025, these power electronics devices are relatively uncommon. Nonetheless, they will become increasingly prevalent as the share of renewable energy sources increases and demand grows for load flow control and grid quality assurance. Combined with energy storage systems, such as batteries and supercapacitors, these systems can provide rapid response capabilities to support grid frequency as they can quickly inject or absorb power to balance supply and demand variations and act as virtual inertia to stabilise the grid.

HVDC is another significant technology that supports system operations by efficiently transporting large amounts of electricity and can provide functionalities for bidirectional load flow control and reactive power control. It can also assist with black start processes. The ability to control the power flow on the HVDC line provides a significant benefit in optimising the power flow distribution across the overall grid.

Even if monitoring systems such as a wide-area management system are already in place in transmission grids, they are becoming larger and more integrated than in the past, expanding to incorporate the monitoring of connected distribution grids whose complexity is increasing with the growing renewables penetration. In these systems, embedded advanced analytics and artificial intelligence algorithms can process vast amounts of data to predict electricity demand patterns and potential grid issues. By anticipating demand peaks and identifying potential transmission bottlenecks, operators can take proactive measures to reinforce the grid and enhance its capacity. By attaching sensors to critical but also expensive assets such as transformers and circuit breakers, valuable feedback can be obtained about their health status. This enables proactive and preventive maintenance, as issues can be identified and addressed before they lead to costly failures.

The use of new technologies such as drones and satellite-based technology has revolutionised the inspection of power lines, both in transmission and distribution grids. Instead of relying on expensive helicopter rides, drones and satellite imaging can be deployed for line inspections. They capture pictures, videos and thermal images that can be automatically evaluated. This enhances the safety of operational staff by minimising their exposure to hazardous conditions during inspections.

Recommendations

6 Ensure market rules provide clearer locational signals to improve system operation and ensure grid stability during the transition

To manage the energy transition with rapid growth in variable renewable generation, distributed renewable resources and significant electrification of end-use sectors, the existing grid infrastructure needs to be used as efficiently as possible. Concerns over integration challenges, such as grid connection queues and congestion management, can deter investment in solar PV and wind capacity. These factors cause delays and uncertainty, making it difficult for projects to connect, and negatively impacting their business case. Regulations that outline the technical and operational requirements of all stakeholders involved in the transmission system, including generators, distributors and consumers, should ensure that new grid connections are in places that support efficient grid operation now and, in the future, and avoid unnecessary delays. Other measures such as the introduction of efficient seasonal and locational tariffs and flexible grid connection agreements that reflect the cost of connection and latest grid stability procedures would facilitate the integration of new sources of variable renewable energy.

Future scenarios in Türkiye will involve periods when renewables satisfy most system demand. To maintain system stability during these times, inverter-connected generation such as wind and solar PV must also contribute. Allowing wind and solar PV to actively participate in balancing and ancillary services markets could be beneficial. These markets may require adjustments, such as lower minimum bid volumes, to accommodate these resources. Furthermore, developing requirements for adding converter-based power sources could be advantageous. Extending current requirements to include unlicensed production is one way to do so. The updated EU Requirements for Generation Regulation which will be decided in 2025 could provide a point of reference. As the Regulation will apply in many IEA European Member countries, manufacturers are expected to adapt their products, resulting in equipment compliant with the Regulation becoming available on the market.

7 Expand participation in the electricity spot market and encourage investment in system flexibility

Türkiye should streamline its different support mechanisms and reform the existing market design to meet the needs of its energy transition (e.g. rather than starting a new market/tender for demand-side response, allow these resources to participate in the existing balancing market). A system with a large share of renewables also needs system flexibility. It is not necessarily the flexibility of individual installations that is important but rather the collective flexibility of the system. One means to integrate large amounts of renewables is to ensure that other resources that offer flexibility services have the correct incentive to do so. Türkiye will need to find a way to encourage new sources of flexibility (both on the generation and the demand side) and meet its targets for battery storage installations. Producers should react to transparent price signals but at the same time have a "firm" income stream to be able to finance investment. Consumers should be able to adjust load according to available power (react to price signals) but without worrying too much about electricity bills.

Energy performance and competitiveness of industry

Over the past 15 years, Türkiye has emerged as one of the world's fastest-growing industrial economies, with industrial manufacturing value added more than doubling since 2010. The industrial sector refers to manufacturing, refining and mining; unless otherwise specified, the analysis in this section focuses on manufacturing, which accounts for around 80% of industrial energy consumption. This rapid growth creates increasing pressure to sustain competitiveness, in light of the effects of carbon taxation on certain industrial sectors. Policy will need to address two challenges: improving access to energy efficiency measures in less energy-intensive industries and managing the exposure of key sectors to carbon pricing and external market measures.

In 2023, Türkiye's manufacturing energy intensity (2.7 MJ/USD), measured in terms of energy consumption per unit of value added, was higher than other G20 economies such as Germany (2.3 MJ/USD) and Italy (2.2 MJ/USD). However, energy intensity remains higher than in many G20 economies, despite relatively fast improvements.

Türkiye has also made progress in electrifying its manufacturing industry sector. The share of electricity in manufacturing processes increased from 25% in 2010 to 28% in 2024, alongside a 73% rise in absolute electricity consumption in the sector. Despite these gains, Türkiye's industrial growth drove a notable rise in fossil fuel consumption, raising critical energy security and environmental risks. Between 2010 and 2024, oil product use increased by almost four times (from a low base), natural gas consumption rose by 62% and coal by 12%. As a result, manufacturing accounted for 29% of the increase in total final energy demand and 30% of the increase in emissions from fuel combustion in the period 2010-2024.

The expansion of less energy-intensive industries provides opportunities for energy savings

Energy represents a significant share of costs in energy-intensive industries such as metals, cement and chemicals, making efficiency a key priority. In 2024, these subsectors accounted for 57% of industry sector energy use and the same portion of the sector's CO_2 emissions from fuel combustion. By contrast, less intensive industries such as textiles, automotive, machinery, and food and beverage processing, consumed 23% of industrial energy in 2024, but contributed around 44% of value added, 66% of manufacturing employment, and nearly 55% of exports. The analysis in this section focuses on manufacturing, as this subsector accounted for 80% of all industrial energy use in 2024 in Türkiye.

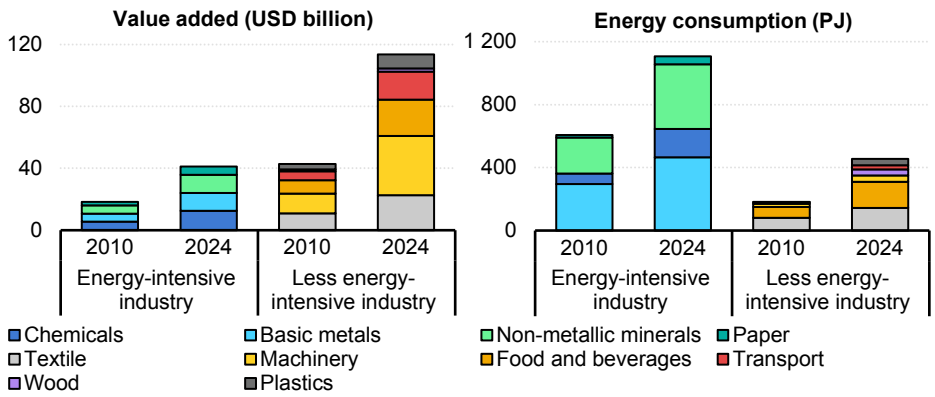
While heavy industry drives energy demand, less energy-intensive industries account for a larger share of value added, jobs and exports. For energy efficiency policy to best support industrial strategy, competitiveness and sustainability, distinguishing between energy-intensive and less energy-intensive industries is therefore important.

Value added in both less energy-intensive and energy-intensive industry roughly doubled between 2010 and 2024. However, energy demand in less energy-intensive industries increased by more than 150%, compared with 82% in energy-intensive industry.

Given their economic and social impact, less energy-intensive industries should be a priority for policy makers. They show relatively high short-term energy efficiency potential and are highly cost effective. Measures such as the electrification of low-temperature process heat and electric motor upgrades, in particular, offer

attractive paybacks. IEA analysis of survey data from the Energy Efficiency and Management Association of Türkiye shows that sectors such as wood, as well as food and beverages, present high energy-saving potential should energy efficiency measures be applied.

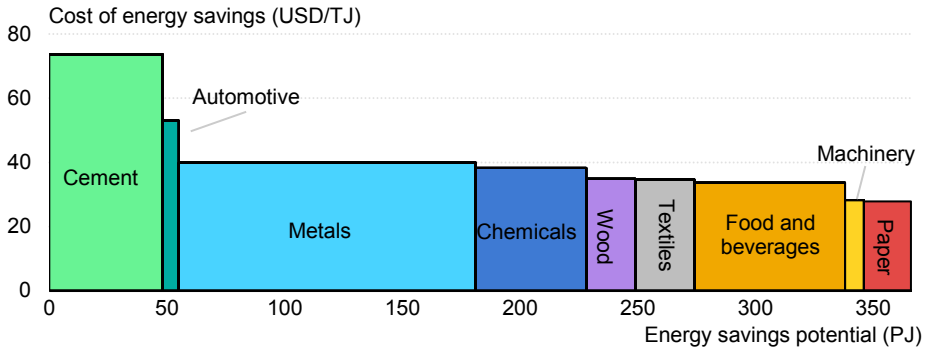
Manufacturing value added and energy consumption in Türkiye, 2010 and 2024



Note: Other manufacturing and non-specified industrial energy consumption are not included.
Sources: IEA analysis based on IEA (2026), Energy End-uses and Efficiency Indicators; UNIDO (2026), INDSTAT Revision 4, Value Added, (accessed in May 2026).

While opportunities exist across all industrial segments, the cost of energy savings varies by sector. Less energy-intensive industries generally offer more cost-effective options, whereas some energy-intensive sectors, such as cement, face higher costs per unit of energy saved. Overall, the largest total savings potential remains in energy-intensive industries, albeit at higher average costs. Among them, paper stands out, as it offers short payback periods and the lowest cost per unit of energy saved (28 USD/TJ). Energy savings from cement are twice as expensive as those from less energy-intensive industries and the paper sector.

Industrial energy efficiency savings potential and cost in Türkiye, 2024



Notes: Paper includes printing. Energy savings costs reflect sectoral averages based on a survey of individual industrial sites which have a variety of cost profiles.

Sources: IEA analysis based on IEA (2026), Energy End-uses and Efficiency Indicators; Energy Efficiency and Management Association (2025), Energy Efficiency & ESCO Market in Türkiye, (accessed in September 2025); Energy Efficiency and Environment Directorate (2025), 2024 Cement Industry Benchmarking Report, (accessed May 2026).

The combination of exceptionally fast energy demand growth and considerable efficiency, electrification and savings potential in lighter industries suggests that a strong policy focus in this area could have a substantial impact. However, these sectors face difficulties in accessing energy efficiency programmes, as they are typically composed of smaller and more fragmented firms. By contrast, energy-intensive industries are typically dominated by relatively large enterprises with greater capacity to implement efficiency measures. At the same time, they are highly capital-intensive, meaning that efficiency improvements often require substantial upfront investment and can be more complex to implement.

This focus on larger energy consumers is reflected in Türkiye's existing Energy Efficiency Obligation Scheme (Law No. 5627). The Scheme requires enterprises with annual energy consumption greater than 1 000 toe per year (tonnes of oil equivalent; about 12 million kWh/year), Organised Industrial Zones (OIZs) with more than 50 active enterprises, and power plants with installed capacity of greater than 100 MW to conduct energy audits and develop efficiency action plans.

OIZs can help address these barriers by providing co-ordination and support to smaller firms and facilitating access to efficiency programmes. In Türkiye, OIZs are

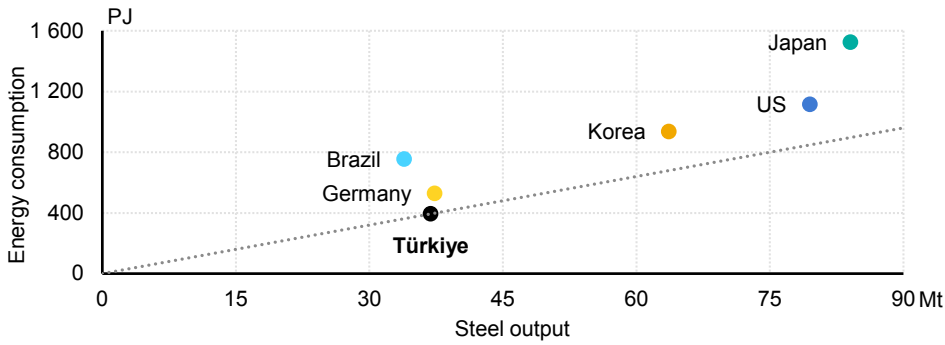
government-backed areas offering investors ready infrastructure, social amenities, and regulatory incentives. Each OIZ is equipped with essential utilities such as roads, water, electricity, and natural gas. As of 2024, 392 OIZs were in place, hosting over 67 000 companies and employing more than 2 million people. Businesses in OIZs enjoy tax benefits and expedited permits, underpinning industrial growth, regional development and account for about a third of exports and industrial employment.

Carbon pricing to mitigate pressures on competitiveness in key export sectors

Türkiye's impressive industrial growth was fuelled largely by exports, with the value of goods exports more than doubling from 2010 to 2024. A key factor underpinning this performance has been the comparatively low industrial energy costs, which provide a competitive advantage relative to many other countries. At the same time, Türkiye's strong trade relationship with the European Union, which accounts for 40% of its total exports, exposes its industry to evolving carbon-related trade measures.

Key export sectors such as steel, cement and aluminium are exposed to EU markets and are therefore directly affected by carbon pricing mechanisms such as the CBAM. Türkiye is the world's seventh-largest steel producer and steel is one of Türkiye's key export sectors. In 2025, a significant share of exports (41%) was destined for EU markets. The sector benefits from relatively low energy intensity (measured in energy consumed per production output) compared with many other G20 producers, at 7.1 PJ/Mt, below Brazil, Germany, Japan and the United States. Türkiye is also the world's largest cement and clinker exporter by value and the fourth-largest cement producer by volume. Energy intensity of non-metallic minerals, which include cement, is lower in Türkiye than in many other G20 producers. Despite Türkiye's advantages, even relatively efficient producers remain exposed to carbon pricing through the EU's CBAM, reinforcing the importance of reducing carbon intensity and introducing domestic carbon pricing mechanisms.

Energy intensity of steel production across selected G20 producers, 2024



Notes: Energy intensity is represented by the slope: the line shows Türkiye's energy intensity, with all the countries above having a higher energy intensity. Selected countries include top 10 G20 producers excluding outliers such as China, India and Russia.

Sources: IEA analysis based on IEA (2026), Energy End-uses and Efficiency Indicators; World Steel Association (2025), (accessed: May 2026).

Reflecting relatively strong performance, energy intensity in non-metallic minerals industries declined by around 18% between 2010 and 2024, reflecting efficiency improvements. Further progress will nonetheless be needed to maintain competitiveness under tightening carbon constraints. Among the measures to reduce carbon intensity further, the Turkish government published the 2024 Low Carbon Pathway for the cement sector and integrated "green cement" in public procurement construction projects. A Communiqué on the Promotion of the Use of Green Cement with Low Carbon Emissions in Public Procurement Contracts was published in the Official Gazette on 16 March 2024 and officially entered into force on 1 January 2025.

Increased efforts and closer integration of efficiency, electrification and climate policies will remain key to secure future industrial growth. To deliver Türkiye's 2053 net zero target and ensure economic resilience, the government developed decarbonisation roadmaps for cement, steel and aluminium. These ambitious roadmaps identify pathways to achieve a 93% emissions reduction for cement, a 99% reduction for steel and a 75% reduction for aluminium by 2053. The pathways rely on the introduction of all feasible low-carbon technologies as well as the necessary

financial and regulatory policies. Their implementation can leverage the government's experience gathered by conducting the mandatory energy and CO_2 audits under the Energy Efficiency Obligation Scheme.

As the European Union's CBAM entered into force in January 2026, reducing the carbon intensity of industrial production will become even more critical for Türkiye to sustain its export competitiveness and overall industrial performance. Under the CBAM, EU importers are required to pay for the carbon emissions embedded in imported goods, unless an equivalent carbon price has already been applied in the country of origin. In its initial phase, the CBAM targets carbon-intensive products most vulnerable to carbon leakage, including iron and steel, cement, aluminium, fertilisers, electricity, and hydrogen.

A study commissioned in 2023 by the Ministry of Environment, Urbanization and Climate Change concludes that Türkiye could mitigate the effects of the CBAM with the introduction of a domestic ETS. Following this, the Grand National Assembly enacted the country's first Climate Law in July 2025, which is now in force. The Climate Law mandates participation in the new ETS for power plants, petroleum refineries, iron and steel producers, cement and lime manufacturers, and selected waste management operators and other enterprises emitting more than 50 000 t CO_2-eq annually. To enhance the effectiveness of emissions reductions, within and outside the ETS, the government also aims to transform the current indirect pricing methodology into a direct carbon tax, potentially establishing a national carbon price where needed.

Türkiye is also aligning its industrial regulatory framework with EU standards, such as the EU Industrial Emissions Directive (as amended by Directive 2024/1785/EU). A regulation on the management of industrial emissions came into effect in December 2025 and aims to minimise or prevent industrial emissions and waste generation as well as sources of air, water, soil, noise and odour pollution, in accordance with zero pollution objectives. The Regulation adopts an integrated pollution prevention and control approach to ensure comprehensive protection of the environment and public health. Additionally, it establishes the administrative and technical framework necessary for advancing green transformation within industry, promoting the circular economy and supporting decarbonisation efforts.

Further alignment with EU policy frameworks, in areas such as electrification and renewable energy development, are under consideration. Importantly, under CBAM rules, only electricity with a demonstrable link to a specific low-carbon generator, via

on-site or PPAs, qualifies as low-emissions electricity, providing an incentive for on-premises solar production. Developing a national green taxonomy harmonised with the EU Taxonomy is particularly relevant in this context to guide capital towards low-carbon investments and support industrial transformation, particularly in hard-to-abate sectors.

Recommendations

8 Leverage organised industrial zones to drive energy efficiency actions in less energy-intensive industries

Lighter industries such as textiles and food and beverages are seeing rapidly increasing energy use but may not have access to efficiency programmes because they consist of smaller energy users who typically lack the capacity to take part independently. Smaller industrial consumers may moreover not fall under the scope of the existing Energy Efficiency Obligation Scheme, which has an annual energy consumption threshold of 1 000 toe per year (about 12 million kWh/year). This is a large amount of energy: a regular small- to medium-sized textile manufacturer consumes typically around 1-5 million kWh/year; a large producer with dyeing operations would likely use over 12 million kWh/year. Some energy efficiency support mechanisms are already available to smaller businesses with annual energy consumption below 1 000 toe. For example, industrial enterprises with an annual energy consumption of 500 toe or more are eligible to apply for support from the Efficiency Increasing Projects. In addition, the SME Energy Efficiency Support Program, administered by the Small and Medium Enterprises Development and Support Administration, is a support mechanism specifically aimed at small and medium-sized enterprises.

Nonetheless, many smaller enterprises may not be able to measure and manage energy consumption and access the government incentive schemes which are focused on larger energy consumers. Organised industrial zones are highly effective at providing co-ordination between enterprises in the zone and can act as one-stop shops for implementing energy efficiency measures and opening the available offer of energy efficiency support schemes to a wider group of enterprises. They would thereby leverage the extensive energy improvement potential of the less energy-intensive sector.

9 Introduce an emissions trading system for large energy consumers to encourage efficiency and emissions reductions while introducing a carbon tax for companies falling outside the ETS

This approach can complement Türkiye's existing Energy Efficiency Obligation Scheme, which has already established a regulatory framework for monitoring and managing energy consumption and carbon emissions. By targeting large energy consumers in sectors such as iron and steel, cement, aluminium, and hydrogen, compliance costs can be reduced while aligning with the requirements of the European Union's Carbon Border Adjustment Mechanism, which also prioritises power generation. Focusing the emissions trading system (ETS) on a smaller number of the largest energy users, who account for most of the energy consumption and CO_2 emissions, can further minimise the administrative and compliance burden while still achieving significant impact. A low-level carbon tax or charge on fuel consumption could be an important element to complement the scheme as the threshold for inclusion in the ETS is high and will only apply to a small group of consumers. This will also generate a revenue stream that can be reinvested to support efficiency or other measures to support the energy transition.

10 Adopt a more integrated approach to industrial competitiveness and support energy security and climate goals

As Türkiye moves forward with its new Climate Law, it should develop an integrated energy and climate governance system and a strategy grounded in analysis of future energy demand, including planned industrial zones, and aligned with designated priority areas for renewables, electricity, gas, hydrogen and CO_2 infrastructure. Building on its existing gas and electricity networks, such a strategy would enhance efficiency, resilience and sustainability by enabling co-ordinated planning at the national and local levels for both current and future needs. This approach should be supported by institutional arrangements that promote policy coherence across energy, climate and economic objectives. Organised industrial zones can play a central role in this framework by facilitating energy efficiency investments, electrification, and the use of renewable and recovered energy, leveraging their advantages of shared infrastructure and industrial clustering.

Annexes

Acknowledgements

The IEA review team visited Ankara on 7-11 April 2025 and met with government officials and public and private sector stakeholders across the energy sector. This report is based on information from these meetings, the review team's assessment of Türkiye's energy policy and detailed research by the IEA. The review team members were Anna Guldbrand (Sweden, team leader); Frédéric Maurer (Switzerland); Michaela Titz (Austria); Cyril Loisel (European Commission); Alexiei Ozeretzkovsky (Nuclear Energy Agency); and Kieran McNamara, Nicholas Howarth and Anders Caratozzolo from the IEA Secretariat.

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Abbreviations and acronyms

BAT	best available technique
BAU	business-as-usual
CBAM	Carbon Border Adjustment Mechanism
CCACB	Climate Change and Adaptation Co-ordination Board
CCUS	carbon capture, utilisation and storage
DoCC	Directorate of Climate Change
EMRA	Energy Market Regulatory Authority
ETS	Emissions Trading System
EU	European Union
EÜAŞ	Electricity Generation Corporation

EV	electric vehicle
GDP	gross domestic product
GHG	greenhouse gas
HVDC	high-voltage direct current
IEA	International Energy Agency
JSC	joint stock company
LNG	liquefied natural gas
LPG	liquefied petroleum gas
MENR	Ministry of Energy and Natural Resources
NDC	Nationally Determined Contribution
NEEAP	National Energy Efficiency Action Plan
OIZ	organised industrial zone
PPP	purchasing power parity
PV	photovoltaic
R&D	research and development
SAF	sustainable aviation fuel
SMR	small modular reactor
TANAP	Trans-Anatolian Natural Gas Pipeline
TEİAŞ	Turkish Electricity Transmission Company
TENMAK	Turkish Energy, Nuclear and Mineral Research Agency
TES	total energy supply
TETAŞ	Turkish Electricity Trade and Contracting Corporation
TNEP	National Energy Plan
TRY	Turkish lira (currency)
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar (currency)
VAT	value-added tax
VRE	variable renewable energy
YEKDEM	Yenilenebilir Enerji Kaynaklari Destekleme Mekanizmasi (Renewable Energy Resources Support Mechanism)

Units of measurement

bcm	billions of cubic metres
GJ	gigajoule
GW	gigawatt
GWh	gigawatt hour
GW_e	gigawatt electrical
kb/d	thousand barrels per day
km	kilometre
kWh	kilowatt hour
mcm	millions of cubic metres
Mt	million tonnes
Mt CO_2-eq	million tonnes carbon dioxide equivalent
MW	megawatt
MW_e	megawatt electrical

MWh	megawatt hour
PJ	petajoule
t CO_2	tonne carbon dioxide
TJ	terajoule
toe	tonne of oil equivalent
TWh	terawatt hour

See the IEA glossary for a further explanation of many of the terms used in this report.

Infographic note

The GHG emissions chart is illustrative, showing the expected direction of emissions beyond 2035 rather than precise projected levels.

Infographic sources

GHG emissions: IEA analysis based on Turkish Statistical Institute (2025), Greenhouse Gas Emissions Statistics 1990-2023, (accessed January 2026).

Wind and solar capacity: IEA (2026), Electricity Information; UNFCCC (2024), 2053 Long Term Climate Strategy, (accessed January 2026).

Industry: IEA analysis based on UNIDO (2025), INDSTAT Revision 4, Value added, (accessed January 2026); IEA (2026), Energy End-uses and Efficiency Indicators.

Natural gas production: IEA (2026), Monthly Gas Data Service.

Power system transformation: IEA (2025), World Energy Balances.

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Energy Policy Review

Government action plays a pivotal role in ensuring secure and sustainable energy transitions. Energy policy is critical not just for the energy sector but also for meeting environmental, economic and social goals. Governments need to respond to their country's specific needs, adapt to regional contexts and help address global challenges. In this context, the International Energy Agency (IEA) conducts Energy Policy Reviews to support governments in developing more impactful energy and climate policies.

This *Energy Policy Review* was prepared in partnership between the Government of Türkiye and the IEA. It draws on the IEA's extensive knowledge and the inputs of expert peers from IEA Member countries to assess Türkiye's most pressing energy sector challenges and provide recommendations on how to address them, backed by international best practices. The report also highlights areas where Türkiye's leadership can serve as an example in promoting secure and clean energy transitions. It also promotes the exchange of best practices among countries to foster learning, build consensus and strengthen political will for a sustainable and affordable energy future.