Energy Policy Review

Czechia 2025

INTERNATIONAL ENERGY AGENCY

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Executive summary

The Czech Republic (Czechia) aims to phase out coal at an almost unprecedented pace. The IEA commends Czechia for such an ambitious phase-out. Coal is a major fuel source in Czechia, currently providing more than one-third of Czechia's electricity and half of its district heating. Coal-fired plants are slated for retirement by 2033, but economic drivers may close them earlier. This would be an extraordinary transformation of Czechia's energy system. The transition from its fossil fuel legacy can be a springboard to building a vibrant clean energy economy. But it is not without challenges, such as addressing local impacts in coal-dependent regions, accelerating the deployment of alternative sources of energy, managing workforce transitions and gaining public acceptance. There is no time to waste: decisions taken in the coming years will be pivotal to determining the success of the phase-out. This report provides timely advice on how Czechia can achieve its goals, including in two focus areas: replacing coal in power generation and decarbonising heating in buildings.

Updating Czechia's suite of energy strategies is a pressing priority, as is ensuring their collective coherence. Doing so will provide a clearer direction to stakeholders and boost investor confidence. The 2024 National Energy and Climate Plan (NECP) sets ambitious goals, including greenhouse gas (GHG) emissions reductions, and increasing the share of renewables and nuclear in power generation. To achieve these goals, many of the associated plans and guiding documents, including the State Energy Policy (2015) and the Climate Protection Policy (2017), need to be updated or more clearly defined, with a particular focus on the long-term pathway for renewables and the role of natural gas in the energy transition. Czechia has set laudable goals and updating its strategic framework, filling implementation gaps, strengthening capacity and fostering societal support will help to achieve them.

Significant steps are being taken to improve energy security and reduce reliance on Russian imports. To address short-term energy security concerns related to the coal phase-out, legislation now allows temporary operation of coal plants in case of shortages, and a capacity mechanism is being developed to attract investment in new dispatchable generation. Government interventions should be targeted and temporary, and low-carbon alternatives should be prioritised to avoid overreliance on natural gas, which would result in fossil fuel lock-in. To avoid this lock-in, Czechia is on course to further develop renewable and low-carbon gases, which can be potentially used in the same infrastructure as natural gas. In the first half of 2025, Czechia stopped importing oil from the Russian Federation for the first time, instead importing from alternative suppliers, including liquefied natural gas (LNG) markets. Supplies of nuclear fuel are also being diversified. Two-way cross-border links are important for electricity supply security, as Czechia may become a net electricity importer before 2030. As coal is rapidly phased out, the substantial challenges in maintaining adequate electricity and heat supply, particularly in winter, require proactive and urgent policy action.

Czechia is doubling down on nuclear: extending the life of existing plants, building new large units and advancing plans for small modular reactors (SMRs). If delivered on schedule, this three-pronged strategy can provide a stable backbone of low-carbon power through mid-century, as well as new job opportunities. Currently, two nuclear power plants account for around 40% of electricity supply, and a contract has been signed to construct two new large reactors (with an option for two more). Czechia's SMR Roadmap envisions up to 3 gigawatts (GW) of capacity by 2050, including as a potential provider of district heating (DH). Maintaining transparency, ensuring rigorous safety oversight and managing long-term waste effectively will help preserve the high levels of public support for nuclear.

Scaling up renewables and enhancing system flexibility are critical to phasing out coal, meeting climate targets and ensuring energy security. Renewable deployment has accelerated in recent years, led by rooftop solar photovoltaics (PV), but wind and utility-scale solar are lagging due to permitting delays, local opposition, retroactive policy changes and grid connection issues. Commendable reforms are now streamlining project approvals and enabling community investment schemes. To build on this progress, Czechia should consider setting binding renewables targets, publishing an auction schedule that is easily accessible on Czech and international platforms, improving conditions for corporate power purchase agreements (PPAs) and reducing grid connection queues. Recognising the importance of grids and system flexibility, significant investments are being made to modernise transmission

and distribution networks. Legislation now recognises energy storage and aggregation, and Czechia aims to deploy at least 2 million smart meters by 2030. High electricity prices help make the case for demand-side flexibility, as well as for policy action to level the playing field and protect the most vulnerable consumers. Czechia should push ahead with smart meter deployment, promote dynamic pricing and ensure that all consumers can benefit from flexibility services.

District heating plays a central role in Czechia's energy transition. Serving over 40% of the population, this sector is heavily reliant on coal and faces short-term supply risks. The sector can play an essential role in the energy transition by enabling efficient use of low-carbon sources and waste while supporting electricity grid stability. The regulator and government have introduced important regulatory reforms and investment support to help decarbonise DH and improve its competitiveness. Further action is needed to incentivise low-carbon fuels, waste heat recovery and utility-scale heat pumps, and to enable long-term financing of such investments. This must be accompanied by actions to boost end-use energy efficiency.

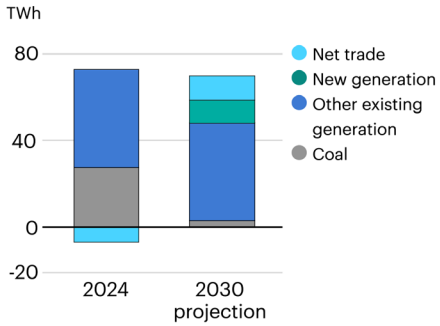
Decarbonising heat in buildings is a major challenge and a vital opportunity. Czech buildings are relatively energy intensive, with high heating demand, which offers significant potential to cut energy losses, lower bills and reduce emissions. The Long-Term Building Renovation Strategy envisages a significant decline in energy consumption, supported by subsidy programmes like New Green Savings (NZÚ), which help reduce energy losses and phase out the dirtiest boilers. Better-targeted support such as higher subsidies and tailored financial products is needed for multi-family buildings and low-income households. While sustained investment is required, it will result in more comfortable and healthier living conditions with low-carbon, lower cost heating.

Energy use and emissions are still rising in transport, primarily due to high reliance on oil and slow adoption of alternatives. Less than 1% of cars are electric vehicles (EVs), but sales are accelerating, and charging infrastructure is rapidly expanding thanks to government support. Czechia's auto industry is pivoting towards EVs, but stronger policies – such as fleet mandates, tax reforms and tighter measures on old vehicles – are needed to boost sales and meet goals. Support should primarily target corporate fleets, which make up 75% of new registrations, and public sector fleets, which can set an example for others. In addition to supporting EVs, a concerted policy push is needed to encourage a shift towards cleaner transport modes, including

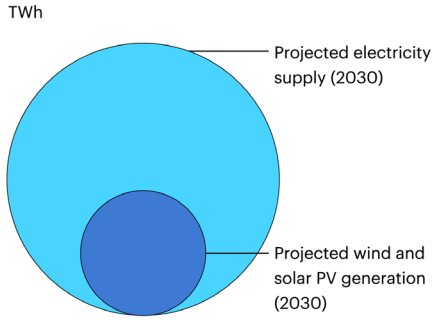
well-developed public transport, and to reduce transport needs. A combination of measures will result in lower oil import bills, cleaner air, and an EV industry that drives jobs and growth.

Czechia's energy transition is as much social as technological. Its success will depend on supporting coal miners and other affected workers, involving citizens in charting the path forward, and ensuring that energy remains affordable for all. The RE:START strategy, the Territorial Just Transition Plan and the European Union (EU)-funded Just Transition Programme provide support to coal regions for reskilling, business development and land rehabilitation, though more local capacity building is needed. Public acceptance of climate policies can be improved using citizens' assemblies and ensuring that communities benefit. Affordability strategies to protect vulnerable citizens should include efficiency upgrades and targeted subsidies. With the elements of a just transition largely in place, effective policy delivery will be key to ensuring that Czechia's energy future is fair.

The **security of electricity supply** is under pressure as coal is pushed out of the market



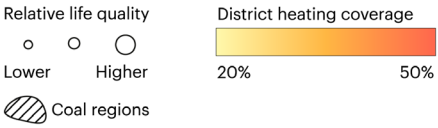
Wind and **solar PV** have the potential to play a bigger role

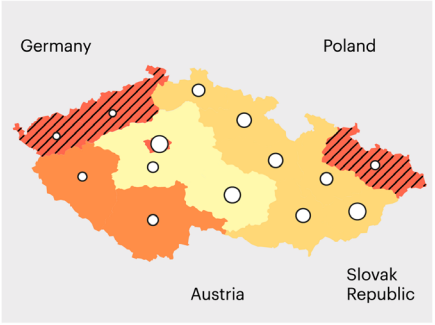


2 GW
new nuclear deal signed in 2025

20%
share in strategic partnership to develop **Small Modular Reactors**

Coal regions lag in **quality of life** – a **people-centred transition** can create new opportunities





High **district heating coverage is a powerful asset**, but affordability hinges on a fuel switch away from coal

Czech buildings have **high heating** demands (2023)

...meanwhile, a successful **home energy improvements programme** is well established

+15 years
support for households

+480 000
subsidy grants allocated

Clean energy technologies – made in Czechia

10
heat pump manufacturers

+150 000
electric vehicles produced in 2024

Sources for this infographic can be found in the annexes.

Policy recommendations for Czechia

Energy policy landscape

1. Adopt a new long-term energy strategy, ensuring broad stakeholder consultation and alignment with sector plans.
2. Invest in energy policy capability and administrative capacity across all levels of government.
3. Improve electricity regulation, taxation and market design to encourage electrification while protecting vulnerable consumers.
4. Use financial, fiscal and procurement policies to encourage electric vehicle adoption in corporate and public fleets.

Replacing coal in the power sector — Focus area

5. Maintain energy security during the coal transition while ensuring that any government interventions are targeted and temporary.
6. Implement the new legal framework and other measures to accelerate the deployment of utility-scale renewable energy projects.
7. Prioritise policy actions that increase power system flexibility.

Decarbonising heating in buildings — Focus area

8. Target support for renovations towards the least energy-efficient apartment buildings and the poorest households.
9. Support the development of local heating and cooling plans as a basis for creating coherent national action plans.
10. Continue reforming district heating regulations to improve competitiveness and boost investment in low-carbon and energy-efficient solutions.

Energy policy landscape

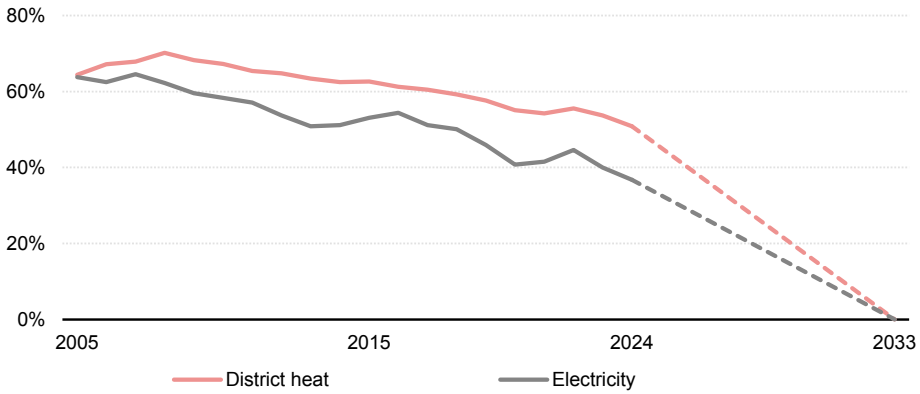
Energy and climate strategy

Czechia faces the significant challenge of decarbonising its energy sector while maintaining a secure and affordable energy supply. Transforming the energy system primarily means replacing coal – which is used to generate about 36% of electricity and more than 50% of district heat – with lower carbon energy sources without jeopardising energy security, the competitiveness of the Czech economy or citizens' well-being. Public perception of the climate agenda is negative: less than half of Czech citizens support the EU Green Deal while seven out of ten believe it is leading to an increase in energy prices. Only 48% of Czechs consider climate change a very serious problem, compared to the EU average of 77%. Energy prices remain a politically sensitive topic, which contributes to delays in important policy decisions in the areas of energy and climate.

Policy framework for a people-centred transition

Switching away from coal is one of the pillars of Czechia's energy strategy. Coal is a major fuel source in Czechia, playing a dominant role in its fuel mix. Czechia ranks third among IEA members for the share of coal in total energy supply and electricity generation. Around 95% of the coal used in Czechia is mined domestically; the remainder is imported, mostly from Poland. Nuclear is another important source of electricity, and the government is strongly committed to supporting this sector.

Share of coal in electricity and district heat generation (2005-2024) and targets for 2033 in Czechia



Sources: IEA (2025), World Energy Balances (until 2024); Czechia, Ministry of Industry and Trade (2024), NECP (accessed June 2025).

Czechia's energy and climate strategies need to be updated. The State Energy Policy (2015) and the Climate Protection Policy (2017) set the country's strategic directions on energy and climate action. The government conducted analysis and public consultations to revise them in parallel to updating the NECP, which was approved and submitted to the European Commission in December 2024. However, the updated energy and climate policies have not been officially adopted.

Public awareness needs to be raised of the long-term benefits of phasing out coal, while addressing local impacts. The coal phase-out in Czechia is a long and complex process, with numerous impacts on coal communities, electricity and heat prices, and security of supply, among others. All the impacts – and benefits – need to be properly assessed and communicated. Czech stakeholders need to be aware that an energy transition can bring significant long-term benefits. The upfront investments are offset over time by large savings on fuel and electricity bills, alongside better air quality and other environmental gains that improve people's health and quality of life. IEA modelling shows that replacing coal-fired power plants with cost-competitive renewable technologies allows reducing average system costs per unit of electricity. In the announced pledges scenario, household energy bills in major coal-consuming countries remain constant as a share of disposable income, thanks to efficiency and electrification.

Czechia's coal-mining regions will be severely affected by the phase-out of coal-fired electricity and heat production. Approximately 25 000 people are currently employed in this sector, primarily in three main coal regions: Ústí nad Labem, Moravian-Silesian and Karlovy Vary. Coal mining and coal-based power and heat generation are labour-intensive, with a high rate of long-term employment. Mine and plant closures mean lost jobs and revenue for coal communities. Comprehensive strategies to provide compensation and reskill workers and redeploy workers and capital are required.

The energy transition in Czechia's coal regions is further complicated by low quality-of-life indicators – for the economy, social cohesion and health. The general feeling of being left behind translates into a reluctance to engage with public authorities, which often manifests as local opposition to renewable energy development. Scepticism regarding the energy transition is, however, not limited to coal regions.

The government has put in place measures to support the transition of coal regions, but they could be more effective. The RE:START programme, together with the Territorial Just Transition Plan, is Czechia's long-term strategy to support the economic restructuring of the affected coal regions. Since 2017, CZK 11.4 billion (EUR 454 million)[1] have been allocated to implement this programme. The Just Transition Plan, with CZK 42.7 billion (EUR 1.7 billion) in funding, aims to address the impacts of the coal phase-out in the most affected regions between 2021 and 2027, supporting land regeneration (about 22% of the funding), workforce skills (22%), research and development (R&D; 21%), and entrepreneurship (13%). However, the coal regions lack administrative and human capacity to manage the funds effectively. In the energy sector, the programme supports the preparation of hydrogen strategies and projects. National and local authorities should conduct more comprehensive opportunity assessments to repurpose the mining lands, including for energy projects. They can use tools such as the World Bank's Land Utilization Rating Application.

Another key aspect of a people-centred energy transition in Czechia is stakeholder engagement. The European Commission highlights a positive role of the regional strategies under the Territorial Just Transition Plan. But civil society and social partners describe their role in strategic planning as limited, and legal analysis of individual renewable projects shows there is no legislative obligation for two-way dialogue between developers and local communities. Local stakeholders can only

[1] 1 EUR = CZK 25.120 based on the ECB's average exchange rate in 2024.

provide comments at the environmental impact assessment stage. More active citizen involvement in decision making would bring mutual benefits to communities and developers; it would not only reduce social opposition but could also help adapt project design to local contexts. More dynamic engagement between the government and society – through deliberative processes such as citizens' assemblies and conventions, juries, and panels – would allow citizens to be better informed and take ownership of the transition.

Capacities and skills for the transition

The analytical basis for the development of energy and climate policies could be strengthened. The Ministry of Industry and Trade, which is responsible for energy policy, has limited modelling capacity, outsourcing complex modelling tasks to external consultants when developing strategic policy documents. The government has approved a commendable initiative to create a Czech modelling centre to provide an analytical basis for policy making and ensure a co-ordinated and continuous approach to modelling.

Lack of capacity and skilled staff in the various permitting authorities create delays in developing energy projects. In 2021, Czechia adopted a new Building Act that concentrated permitting procedures for specific infrastructure projects in a single authority: the Transport and Energy Construction Authority. The Authority permits major energy infrastructure, including transmission lines and power plants with a capacity over 100 megawatts (MW). In reality, however, the deadlines stipulated by law are not always respected. Czechia needs to ensure that the Transport and Energy Construction Authority and other authorities are equipped with the necessary personnel and resources to fulfil their legal obligations.

The progression of the energy transition relies on a suitably qualified workforce to meet the needs of the new energy system. This includes the existing workforce, who will need targeted upskilling and reskilling, as well as a new generation of workers equipped to meet the growing demands of expanding sectors such as renewable energy and nuclear power. For example, to support Czechia's nuclear strategy, it is essential to ensure an adequate workforce for the construction, operation, maintenance and decommissioning of nuclear facilities; the upskilling and reskilling programmes should take these needs into account to the extent possible. The government estimates that the nuclear sector will require about 8 000 new graduates in technical fields. Skills development is supported by the National Recovery Plan and

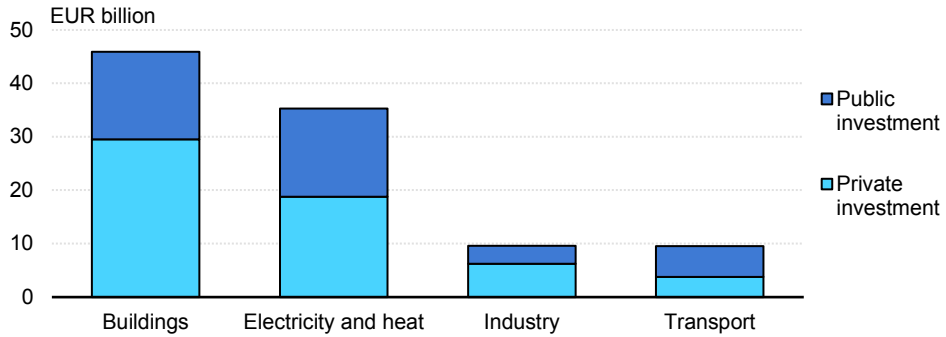
the Just Transition Programme, which provide a systematic approach to foster the skills needed for the future labour market. Czechia launched a database for reskilling and upskilling courses in 2023 that focuses on matching supply and demand for training courses. The database offers courses to employees and jobseekers, including for energy-specific topics. The National Qualifications Framework helps tackle skills shortages in key areas such as heat pump installations, decentralised renewable energy installations and energy advisory services.

Energy is included in most national strategies related to R&D, innovation, and competitiveness. As part of the broader national research priorities, one of the main instruments to finance energy-related R&D are the Théta 1 (2018-2025) and Théta 2 programmes (2024-2031). Théta 2 has a budget of CZK 10.62 billion (EUR 423 million). It is important to allocate the funding in a democratic and transparent way to ensure that the most relevant and promising topics are financed. Nuclear research received approximately one-third of public energy-related RD&D investment, dedicated to short- and long-term safety and security, more efficient nuclear power plant operations, and innovative reactor concepts. So-called “large research infrastructures”, which mainly support nuclear research (including the Czech International Centre of Research Reactors), form an important pillar of Czechia’s R&D activities. Two gaps identified in the 2023 Roadmap of large research infrastructures are smart cities and smart grids, and energy storage. Around 20% of the public energy R&D budget is allocated to energy efficiency. Czech companies and academia also participate in EU research programmes.

Funding the energy transition

The investment needs to decarbonise are substantial and more than half of the energy transition investments to 2030 are expected to come from private investors. The estimated ratio between public and private capital varies across sectors and types of investments. Successful decarbonisation investments will require a stable and predictable environment for investors, including consistent financial support, streamlined permitting processes, and clear communication of goals and tools to the public. EU sources are expected to cover the bulk of the public investment support.

Estimated required investments to support decarbonisation efforts in Czechia by source of funding, 2023-2030



Note: Investments do not include agriculture and forestry, road vehicles beyond the scope of publicly supported investments, railway infrastructure except electrification, R&D, climate adaptation, or the circular economy.

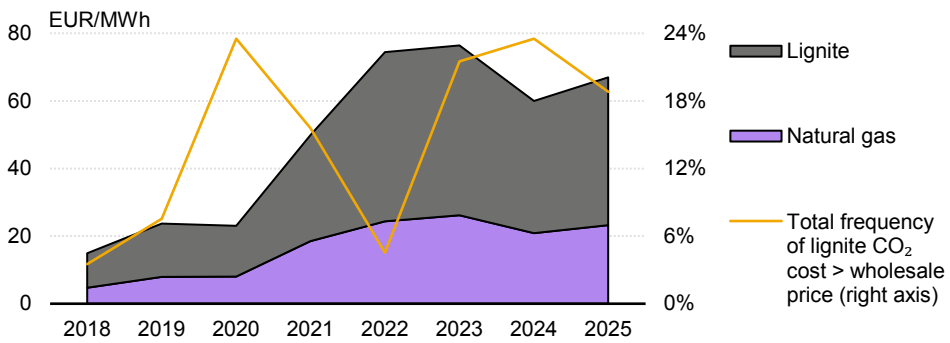
Source: IEA analysis based on Czechia, Ministry of Finance (2024), Diagnostic Report (accessed June 2025).

Substantial funding is available for decarbonisation (e.g. Cohesion Policy Funds, the National Recovery and Resilience Plan, the Modernisation Fund, and the future Social Climate Fund), financed by the revenues from the ETS1 (EU Emissions Trading System) and the forthcoming ETS2 and various EU programmes. However, the EU framework imposes conditions, such as different application and eligibility requirements, which result in a fragmented structure of the different funding sources. This could be improved by streamlining or better co-ordinating the various funding schemes. The Ministry of Industry and Trade manages funding for businesses; the Ministry of Environment oversees support for households, electricity and heat, industry, transport, and the public sector; and the Ministry of Regional Development funds municipalities. The effectiveness of funding uptake largely depends on the design and implementation of each individual programme. One of the most effective support programmes is the NZÚ Programme (see the policy highlight in Focus area 2). Raising awareness is key to ensuring that available resources are fully and effectively used.

Carbon pricing

The EU ETS is a powerful economic tool to reduce GHG emissions and, therefore, indirectly accelerate the coal phase-out. It covers about 230 stationary installations in Czechia (including large coal plants), accounting for approximately half of total GHG emissions. Between 2005 and 2023, emissions under the EU ETS declined by 44% in Czechia, compared to a reduction in the non-ETS sectors of 18% and a total emissions reduction of 17%. This means that 90% of all emissions reductions since 2005 have come from the ETS sectors. The use of coal in co-generation plants is particularly exposed to the ETS price. Since 2022, the carbon costs for lignite power generation in Czechia have increased to over EUR 60 per megawatt hour (MWh) and remain high. In 2024, around 24% of the hourly electricity wholesale prices were below the carbon costs of lignite power plants, making coal-fired generation uncompetitive much of the time.

Estimated CO_2 costs for select electricity generation sources in Czechia, 2018-2025



Notes: Data for 2025 are available until April 2025. Free emissions allowances are not included in the carbon costs. The day-ahead price is taken as a baseline for the wholesale price. CO_2 costs stem from EU Emissions Trading System prices and the emissions intensity of generation technologies.

Sources: IEA analysis based on IEA (2025), Emissions factors; ENTSO-E (2024), Transparency platform, collected through the Real-Time Electricity Tracker (accessed June 2025); International Carbon Action Partnership (2025), ETS prices (accessed June 2025).

The new system, ETS2, aims to reduce emissions from fuel combustion in the sectors not covered by the ETS but governed by the EU Effort Sharing Regulation: domestic

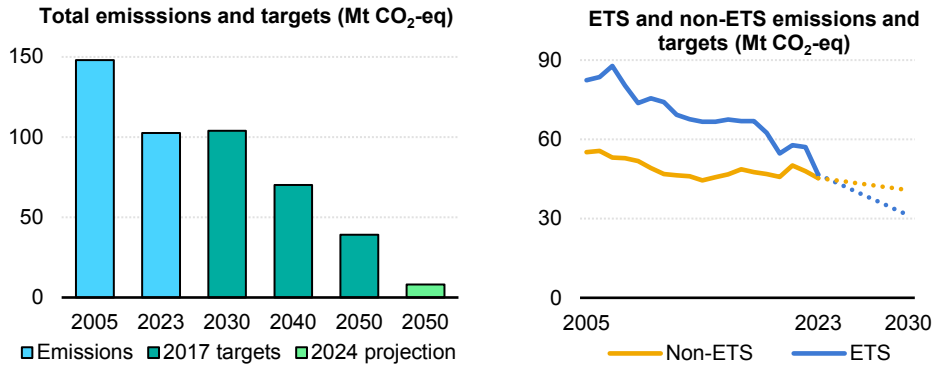
transport (excluding aviation), buildings, agriculture, small industry and waste. With the ETS2 to be launched in 2027, Czechia will have access to proceeds from the auctions of ETS2 allowances, in part directly and partly channelled through the new Social Climate Fund, to support the decarbonisation of the sectors covered and address the social impacts of the ETS2 system. The volume of ETS2 revenues will depend on the evolution of allowance prices; however, the Czech national allocation in the Social Climate Fund was set at roughly EUR 1.56 billion for the period 2026-2032. The ETS2 is a politically sensitive topic in Czechia, mainly due to the potential increase of energy prices for end consumers, and the government is not on track to transpose the updated ETS Directive into national law. Czechia has submitted a proposal to the European Commission, co-signed by 18 EU member states, requesting fundamental changes to the ETS2 to make it more predictable and reduce its negative impact on citizens.

Trends and targets

Czechia's GHG emissions reduction targets need to be clearly stated in national policy and legislation. Achieving them will require bolder measures. Czechia's economy-wide GHG emissions declined steadily and dropped to 102.5 Mt CO_2-eq in 2023, surpassing the 2020 target set in the Climate Protection Policy from 2017, though it was partly due to the Covid-19 pandemic. Czechia does not have a commitment for climate neutrality by 2050 in its national legislation. The NECP only mentions the general objective to move towards climate neutrality. The NECP also aims to phase out coal in electricity and heat generation by 2033, therefore reducing the share of unabated fossil fuels in primary energy consumption to 50% by 2030 and to 0% by 2050, down from 68% in 2023. The NECP modelling demonstrates that more ambitious policies and measures would allow meeting these targets. The Climate Protection Policy from 2017 sets GHG targets until 2030 and 2050, but these need to be updated to align with the EU Fit-for-55 package.

As part of the Fit-for-55 package, the European Union set an emissions reduction target of 62% by 2030 compared to 2005 levels for sectors covered by the EU ETS. The EU Effort Sharing Regulation defines national targets for non-ETS sectors. In 2018, this regulation established a national target for Czechia to reduce GHG emissions by 14% by 2030 compared to 2005 levels; the target was increased to 26% in 2023. The NECP finds that additional measures are required to fully meet the new target.

Economy-wide GHG emissions (2005-2023) and targets in Czechia



Notes: The 2017 targets are established in the Climate Protection Policy and the 2024 projection is based on the NECP. The land use, land-use change and forestry (LULUCF) sector is not included. The LULUCF sector historically functioned as a CO_2 sink but in recent years it temporarily became an important source of CO_2 emissions (with a peak in 2020), impacted by the bark beetle disaster, random harvests and droughts. Czechia expects to report the sector as a carbon sink again starting in 2024.

Sources: IEA analysis based on EEA (2025), Greenhouse Gases (accessed June 2025); EEA (2025), Emissions Trading System (ETS) (accessed June 2025); Czechia, Ministry of Environment (2017), Climate Protection Policy (accessed June 2025); Czechia, Ministry of Industry and Trade (2024), NECP (accessed June 2025).

Czechia has made impressive strides to reduce energy intensity but could still fail to meet its energy efficiency targets. While the energy intensity of the Czech economy has almost halved since 2000, Czechia still remains one of the most energy-intensive countries in the European Union, partly due to the high share of industry in gross domestic product (GDP). The NECP sets energy conservation targets for 2030 in line with EU legislation. According to the new Energy Efficiency Directive (EED), Czechia must decrease its final energy consumption from 1 048 petajoules (PJ) in 2022 to 852 PJ in 2030, along with other sub-targets. Scenarios modelled in the NECP show that even if Czechia adopts ambitious policies and measures, final energy consumption would be 945 PJ in 2030, which would still be 10% higher than the target. Energy conservation targets need to be backed by clear support mechanisms and investment plans defining how to reach them if they are to remain credible.

Renewable energy consumption is expected to grow significantly by 2030, compared to the very modest growth over the last decade. The share of renewables in gross final energy consumption stood at 18.6% in 2023, up from 15% in 2014. Bioenergy maintains a dominant position in renewable energy use, but the share of variable renewables is expected to increase. According to the updated NECP, by 2030

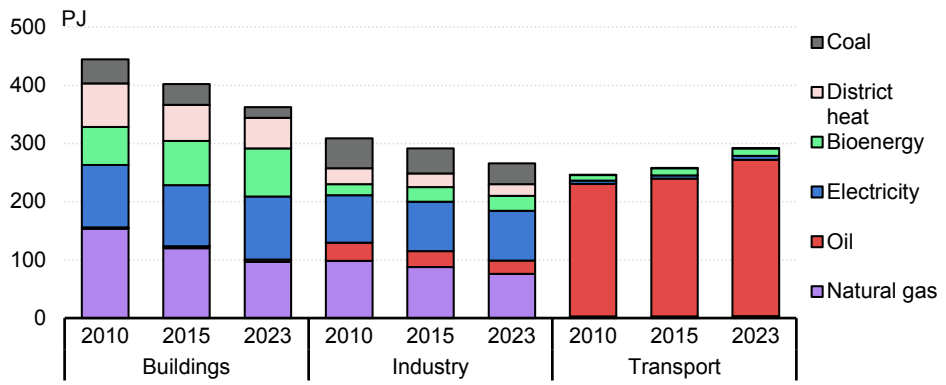
Czechia plans to increase the share of renewable energy in gross final energy consumption to 30%, in final electricity consumption to 27%, in heating and cooling to 40%, and in transport to 18%, with indicative targets for buildings. These targets are backed by policies and measures; if the private sector takes additional initiatives, the country can exceed these targets.

End-use sectors

Overview

Energy consumption in the important end-use sectors, apart from transport, is declining steadily in Czechia. Buildings, including public and commercial buildings, remain the largest end-use sector, accounting for 39% of total final energy consumption in 2023, followed by the transport and industry sectors. Between 2010 and 2023, energy demand declined by 18% in buildings and increased by 18% in the transport sector. Consumption of coal and natural gas in buildings and industry declined, with much of the reduction offset by increased use of bioenergy, mainly solid biofuels. Demand for district heating fell over the period, while electricity consumption remained relatively stable. Oil demand rose in line with the growing energy needs of the transport sector.

Energy consumption in end-use sectors by fuel source in Czechia, 2010-2023



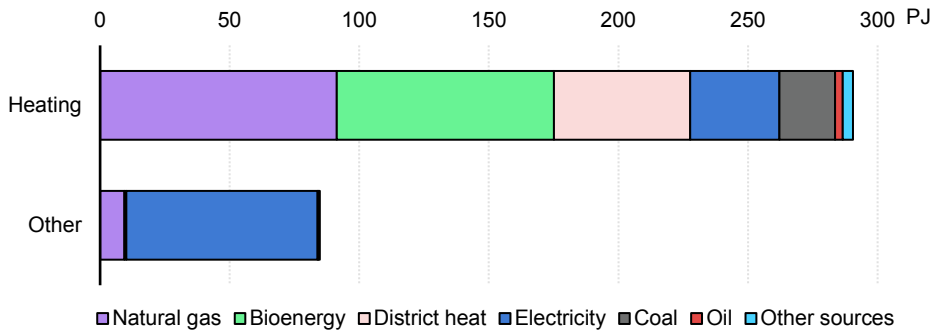
Notes: Industry includes manufacturing and other sectors (agriculture, construction, mining and quarrying). It does not include refinery and non-energy use (fuels that are used as raw materials and are not consumed as fuel or transformed into another fuel).

Source: IEA (2025), World Energy Balances.

Buildings

Buildings are the largest end-use sector in Czechia. The sector includes energy used for heating and cooling, cooking, and lighting and other appliances in residential homes and public and service buildings. Electricity and natural gas are the largest energy sources used in buildings, followed by bioenergy. Residential buildings account for about 70% of the sector's energy consumption. Heating is the main demand driver and accounts for more than 75% of energy consumption in buildings. Heat is supplied by individual and DH technologies. Natural gas and coal are the main sources of direct GHG emissions in individual heating solutions, and most of DH generation continues to rely on coal. This reliance on fossil fuels explains the high carbon intensity of the heating sector. Nevertheless, the share of renewables (mainly bioenergy) in heating was close to 28% in 2023 and is expected to expand. There are also plans to use heat from nuclear power plants and to improve the energy performance of buildings (see Focus area 2).

Energy consumption in buildings for heating and other subsectors in Czechia, 2023



Notes: Non-allocated energy use of natural gas and district heat in non-residential buildings is included in heating. Other sources mainly include solar thermal.

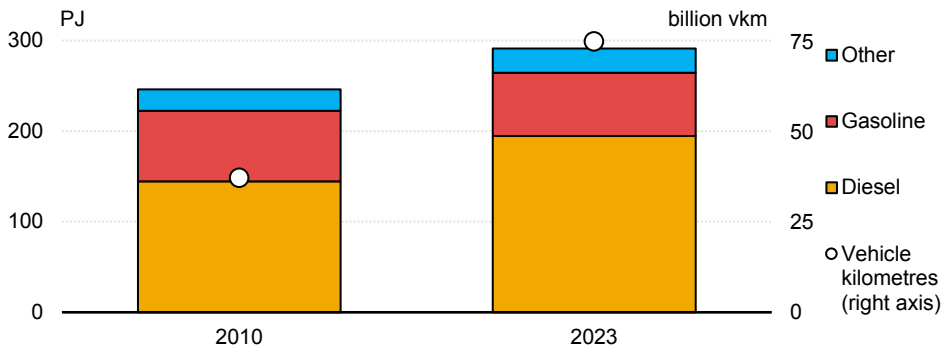
Source: IEA (2025), Energy End-uses and Efficiency Indicators.

Transport

Transport is Czechia's second-largest energy consumer and the only end-use sector where energy consumption and energy-related emissions are increasing. Transport accounts for around one-third of Czechia's final consumption. Diesel and gasoline

dominate with 92% in 2023, followed by liquid and gaseous biofuels (4.4%) and electricity (2.2%). The share of renewables in transport is one of the lowest in the European Union and has remained flat over the past decade. Czechia's energy use in transport is almost exclusively from road transport, with passenger transport accounting for 72% of the total. With its central position in Europe, Czechia also experiences high volumes of transit traffic. Since 2010, energy consumption in transport has increased by around 20%. Most of the increase stems from a growing stock and activity of light-duty vehicles, particularly those using diesel. Transport is set to become the largest energy-related CO_2 emitter by 2027. With increasing transport volumes and a growing vehicle stock combined with a large second-hand vehicle market, reducing transport emissions in Czechia is challenging.

Energy use in transport by fuel and light-duty vehicle kilometres in Czechia, 2010 and 2023



Note: vkm = vehicle kilometres.

Sources: IEA (2025), Energy End-uses and Efficiency Indicators; IEA (2025), World Energy Balances.

Czechia's Transport Policy 2021-2027 and National Action Plan for Clean Mobility comprise key dimensions of best-practice transport policy: avoid, shift and improve. Czechia's "avoid" policies aim to minimise commuting needs for passengers and the transport volumes for freight. Modal "shift" policies include public transport systems, multimodality and a switch to rail transport. Prague and other big cities have well-developed public transport; inter-city transport (buses and railways) is also well-developed. However, Czechs generally still prefer to use cars. Policies focusing on urban design, for example mixed-use neighbourhoods and "15-minute cities" such as in Paris and Tokyo, can reduce the need for using cars. This report focuses

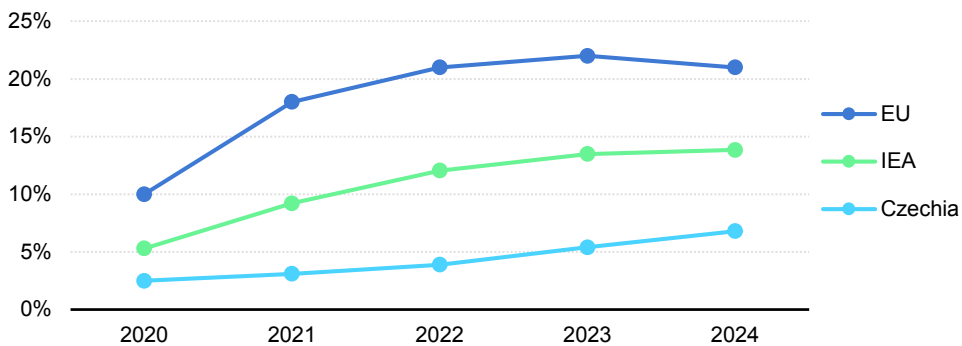
primarily on the expansion of electric and gas mobility within the “improve” dimension, which is interrelated with energy policy.

Local support frameworks are essential for transitioning to low-emission mobility. In addition to national policy instruments, local governments can create enabling conditions for low-emission mobility. Public acceptance is likely to be greater for local programmes. Prague implemented free parking for EVs and invested in developing charging infrastructure. Other successful examples include the introduction of low-emission zones and enabling other forms of alternative transport through investments in public infrastructure in Usti nad Labem. Local authorities can also provide local remote working hubs and Internet cafés in partnership with businesses or ride-sharing facilities or community “Car Clubs” like those in London.

Electric mobility

Czechia’s car fleet is dominated by old gasoline and diesel cars; sales of EVs are small but growing. In 2023, the car fleet comprised 6.5 million vehicles, of which 96% are gasoline and diesel, above the EU average of 90%. On average, more than seven of ten newly registered vehicles since 2020 have been second-hand for affordability reasons. The average age of the vehicle fleet is more than 16 years, almost 4 years more than the EU average. EVs only accounted for around 0.5% of cars in Czechia in 2023; their sales have been growing but still remain well below the EU and IEA averages.

Share of electric car sales in Czechia, the European Union and the IEA (2020-2024)



Source: IEA (2025), Global EV Data Explorer (accessed June 2025).

The National Action Plan for Clean Mobility provides medium-term targets for the battery electric car stock of 250 000 in 2030 and 1 million in 2035, up from 33 500 in 2024. The key barrier for the uptake of EVs and new, more efficient internal combustion engine vehicles is their high purchase price, even though their total life cycle costs can be attractive.

Czechia has introduced some support measures for EVs, including exemption from registration fees and tolls, accelerated depreciation for EVs, and a reduced depreciation period for home and public chargers. The Electromobility Guarantee programme offered guarantees to businesses and the public sector for loans to purchase EVs and charging stations. The programme was successful but ended in October 2024 as the funds had been depleted.

Czechia is gradually expanding its charging infrastructure. Support programmes led to an almost fivefold increase in public charging points between 2020 and 2024, reaching 5 500 public charging points as of April 2025. In addition, private individuals can receive a subsidy of CZK 30 000 (~EUR 1 200) to install home chargers for their personal use. The charging infrastructure in Czechia is thus well developed to support the adoption of EVs, with more public charging points per EV than the EU average. To encourage widespread EV adoption, it is important to continue expanding charging infrastructure across the country, particularly in rural areas, as charging points are currently largely concentrated in the Prague region.

Targeted communication campaigns can increase consumers' willingness to buy EVs by informing them of the economic and environmental benefits of EVs. Total cost of ownership, or the sum of all costs associated with acquiring and running a vehicle over its lifetime, is, in many cases, lower for EVs than for traditional internal combustion engines. Communication campaigns could also underline that by purchasing domestic low-emission vehicles consumers can support the Czech EV industry, as Skoda produces one of the best-selling electric cars in Europe. The automotive industry accounts for around 10% of GDP, the highest share in Europe, and 8% of total employment.

Gas mobility

The Czech transport strategy includes the use of compressed natural gas (CNG) and LNG in freight and public transport, and a transition to biomethane. There were over 30 000 CNG vehicles in Czechia in 2023. The National Action Plan for Clean Mobility envisages an increase in the number of CNG buses and heavy-duty vehicles until

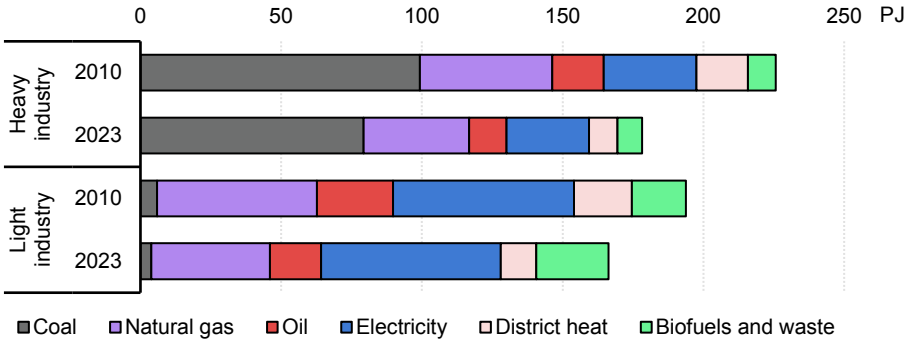
2035 and a smaller role for CNG cars due to the slowdown in CNG car production. The number of LNG heavy-duty vehicles is projected to reach 9 000 by 2035 from just 165 in 2023. Sales trends, however, demonstrate that this is unlikely to happen. To meet the renewable energy targets in transport, Czechia envisages a gradual transition to biomethane, with annual consumption of 10-12 PJ by 2030, either in compressed or liquefied form (bioCNG and bioLNG). However, challenges include a limited supply of CNG/LNG vehicles, inadequate filling infrastructure and uncertainty about the availability of domestically produced biomethane that also faces growing demand from the electricity and heating sectors. The National Action Plan for Clean Mobility does not mention the possible role of biodiesel. Czechia had volume-based blending mandates of 6% for biodiesel and 4.1% for bioethanol but suspended them in 2022 in response to the high price of motor fuels.

The CNG/LNG policy diverts limited resources. Although Czechia is making efforts to increase the role of bioCNG and bioLNG, international experience demonstrates that most of the gas demand in CNG/LNG vehicles will likely be met by natural gas, increasing the risk of fossil fuel lock-in. Moreover, the need to build an adequate filling infrastructure and possibly to subsidise vehicles would divert limited funds away from more optimal solutions to decarbonise transport. The government is, therefore, encouraged to prioritise support for EVs; public transport; scrappage schemes to reduce the age and improve the efficiency of the current fleets; and other cost-efficient avoid, shift and improve strategies.

Industry

Despite reduced energy use in industry, the sector still accounts for 30% of Czechia's energy consumption. Energy use in industry declined by 18% between 2010 and 2023, driven by efficiency gains and deindustrialisation, the latter influenced by post Covid-19 rising energy prices and supply chain crunches. Energy consumption declined by 21% in heavy industry covered by the ETS and by 14% in light industry. Industrial energy use is dominated by fossil fuels, which represented almost 60% of Czechia's total industrial consumption in 2023. Coal and natural gas are mostly used in heavy industry as energy and as a feedstock. The use of electricity is higher in light industry (38% of energy consumption in 2023), driven by the machinery and vehicles manufacturing industry's needs to power machinery, motors and equipment, and, to a lesser extent, to meet its process heat requirements.

Energy use in heavy and light industry by fuel in Czechia, 2010 and 2023



Notes: Heavy industry includes steel, cement and the production of basic metals, chemicals and non-metallic minerals. Light industry includes sectors with lower absolute energy use than heavy industry. Key sectors of light industry include the production of food, machinery, textiles, vehicles, timber, and construction and mining.

Source: IEA (2025), Energy End-uses and Efficiency Indicators.

The decarbonisation of heavy industry in Czechia and the European Union is challenged by competitive pressure from countries lacking similar decarbonisation requirements. Historically, Czech heavy industry, particularly iron and steel, cut emissions mainly through decreased production and to a lesser extent decarbonisation efforts rather than structural changes in production processes (i.e. scrap- or hydrogen-based ironmaking, and electrified steel production). Liberty Ostrava recently halted production and filed for bankruptcy partly due to high energy prices. On the other hand, Třinecké Železárny has taken the lead with its GreenWerk programme launched in 2024 targeting a 55% reduction in energy-related emissions by 2030 and backed by a 3-year PPA for 4.4 gigawatt hours (GWh) of renewable electricity annually signed in 2025. Yet the deeper emissions reductions hinge on structural technology change, which the company is postponing due to insufficient public support and legal uncertainty regarding the protection of the EU iron and steel market from unfair competition. As some decarbonisation efforts (e.g. increasing the shares of hydrogen and biofuels in feedstocks or capturing emissions from production) are required by law but technically and financially demanding, temporary and well-designed government support may be unavoidable.

The decarbonisation of light industry is challenged mainly from the high electricity-to-gas price ratio and insufficient policies. Policy support has so far centred on heavy industry, leaving light industry with fewer incentives and weaker institutional guidance. Measures such as energy efficiency improvements, greater use of renewables and waste heat can deliver cost-effective emissions reductions while boosting competitiveness. In the longer run, SMRs may also provide industrial heat and on-site electricity.

The Czech government has made some strides to support industrial decarbonisation. The NECP prioritises electrification and fuel switching in industry and supports the deployment of advanced industrial boilers using biofuels or gas and waste heat recovery. Yet electric boilers and heat pumps are still rare in industry, particularly for low- and medium-temperature industrial heat, despite Czechia being one of the leading heat pump manufacturers in Europe. This highlights a disconnect between domestic production capacity and local market uptake. The Czech government put forward a carbon leakage compensation mechanism, but it remains inadequate. A CZK 60 billion (EUR 2.39 billion) state aid programme approved by the European Commission under the Modernisation Fund and the National Emission Reduction Programme (with 20 cross-cutting measures to reduce emissions in the industry sector, including energy efficiency, waste heat and renewables) provide additional support. Other steps include voluntary agreements and energy audits under the EED, and a carbon capture, utilisation and storage (CCUS) action plan targeting CO_2 capture in cement, lime, iron and steel and being repurposed in petrochemical production. To this end, it identifies market barriers and potential funding streams and establishes an active network of relevant stakeholders. However, Czechia needs to better align its strategic planning for industrial decarbonisation with technological readiness and the available financial resources.

Electricity

Demand and supply

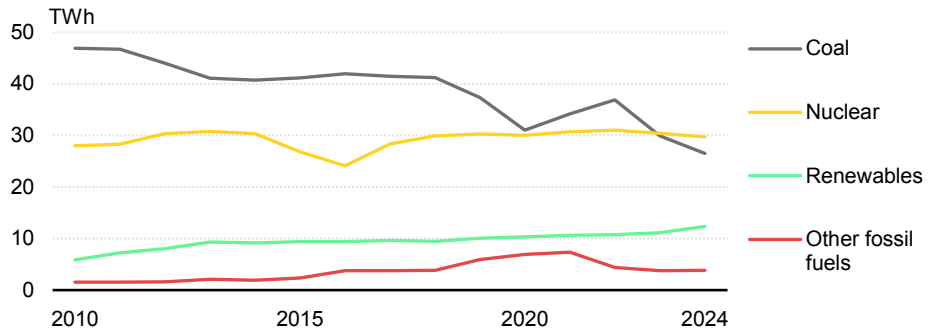
Electricity plays a central role in Czechia's climate strategy and decarbonisation pathway, but the electrification of end-use sectors remains limited. As sectors such as industry, buildings and transport electrify – driven by the expected shift to the electrification of industrial heat processes, residential heating and cooling, and EVs – the transmission system operator (TSO) ČEPS projects demand to grow from approximately 61 terawatt hours (TWh) in 2024 to 70 TWh by 2030. However, consumption trends indicate a slower electrification of end-use sectors compared to the IEA average. Total electricity consumption in Czechia has remained constant over

the past 20 years at around 60 TWh, accounting for almost one-quarter of energy end use. Electrification rates grew slowly from 25% to 30% in buildings and from 22% to 31% in industry between 2005 and 2023. These sectoral electrification rates, however, remain below the IEA average of around 45% for buildings and 33% for industry, although the comparison across countries does not take into account differing subsector compositions.

Several barriers need to be removed to accelerate the electrification of end-use sectors. Electricity prices are up to three times higher than gas prices, which favours fossil fuel over electricity use (see below). Other challenges include electricity grid capacity problems, including long permitting procedures for connecting industrial sites to higher voltage electric networks; a lack of policies and incentive schemes to support electrification; and a lack of fully operational large-scale demonstration projects directly applicable to end-use sectors.

Coal is one of the primary sources of electricity generation in Czechia, but this is expected to change. Historically, most Czech electricity was generated from coal but its relative share has declined steadily since 1990, dethroned by nuclear power in 2023. Nuclear now provides around 40% of Czechia's electricity generation, followed by coal at approximately 36%. Bioenergy is the largest renewable energy source (RES) in the electricity mix, followed by solar PV and hydropower. Wind energy plays only a minor role, with Czechia recording the fourth-lowest share of wind power among IEA countries in 2023, at just 1%. Coal-fired co-generation plants are being converted to gas, and nuclear and renewable generation is set to expand (see Focus area 1).

Electricity generation by fuel in Czechia, 2010-2024



Note: Other sources are not included.
Source: IEA (2025), Electricity information.

Electricity market

The Czech electricity sector is dominated by a few major suppliers. ČEZ Group is nearly 70% state-owned and accounts for about 66% of the country's electricity generation capacity and around 64% of distribution. Other significant players include Sev.en Energy and Energetický a Průmyslový Holding. There is one national TSO, ČEPS, and three regional distribution system operators: ČEZ Distribuce, EG.D and PREdistribuce.

On the retail side, electricity supply is fully liberalised, allowing consumers to choose among multiple licensed suppliers, with options for fixed or variable pricing. In 2025, the top five electricity suppliers held a combined market share of about 86%. The market is regulated by the Energy Regulatory Office, with oversight on competition also provided by the Czech Office for the Protection of Competition.

The Czech electricity market is integrated with the EU market and evolves in line with EU regulations. The Czech market operator OTE manages the day-ahead, intraday and balancing markets. Wholesale electricity trading in Czechia takes place within the integrated EU market, where prices are determined through marginal-cost pricing mechanisms. This means that wholesale prices reflect broader European market conditions rather than domestic cost structures. A particular characteristic of the Czech market is the very high share of bilateral trade – over-the-counter contracts and exchange-traded forwards via the Power Exchange Central Europe (54% of electricity sold in 2023). This may result in wholesale prices not fully reflecting supply-demand dynamics, therefore affecting investment decisions, dispatch and consumer behaviour.

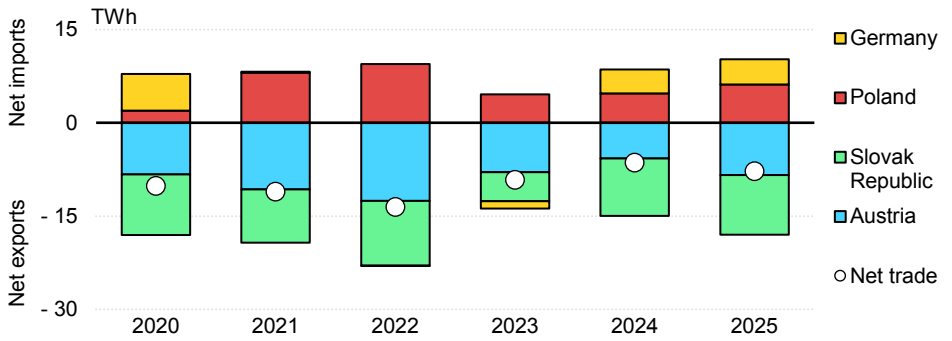
Czechia participates in key European balancing platforms, enabling cross-border balancing and resource sharing. Balancing services are procured through daily auctions, contributing to a more dynamic and market-based approach. The imbalance settlement period was shortened to 15 minutes for better balancing of the power system. As the share of variable renewable electricity grows, the role of balancing markets is expected to expand further.

Trade and interconnections

Historically, Czechia was a net exporter of electricity, but this is changing: electricity imports will become a crucial component of its electricity supply. The country is integrated into the synchronous grid of Continental Europe through several

interconnectors with Austria, Germany, Poland and the Slovak Republic. These interconnectors support commercial electricity trade with these countries and system stability. Net exports averaged around 30% of total electricity generation between 2013 and 2022, corresponding to 13.5 TWh in 2022. Following a 10 TWh reduction in coal-based electricity generation, however, Czechia's net electricity exports declined significantly in 2023 and 2024 to reach 6.7 TWh in 2024. Electricity exports will continue declining and Czechia is projected to become a net importer of electricity between 2026 and 2030. The coal phase-out, the slow pace of commissioning new generation capacity and rising electricity demand mean that imports will play a prominent role in ensuring the security of electricity supply. The NECP projects that electricity imports will reach nearly their technical limit in the 2030s, accounting for over 20% of total supply. Even the new Dukovany nuclear plants coming online in 2036 and 2038 will not fully offset declining coal power or meet rising demand.

Electricity net trade by country in Czechia, 2020-2025



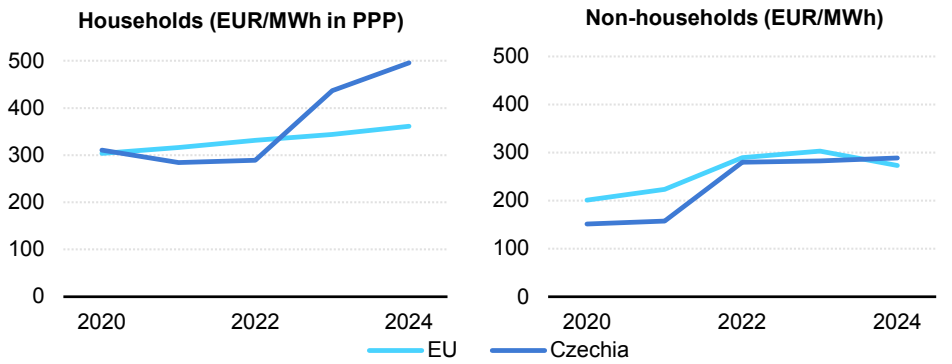
Note: Electricity trade for 2025 is available until August 2025.

Sources: IEA (2025), Electricity information (for data until 2023); IEA analysis based on ENTSO-E (2024), Transparency platform, collected through the Real-Time Electricity Tracker (accessed August 2025).

Czechia's high electricity prices contribute to delays in important policy decisions. Retail electricity prices in Czechia used to be around 25% lower than the EU average but this has not been the case since 2023. Electricity prices nearly doubled for residential and non-residential consumers from 2000 to 2024, although in 2022-2023

the government temporarily introduced measures to reduce electricity bills. In 2024, Czechia's electricity tariffs for households were the highest among EU countries based on purchasing power parity and the sixth highest in absolute terms. The electricity-to-gas price ratio remained relatively stable, averaging about 3:1 for households and non-households. The structure of electricity prices does not sufficiently encourage demand-side flexibility. The Energy Regulatory Office has initiated a reform of regulated tariffs, but concerns about possible increases in energy prices is one of the reasons behind the delay in implementing this and other reforms.

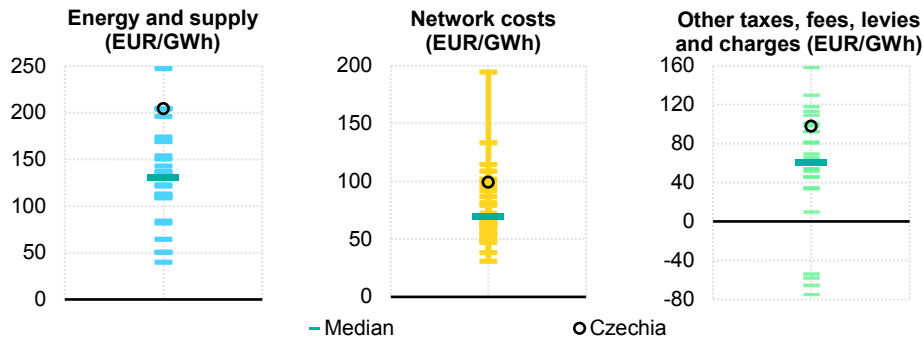
Electricity prices in Czechia and the European Union, 2020-2024



Note: PPP = purchasing power parity.
Source: IEA analysis based on Eurostat, Electricity price statistics (accessed June 2025).

Overall end-user prices have grown due to increases in all price components. Electricity prices are comprised of several components, including supply costs (51% of the final price); network costs (around 25%); and value-added tax (VAT) and various other taxes, levies and charges (around 24%). Every component rose significantly from 2020 to 2024: wholesale prices increased 2.1-fold, grid costs 1.7-fold, VAT and other taxes and levies (excluding the renewable levy) 1.5-fold. The taxation component has grown in absolute terms, although the VAT rate remained the same (21%).

Electricity price components in purchasing power parities for households in Czechia compared to EU countries, 2024



Source: IEA analysis based on Eurostat, Electricity price statistics (accessed June 2025).

Fuels

Czechia's total energy supply, i.e. all the energy required to supply end users across the country, was dominated by coal (28%) and oil (24%) in 2023, followed by nuclear (20%), natural gas (15%), and biofuels and waste (12%).

Coal

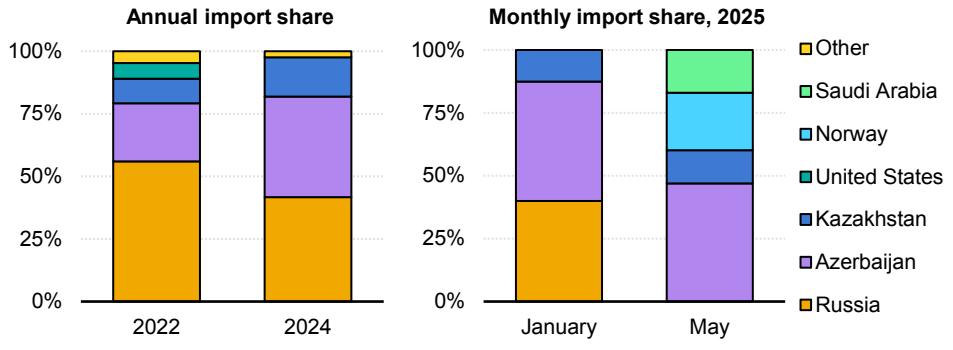
Coal is Czechia's most important energy source, contributing to roughly 25% of total energy supply and 36% of domestic electricity generation in 2024. Coal is primarily used for power and heat generation, although some higher quality varieties are used as feedstock in the chemical industry. There has been a steady decline in coal production since its peak in the 1980s. In 1984, Czechia had its highest ever brown coal (or lignite) production at nearly 97 million tonnes (Mt). By 2020, production had fallen to approximately 29.5 Mt, and continued to decline in subsequent years, with estimates for 2023 around 28.7 Mt. The North Bohemian and Sokolov Basins are the main sources of brown coal in the country, with the North Bohemian Basin accounting for over 80% of total production. Lignite mined in Czechia varies in quality, with calorific values ranging from 10 megajoules per kilogramme (MJ/kg) to 17 MJ/kg. Czechia has been a net importer of hard coal since 2017.

Oil

Czechia has limited upstream oil production and a well-developed downstream market. The country consumes about 8 Mt of oil per year, with domestic production accounting for 1-2% of annual consumption. Oil and gas production are continually decreasing and expected to stop naturally when the remaining reserves are depleted. Czechia has two refineries operated by ORLEN Unipetrol and a well-developed network of oil products pipelines. Refineries and independent suppliers distribute oil products. ORLEN Unipetrol also implements several clean energy transition initiatives, including switching from coal to gas and PV, and the development of hydrogen projects.

Czechia has diversified its oil supplies but remains vulnerable to crude oil supply disruptions. The Russian Federation (hereafter, "Russia") was Czechia's largest supplier of crude oil in 2024, followed by Azerbaijan and Kazakhstan. In 2025, Czechia stopped importing oil from Russia because the government had taken decisive action to source crude oil from a more diverse range of suppliers thanks to significant investments in expanding the TAL-IKL pipeline, the so-called TAL Plus project, which is essential for the country's energy security. This pipeline now allows Czechia's two refineries to import increased volumes of crude from a variety of suppliers via the Italian port of Trieste. This ended Czechia's long-standing reliance on Russian crude oil imports via the Druzhba pipeline, which has proven to be an unreliable source of supply, as evidenced by several disruptions since 2022. However, Czechia will remain highly exposed to crude oil supply disruptions, as it becomes reliant on just one supply route. It should, therefore, consider a scenario of prolonged disruption to flows on the TAL-IKL pipeline in its emergency planning.

Czechia's crude oil imports by origin, 2022-2025



Sources: IEA (2025), Oil information; IEA (2025), Monthly oil statistics.

Nuclear

Nuclear supplied more electricity than coal in 2023 and 2024, and Czechia plans to expand this share even further. Although all nuclear fuel is imported, the supply chain proved its robustness during the 2022 crisis, as both power plants had sufficient fuel stocks to overcome potential supply disruptions. To further strengthen the security of supply, Czechia passed a law requiring the nuclear power plants' operator to maintain a stock of nuclear fuel to enable the operation of all units for 36 months, or in specific cases with supplier diversification contracts for at least 18 months. Moreover, Czechia has contracted nuclear fuel from alternative suppliers, including an American and a French company, to gradually reduce its dependence on Russian suppliers.

Natural gas

Natural gas is used in many sectors. Its availability and affordability are thus important for the country's energy security and economic development. Natural gas accounted for 27% of total consumption in buildings, 21% of industrial energy consumption, 29% of DH generation and 5% of electricity generation in 2023. Czechia produces very little natural gas, importing more than 99% of its gas consumption in 2023 via pipeline. Until 2022, its main trade partner was Russia, whose role has drastically been limited since 2023, when most imports started coming from Norway and in the form of LNG from global LNG markets. Physical delivery of Norwegian gas and LNG supplies from Dutch, Belgian or German terminals flows via pipeline through Germany. A connection on the eastern border supplied natural gas stored in Hungary, the Slovak Republic and Ukraine until the Russia-Ukraine transport contract expired at the end of 2024. As of 2025, natural gas only flows in from Germany.

Czechia strengthened its role as transit country from Western European countries to Eastern ones. The Capacity4Gas project, implemented by the Czech natural gas TSO, NET4GAS, increased Czechia's gas transmission capacity by 35 billion cubic metres per year. The construction of Capacity4Gas started in 2018 and it became operational in 2020. The new infrastructure was integrated with the existing Czech transmission system at multiple points, facilitating the delivery of natural gas to the domestic distribution network. The pipeline's capacity and the potential for transit to Eastern European countries is currently not fully being exploited.

Bioenergy

Bioenergy is an important domestic fuel in Czechia and plays a prominent role in the energy transition. It accounted for 11% of total energy supply and 13% of total final energy consumption in 2023. Around 80% of bioenergy is consumed in end-use sectors (mainly for heating), with the remainder transformed into electricity and heat at the utility level. Solid biofuels make up most of the bioenergy supply, with gaseous biofuels expected to play a growing role in transport, electricity and heat generation (see Focus area 1).

Hydrogen

Czechia produces and consumes about 125 kilotonnes of hydrogen per year, using it as a feedstock for the petrochemical industry. Czechia's Hydrogen Strategy identifies three phases for hydrogen production and use:

1. "local islands": production of low-carbon hydrogen in local hubs
2. "global bridges": imports after 2030 when infrastructure is available
3. "new technologies": combined production of electricity, heat and hydrogen from nuclear or geothermal in the longer term.

The Strategy highlights that the production of renewable hydrogen in Czechia is costly. The country thus anticipates importing hydrogen via pipelines from regions with cheaper and more abundant RES. The gas TSO, NET4GAS, is preparing the gas transmission system for the transport of gas mixtures with hydrogen up to 2% in the short term. In the longer term, the goal is to create dedicated infrastructure for transporting (including the transit of) pure hydrogen. Three projects are planned by the end of 2029 to connect hydrogen infrastructures in Germany and the Slovak Republic through Czechia and contribute to hydrogen transit corridors throughout Europe.

Cost-effective hydrogen production in Czechia is challenging in the current framework. Like other EU member countries, Czechia must ensure that the contribution of renewable fuels of non-biological origin (RFNBO) is at least 42% of the hydrogen used for final energy and non-energy purposes in industry by 2030 and 60% by 2035. In Czechia, this would correspond to around 8 000 tonnes in 2030 and 12 000 tonnes in 2035. The minimum share of RFNBOs in transport fuel consumption

must be at least 1%, which would amount to around 13 600 tonnes per year by 2030. In discussions with the European Commission, Czechia argues that the Delegated Act on Low-Carbon Hydrogen should explicitly allow the use of nuclear energy for hydrogen production and define the carbon footprint of nuclear fuel. It also advocates for postponing the application of the Delegated Act on RFNBOs until a fully developed and functional hydrogen market is established. The requirements for additionality and hourly and geographical correlation, as defined in the Delegated Act, significantly increase the cost of RFNBO hydrogen production in Czechia, thus reducing the opportunities for decarbonising industry and transport.

Recommendations

1 Adopt a new long-term energy strategy, ensuring broad stakeholder consultation and alignment with sector plans

To decarbonise the energy sector while maintaining a secure and affordable energy supply, urgent and concerted actions are needed from investors, financiers, households and all other stakeholders. While the government approved the National Energy and Climate Plan and conducted analysis and public consultations to revise the State Energy Policy and the Climate Protection Policy, these two important documents have not yet been officially approved. The government developed several sectoral documents including strategies (on Hydrogen and Long-term Building Renovation), action plans (on Smart Grids, Clean Mobility and CCUS) and roadmaps (on Small Modular Reactors and Large Research Infrastructures). In the absence of an overarching energy policy, however, market players lack clarity on the coherence, consistency and hierarchical relations between various sectoral strategies and visibility on its strategic directions. The Czech government should adopt national energy and climate policies without delay to provide the necessary guidance and predictability to the market players.

The relatively negative public perception of the energy transition complicates the adoption of new policies. While energy prices are a politically sensitive issue in many countries, in Czechia this sensitivity contributes to delays in important policy decisions in the areas of energy and climate. There is a need to improve communication to raise awareness and public acceptance of the needed changes. Targeted communication campaigns should underline additional benefits of the transformation, such as clean

air, better health, local economic development, energy security and self-sufficiency. These campaigns should be conducted by trustworthy institutions in transparent and deliberative ways and build upon successful examples, such as the Green Savings Programme. The public should be informed that energy efficiency improvements and the use of low-carbon heating can offset the expected growth in the heating fuels prices under the ETS2. It is also necessary to highlight the positive role the ETS and other EU instruments play in financing Czechia's energy transition, for example via the popular Green Savings Programme.

2 Invest in energy policy capability and administrative capacity across all levels of government

Recent regulatory and institutional reforms have introduced many positive changes in Czechia. However, lack of capacity, digitalisation, and targeted training to develop new skills in government institutions and permitting authorities have contributed to delays in implementing the energy and climate policies and the stagnant development of renewable energy projects. Moreover, local authorities delay or reject energy projects due to public opposition, which is often due to low awareness. Another challenge reported by many stakeholders is the weak enforcement of rules and regulations, such as the emissions standards for vehicles or energy performance standards for buildings.

Government agencies have an increasing amount of work to address national challenges, meet international commitments and implement EU legislation, with limited human and financial resources. For example, the Ministry of Industry and Trade does not have sufficient energy modelling capacity and has been outsourcing modelling tasks to external consultants. In 2025, the government approved an initiative to create a Czech modelling centre to provide an analytical basis for policy making and ensure a co-ordinated and continuous approach to modelling. Czechia should pursue this commendable initiative.

National, regional and local authorities must be equipped with the necessary human and financial resources, skills, awareness, and tools to fulfil their obligations and manage procedures in a timely manner. The government should strengthen all relevant institutions' capacities to enable them to develop and implement policies, enforce regulations, and accelerate permitting and authorisation procedures.

3 Improve electricity regulation, taxation and market design to encourage electrification while protecting vulnerable consumers

Electrification of end-use sectors offers a dual benefit of reducing emissions and saving energy. The overall electrification rate of 19% in Czechia is below the EU average of 22%. Heat pumps and electric boilers are mature technologies to electrify residential and industrial heating and cooling. However, high electricity prices, and particularly high electricity-to-gas price ratios, which in 2024 were around 3:1, hinder the broader adoption of these technologies by Czech consumers, even though Czechia is one of the largest global manufacturers and exporters of heat pumps. Electricity prices in Czechia consist of an energy component, grid fees, and taxes and levies. Each of these components offers potential levers to reduce costs and make electrification more economically viable:

- Continue to support smart metering, time-of-use tariffs and dynamic tariffs to reduce peak demand and lower system costs. This will enable demand-side flexibility, real-time responsiveness to market signals and cost savings for consumers who shift use to off-peak hours.

- Continue supporting renewable energy by enabling competitive auctions and corporate power purchase agreements, which would contribute to lowering average wholesale prices. Consider shifting the levy for renewable energy support from the electricity price to the general budget, as in Finland, France, Germany and Malta, or to the gas price, as discussed in the United Kingdom.

- Implement a planned network tariff reform to more fairly and more transparently distribute costs between consumers and energy producers. In addition, review the distribution companies' allowed revenues where necessary: reviewing the asset base and depreciation policies, and extending the lifetime of assets can deliver great savings.

- Consider using the ETS revenues from the Modernisation Fund or other funding sources for investments to reduce grid-related costs. Poland and Romania have used this approach.

- Consider fiscal instruments to decrease electricity end-use prices such as a reduced value-added tax rate for electricity and taxing fuels based on their energy content and CO_2 intensity.

Efforts to reduce electricity costs should be accompanied by measures to protect vulnerable consumers with targeted aid, social programmes and subsidised energy-saving measures. In addition, well-designed communication and stakeholder engagement campaigns are important to reduce public opposition to pricing and taxation reforms.

4 Use financial, fiscal and procurement policies to encourage electric vehicle adoption in corporate and public fleets

Energy consumption and emissions in the transport sector are steadily increasing, and the sector is expected to become the largest source of energy-related CO_2 emissions by 2027. Decarbonising transport is, therefore, a critical part of Czechia's energy transition strategy. Czechia should significantly ramp up efforts in this sector, applying a combination of comprehensive policies including urban planning, car sharing and other measures to reduce transport needs, encouraging the shift to cleaner transport modes such as public transport and EVs, and improving the efficiency of the current fleet through, for example, scrappage programmes to remove the most polluting cars.

Electric vehicles (EVs) are expected to play a key role in decarbonising transport. Skoda is one of best-selling electric cars in Europe and increased demand for EVs in Czechia could contribute to strengthening the domestic automotive industry even further. The key barrier is the relatively high purchase price of EVs, especially compared to the popular second-hand internal combustion engines. All leading EV markets offered support to address the purchase price barrier. This support should be gradually phased out when EVs become cost-competitive.

Czechia should prioritise EV support for corporate and public fleets through loans, fiscal policy and procurement rules. Corporate cars represent 75% of new registrations – the second-highest in the European Union, well above the EU average of 60%. This highlights companies' key role in shaping the Czech car market. Corporate support programmes could also specifically target taxis and urban delivery companies, which are sensitive to costs and policy incentives. As corporate EVs are often sold after a few years, they can boost the second-hand market. Although businesses may worry about low resale values, fiscal incentives can help mitigate

these concerns. As for public institutions, they should prioritise EVs in procurement to set an example, following or exceeding the EU Clean Vehicles Directive's requirements.

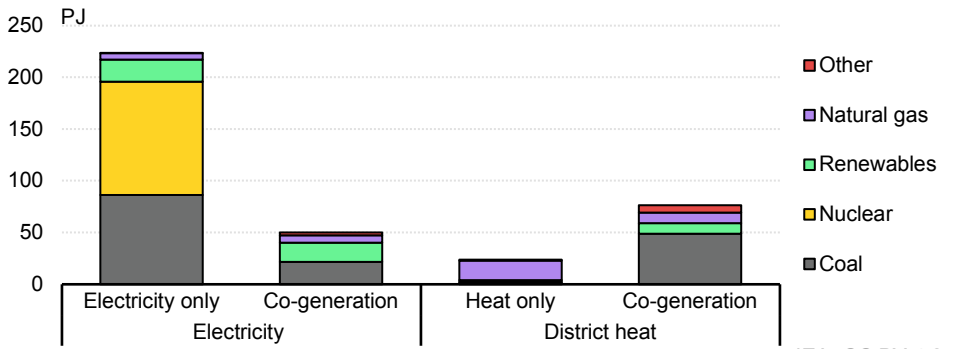
Preferential loans and loan guarantees for the purchase of EVs, such as Scotland's EV loan programme, can help bridge the gap of higher purchase prices. Low-cost financing would allow businesses to invest in EVs and use the cost savings from the operation to help repay the loan. While the total cost of ownership of EVs is generally attractive, it can be lowered further through fiscal policies such as targeted tax benefits. The Czech toll system for trucks and vans with a permissible weight of more than 3.5 tonnes integrates environmental parameters, thus fulfilling the "polluter-pays" principle. However, the government has limited ability to encourage the use of low-carbon personal vehicles because Czechia is one of the few countries without annual taxation for personal car ownership. Czechia could consider introducing taxes for polluting vehicles: this would provide an incentive for EVs and would also encourage public transport and active transport. Germany and the United Kingdom are among the countries that have succeeded in increasing the market penetration of EVs thanks to taxation. Besides accelerated depreciation, Czechia might consider other corporate tax breaks related to the EV fleet. To avoid tax erosion, a tax-neutral bonus-malus system could be introduced, where enterprises with a corporate fleet consisting of EVs are granted a bonus, which is paid for by enterprises without EVs.

Focus areas

Introduction: Intertwined challenges

The decarbonisation of electricity and heat supplies in Czechia are interrelated and should be addressed simultaneously. First, due to the important share of co-generation in both sectors, coal-fired co-generation plants cannot be retired from the electricity market until new sources of heat in the respective DH systems are available. Second, natural gas is expected to play a significant role as a transition fuel in both sectors; therefore, investments in gas-fired generation capacity and infrastructure should consider the future demand for electricity and heating. Third, electricity demand will largely depend on the rate of deployment of heat pumps, and their deployment, in turn, will depend on the availability and affordability of electricity. Moreover, both the electricity and heat sectors should keep energy efficiency improvements in buildings and other end-use sectors in mind as they develop.

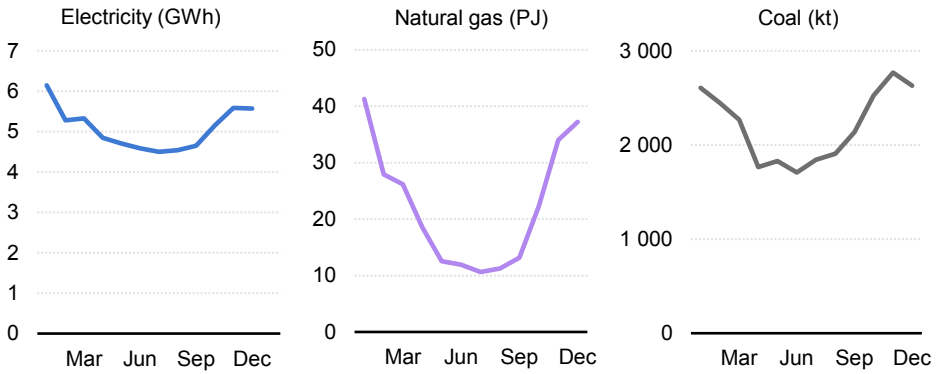
Electricity and district heat generation by plant type in Czechia, 2023



Note: Only heat sold to third parties is included.
Source: IEA (2025), Electricity information.

The seasonality of energy demand must also be addressed in a co-ordinated manner. Typical seasonal consumption patterns reflect the importance of natural gas and coal for heating: demand for both fuels is the highest in winter. Electricity demand exhibits smaller seasonal fluctuations; nevertheless, demand peaks are 2 GWh higher in winter than in summer. The decommissioned coal-fired capacity will need to be replaced by other sources capable of producing more electricity in cold months. This needs to be considered in a comprehensive energy planning framework.

Monthly demand of electricity, natural gas and coal in Czechia, 2024



Note kt = kilotonne.

Sources: IEA analysis based on IEA (2025), Monthly electricity statistics; IEA (2025), Monthly gas statistics; Eurostat, Supply and transformation of solid fossil fuels (accessed June 2025).

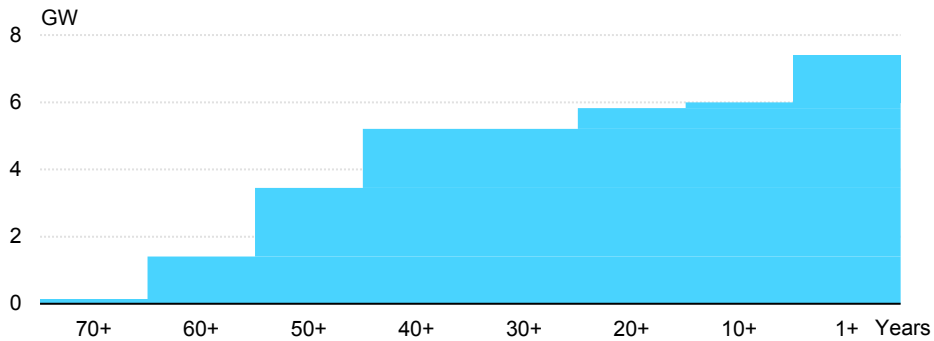
The coal phase-out will have several knock-on effects, which need to be managed. Retiring coal plants removes not only a large portion of the country's reliable baseload capacity, but the associated system services and heating capacity as well. Replacing these functions will require a mix of technologies, such as flexible gas-fired co-generation plants, drop-in ready biofuels, sustainable heating systems, battery storage and demand-side measures. Market conditions and policy frameworks need to be improved to support this investment.

Focus area 1: Replacing coal in the power sector

Retirement of coal generation

Coal power plants are retiring as they become economically unviable. The average age of Czechia's coal units is 49 years old. As of January 2025, Czechia had 68 coal-fired power units in 29 stations in operation, with a combined capacity of 7 400 MW. Over 3 000 MW of capacity has been retired since 2000. The most recent Ledvice coal plant was commissioned in 2017, and no new plants have been announced, permitted or are currently under construction. The government's plan is to phase-out electricity and heat production from coal by 2033. However, the rising cost of carbon allowances under the EU ETS is making coal-fired power generation increasingly uneconomical in Czechia, so some units may retire around 2027-2028. In 2025, ETS prices have typically ranged from EUR 65 to EUR 75 per tonne of CO_2, significantly affecting the operating costs of lignite-fired power stations, which emit approximately 0.92 tonnes CO_2 per MWh. When combined with other operational costs, this renders many units financially unviable.

Operational coal power capacity by plant age in Czechia, 2024

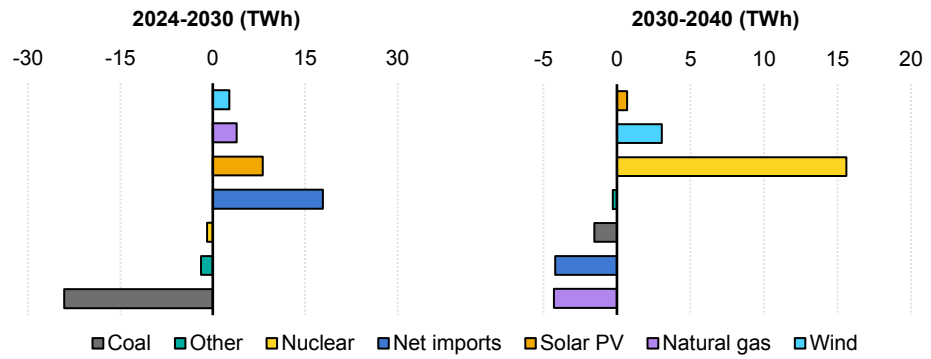


Source: IEA analysis based on Global Energy Monitor, Global Coal Plant Tracker (accessed May 2025).

Supply adequacy

Recent assessments highlight a possible supply gap if there is an accelerated coal phase-out. ČEPS prepares an annual Resource Adequacy Assessment of its electricity grid. The latest edition (2023) forecasts maintaining electricity generation adequacy through 2030 under the "respondent" (conservative) scenarios. Czechia would become a net importer of electricity, with coal-fired plants accounting for 12.6% of installed capacity, and only a modest growth of electrification. However, adequacy becomes more uncertain under progressive assumptions or when weather variability is considered. In the progressive scenario, which models growing demand with a faster phase-out of coal-fired plants, the loss of load expectation (LOLE) – a metric used to measure security of supply and electricity market reliability – exceeds 13.7 hours/year by 2040 and expected energy not supplied is 25 GWh. Accounting for extreme weather, LOLE reaches 14 hours by 2030 in the conservative scenario and 41 hours in the progressive scenario. ČEPS also cautions against overreliance on imports.

Projected changes in electricity supply in Czechia, 2024-2040



Note: The respondent scenario is used for the projected changes in electricity supply.

Sources: IEA analysis based on IEA (2025), World Energy Balances; ČEPS (2023), Resource Adequacy Assessment of the Power Grid of the Czech Republic until 2040 (only available in Czech; accessed August 2025).

Relying on imports to meet the supply gap has its limitations. Recent EU-wide preliminary analysis reinforces ČEPS's outlook: ENTSO-E's Electricity Resource Adequacy Assessment 2024 shows Czechia facing some of the highest adequacy

risks in continental Europe, with a LOLE of 8.4 hours in 2026. This exceeds the reliability standard used in many EU countries and signals tightening supply margins. This is largely due to the pace of coal decommissioning outpacing the construction of new renewable and gas-fired capacity. Imports may play a growing role, particularly during periods of peak demand, but relying on imports may not always be possible. The Czech transmission system can accommodate up to 20 TWh of electricity imports per year, a limit that is reached or nearly reached in several stress scenarios. Moreover, neighbouring countries, in particular Germany and Poland, are also expected to face tighter supply-demand balances, which means imported electricity may not always be reliably available when required.

Energy security concerns must be addressed while keeping in mind the longer term decarbonisation objectives. Czech legislation is introducing safeguards to provide a "safe net" in case of a rapid coal phase-out: based on the TSO's assessment, the regulator would be able to require coal power plant operators to temporarily prolong their operations with potential reimbursement of the incurred costs. The operator also must inform public representatives about planned decommissioning in advance. If the historical operator of a plant cannot extend its operation, the government can organise an auction for other potential operators. In parallel, the legislation facilitates permitting procedures for new gas-fired projects. These legal initiatives are helpful to ensure energy security throughout the long and challenging decarbonisation process. Maintaining some fossil fuel-fired capacity may be necessary during the transition in the case of supply shortages. However, the country should avoid "locking in" emissions from new gas generation projects. Therefore, in addressing the short-term energy security concerns, the government should keep in mind the longer term objectives and prioritise low-carbon sources.

Nuclear expansion

Nuclear energy is one of the cornerstones of the Czech energy strategy. Czechia currently operates two nuclear power plants: Dukovany (four 500 MW units commissioned between 1985 and 1987) and Temelín (two 1 082 MW units, commissioned in 2002-2003). The Dukovany units are scheduled for retirement around 2037, although ČEZ announced plans to extend the operating lifetime of Dukovany 4 to 2047 and is assessing a potential further extension. There is no planned retirement date for Temelín.

Czechia is planning a significant expansion of its nuclear sector. The government aims to increase the share of nuclear power in electricity generation from about 40%

today to 44% by 2030 and 68% by 2040. It is expected to decline to 46% by 2050 after the decommissioning of the current Dukovany units. Elektrarna Dukovany II, which is 80% owned by the Czech state, is moving forward with plans to build new large-scale reactors for a total of approximately EUR 17.5 billion. In 2024, Korea Hydro & Nuclear Power was selected to construct two new 1 GW units at the Dukovany site. The contract was signed in June 2025. The government approved a state-backed investment model for the construction of the first new reactor. This model includes a contract for difference (CfD) mechanism with a PPA which guarantees revenues for the plant operator for 40 years, from the plant's expected commissioning in 2036 until 2076. The financing package also comprises a low-interest state loan. The financing model for the other reactor(s) will be different, with the state – rather than ČEZ – as the owner. The contract with Korea Hydro & Nuclear Power includes a possibility to build additional units at Temelín. This option is currently under assessment, including the financing, licensing and supply chain.

Czechia sees SMRs as a strategic component of the future energy mix. In 2023, the government approved the Czech SMR Roadmap, which outlines potential sites, many at former coal-fired power plants. ČEZ has initiated preparations to construct the first SMR at the Temelín nuclear power plant site in partnership with Rolls Royce, with environmental impact assessments launched in late 2024 and construction envisaged in the early 2030s. In parallel, the current site of ČEZ's Tušimice coal plant is being prepared for an SMR, with the environmental impact assessment lunched in 2025 and construction envisaged in the mid-2030s. SMRs are expected to play a role not only as dispatchable electricity generation but also in DH and low-carbon hydrogen production, particularly in regions with high thermal demand such as Prague and Moravian-Silesia and possibly others. The Roadmap estimates that up to 3 GW of SMR capacity may be deployed by 2050. However, it also highlights the need for accelerated permitting, investment models and public support to make the technology viable at scale.

Renewable energy

Renewable energy must play a far greater role in Czechia's future electricity mix. In the context of the widening supply gap, wind and solar plants – which can be constructed quickly – have significant potential to replace coal in the power system in the short to medium term. Yet policy and financial support for renewables remains limited, particularly for utility-scale renewables. The NECP estimates that around 10.5 GW of solar PV and 1.4 GW of wind will be needed to reach the expected share of renewable energy in gross final energy consumption by 2030. It projects increasing

the share of renewable electricity generation from 15% in 2023 to 28% by 2030. However, market players lack a clear vision of how the country is going to reach these targets. While secondary legislation specifies the RES capacities expected to be supported by auctions, this information is not easily accessible to potential investors via Czech and international platforms such as the EU RES auctions platform.

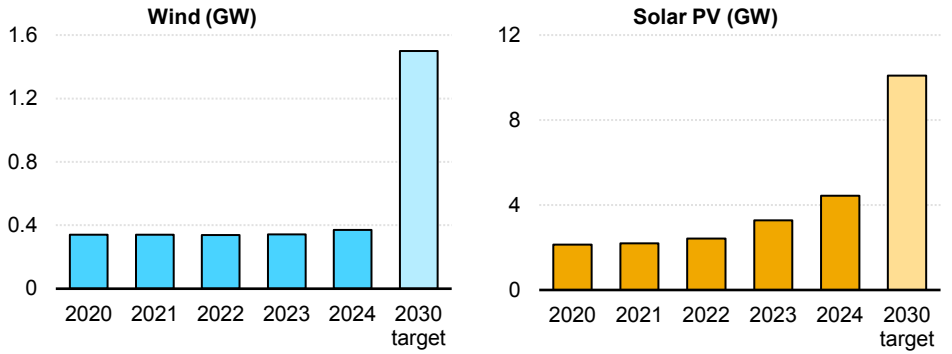
Czechia's renewable energy investment climate suffers from a lack of policy consistency and credibility, undermining investor confidence. In 2009 and 2010, Czechia experienced a sharp increase in solar PV installations due to generous operational support measures: purchase prices (feed-in tariffs) and green bonuses (feed-in premiums). The solar boom led to a surge in support payments; prompted concerns about grid stability; and continues to influence Czech politics, public perception and acceptance of renewable energy projects. The government carried out profitability assessments of PV plants commissioned during 2009 and 2010 and retroactively imposed a levy on them between 2011 and 2013. This undermined investor confidence and renewable deployment stagnated. New proposed amendments to the Act on Supported Energy Sources (LEX RES III) in 2025 introduce retroactive cuts to solar feed-in tariffs for PV plants built during the solar boom and exceeding a certain profitability. Such measures signal policy unpredictability and create significant risks for ongoing and future investments. Other persistent challenges such as slow permitting processes and grid connection issues and weak, fragmented and inconsistent support schemes continue to deter capital flows into the sector. On a positive note, an amendment to the Energy Act in 2023 (LEX RES I) simplified and streamlined the permitting process and a second amendment in January 2024 (LEX RES II) introduced a new institute of (Renewable) Energy Community that could produce, manage and share energy.

Czechia's recent renewable energy auctions are a "learning by doing" experience. Czechia only started conducting auctions for two-sided CfDs in 2022 to provide developers with revenue stability by compensating for differences between market prices and agreed strike prices. Following three undersubscribed auctions in 2022/2023, which awarded a 1.8 MW small-scale hydropower bid (at 179 EUR/MWh) that recently started construction, 69.9 MW of wind (at prices ranging between 119 EUR/MWh and 139 EUR/MWh) and no biogas co-generation, the 2024 round attracted greater interest. The 90 MW onshore wind auction was oversubscribed, awarding 89 MW under 20-year two-sided CfDs (at 130 EUR/MWh). There were no successful bids for 5 MW biogas co-generation, but 7.8 MW of small-scale hydropower was awarded. For 2025, volumes have been set at 180 MW for wind and 5 MW for hydropower. While the auction volumes seem relatively

modest, they are on an upward trajectory, in line with the NECP and take into account the available sources of public support.

Support schemes and energy security and affordability concerns from the energy crisis have accelerated solar power growth since 2022. Czech households, businesses and municipalities can benefit from investment grants that help offset the installation costs of PV systems. Small-scale systems under 1 MW qualify for green bonuses while larger installations receive support through competitive auctions. The successful NZÚ Programme supports residential and municipal projects. It is administered by the National Development Bank, which provides interest-free loans and subsidies for rooftop PV systems under 50 kilowatts (kW). The total programme budget is CZK 3 billion (EUR 119 million). Czechia's solar policy is also supported by major EU-funded programmes, such as the Modernisation Fund and the National Recovery Plan. Three PPAs totalling 43 MW have been signed between renewable energy developers and automotive and steel companies, signalling rising interest in long-term clean energy supply among Czech industries to cut emissions and manage energy price volatility.

Total installed wind and solar PV capacity in Czechia, 2020-2024 and 2030 target



Sources: IEA analysis based on IEA (2025), Electricity information; Czechia, Ministry of Industry and Trade (2024), NECP (accessed May 2025); Czechia, Ministry of Industry and Trade (2025), The number of sources connected to the electricity system increased by a quarter last year. The total installed capacity in the Czech Republic increased by Temelín block (accessed May 2025); České noviny (2025), Wind energy covers 1% of domestic consumption, the Czech Republic lags behind Europe in development (accessed May 2025).

Policy spotlight: Agri-PV

In May 2024, the amendment to the Protection of Agricultural Land Act allowed agrivoltaics, the dual use of agricultural land for both farming and solar panels, without requiring a reclassification of the land or altering zoning plans. Previously, deploying agrivoltaics in Czechia was challenging, as it required reclassifying agricultural land for non-agricultural use, leading to additional levies and administrative hurdles. Under the new law, such a reclassification is no longer necessary. Obtaining consent from the Agricultural Land Fund Protection Authority is still, however, necessary. The new provisions limit agrivoltaics systems to no more than 10% of the farm's total area.

Following the law, the supporting decree, effective from early 2025, allows solar systems on six crop types: vineyards; orchards; hopyards; tree nurseries; crops in containers and truffle areas; and within two system types, horizontal and vertical. It limits non-solar components like batteries to 5% of the area. Under these conditions, agrivoltaics land remains eligible for agricultural subsidies. Agrivoltaics is only eligible for CAPEX subsidies through the Modernisation Fund, not from feed-in-tariffs or other OPEX subsidies. As the law is very recent, agrivoltaics in Czechia is still in the pilot stage, with early projects primarily focused on wine-growing areas such as South Moravia.

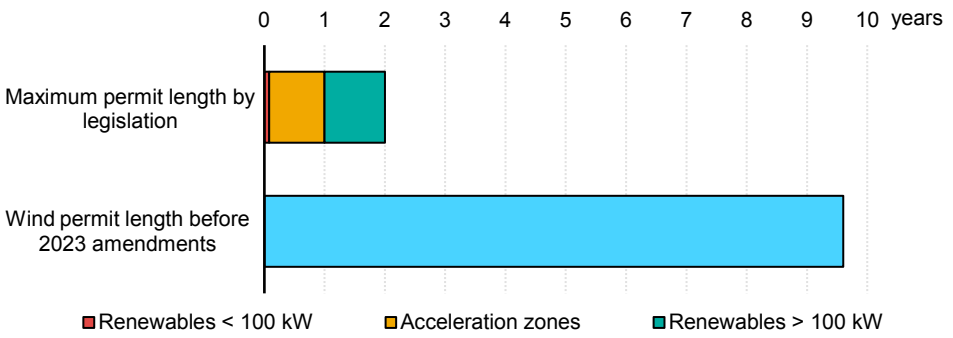
At 1%, Czechia has the fourth-lowest share of wind energy in electricity generation among IEA countries. Installed capacity in 2023 was approximately 370 MW, an increase of just 30 MW from 2019. Opposition to wind energy in Czechia arises from a combination of public scepticism and local resistance due to concerns about the visual and environmental impact of wind turbines, including noise, effects on wildlife and potential harm to property values. These concerns are exacerbated by complex and protracted permitting processes. Until recently, new wind energy projects were primarily implemented through auctions. The NECP envisages the installation of 1.2-1.5 GW of wind capacity by 2030.

The role of biofuels and biogases is growing in the electricity, heating and transport sectors. Czechia has 603 biogas plants, including 417 agriculture-based facilities and 66 landfill gas collection sites. Most biogas is used in co-generation units. Efforts are underway to integrate biogas-fired electricity into ancillary power grid services. The country has begun scaling up biomethane production, growing from 12 GWh in 2022 to 103 GWh in 2023, with plans for further expansion via the repowering of existing biogas plants located near high-pressure pipelines. Biomethane derived from agricultural sources will be mainly allocated for heating purposes, while biomethane produced from waste is intended primarily for use in the transport sector, supported by a CNG refuelling network of 171 stations. A EUR 2.4 billion support scheme subsidises the construction and operation of new or converted sustainable biomethane facilities through green bonuses. Additionally, pure and high-blend biofuels benefit from a lower excise duty compared to their fossil fuel equivalents.

Permitting and grid connection procedures for energy projects

Commendable legislative changes have simplified permitting procedures for new energy projects but they have yet to be implemented in practice. Lengthy and complex administrative permitting procedures have been one of the key barriers to expanding renewable and dispatchable gas-fired power capacity. Building a wind farm in Czechia commonly takes about ten years, mainly due to the long permitting process. Outdated spatial planning rules and a lack of clear development guidelines further hinder progress. Amendments to the Energy Act (LEX RES I and III) were introduced to encourage investment in new energy projects and reduce administrative delays. Renewable electricity plants over 1 MW are now classified as public infrastructure and can be built outside developed areas without prior changes to the spatial plan. Exemptions for licensing, zoning and building permits now apply to installations up to 50 kilowatt peak (kWp) (instead of 10 kWp previously). The threshold for these exemptions was raised from 50 kW to 100 kW and were extended to storage. There are now simplified construction procedures for projects up to 250 kW. Updates to the Building Act have digitised permitting to streamline processes. Despite these changes, stakeholders face challenges to implement the new regulations.

Permit length under LEX RES III and before the 2023 amendments



Notes: "Wind permit length before 2023 amendments" refers to the number of years it takes to go through the entire permitting process under the current regime as commonly reported by industry associations, law firms and think tanks. There is no centralised data collection of permitting for renewables in Czechia.

Source: IEA analysis based on Chamber of Deputies, Parliament of the Czech Republic, Government proprosal : Act on accelerating the use of renewable energy sources (accessed June 2025); Czech Wind Energy Company, Wind power plants in 2024: Growth continues, but power plants are still being permitted very slowly (accessed June 2025).

Czechia approved legislation for "acceleration zones" to fast-track wind and solar project permits. In August 2025, a new law came into effect offering conditions more favourable than those required under the Renewable Energy Directive III. Permitting decisions in these zones must be taken within 60 days, with "tacit approval" if authorities do not reply within this period. In addition, PV plants up to 100 kW do not require a building permit or a licence from the Energy Regulatory Office, and systems under 10 kW no longer need a building or grid connection permit. Municipalities and regional authorities will play an active role in identifying acceleration zones, which will be integrated into municipal, regional and national planning. Local acceptance remains low, particularly for large-scale wind projects, making engagement and inclusivity vital to enhance public support and project legitimacy. Success depends on political will and stronger administrative capacity.

Limited transparency and lengthy grid connection processes in Czechia have led to widespread speculative booking of grid capacities, especially for solar projects. Developers often reserve capacity at multiple sites to find viable locations, which results in large amounts of capacity being blocked for projects that may not proceed.

This “first-come, first-serve” approach can prevent other initiatives, including small-scale rooftop solar installations, from accessing available capacity. To address these challenges, Czechia has introduced reforms that require distribution system operators to publish monthly capacity maps, enforce contract deadlines, and impose penalties or cancellations for unused reservations. While these measures aim to increase transparency and access, effective implementation and up-to-date information are ongoing issues. It is of utmost importance that distribution system operators’ maps are up-to-date and embed critical information to facilitate and identify opportunities to best connect and build new capacity.

Grid integration of renewable energy

Significant investments are needed to the distribution system to cope with the growing penetration of variable renewable energy generation. Variable renewable energy plants usually connect to the distribution grid, adding strain to the system. Grid congestion is a growing issue for the Czech electricity network and limits renewable energy expansion. In the period 2021-2023, there were 233 000 applications to connect renewable energy projects to the grid, but only 128 000 connections (about 1.6 GW in total). Much more capacity was denied than accepted. Demand exceeded the network’s technical limits, causing local overloads and leading to reduced or denied capacity for many applicants. This trend is projected to worsen without network investments: the NECP expects 8 GW of new solar and 1.2-1.5 GW of new wind capacity to be added by 2030.

Distribution system operators expect a significant increase in required investments: the electrification of end-use sectors and the expansion of renewable energy capacity will require grid reinforcement, expansion, digitalisation and possibilities for demand-side flexibility. ČEZ is upgrading its network supported by a EUR 400 million loan from the European Investment Bank.

Investments are also required at the transmission level. ČEPS has identified major congestion in its transmission corridors, especially along the north-west to south-east route, necessitating substantial reinforcement for reliable power flow. Additional congestion risks exist in the southwest-southeast corridor under nuclear expansion scenarios. To address these issues, the Czech TSO is investing heavily with EU support (CZK 89 billion, or EUR 3.5 billion, over the period 2023-2025) in transformer upgrades, substation modernisation and smart grid development to enhance capacity and renewable integration.

System flexibility

The future electricity system will require significantly more flexibility. Electricity generation and demand will have steeper ramps, upwards and downwards. Power system flexibility – the ability to respond in a timely manner to variations in electricity supply and demand – is a key enabler for accelerating the deployment of RES. Flexibility in the Czech electricity system is growing, and the National Action Plan for Flexibility provides a concrete pathway until 2035 by scaling up electricity storage and facilitating demand-side response. The amendment to the LEX RES III is a good first step, enabling the aggregation of flexibility sources (including so-called independent aggregation) and the formal integration of electricity storage. However, there is a pressing need to sharply increase flexibility in demand and grid operations to ensure system security. Even low levels of demand flexibility can significantly lower the risk of supply or transmission capacity inadequacy and, ultimately, load shedding.

Repurposed coal plants can provide important peak capacity and load-balancing services. Coal plants can be repurposed to run less but more flexibly or can be retrofitted to enable the use of low-carbon fuels such as biomass, and CCUS in the longer term. Converting coal plants to provide ancillary services such as frequency control can be a means to obtain an adequate return from existing assets and reduce emissions while keeping jobs and wealth in local communities. There is a role for solid biofuels to be drop-in ready and compatible with coal-fired co-generation plants. Experience in other countries, such as Denmark's Orsted, demonstrates that biofuels limit costly retrofits and can prolong the life of current assets.

Pumped hydro storage capacity plays a key role in maintaining system flexibility. Dlouhé Stráně (650 MW) and Dalešice (450 MW) in Moravia are the main pumped storage plants and are essential for emergency power supply, maintaining grid stability and providing peak load balancing. No additional capacity is foreseen.

Battery storage capacity is, however, expected to increase the integration of variable renewable energy. As of 2024, there was 480 MW of battery capacity connected to the grid, with 2 GWh of operational energy storage. In the NECP's progressive scenario, battery storage installed capacity is forecasted to reach 637 MW by 2030, approximately 1 500 MW by 2035 and 2 600 MW by 2040. As several energy sector players demonstrate interest in storage (e.g. a 100 MW Tykačova project), actual capacity could be higher. The 2024 amendment to the LEX RES III permits the use of battery energy storage systems as components of utility PV plants or as stand-alone systems to provide ancillary services for the grid and energy flexibility

services. Other excess electricity is to be diverted either to electrolysers or resistive dump loads, although the status of resistive dump loads is uncertain.

Demand-side response faces significant technical and legislative challenges. The National Action Plan for Flexibility envisions a role for explicit consumer-driven and implicit command-driven flexibility, but many of its critical tenets remain unimplemented. Implicit flexibility requires regulatory change to permit EVs and heat pumps to connect to the grid. Creating flexibility through direct consumer intervention relies on reforming the tariff structure to enable technology-neutral, dynamic pricing and prevent double charging of energy storage owners and operators. Both policies need to be accompanied with strategies to promote awareness and the rapid uptake of the new measures alongside sufficient technical infrastructure, including smart meters and data processing.

Smart meters are introduced in Czechia as part of a broader electricity system modernisation, but the slow pace limits demand-side response and flexibility. According to the National Action Plan for Smart Grids (2025-2030), over 2 million smart meters are expected to be installed by 2030, with the aim of enabling 15-minute interval data collection to support more accurate billing, enhanced grid management and consumer access to detailed consumption data. However, the current deployment of smart meters remains limited. As of late 2023, only 3% of households in Czechia were equipped with a smart meter, ranking it among the lowest penetration levels in the European Union. Earlier cost-benefit analyses did not support a nationwide rollout, which contributed to the slow adoption. More recently, policy developments have initiated a more targeted approach, with new requirements introduced in July 2024 mandating smart meters for customers whose annual electricity consumption exceeds 6 MWh, including electricity sharing. Electricity distributors provide smart meters free of charge to consumers involved in sharing electricity.

The establishment of the Electricity Data Centre (EDC) will strengthen essential data collection, processing and sharing capabilities. Operated under the ownership of ČEPS and regional distribution system operators, the EDC collects, aggregates and standardises data on the electricity consumption and generation of residential and commercial entities. This facilitates electricity network decentralisation, transparency and the proliferation of local energy communities. In the future, the EDC will fully automate data analysis and verification alongside expanding modelling capabilities and data access. With the intention to fully implement LEX RES III, the EDC will also collect data necessary for accumulation, flexibility and aggregation – the process of

pooling flexibility from electricity market participants for market participation or to manage deviations. Entities engaged in aggregation are required to obtain a general electricity trading licence.

Dispatchable generation will be needed to support the coal phase-out, but market players lack clarity about the role of natural gas in the energy transition. Czechia currently operates nine gas power plants with a total capacity of 1 700 MW, eight of which are co-generation units. Some additional units are in the pre-construction phase. The government has not established specific targets for gas-fired electricity and heat production. This lack of clarity around the future role of natural gas in electricity and heating is not only impeding investment in gas infrastructure but also puts into question overall policy directions. This sends unclear signals to renewable energy investors.

Czechia is exploring mechanisms to support investment in new dispatchable generation capacity, including combined-cycle gas-fired plants. In particular, the government is evaluating various market-based options, which would allow mechanisms such as CfD, PPAs or targeted capacity support schemes. In 2024, the European Commission approved a EUR 3.2 billion support scheme for electricity production from new and modernised high-efficiency co-generation plants. The scheme offers a 15-year feed-in premium per MWh of electricity produced, awarded through competitive tenders for installations over 1 megawatt electrical (MW_e). For small units, the premium is set administratively based on funding gap calculations.

Czechia launched several auctions in 2025 for a total installed capacity of 3 GW. The winning bids include 2.5 GW of gas-fired and 0.5 GW of solid biofuels-fired co-generation capacity. ENTSO-E's latest adequacy assessment makes Czechia eligible to request the European Commission's approval of capacity mechanisms. The Gas Act ("Lex Plyn"), adopted in June 2025, aims to expedite the permitting process and the environmental assessment for gas-fired power plants and to classify projects exceeding 100 MW of capacity as crucial for national security.

Gas storage moves into a more central position with new dispatchable capacity mainly from natural gas. Czechia currently operates around 83 PJ of gas storage capacity, including the facility in Dolní Bojanovice that was connected to the Czech network in April 2025. Czechia is well placed with its gas storage infrastructure to manage an increasing gas demand until 2030, and existing gas storages can help exploit the potential to store biomethane for heat production in winter. By 2030, Czechia expects to produce around 14 PJ of biomethane per year, most of it from

converted or upgraded biogas plants. Czechia's gas storage infrastructure is ready to integrate biomethane with existing capacities, but connecting biomethane plants poses challenges, as many existing biogas plants are not connected to the gas network.

Recommendations

5 Maintain energy security during the coal transition while ensuring that any government interventions are targeted and temporary

With the accelerated phase-out of coal, determining how to maintain supply adequacy and reliability is a key consideration. Government measures may be needed to support electricity and heat supply over the next several years, especially in winter, as approximately half of Czechia's heat supply is sourced from coal.

The government has introduced legal provisions that allow coal-fired plants in operation to be maintained in the case of supply shortages and is planning a capacity mechanism to attract investment in combined-cycle gas plants. While it will be necessary to use support mechanisms to maintain the security of supply, it is important to devise these instruments transparently and with a defined end date and phase-out procedure to limit market distortion, provide visibility to investors and respect decarbonisation targets. If a market-wide capacity mechanism is considered, it should provide incentives to a range of technologies, including energy storage and demand-response management.

The energy security considerations should reinforce the government's efforts to significantly scale up electricity production from renewable sources. As there is uncertainty around the dispatchable generation capacity that will be available over the next decade, the government is encouraged to model demand for natural gas under different scenarios and work with stakeholders to ensure that they have clarity over the long-term role of natural gas, relative to other energy sources. Czechia must not rely primarily on natural gas power plants to address the generation gap because this would risk fossil fuel lock-in. More investment in gas-powered plants than strictly necessary risks stranding assets and exacerbating the gas phase-out challenge in the longer term.

Therefore, when designing support schemes for fossil fuel-fired generation, the government should first consider alternative low-carbon options. Coal plants can be retrofitted to enable the use low-carbon fuels such as solid biofuels and waste in the short term or ammonia in the longer term. It is urgent to impose and enforce a landfill ban for municipal waste and support waste incineration as a short-term replacement for coal, especially in district heating (see Focus area 2). Biogas and biomethane can also contribute to energy security, especially for heat, when used in co-generation installations. It makes sense to encourage the production of biomethane in summer and its storage for winter use to address demand seasonality.

6 Implement the new legal framework and other measures to accelerate the deployment of utility-scale renewable energy projects

Renewable deployment in Czechia has been slow, driven mainly by biofuels and rooftop solar PV, with wind still at a very early stage. This limits Czechia's access to low-cost electricity amid supply shortages. Recent praiseworthy legal reforms (LEX RES I, II, III) mark strong government action to ease investment barriers, particularly by facilitating permitting. Attention must now turn to ensuring the timely and effective implementation of the new legal framework and resolving outstanding challenges that could hinder further progress:

- Introduce and enforce binding renewable energy targets in electricity generation.
- Ensure the swift implementation of the renewable acceleration zones and mandate municipalities to designate a minimum share of land for renewables in their spatial planning. Spatial planning can recognise repurposing open pit mines for the deployment of renewable energy projects and underground mines for thermal storage.
- Create a one-stop shop to streamline permitting, including for grid connection for industrial electrification projects.
- Consider introducing mechanisms to boost public acceptance of renewable projects, such as early public participation and benefit-sharing schemes. An example of this is Ireland's Community Benefit Fund, which has successfully improved local support.
- Establish clearer frameworks to encourage rooftop solar PV grid injection instead of curtailment.

- Regularly plan and implement competitive auctions for utility-scale renewable projects. Publishing at least a five-year plan on the allocation of support for renewables, including an easily accessible calendar with auction dates and volumes, such as in Germany, will increase investors' confidence.
- To unlock additional private investments, improve the enabling environment for corporate power purchase agreements (PPAs): help ensure fair and transparent grid access and wheeling arrangements for physical and virtual corporate PPAs, and together with renewable associations and financial institutions provide tools to help manage project and off-taker risks. Countries such as Norway and Spain and the EIB offer guarantee schemes for this purpose.
- Implement additional measures to reduce connection queues by addressing reserved but unused grid capacity through stricter project maturity requirements, such as "first-ready-first-served" provisions, auctions, "use-it-or-lose-it" provisions with clear time frames, requiring all permits and financing before granting grid access, and regular reviews of allocated grid access rights by system operators and the energy regulator.

7 Prioritise policy actions that increase power system flexibility

Growing shares of solar and wind energy need to go hand-in-hand with the development of a flexible power system. Power system flexibility can be enhanced through a combination of non-fossil instruments including low-carbon dispatchable generation, optimised use of the grid infrastructure (including interconnections), energy storage and demand-side response. Czechia is making progress in all these areas, but further actions are required to fully futureproof the electricity system, in particular by maximising the use of energy storage and demand-side management.

Recent legislative advances have laid the legal basis for flexibility, with new provisions including storage and aggregation. Smart meters are being introduced in Czechia, but deployment remains limited, and the penetration rate is among the lowest in the European Union. As smart metering is a pre-condition of demand-side flexibility, the rollout of smart meters should be accelerated, based on broader accessibility of supports.

Promoting demand-side management through dynamic pricing mechanisms – building upon existing flexible tariffs – can incentivise households and large consumers to adjust their energy use in response to price signals. This approach not

only enhances grid stability but also aligns consumer behaviour with the availability of renewable energy, contributing to a more sustainable and resilient energy system. Beyond facilitating the integration of variable energy sources, demand-side management can also enhance public acceptance of the energy transition, as citizens become active consumers. To empower citizens and communities to contribute to and benefit from flexibility services, the Energy Data Centre should be implemented quickly and comprehensively.

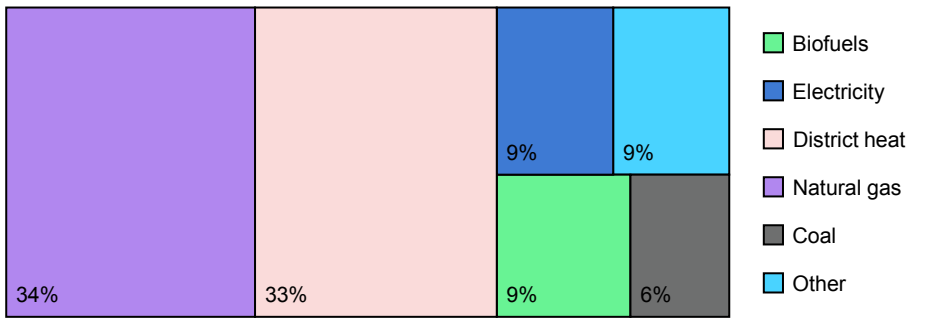
Focus area 2: Decarbonising heating in buildings

Introduction

Czech buildings are carbon-intensive because of their low energy performance and high reliance on fossil fuels. They are, on average, energy intensive with high heating demands. Heating in buildings accounted for 260 PJ, or 28%, of total final energy consumption in 2023. The country's Long-Term Building Renovation Strategy (2020) estimates that moderate renovation of the residential building stock can save 92 PJ, or a third of total consumption for heating. Approximately a third of Czech residential buildings are connected to DH systems and another third to natural gas networks. The remaining third uses different individual heating solutions, including electric heat pumps or burning biofuels or coal in household boilers. When including individual and collective heating solutions, fossil fuels accounted for 57% of the heat supply in buildings in Czechia in 2023. Decarbonising the sector will require energy efficiency improvements and the replacement of heat sources in individual boilers and DH with low-emission alternatives.

Due to climate change, air conditioning may become another important driver of Czechia's energy demand in the future. However, national strategies do not explicitly address cooling needs in a comprehensive way.

Main space heating sources by product in Czech dwellings, 2022



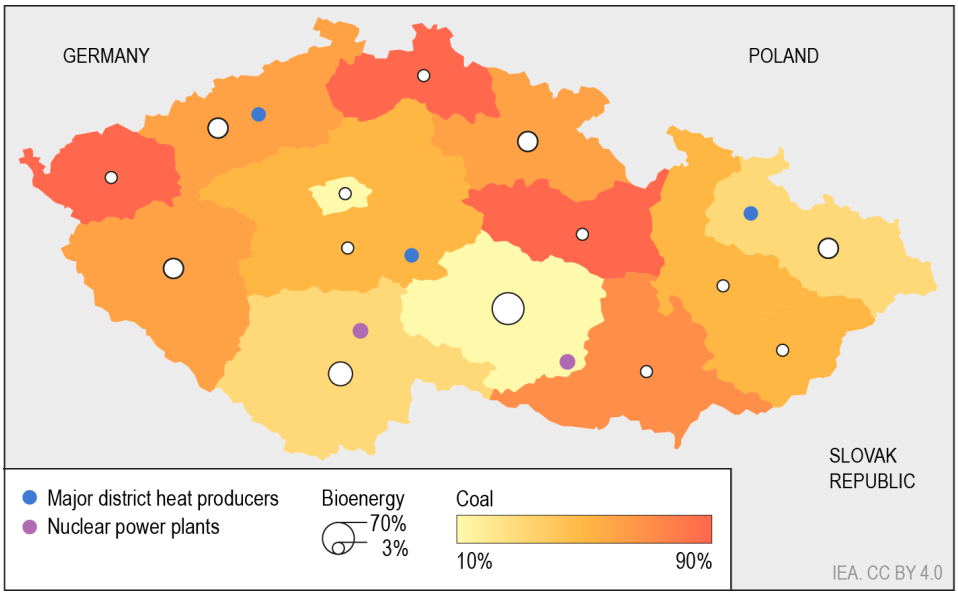
Notes: Commercial and public buildings are not included. The figure shows only the main heat supply option used in residential dwellings. It does not include heat generation efficiencies of various appliances, the absolute amount of heating needs or the size of dwellings, the eventual use of multiple fuels in the same boiler, or additional heating supply systems.

Sources: IEA analysis based on IEA (2025), Energy End-uses and Efficiency Indicators; LCP Delta (2024), Analysis of the EU heating market (accessed May 2025).

Czechia lacks a systematic approach to spatial planning. The importance of DH and the use of low-carbon fuels vary significantly among Czech regions, as the figure below demonstrates. These differences are driven by historical developments and local peculiarities. To comply with the EED, Czech regions, the capital city of Prague and statutory cities must submit territorial (local) energy concepts, including heating and cooling aspects. Such plans can help authorities stimulate the use of local resources, DH operators to optimise their heating systems and end users to decide on the optimal heating system for their needs. However, local authorities have limited human resources to carry out comprehensive energy and heat planning. They have limited access to financial or technical support for developing local energy policies, and there are no national data platforms or tools to assist them in this task. The German Heat Planning Law is a good example of approaching heat mapping in a structured way.

Czechia does not have a clear national strategy to decarbonise heating. Several assessments have been made, including a comprehensive “Assessment of the decarbonisation of district heating in the Czech Republic (2024)” that modelled several sector development scenarios. However, in the absence of a clear national policy based on concerted local heating and cooling plans, the directions and the pace of the sector’s transformation are uncertain, especially in the longer term. Concrete action plans to replace coal-fired plants and individual boilers still need to be developed.

Distribution of coal and bioenergy in district heat production and major district heating regions in Czechia, 2024



IEA. CC BY 4.0.

Notes: The map displays the fuel mix between bioenergy and coal by region – the dominant sources of district heating. Major district heat producers refer to regions producing > 5% of the national district heating. Nuclear power plant locations are shown as their waste heat is used in the district heating system.

Source: IEA analysis based on Energy Regulatory Office, Yearly report on the operation of Czech heat supply systems for 2024 (accessed August 2025).

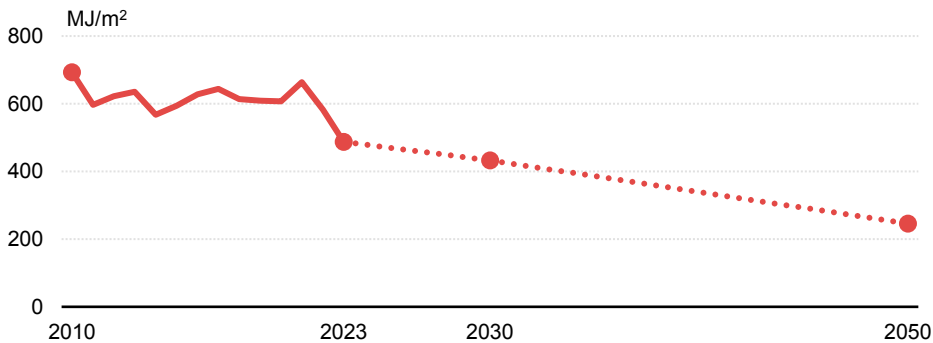
Energy efficiency in buildings

Energy efficiency targets for Czech buildings are challenging and require stronger policies and measures to be achieved. The Long-term Building Renovation Strategy and the NECP set targets for reducing energy consumption in buildings. The most ambitious "progressive" scenario envisages a decline in energy consumption in buildings from 371 PJ in 2023 to 312 PJ by 2030 and 212 PJ by 2050 thanks to the gradual increase in the annual renovation rate to 3% by 2030, and thorough renovations[2] of 85% of buildings by 2050. Meeting the target for 2030 will require

[2] A "thorough" renovation is an upgrade of a building's energy performance close to the passive energy standard.

annual energy savings of more than 2%. However, energy consumption in buildings has remained relatively flat since 2005 and only dropped by 10% in 2023, which was a particularly warm year. The strategy sets an indicative target to reduce the energy intensity of heating in buildings from 491 MJ/m²/year in 2020 to 386 MJ/m^2 in 2030 and 246 MJ/m^2 in 2050, with sub-trajectories for residential and non-residential buildings. The heating intensity in residential buildings has fluctuated since 2010 at levels significantly above the targets, with an exceptional drop in 2023. Non-residential buildings show a similar trend. This highlights the need to more quickly remove the existing barriers to energy efficiency investments, which include a lack of awareness, limited access to financing, split incentives between building owners and tenants, and difficult decision making in multi-apartment buildings.

Heating intensity in residential buildings (2010-2023) and targets in Czechia (2030, 2050)

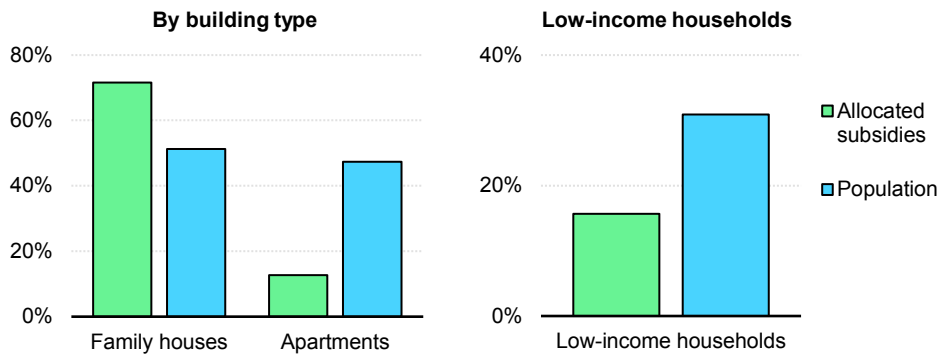


Sources: IEA analysis based on IEA (2025), Energy End-uses and Efficiency; Czechia, Ministry of Industry and Trade (2024), Long-term Building Renovation Strategy (accessed June 2025).

Households are the key stakeholders for improving the energy efficiency of buildings. The residential sector accounts for about 70% of energy consumption in buildings. In contrast to many other European countries, a high share of the Czech population (about 70%) lives in privately owned houses or apartments. Therefore, households are the key decision makers as regards renovations and energy efficiency improvements in buildings. Just over half (51%) of the Czech population lives in family houses (CSU 2021). According to the Building Renovation Strategy, more than half of the total floor area of residential buildings has not been renovated; this share is higher for family houses: about 75% of which require renovations. Family houses account for the major share of total cumulative investment costs of CZK 1 419 billion (EUR 56.49 billion) in the progressive scenario.

Czechia has an effective funding programme to support energy efficiency in the residential sector, but the allocation of subsidies could be more targeted. Its successful funding scheme – the NZÚ Programme – has primarily targeted family houses (72% of allocated subsidies). This approach seems to be driven by the fact that Czech family houses are generally less energy efficient than apartment buildings. Nearly half of the Czech population lives in multi-apartment buildings, many of which have low energy performance. Such buildings only receive 13% of NZÚ subsidies. Renovating multi-apartment buildings could lead to significant cost-effective energy savings and reduce GHG emissions thanks to economies of scale. Moreover, the renovation of the least-performing multi-apartment buildings would allow efficiency improvements in DH systems because when all buildings connected to the DH network meet certain energy performance standards, it is possible to lower the temperature of heat in the network. The NZÚ has a separate window targeting low-income and vulnerable consumers, who represent over 30% of the population but have benefited from less than 16% of the programme's budget. Low-income households often live in less-efficient dwellings compared to wealthier families. Therefore, directing more support to vulnerable groups would help achieve two policy objectives simultaneously: decarbonising the economy and reducing the negative social impacts of the energy transition.

Allocated subsidies from the New Green Savings Programme



Notes: The subsidy data are aggregated from officially published lists of paid out subsidies in the current programme period (2021-2025). The low-income household population refers to households that meet eligibility criteria to receive a subsidy in the low-income category: pensioners and recipients of housing support, state child support and category III disability support.

Source: IEA analysis based on NZÚ (2025), Recipients overview (accessed June 2025); Czech Statistical Office, Census 2021 (accessed June 2025).

Policy spotlight: New Green Savings Programme

The New Green Savings Programme (NZÚ) is Czechia's flagship initiative for the residential sector. It builds on the previous programme established in 2014 and is estimated to lead to energy savings of 62 PJ between 2021 and 2030. The NZÚ offers subsidies for a range of energy-saving measures and for replacing coal- or gas-fired boilers with a heat pump, biofuel boiler or another low-carbon heat source. It covers up to 50% of a household's expenses, but the most vulnerable consumers can benefit from an 80% subsidy via the NZÚ sub-programme "Light".

Several changes have streamlined the application process and simplified the support programme. Applicants are encouraged to carry out comprehensive renovations, including insulating the building envelope, replacing the heating source and installing other renewable energy sources. A subsidy bonus is usually granted for combining several saving measures. The most recent reforms introduced ex ante subsidy payments, thereby granting access to financing to households with limited resources. Support for solar PV has been reduced.

NZÚ has already supported more than 600 000 households – with two-thirds of all subsidies allocated since 2021. EUR 4.4 billion have been distributed since the start of the programme. Between 2014 and 2021, the programme was financed through revenues from the EU ETS. The post-2021 EUR 3 billion budget is also funded by the EU ETS alongside the EU Recovery and Resilience Facility since 2021 and the Modernisation Fund as a part of HOUSEnerg since 2023 through the National Recovery Plan.

As the floor area in residential buildings is constantly increasing, it is important to ensure that new buildings meet stringent energy performance standards. Around 30 000 houses are constructed in Czechia annually and the average number of persons per dwelling is steadily decreasing. Only 30% of newly constructed dwellings in the past 20 years have been in apartment buildings. Czechia plans to build new single-family houses at a rate exceeding 1% per year of the current stock. New buildings need to comply with the Energy Management Law, including so-called near-zero energy buildings, which are characterised by minimal energy consumption and the use of renewable sources. Most new buildings and dwellings have an energy performance class B, the second-highest energy performance standard. Buildings

undergoing major alterations or new buildings must have an energy performance certificate (EPC). It is important to enforce the implementation of the regulations.

Reducing energy consumption in public and commercial buildings is crucial for limiting public expenditure, reducing emissions and easing the cost of the energy transition. Czechia's public sector owns nearly 96 000 buildings, over three-quarters of which fall into energy performance classes D and lower. Despite stable energy consumption, public expenditure on energy rose from CZK 22 billion in 2020 to CZK 37 billion in 2024. Public and commercial buildings account for about 11% of total emissions in Czechia. The 2023 revision of the EED mandates public entities to reduce final energy consumption by at least 1.9% annually and renovate 3% of their building floor area to nearly zero-emission standards each year. Additionally, the Energy Performance of Buildings Directive requires mandatory renovations of public buildings. Despite rising energy prices and available EU subsidies, inflation-adjusted expenditure on public building renovations remained between CZK 25 billion and CZK 30 billion between 2020 and 2024. Only one-fifth of renovation projects achieved the required 30% energy savings to meet the subsidy conditions. Most projects only resulted in savings of around 5%.

Structural underinvestment in public buildings compared to privately owned buildings perpetuates poor energy performance standards. Substantial subsidies are available for renovating public buildings, such as the Operational Programme Environment, which allocated CZK 11 billion in 2014-2020 and another CZK 10 billion from 2021; the National Recovery Plan (CZK 8 billion), partially overlapping with the EFEKT programme (calls for proposals administered by the Ministry of Industry and Trade); and about 4% of the Modernisation Fund channelled through the ENERGov programme (estimated at roughly CZK 15 billion). However, fragmented facility management and a lack of strategic, data-driven renovation planning contribute to underinvestment. Municipal leaders often lack the expertise to secure funding and manage assets effectively. This results in inefficient operations and higher administrative costs. A central database for energy consumption and performance data, along with a dedicated facility management institution, could help address these challenges and improve the energy performance of public buildings.

Energy performance contracts are a proven tool in Czechia and should be used more often. Over the last 30 years, about 290 such projects have been accomplished in municipal and regional administration buildings and some central-level public institutions. However, central government institutions, such as ministries and state administrations, have been legally prohibited from taking any loans, including supplier

credit in the context of an EPC. Energy renovation projects in state buildings have thus been mainly financed from the state budget. Recent amendments to the Act on Public Finance Management and Control have removed this bottleneck. The use of energy performance contracts by private investors is limited in Czechia, reportedly due to their cost structures or different planning horizons.

District heating

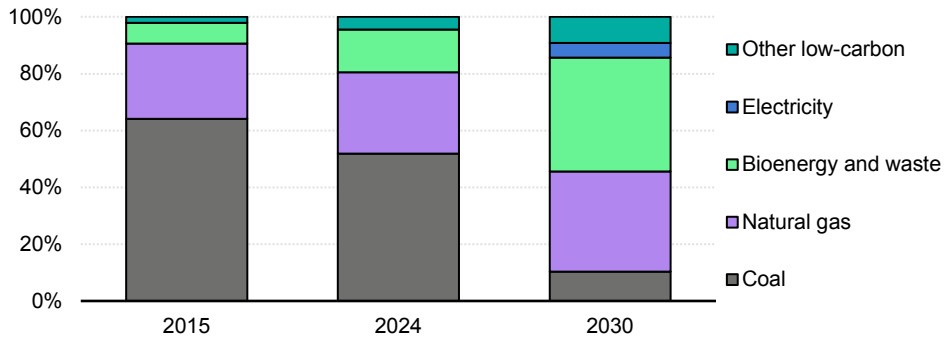
Need for urgent policy decisions

District heating[3] plays an important role in Czechia, providing heat to approximately 1.7 million households (more than 40% of the population) and accounting for 9.4% of the country's GHG emissions. The residential sector is the main consumer of DH (47%), followed by industry (27%), then commercial and public buildings (26%). The installed thermal capacity in DH systems totalled 38 gigawatt thermal, and about 76 PJ heat was supplied to end users in 2023. In addition, industrial and commercial actors that operate their own co-generation and heat-only plants produced around 44.3 PJ in 2023. Around a third of this heat was supplied to DH networks. The remainder was used for own consumption. Industrial heat accounts for 13% of the heat supply in DH systems.

The sector is heavily dependent on fossil fuels; coal is being phased out at a rapid pace while natural gas is expected to remain a transition fuel. Coal accounted for 54% of DH production, natural gas 29%, bioenergy 12% and other products 5% in 2023. About 64% of net heat production comes from co-generation. The share of coal has declined significantly since 2015 and the share of gas has increased. According to a recent assessment, in the period to 2030, most coal in DH would be replaced by natural gas, sustainable solid and gaseous biofuels, waste-to-energy plants, and heat from nuclear power plants.

[3] In this report, the term "district heating" also includes so-called "centralised" heating systems that sell heat to a building, a group of buildings, or a commercial or industrial site.

District heat fuel sources, 2015, 2024 and 2030 projection in Czechia



Sources: IEA analysis based on IEA (2025), World Energy Balances; Czechia, Ministry of Industry and Trade (2024), Assessment of the decarbonisation of district heating in the Czech Republic (accessed June 2025).

DH systems are facing short-term supply constraints due to the closure of coal-fired co-generation plants. Operators determine the continuation of coal-fired plants' operations based on economic considerations, which includes carbon prices. When coal-fired co-generation plants – which supply DH systems – retire from the electricity market, the coal demand for heat generation only will not be sufficient to keep the respective coal mines economically viable, so they are likely to close. Therefore, the concerned DH companies are urgently trying to switch to other fuels, e.g. gas or biomass; if they do not, they may be obliged to close their business in the coming years. There are strong arguments in public debates for temporarily maintaining some coal-fired power plants and associated coal mines in operation in the short term until new sources of heat are available. This topic is especially sensitive in regions where a large part of the population is energy vulnerable.

Czechia needs to address the closure of coal-fired plants in a co-ordinated manner. The landscape and ownership structure of co-generation plants, heat-only boilers and network operators is diverse. More than 700 licensed entities manage DH networks, and there are close to 700 licences for the production of thermal energy. Without a co-ordinated approach between the different actors, DH systems could face supply constraints as early as 2025, leaving vulnerable portions of the population without an adequate heat supply. Managing the looming coal phase-out requires co-ordination between several actors, including national and regional/municipal authorities.

DH systems lose some customers to decentralised heating solutions due to the unlevel playing field. DH consumption in end-use sectors has declined by approximately 30% since 2010 while the length of the heating network has remained stable. One of the reasons for this is that most of the DH systems are fired by fossil fuels and covered by the EU ETS, which increases their costs. In contrast, no carbon tax is levied on decentralised heating sources, which provides an incentive for consumers to disconnect from DH and install individual heating sources. The forthcoming ETS2 is expected to raise the cost of individual heating based on fossil fuels, thus creating fairer competition with DH. However, the transposition and implementation of the ETS2 has been delayed in Czechia. To attenuate the negative social consequences of the ETS2 introduction in Czechia, it is important to communicate transparently about its impact on fuel prices and available support for switching to low-carbon alternatives. If households and businesses are not fully aware of the consequences of the ETS2, they may take investment decisions that will result in higher operational costs in the near future. It is also important to put in place targeted support for the most vulnerable.

There are significant benefits of maintaining and modernising the DH sector in Czechia. As most DH systems are based on co-generation plants, they ensure an efficient use of primary energy sources, including solid and gaseous biofuels, and waste; provide cheap thermal energy storage; can reduce air particulate matter; and have the potential to be net-negative sources of energy when paired with CCUS. Importantly, DH can complement the electrification of the Czech economy by reducing peak demand for electricity, supporting grid stability and using electricity for higher value uses instead of home heat (e.g. EVs).

There is potential to improve supply-side efficiency with low-temperature networks. About 3 470 km of DH networks are hot water pipelines, vs 1 350 km of steam pipelines in 2020. Hot water pipelines are not only more efficient but also allow tapping into waste heat potentials. Czechia plans to reconstruct 240 km of steam pipelines by 2030 and another 400 km by 2040, for a total of 85% of the identified replacement potential. This conversion of steam networks into water ones is lengthy and requires multi-year funding. About CZK 1.6 billion (EUR 63.7 million) have been allocated to the reconstruction of networks from the Recovery and Resilience Fund, but additional funding would be provided through the Modernisation Fund.

The DH regulation is being modified to improve the sector's competitiveness. DH companies must set their tariffs using the obligatory formula published by the Energy Regulatory Office, according to which they can apply the maximum tariff based on economically justified costs of production and distribution, a reasonable profit, and VAT. The regulator does not approve DH prices but publishes detailed tables showing the preliminary and final prices of heating in each location. The

regulator does not verify all heat suppliers' actual costs but carries out individual checks on its own initiative or following a consumer complaint. Since 2022, the regulatory framework is under amendment to provide more flexibility and stronger incentives for modernising district heating, which competes with individual heating solutions while being a natural monopoly. New conditions have been introduced for consumers willing to disconnect from district heating, e.g. requiring that any switch towards individual heating result in at least an equivalent level of energy efficiency of a given building. The regulator also implemented dual tariffs, made up of a capacity component and an energy component to provide customers with incentives to improve demand-side efficiency and distribute costs more fairly between customers, e.g. when DH is used only as a backup source.

Regulation can be improved further to incentivise the decarbonisation of DH. Another positive amendment allows DH customers to obtain a lower tariff if they use the energy from the heat supply for the dwelling more efficiently and reduce the temperature of the returned heat transfer medium. This practice should be encouraged: if customers lower temperatures on their side, it can improve the efficiency of the entire DH system. For DH companies, the regulator plans to revise how subsidies are included in the regulation. Most investments in efficiency improvements or switching to low-carbon fuels are financed by subsidies from different funding schemes. The current regulation does not allow a profit on subsides, which may be a disincentive for investment because it reduces the profit margin in the coming years. To address this shortcoming, the regulator plans to allow a reasonable profit on subsidies to finance decarbonisation investments.

Support for decarbonising district heating

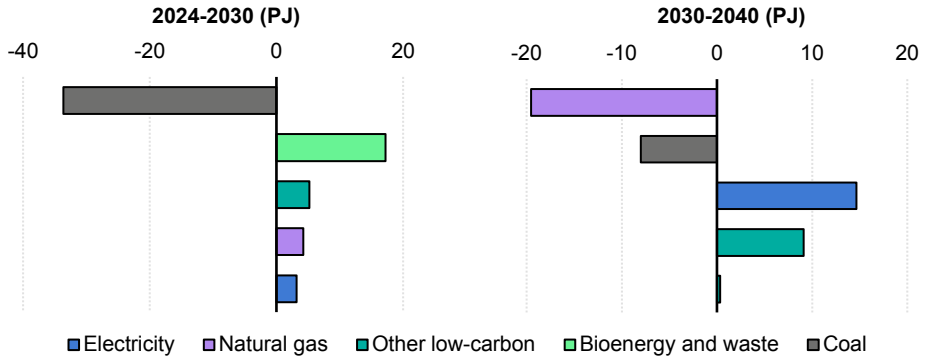
The estimated cost of decarbonising district heating by 2030 is CZK 200 billion (EUR 8 billion). Decarbonisation is encouraged through investment and operational support. The main programmes supporting the decarbonisation efforts are the HEAT programme, which receives CZK 100 billion (EUR 4 billion) from the Modernisation Fund, along with the Just Transition Fund, the Recovery and Resilience Facility, and EU/Cohesion Funds (OP TAK, Operational Programme Environment). These programmes target system-level decarbonisation of heat infrastructure, such as DH networks and high-efficiency co-generation plants, to help DH operators replace coal with other fuels; however, the number of applications for this support exceeds the available funding. Focus area 1 discusses operational support for co-generation.

Decarbonisation of DH is also promoted by regulatory provisions aligned with EU legislation. The ETS is the key instrument (see Focus area 1). Another disincentive for coal use will be more stringent legislation with regards to pollutants (NOx, SOx, etc.) that will be applied by 2026. Consumers supplied by DH are allowed

to switch to individual or centralised heating. However, new individual heating sources with installed capacity above 200 kW must undergo an energy assessment of the technical and economical availability of DH in the given area. The recent legal amendment introduces a new obligation requiring that any switching from DH to alternative heating must result in at least an equivalent level of energy efficiency of a given building.

Biofuels and waste are expected to play a central role in the transformation of the DH sector. As the figure below demonstrates, the rapid phase-out of coal in the next five years is projected to be underpinned by substantial growth in low-carbon fuels. Sustainable biofuels and municipal solid waste are seen as a key alternative for supplying heating and electricity, particularly through high-efficiency co-generation plants. The use of natural gas is also projected to grow up to 2030 then decline significantly by 2040 and be phased out by 2050, although market participants complain about the lack of clear policies to support this forecast. The role of large-scale heat pumps, renewables and nuclear waste heat is expected to increase between 2040 and 2050. However, this outlook will depend on future policies and measures. Many DH operators that are currently switching to natural gas, supported by existing funding schemes, may need additional incentives or regulatory requirements in the medium term to switch away from gas to non-fossil energy sources.

Projected changes in district heat fuel sources in Czechia, 2024-2040



Sources: IEA analysis based on IEA (2025), World Energy Balances; Czechia, Ministry of Industry and Trade (2024), Assessment of Decarbonisation of District Heating in the Czech Republic (accessed June 2025).

The availability of low-carbon resources will be key to enabling the switch away from coal and natural gas. Czechia has made several assessments of solid biofuel and waste potential. The results of these studies should be taken into consideration when developing national and local heating action plans. The potential of forest residues is declining but there could be an opportunity to increase it through sustainable forest management practices, for example thinning, stand management, pest infestation management. The Czech forestry sector has suffered from bark beetle calamities for many years, damaging spruce growing stocks and even causing the total depletion of spruce in some regions. The situation somewhat improved in 2021-2022 but the risk of this natural disturbance still exists. Because of the limited possibilities to secure sustainable biomass from domestic sources, further growth in solid biomass use is not expected after 2030.

The use of municipal solid waste in DH plants would enable not only switching away from coal, but also reducing methane emissions from landfills. About 90% of municipal waste (over 2 730 kilotonnes per year) goes to landfills, which produce 5% of the country's GHG emissions, i.e. more than the Czech cement industry. If this waste was incinerated in co-generation plants, it could provide nearly 10% of DH generation, with over 8 PJ of heat per year. To comply with national legislation (that goes beyond the EU Landfill Directive), Czechia must stop landfilling non-recoverable and pre-treated municipal waste by 2030; however, there are discussions about postponing this date because of strong opposition from the landfill industry. Experience in other countries demonstrates that municipal waste is a reliable and affordable source for DH generation. Sweden has had a ban on landfill for municipal waste since 2002; in Denmark, heat from waste incineration covers about 20% of the DH production. Czechia should, therefore, not postpone the upcoming landfill ban because the industry needs clear signals to make the right investments today. There are four facilities in Czechia for energy recovery of mixed municipal waste: Brno, Liberec, Plzeň and Prague. Their total capacity is approximately 940 000 tonnes per year. Seven other projects are in the pipeline.

DH can use waste heat from industrial processes and utility-scale heat pumps. The potential for recoverable industrial waste heat in selected sectors was estimated at 12 609 GWh per year, representing 11% of these sectors' energy consumption. The largest potential was identified in the metallurgical and petrochemical industries. Czechia intends to introduce regulatory requirements to incentivise the use of waste heat from 2026 in the form of valuation of waste heat compared to the current situation where waste heat energy is valued at zero. For comparison, Finland is considering introducing stricter conditions for tax incentives for data centres, such as a

requirement that their waste heat be utilised. Utility-scale heat pumps are expected to account for up to 8% of the DH supply by 2030, supplying over 6 PJ of heat from low-temperature sources (wastewater treatment plants, geothermal heat, heat from rivers and ambient heat), while consuming 0.5 TWh of electricity. As discussed in Focus area 1, high electricity prices are a key barrier to the accelerated rollout of heat pumps. This should be addressed.

The government promotes the use of advanced biofuels and biomethane to support the decarbonisation of heating systems and industrial processes. In 2023, there were 584 biogas plants, 112 of which were wastewater treatment facilities, and 64 facilities using landfill gas. Over 1 300 million m^3 of biogas produced at these plants is used essentially for electricity and heat production. Many of these plants produce mainly electricity. There is scope to create new small DH networks to supply heat to surrounding settlements. Alternatively, as about half of the existing biogas plants are situated within 2 km of the gas pipeline, they could be converted to biomethane plants.

Policy spotlight: Using heat from nuclear power plants

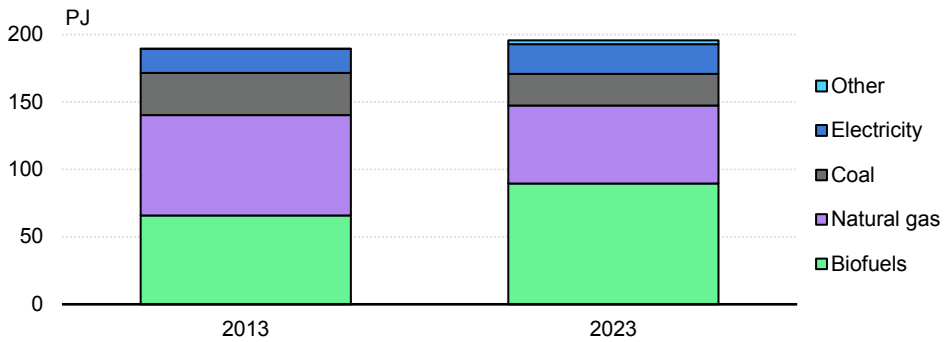
Czechia plans to maximise the use of heat from nuclear plants in DH systems. This will be a commendable achievement. The Temelín nuclear power plant has been supplying heat to the town of Týn nad Vltavou since the early 2000s. More recently, a large-scale pipeline has connected Temelín to České Budějovice. The Dukovany plant will be connected to the district heating in Brno by 2030 to supply heat to about 110 000 households. The IEA's previous recommendation to consider the role of SMRs in decarbonising the heating sector is being taken onboard. The SMR Plan adopted in 2023 envisages the construction of several SMRs in the 2030s, with a power capacity of 300 MW_e/800 megawatt thermal (MW_t) or more. Using them for heating would be possible in larger cities and agglomerations. The most promising locations include Mělník, Ledvice, Opatovice, Dětmarovice, Prunéřov, Tušimice and Vřesová. SMR concepts that would supply only heat for DH can be considered in the future. While public acceptance for nuclear energy is generally strong in Czechia, it remains to be seen if there will be any strong opposition to locating new reactors close to urban areas.

Repurposing former underground mines for thermal storage could be considered. Such initiatives are emerging in Europe. In the Netherlands, a former coal mine is being transformed into a large-scale thermal energy storage system. Another example is Iberdrola's pilot project in Spain. While still in the early stages, this concept holds potential for large-scale implementation. In Czechia, most coal mines are open pits, so not suitable for thermal storage, but opportunities in other depleted mines could be investigated. Some research has been carried out focusing on using decommissioned coal mines for energy storage through hydro pump storage and kinetic energy.

Individual heating

Around two-thirds of Czechia's dwellings are heated by individual heating systems. Solid biofuels continue to be a key source for individual heating in residential buildings in Czechia, mainly in rural areas. Alongside natural gas and coal, these three fuels have a dominant share in residential heating. The share of coal in space heating has decreased gradually: from 17% in 2005 to 12% in 2010 and 10% in 2023. Contrary to residential buildings, individual heating systems in public and commercial buildings have two main pillars: electricity and natural gas.

Individual heat sources in residential buildings in Czechia, 2013 and 2023



Note: Values for space heating are temperature-corrected.
Source: IEA (2025), Energy End-uses and Efficiency Indicators.

The decline in coal use in residential buildings is driven by a successful subsidy scheme, more recently supplemented by a regulatory ban. The state financial support (especially the NZÚ Programme) and the recent ban on solid fuel boilers are the key measures to support the decarbonisation of individual heating systems. The latest estimates indicate there are still about 150 000 old boilers in Czechia, although many may no longer be in use. Czechia planned to ban solid fuel-fired boilers classified as low efficiency and high emissions in 2022 but extended the deadline due to high inflation and rising energy prices. The ban came into force in September 2024, with fines for non-compliance. Estimated total energy savings from the ban of solid fuel-fired boilers in emission classes 1 and 2 is 50 PJ.

Energy prices are an important factor in a household's investment decisions. IEA analysis demonstrates that replacing fossil fuel boilers with high-efficiency heat pumps can reduce energy use in buildings by up to 75%. Heat pump installations surged in 2022 and 2023 in response to the higher price of natural gas amid the global energy crisis but gradually returned to previous rates as the natural gas prices stabilised. The higher price of electricity, compared to gas, as discussed above, is a key barrier to the electrification of heating.

Excise taxes could provide stronger incentives to reduce emissions from heating. Natural gas and coal are responsible for 97% of direct energy-related emissions in buildings. Currently, natural gas for non-business use is exempt from excise taxes in Czechia, and excise taxes for coal are set at minimum rates defined by the Energy Taxation Directive. The current proposal to revise this Directive seeks to align energy taxation with EU climate objectives by imposing higher taxes on energy products with a greater climate impact. As any other sensitive policies related to pricing and taxation, the future changes to excise duties should be implemented in a transparent and inclusive way, with parallel measures to protect the most vulnerable segments of the population.

Recommendations

8 Target support for renovations towards the least energy-efficient apartment buildings and the poorest households

To meet its energy efficiency targets, Czechia should scale up the renovation rates in all existing buildings. The accelerated renovation of the poorest performing buildings is particularly important, including those in rural areas. Many of the least energy-efficient buildings are situated in low-income regions that face numerous social and economic challenges; therefore, additional support might be needed to encourage renovations. Reducing heat losses in the least-performing multi-apartment buildings connected to DH will have an additional benefit: it would allow DH operators to lower the temperature in the whole network, thereby improving supply-side efficiency and reducing the heat price. The government could develop a national methodology for identifying and prioritising the least energy-efficient buildings, including mapping tools and databases.

In the residential sector, successful programmes can be improved further to maximise their effectiveness for single-family homes and multi-occupancy buildings. Building upon the Green Savings “Light” Programme that targets low-income households, the Czech government is encouraged to introduce further income-adjusted differentiation of support for single-family homes. While maintaining the same overall budget, the programme can be redesigned to provide several levels of support according to income. The lowest income households will be eligible for the highest share of the subsidy and the wealthiest households will receive no capital subsidy but can benefit from free advisory services. In multi-apartment buildings, inhabitants’ incomes might differ, but low-income households are more likely to live in inefficient buildings. A bonus should, therefore, be given for deep renovations of the least energy-efficient buildings.

For public and commercial buildings, energy performance contracting should be promoted, showcasing the successful projects implemented by several municipal and regional administrations. Czechia has recently removed the legal bottleneck that prohibited central government institutions, such as ministries and state administrations, from procuring a loan, including supplier credit in the context of an energy performance contract. This encouraging reform should be supplemented by

implementation support, e.g. creating a database of certified or nationally authorised suppliers and a helpdesk at the federal level to assist building owners in the energy performance contracting process.

In new buildings, it is vital to ensure the implementation and enforcement of stringent efficiency standards. The regulatory requirements should be accompanied by efforts to raise public awareness and encourage the rollout of smart interactive technologies, which can show real-time energy performance and help occupants optimise their energy use.

9 Support the development of local heating and cooling plans as a basis for creating coherent national action plans

Czechia lacks clear action plans – at the local and national levels – to decarbonise the heating sector and secure an uninterrupted supply of heat. Several comprehensive assessments have been made; however, the directions and the pace of the sector transformation are not clear to all stakeholders, especially in the longer term. As the planet warms, the use of air conditioners can become another important driver of Czechia's energy demand. It will be vital to ensure that cooling needs are met in a sustainable way, e.g. with the help of efficiency standards; passive, nature-based and alternative solutions to air conditioners; and improved design of buildings and districts.

While natural gas can be a necessary transition fuel in some areas, more diverse heat production is needed to enable the cost-efficient decarbonisation of the heating sector and security of supply. Czechia, therefore, needs to comprehensively map the local heating and cooling demand and the available sources, including waste heat from industrial processes and data centres; heat from waste incineration; and biomass, solar and geothermal energy. The local plans should also assess the potential for sustainable individual and utility-scale technologies such as heat pumps. The heating and cooling plans should be linked with building renovation strategies, electricity grid planning and industrial decarbonisation efforts.

Local and regional authorities have limited experience and constrained financial, technical and human resources to conduct strategic energy or heat planning. The Czech government should put in place national support (e.g. a helpdesk) to enable the relevant authorities to prepare local plans in a holistic manner in co-operation with

utility companies and other affected parties, e.g. companies with special energy and heat needs. After having built the planning capacity in the largest municipalities, the requirement can be gradually extended to smaller cities and towns, with a clear time frame to give them visibility and sufficient time to prepare.

In parallel, the government should use the local plans as the basis for adopting a coherent national heating and cooling action plan, which will enable the use of the least-cost cleaner heat options across the country. For example, in the short term, the government can align solid biofuel-related policies with the heating/cooling sector's needs and develop strategic planning of future SMR sites to use nuclear heat in local district heating systems in a longer term perspective. The national action plan should provide a framework and methodology for local plans to avoid inconsistencies.

10 Continue reforming district heating regulations to improve competitiveness and boost investment in low-carbon and energy-efficient solutions

District heating (DH) has long been a cornerstone of Czechia's heating system. It is positive that the government, the regulator and other stakeholders recognise the essential role DH will play in Czechia's clean energy transition. The regulatory framework for DH in Czechia has many positive elements aligned with international best practices, but it could be further improved to maintain the sector's relevance, ensure its competitiveness and facilitate decarbonisation.

The recent regulatory measures to stimulate the modernisation of district heating, demand-side energy efficiency and a fairer distribution of costs are positive and should be further supported and developed. They should go hand-in-hand with targeted measures to encourage and enable consumers to lower heat temperatures. They should also be accompanied by transparent communication to help consumers understand the different components of DH tariffs and compare DH with other heating options, keeping in mind the forthcoming introduction of the ETS2.

The price-setting methodology on the supply side could be improved to include performance-based components, thus providing explicit incentives for switching to renewable energy and waste, using waste heat and utility-scale heat pumps, implementing temperature reductions in heat networks, and other measures. In Denmark, profit opportunities are available for district heating based on renewable

energy, but not for fossil fuel-based production. To enable debt co-financing of decarbonisation investments (in addition to subsidies), the Energy Regulatory Office could consider extending the regulatory period. With the current cost-based regulation only covering a one-year time frame, DH companies would have difficulties procuring a loan to finance decarbonisation investments that have payback periods of several years.

Annexes

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Abbreviations and acronyms

CCUS	carbon capture, utilisation and storage
CfD	contract for difference
CNG	compressed natural gas
CO_2	carbon dioxide
CZK	Czech koruna
DH	district heating
EDC	Electricity Data Centre
EED	Energy Efficiency Directive
EPC	energy performance certificate
ETS	Emissions Trading System
EU	European Union
EUR	euro
EV	electric vehicle
GDP	gross domestic product
GHG	greenhouse gas
IEA	International Energy Agency
LNG	liquefied natural gas
LOLE	loss of load expectation
LULUCF	land use, land-use change and forestry
NECP	National Energy and Climate Plan
NZÚ	New Green Savings Programme
PPA	power purchase agreement
PV	photovoltaic
R&D	research and development
RES	renewable energy source
RFNBO	renewable fuels of non-biological origin
SMR	small modular reactor
TSO	transmission system operator
USD	United States dollar
VAT	value-added tax

Units of measurement

GW	gigawatt
GWh	gigawatt hour
kg	kilogramme
km	kilometre
kW	kilowatt
kWp	kilowatt peak
MJ	megajoule
Mt	million tonnes
Mt CO_2-eq	million tonnes carbon dioxide equivalent
MW	megawatt
MW_e	megawatt electrical
MWh	megawatt hour
PJ	petajoule
TWh	terawatt hour

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

Infographic sources

Clean energy technologies: EHPA (2025), Map of heat pump factories; AutoSAP (2025), 2024: A year of record passenger car production.

Electricity supply: IEA analysis based on IEA (2025), World Energy Balances; ČEPS (2023), Resource Adequacy Assessment of the Power Grid of the Czech Republic until 2040 (only available in Czech).

Maps: IEA analysis based on The Prosperity Index (2024), Regional Prosperity; Czech Statistical Office (2021), Statistical Atlas.

Heating: Czechia, Ministry of Environment (2024), The most successful program, New Green for Savings, is celebrating its 15th anniversary. Thanks to it, we have already supported almost half a million applications for home renovations or photovoltaics (only available in Czech).

Small modular reactors (SMR): Rolls Royce (2024), Rolls-Royce SMR and ČEZ Group partner to deploy SMRs in UK and Czechia.

Nuclear: Reuters (2025), Czechs sign $18 billion nuclear power plant deal with KHNP after court injunction lifted.

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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 Czechia and the IEA. It draws on the IEA's extensive knowledge and the inputs of expert peers from IEA Member countries to assess Czechia'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 Czechia'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.