

Energy Efficiency Policy in Azerbaijan: a Roadmap



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Executive summary

Azerbaijan's energy system is at a crossroads. Longstanding and substantial natural gas and electricity subsidies have disincentivised investments and progress on energy efficiency. Reliance on natural gas for energy and economic growth has limited diversification and increased exposure to global fossil market volatility. In recognition of these and other issues that present challenges to Azerbaijan reaching its COP28 commitment to transition away from fossil fuels, the Government of Azerbaijan has introduced a series of measures to improve energy efficiency over the recent years.

In 2022, Azerbaijan's first legal framework on energy efficiency entered into force, and several pieces of secondary legislation covering buildings and appliances standards and norms, energy audits, and promotion of energy-efficient street lighting, among others, have since been adopted. The adoption of a new a Socio-Economic Development Strategy, which contains more measures targeting energy efficiency improvements and increases in the share of renewable energy, and recent creation of a dedicated fund for energy efficiency suggest policy efforts are gaining momentum. Policy efforts on energy efficiency are also undergoing a transition, moving from the adoption of framework laws to the implementation of measures, including deploying codes and norms in markets.

This is an opportune moment for Azerbaijan to develop targeted actions for energy efficiency that are aligned with the country's climate commitments, building on progress made to date. Action on energy efficiency is more pertinent than ever for Azerbaijan. Moreover, as the host of COP29 in 2024, Azerbaijan can both demonstrate and encourage leadership in this area. Progress on energy efficiency can also support the long-term strategic development of Azerbaijan's economy and energy sector while reducing the country's exposure to global fossil fuel market fluctuations. While precise estimates still need to be developed, there is significant untapped energy efficiency potential in Azerbaijan, especially in its buildings, industry, transport and agriculture sectors. Unlocking savings and efficiencies could help Azerbaijan conserve natural gas and oil, diversify its economy and deliver multiple economic, social and environmental benefits.

To support Azerbaijan's journey towards greater efficiency across its economy, this report examines the country's energy efficiency status based on recent analysis by the IEA and other international bodies, as well as engagement with officials and stakeholders. It includes recommendations, in the form of a summary roadmap, designed to offer inputs on energy efficiency strategy formulation and

policymaking over the coming decades to 2040. In addition to subsidy and tariff reforms to incentivise investments in energy efficiency, a key recommendation in the roadmap is the setting of energy efficiency targets. This can support the successful implementation of recently adopted secondary legislation, including the development of new technical norms related to eco-design requirements and minimum energy performance standards for buildings. Work in this area is already under way, but full implementation will require dedicated institutional capacity and co-ordination. Special funding mechanisms and incentives, building on the recent creation of a new energy efficiency fund, are also needed to ensure the best available technologies are available to consumers and businesses.

As many countries have already experienced exponential growth in key high-efficiency, low-carbon technologies such as heat pumps and electric vehicles, Azerbaijan could benefit from globally established best practices and lessons learned by governments that have deployed regulatory measures and incentives to promote these and other innovations. As a relative latecomer in developing rules and norms for energy efficiency, Azerbaijan now has the chance to build on other governments' insights to formulate and implement its own robust policies and measures quickly and at scale.

Data will be critical for Azerbaijan to achieve success in its energy efficiency efforts, with effective strategy formulation, policy design and monitoring reliant on effective data governance. Our roadmap therefore recommends that Azerbaijan develop robust methodologies for compiling data on energy efficiency across sectors, in line with IEA recommendations and global best practices. In parallel, capacity building and awareness raising within institutions and markets – and among the public – are necessary to ensure policies are supported and implemented across all sectors.

Introduction

Building on energy efficiency and energy sector analyses conducted by the IEA, the Energy Charter and other agencies, this report aims to provide practical recommendations for Azerbaijani policymakers working on energy efficiency.

To better assess the opportunities and challenges involved in realising energy efficiency benefits, the first section of this report provides a deep analysis of Azerbaijan's energy efficiency context and the status of energy efficiency in the country. Among the many items we assess are its recently adopted policy framework; energy sector governance; tariffs and subsidies; sector trends; policy implementation and enforcement; and data availability and quality. The subsequent section offers a closer examination of energy efficiency within key energy-using sectors, notably buildings, industry, and transport, and provides targeted recommendations for each sector to inform the roadmap.

The roadmap at the end of the report encapsulates our study's main elements as recommendations and milestones, and it can serve as a visual aid for policymakers in Azerbaijan as they consider the best options to enhance energy efficiency in upcoming years and decades.

Setting the scene: Energy efficiency in Azerbaijan

The case for energy efficiency

Attention to energy efficiency has been growing in Azerbaijan in recent years as the country tracks its commitments under the Paris Agreement, seeks to diversify its economy and reduce its dependence on fossil fuels, which account for [90% of its export revenues](#), 60% of state revenues and [30-50% of GDP](#). Realising the benefits of energy efficiency will become increasingly important for the country in the coming decades as demand for energy, especially electricity, increases with population and economic growth. Between 2010 and 2022, the country's population increased 12% and average annual GDP rose by [just under 2%](#). Although half of Azerbaijanis still live in the countryside, the country's population has increased considerably since 2000 and is expected to continue growing, urbanising, and becoming wealthier.

Energy efficiency will also be a key tool for Azerbaijan to keep rising greenhouse gas (GHG) emissions in check, especially considering the Government of Azerbaijan's pledge to reduce GHG emissions 35% from 1990 to 2030 under the Paris Agreement. At COP26, Azerbaijan also announced new goals to reduce greenhouse gas emissions by 40% by 2050 and to create a regional net zero emission zone, and the upcoming COP29 in Baku in November presents an opportunity to boost energy efficiency as part of wider efforts by Azerbaijan to tackle GHG emissions.

While Azerbaijan's citizens currently have access to affordable electricity, power consumption per capita is relatively modest (29% below the global average) and tariffs are artificially low due to [subsidies](#). However, both electricity use and end-user prices are expected to increase, and the Government of Azerbaijan has commenced subsidy reforms, as discussed later in this section. Improved energy efficiency can be an important lever to mitigate the impacts of both higher electricity demand and prices, helping to ensure that consumers are not locked into paying high prices to operate inefficient technologies.

Although Azerbaijan is an oil- and gas-rich country, oil production peaked in 2010 and has since declined. In addition, [gas distribution system losses and gas supply quality](#) remain concerning despite significant modernisation of ageing natural gas networks. The global shift to reduce carbon emissions to meet climate targets – combined with worldwide oil and gas market volatility – heightens the urgency for

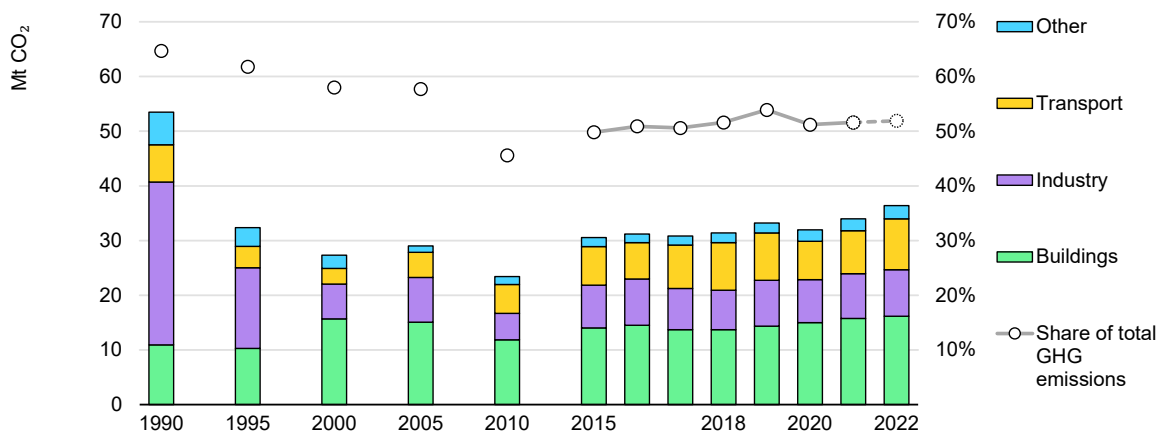
Azerbaijan to transition away from its traditionally heavy reliance on fossil fuels as the bedrock of its energy system and economic model. Energy efficiency can be a key enabler of this transition.

Emissions trends and energy efficiency impacts

Historical emissions trends are mixed. Based on available data, GHG emissions from fuel combustion appear to have dropped significantly between 1990 and 2010. However, this decline was primarily in the industry sector, which was heavily affected by post-Soviet transformation and restructuring. Historical data quality issues may also make it difficult to accurately assess emissions trends during this period.

A different pattern emerges for the more recent 2010-2022 period. For instance, emissions rose 76% in both the industry and transport sector, and 36% in buildings. Driven by population and economic growth, these increases are reflected in higher demand for energy, which has been met primarily by greater natural gas consumption in industry and buildings, and increased oil use in transport, as discussed in the next section. On average, end-use sectors account for more than 50% of Azerbaijan's total emissions.

CO₂ emissions from fuel combustion in Azerbaijan, by end-use sector, 1990-2022



IEA. CC BY 4.0.

In addition to mitigating rising GHG emissions, energy efficiency could be an important enabler of one of Azerbaijan's key clean energy transition pillars: exploiting the country's abundant renewable energy potential, notably from hydro, wind and solar resources. While the share of renewables in Azerbaijan's electricity supply has gradually increased in recent years, growing from just over 6% in 2022 to 8% in 2023, more efficient end-use energy consumption would support renewable energy development by reducing total energy demand, enlarging the portion of renewables in the energy mix [more quickly](#). Developing this synergy

between renewable energy and energy efficiency is also essential to expand the share of clean, affordable, unsubsidised electricity in Azerbaijan's energy mix.

While the absence of granular data on energy efficiency is a significant obstacle for Azerbaijani policymakers (as discussed further in this section), high-level estimates made by the Government of Azerbaijan in collaboration with the Energy Charter indicate that greater energy efficiency would lead to substantive benefits in all sectors. These [benefits](#) include savings of 3.5-4.2 bcm of natural gas; CO₂ emissions reductions of 4-10 Mt CO₂; a budget subsidy reduction of between USD 500 million and 1 billion; the stimulation of nearly USD 3.5 billion of new investments; and the creation of nearly 125 000 new jobs. At the level of the economy, estimates suggest that energy efficiency could offset [over 25%](#) of the country's primary energy needs. According to United 4 Efficiency (U4E) [estimates](#), energy efficiency could continue to deliver significant savings and benefits for Azerbaijan in upcoming decades, including annual savings of USD 37 million in electricity subsidies and cumulative GHG reductions of nearly 1 Mt. More precise estimates and projections across clear timelines are currently not available, underscoring the need to develop more robust data sets to help increase buy-in and action for energy efficiency improvements.

Energy efficiency assessment

Summary

Azerbaijan is at an early stage of developing its approach to energy efficiency. Historically, energy efficiency has received little attention in the country, with general awareness of its benefits being low within government departments and economic sectors, as well as among the public. Relatively abundant domestic fossil fuel reserves and heavily subsidised gas and electricity for end users have traditionally [disincentivised](#) energy efficiency. During the period 2021 to 2023, the Government of Azerbaijan established the country's first legal framework for energy efficiency and subsequently, in 2022, adopted strategies and programmes to advance energy efficiency, among other policy priorities. Further details of these measures are provided in the Policies and Measures section.

The Government of Azerbaijan has also engaged with international experts to draft a National Energy Efficiency Action Plan (NEEAP) that covers a range of measures across sectors and provides valuable recommendations for future action on energy efficiency. Although the draft NEEAP has not been formally adopted, some elements of it have been reflected in newly introduced legislation. We encourage the Government of Azerbaijan to continue to draw on the draft NEEAP as part of further policy formation, since it contains a range of targeted and appropriate instruments to promote energy efficiency, and we have included many of its elements in our report, notably to inform analyses of end-use sectors.

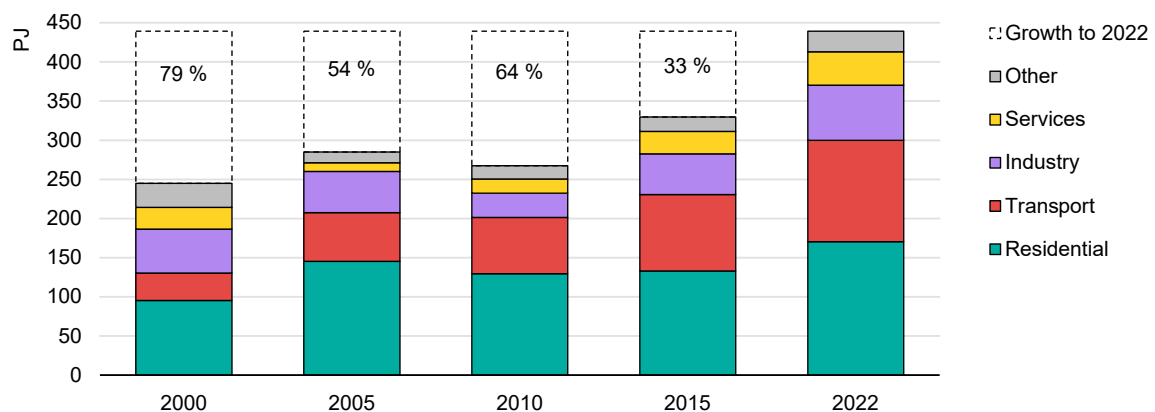
To ensure its new legal framework can be implemented effectively, critical enablers of energy efficiency – cost-reflective tariffs, minimum energy performance standards (MEPS), targeted incentives, information campaigns and awareness-raising efforts – need to be deployed across the economy and within end-use sectors (e.g. buildings, transport, and industry). While a number of these enablers are reflected as part of the newly created legal framework for energy efficiency, significant efforts will be required in the coming years and decades to create a comprehensive approach to energy efficiency across sectors, with a focus on implementation, enforcement and monitoring of secondary legislation, MEPS and other supporting measures.

The Government of Azerbaijan is aware of this challenge and has cited among planned efforts the improvement of construction norms and rules, the development of a standard calculation methodology for building energy use, the development of technical regulations on energy labelling and eco-design requirements.

Energy intensity and consumption trends

While Azerbaijan's energy intensity is below the world average and the lowest in the Eastern Partnership (EaP) region, the high share of oil and gas exports in its GDP weakens the [usefulness of energy intensity as an efficiency indicator](#) for this country. Reflecting population and GDP growth, total final energy consumption (TFEC) has risen steadily since 2000, notably in residential buildings and transport, reflecting strong energy demand growth in these sectors.

Total final energy consumption by sector in Azerbaijan, 2000-2022



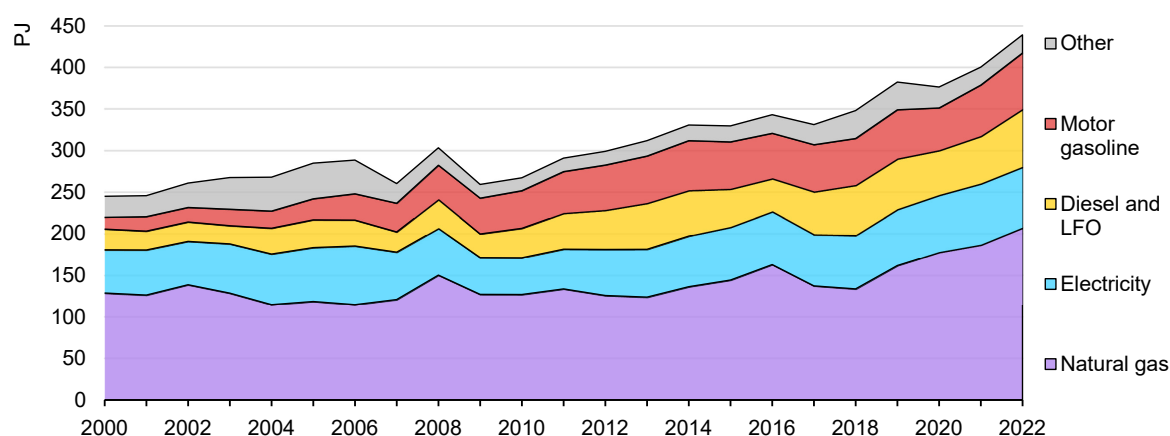
IEA. CC BY 4.0.

Note: For the purposes of this analysis, non-energy uses of energy products are excluded from the figures. It is noteworthy that non-energy uses in Azerbaijan's industry sector (e.g. natural gas consumption for fertiliser and chemical production) exceed the sector's energy demand.

Source: IEA (2024) [World Energy Statistics and Balances](#) (database) Accessed 26 June 2024.

Analysing TFEC in terms of fuel, natural gas is the most used across all sectors, with its share declining from 52% of total annual consumption in 2000 to 47% in 2022. In absolute terms, however, annual gas usage rose 61% during this period. Meanwhile, motor gasoline use has increased the most, in both relative and absolute terms: its share almost tripled from 6% of TFEC in 2000 to 16% in 2022, with annual consumption climbing nearly fivefold between 2000 and 2022 as the car fleet expanded fourfold. The electricity share remained relatively constant at 17-21% over the period, although annual consumption increased 40%.

Total final energy consumption by energy source in Azerbaijan, 2000-2022



IEA. CC BY 4.0.

Policies and measures

Targets

No specific targets are currently in place for energy efficiency, either for the economy as a whole or for individual sectors. As target setting is an important pillar of energy efficiency policymaking, we will discuss it at greater length later in this report.

Framework law on energy efficiency

Azerbaijan's Law on Rational Use of Energy Resources and Energy Efficiency was adopted in 2021 and entered into force in July 2022. This law creates a legal framework for energy efficiency and cites several objectives for using energy more rationally across the economy, in terms of both energy supply and consumption. It also provides a basis for developing several measures, such as MEPS and passports for buildings; energy labelling and eco-design requirements for appliances and equipment; mandatory energy audits for public and non-residential buildings that meet certain criteria; energy management systems; energy

efficiency services; metering; consumption data collection; and awareness raising. The law also calls for the creation of specially designed financing instruments, such as grants and concessional loans, and a dedicated Energy Efficiency Fund, which has since been established.

Several important pieces of secondary laws have been adopted to date in the wake of the new law. These can be classed into legislation covering:

- Residential buildings and appliances: minimum energy efficiency norms for buildings as well as eco-design requirements for energy-related products and rules on labelling of energy-related products have also been adopted. Technical specifications for these measures notably kWh/m² requirements for buildings still need to be developed.
- Energy management in commercial and public buildings: requirements and rules related to energy audits, including criteria for buildings subject to mandatory audits, certification of energy auditors, submission of reports, energy management system (EMS), energy performance contract (EPC) terms and templates, and rules on energy efficiency services.
- Industry: mandatory energy audits every three years, with exemptions for ISO50001 certified facilities. Incentives for deploying an EMS are also a provision of the new law.

Energy efficiency policy development

The Government of Azerbaijan developed a draft NEEAP in collaboration with the EU-funded EU4Energy programme in 2021. The draft contains numerous measures and provisions to advance energy efficiency, covering cross-sector topics such as institutional and governance reform as well as sector-specific provisions (see the Sector Trends section below for selected draft NEEAP provisions). The recommendations it contains are based on international best practices and are therefore included in our analysis to inform future policymaking and provide guidance on specific measures across sectors.

While a handful of draft NEEAP provisions have been implemented or are reflected in legislation, the Government of Azerbaijan is not planning to adopt the action plan as such. Instead, a State Programme, aligned with the [Socio-Economic Development Strategy for 2022-2026](#), was adopted in 2022. These measures signal further policy efforts on energy efficiency, including the planned development of a National Electric Mobility Plan and a National Renovation Programme for private and public buildings. The latter is to be deployed within five to six years and is being developed in collaboration with the World Bank, which is also supporting development of the Energy Efficiency Fund.

The Government of Azerbaijan is also developing further technical regulations on energy efficiency and is planning to deploy a monitoring and reporting system,

with a focus on assessing energy efficiency potentials on both the supply and demand side, in various economic sectors, and in households. In parallel, drafts of procedures related to the issuance of energy efficiency passport for buildings and rules for accessing the Energy Efficiency Fund have been prepared but are pending adoption. Improvements to current construction norms and rules taking into consideration energy efficiency in buildings and the development of methodology on calculation of energy consumption in buildings are also in the development phase.

In the transport sector, Euro-4 emissions standards have been in place since 2014. In addition, all imported vehicles must be no more than ten years old and have been required to [comply with Euro-4 or higher emissions standards](#) since 2014. The Government of Azerbaijan has also implemented several measures to promote electric vehicles (EVs) and hybrids, including a lifetime tax exemption for EVs and a three-year tax exemption for hybrid vehicles, along with reduced import tariffs for EVs. Furthermore, the Order of the Republic of Azerbaijan “On promotion of the use of electric vehicles” was adopted on 7 March 2024, and the Government of Azerbaijan is currently developing a National Electric Mobility Plan to be adopted at the end of 2024. A long-term (post-2027 – taking into account the liberalisation of the electricity market) and short-term (2024-2026) scenarios have also been developed for expanding the EV charging infrastructure.

In this context, Azerbaijan’s national energy efficiency policy is now in a moment of transition from the initial adoption of policies to their implementation. This is a key focus area that is explored further in this roadmap.

Institutions and stakeholders

The Ministry of Energy has the lead role in developing Azerbaijan’s energy efficiency policies. For example, it develops technical regulations for energy labelling and eco-design requirements of energy-related products in collaboration with other ministries, as noted below. An Energy Efficiency Department was created within the ministry in early 2023. The department has three divisions, one for each of the following domains: buildings; economic areas; and policy and reporting. Approximately five officials support each area, but the department’s staff is expected to grow to nearly 20.

Several other institutions and stakeholders also have important roles in shaping and implementing the country’s energy efficiency policy framework. The non-exhaustive list includes:

- The President of the Republic of Azerbaijan holds executive powers over all measures.
- The Cabinet of Ministers, which is assembled by and accountable to the President, organises the work of the ministries.

- The Azerbaijan Energy Regulatory Agency under the Ministry of Energy regulates relationships between key stakeholders such as producers, transmissions system operators and distributors as well as consumers. The agency supervises efficient use of energy resources and energy efficiency by enterprises and implements measures in accordance with relevant norms. A Department of Energy Efficiency and Investments has also been established within the Energy Regulatory Agency.
- The Ministry of Economy and the Ministry of Ecology and Natural Resources work with the Ministry of Energy to set technical requirements for energy-using equipment.
- The Tariff Council sets tariffs for purchasing electricity from producers, retail tariffs for wholesale and consumer groups, and tariffs for processing, transportation, purchase of natural gas from producers. It also regulates retail and wholesale prices for motor gasoline and diesel fuel, and wholesale tariffs for bitumen.
- The Azerbaijan Standardization Institute advises on the development of technical standards, norms and labelling across sectors.
- The State Statistical Committee is responsible for managing key data sets (e.g. on energy consumption trends).
- Azerenergy, the largest energy producer and the transmission system operator, Azerishiq, the distribution system operator and supplier, and Azerigas, the gas distribution network operator, are responsible for smart metering rollout.
- The Ministry of Agriculture is involved in developing sector-specific energy efficiency measures, such as grants for efficient agricultural pumps and awareness-raising programmes for farmers.
- The State Committee for Urban Planning and Architecture is responsible for the development, improvement and approval of construction norms and rules to ensure energy efficiency in buildings.
- Cities and municipalities play important roles in terms of procuring energy efficiency services, leading pilot programmes and raising awareness among consumers, for example.
- International organisations, donors and international financial institutions (IFIs) provide technical assistance to the Ministry of Energy and other state institutions in formulating energy efficiency policies and implementing other measures, such as the Energy Efficiency Fund.

Cross-sector issues

Energy sector governance and subsidies

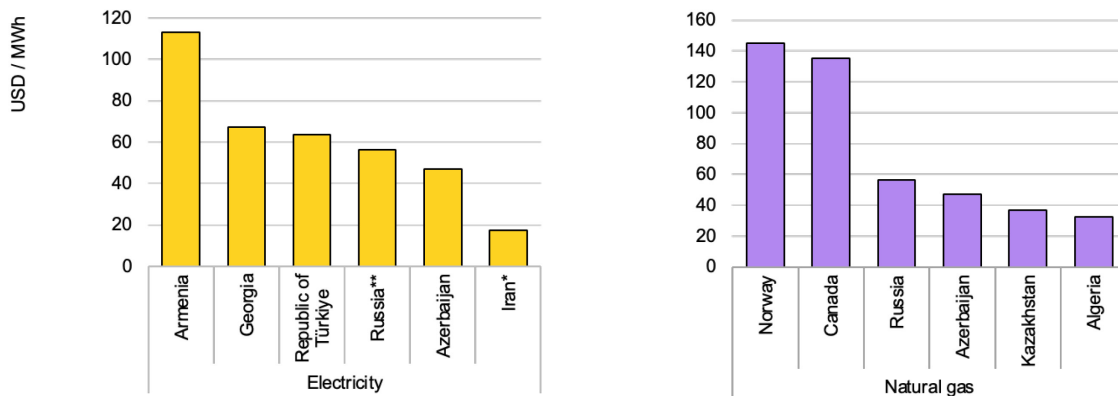
While a deep analysis of energy sector governance and tariffs in Azerbaijan is beyond the scope of this roadmap, it is important to note some elements as they impact efforts on energy efficiency. Azerbaijan's energy sector is largely government-owned, operated and vertically integrated. More than 90% of all installed capacity belongs to state-owned companies, with the country's largest

electricity producer and transmission system operator (TSO), Azerenerji OJSC, owning [85% of all generating capacities](#). While the issue of energy sector regulation is complex, with experts holding a range of views, the broad consensus is that [greater competition in energy markets boosts investments](#), including in energy efficiency and innovation.

High historical and ongoing subsidies for consumers have an important impact on incentives for energy efficiency in Azerbaijan, such as residential consumers of natural gas for heating. Between 2016 and 2021, average annual explicit and implicit subsidies for natural gas, electricity and oil were [USD 2.3 billion, accounting for just over 5% of GDP](#). Prices, which are set by the government, are currently among the lowest in the region and do not reflect the full cost of supply. The existing tariff-setting methodology, which does not contain separate rules for calculating electricity, natural gas or heat tariffs, also provides few incentives for utilities to improve the cost efficiency of their services. Instead, it motivates them to [increase their operational costs](#) to justify a greater need for regulated revenues.

The Government of Azerbaijan has commenced reform efforts in these areas, with the introduction of free competition and removal of subsidies to be implemented in stages by 2028. Drafts revisions of methodologies for determining tariffs have been presented by the Ministry of Energy, with inter-ministerial discussions ongoing.

Regional residential electricity and gas price comparison, 2023



IEA. CC BY 4.0.

Notes: For Iran, the most recent electricity price available is for 2016; For the Russia Federation, the most recent natural gas price available is for 2020.

While the Government of Azerbaijan is considering gradual reforms to achieve a more liberalised market by 2025, the existing arrangement has important implications for energy efficiency, since tariff levels do not incentivise energy efficiency improvements (e.g. in residential buildings or in industry). In addition, high subsidies encourage [greater consumption](#) of domestic oil and gas reserves.

Investments

Energy efficiency investment data for Azerbaijan are not available. Current energy sector investments primarily support fossil fuel extraction and electricity system development, including renewable energy – an area in which efforts are under way to improve the environment for international investors. Nearly 90% of all energy sector investments targeted [hydrocarbon extraction](#) between 2008 and 2017, with 9% devoted to developing the electricity sector, including renewable power. In recent years, however, investments in renewable energy sources have increased, with an increase in installed renewable energy sources and a major investment in a 230 MW solar plant [announced](#) at the end 2023.

As noted previously, the Government of Azerbaijan has established the Energy Efficiency Fund to support energy efficiency measures in buildings and economic sectors. The fund was formally established by decree in March 2024 and will be the responsibility of the Ministry of Energy, with management led by the Energy Regulatory Agency. The rules on formation and use of funds were also approved. However, funds are to be raised through the sale of fossil resources, and the Cabinet of Ministers is to submit proposals with further details on this matter by the end of 2024.

Subsidy and energy sector reforms to spur investments in energy efficiency will be key to ensuring the success of the fund and other instruments to increase money flows into energy efficiency improvements. High subsidies also limit financing for enabling infrastructures, such as district heating and electricity networks, with implications for energy efficiency and decarbonisation. In parallel, a lack of competition in the energy sector and low end-user tariffs [reduce incentives](#) for private sector investment in energy efficiency as well as in renewables.

Implementation and enforcement

Since the legal framework for energy efficiency and some secondary legislation has only recently entered into force, there is little evidence yet on the success of implementation and enforcement efforts. Given the country's energy sector governance and tariff regime legacy, putting robust implementation and enforcement systems in place is an important consideration for energy efficiency policymakers in Azerbaijan.

Data availability and quality

Azerbaijan's current data collection system is comprehensive and broadly aligned with international norms, with monthly and annual mechanisms covering energy production, transformation and consumption under the oversight of the State Statistical Committee. Azerbaijan was also the first country of the Former Soviet

Union to publish an energy balance according to international norms, and the State Statistical Committee's website publishes updated statistics annually. In parallel, a nationwide [smart meter and pre-paid meter rollout](#) is under way, with high collection rates for grid-connected consumers. Collecting accurate end-use energy consumption data will play an important role in policy efforts, notably the monitoring and enforcement of codes and standards for buildings and energy-using equipment.

Awareness and capacity

Given Azerbaijan's longstanding reliance on domestic fossil fuels and subsidised energy tariffs, awareness about the benefits of energy efficiency is unsurprisingly reported to be generally low among the country's population and within economic sectors. Similarly, capacity for energy auditing, energy service provision and other important areas is minimal. However, in line with its wider policy agenda for energy efficiency, Azerbaijan has been making collaborative efforts with international partners to raise public awareness, including through EU-funded initiatives.

Energy efficiency services

The Law on the Rational Use of Energy Resources and Energy Efficiency includes language aimed at promoting energy efficiency services in Azerbaijan, and secondary legislation is now in place to define EPCs for energy efficiency services. However, scant data on energy service companies (ESCOs) and related market activity are available, and the combination of subsidised energy prices and a lack of skills have constrained market development so far.

Sector trends

Buildings

Azerbaijan has nearly [1.6 million residential buildings](#) covering approximately 109 million m². Of these, 65% are single-family homes (SFHs) and the remainder are multi-apartment buildings (MABs). More than half of these dwellings were built in the pre-1980 Soviet era when few or no building efficiency codes were in place. Within the region, Azerbaijan has among the smallest floor space and lowest housing stock per capita. On average, each Azerbaijani citizen has less than 15 m² of floor space, with 200 dwellings serving 1 000 inhabitants. In comparison, the [EU average](#) is approximately 35 m² of floor space per person and over 450 dwellings per 1 000 inhabitants.

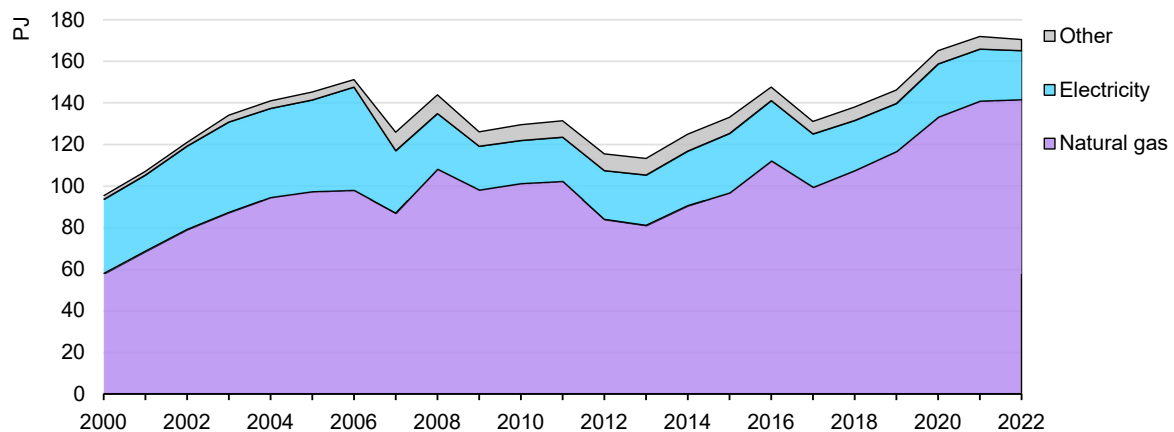
This level of density might suggest more efficient energy use in Azerbaijan's buildings, since each unit of energy serves more building dwellers than in, for example, the European Union. However, Azerbaijan's residential buildings still

have considerable energy efficiency potential, as they are the country's single largest consumers of energy, accounting for 39% of TFEC in 2022. Based on available data and estimates, the [average energy intensity](#) of residential buildings in Azerbaijan is [250-280 kWh/m²](#) per year, compared with an EU average of approximately [160 kWh/m²](#).

Estimates suggest that [energy savings of 50%](#) are possible, notably in MABs. In addition, while Azerbaijan's residential building consumption has grown at a modest annual rate of 1.2% since 2008, demographic and economic growth are expected to drive [increasing demand for energy and floor space](#).

Gas accounted for 83% of TFEC in residential buildings in 2022, with gas usage (predominantly for boilers) 22 percentage points higher than in 2000 following an expansion of gas networks to residential buildings. Meanwhile, the share of electricity in residential TFEC more than halved over this period, falling from 37% in 2000 to 14% in 2022. The portion of district heating and biofuels (shown as "other" in the figure below) increased slightly from a low base in 2000 to just over 3% in 2022.

Residential sector energy consumption by fuel in Azerbaijan, 2000- 2022



IEA. CC BY 4.0.

Little granular data is currently available on non-residential (e.g. commercial and public) buildings since Azerbaijan's statistical services do not collect this information in any systematic manner. However, estimates suggest that the footprint of the country's non-residential buildings is approximately 23 million m² (21% of the residential building footprint), with average annual energy consumption in non-residential buildings estimated at around [220 kWh/m²](#) and [energy efficiency potential at 50%](#).

Space heating

Natural gas is Azerbaijan's dominant heating fuel, covering 99% of space heating needs. While granular data on heating technologies is limited, it is estimated that over 80% of residential buildings rely on gas boilers. Since the collapse of the Soviet Union, the natural gas grid has been expanded to most of the population, reducing reliance on legacy district heating systems. [Less than 3% of residential buildings](#) remain connected to district heating, although in 2017 these systems still provided heating services to [26% of hospitals, 9% of preschools and 6% of schools](#).

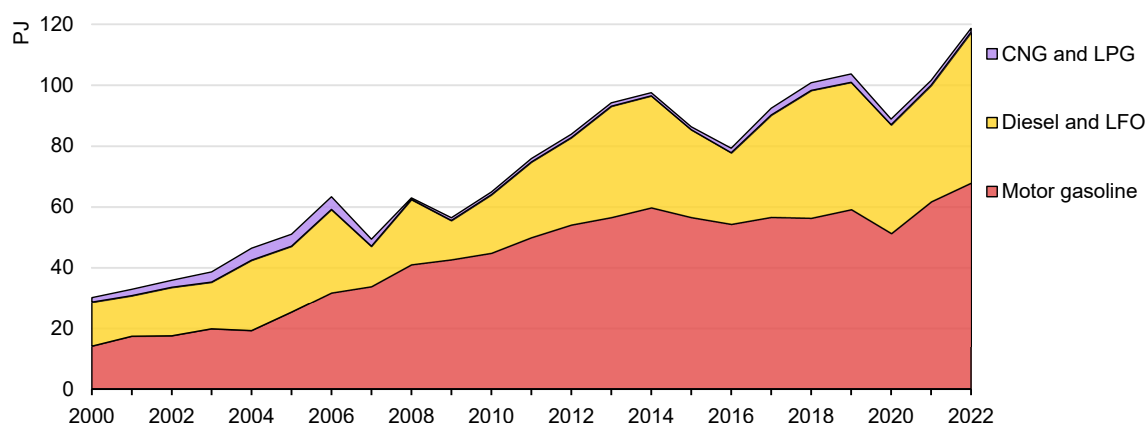
Appliances, lighting and cooling

Little information is available on the number and energy performance of standard appliances such as refrigerators and washing machines, or lighting technologies being used in Azerbaijan. Also, numbers and growth rates for air conditioning units, fans and other cooling equipment are not currently publicly available. Historically, Azerbaijan has never implemented MEPS or import controls for energy-consuming appliances or for lighting and cooling equipment, although MEPS are being introduced in its new legislation.

Transport

Azerbaijan's transport sector TFECC more than tripled between 2000 and 2022 – the strongest energy demand growth of any sector. In the same period, gasoline demand for road transport increased nearly fivefold while diesel and light fuel oil use rose well over threefold.

Total final road transport consumption by fuel in Azerbaijan, 2000-2022



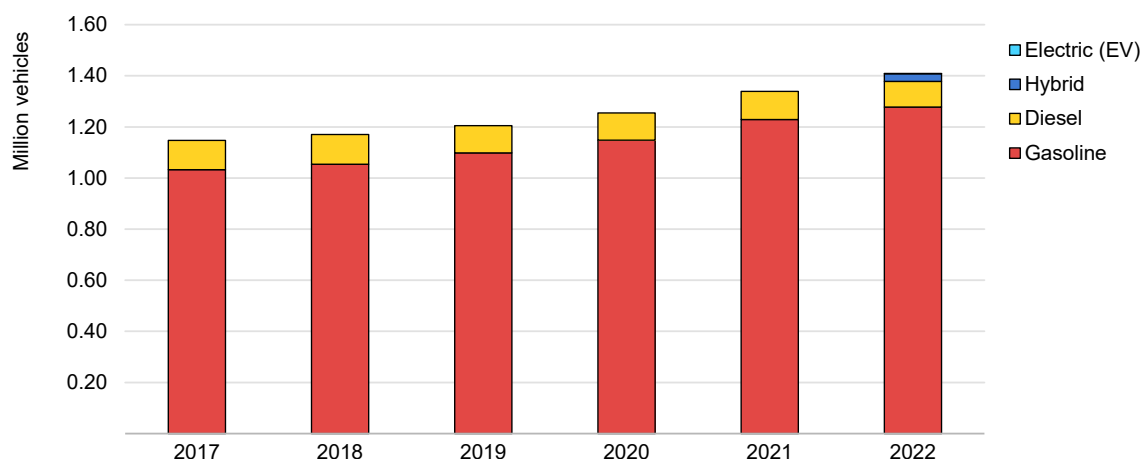
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Notes: CNG = compressed natural gas. LPG = liquefied petroleum gas. LFO = light fuel oil.

The transport sector has significant energy efficiency potential, as nearly 80% of vehicles on Azerbaijan's roads are more than ten years old. Azerbaijan also imports a significant number of used cars – it is estimated that 40% of cars imported in the last decade were second-hand. While a metro system expansion in the capital of Baku has made public transport more readily available, [vehicle use remains predominant](#).

Transport sector energy demand is expected to continue rising in tandem with economic and population growth, based on historical trends. Vehicle ownership doubled between 2005 and 2018, with many cars considered inefficient due to their age, and during 2017-2022 the number of registered cars (fuelled mainly by gasoline and diesel) increased a further 20%. The number of hybrid cars has begun to expand, with just over 30 000 registered in 2022 out of a total car fleet of over 1.4 million. Owing to tax incentives, EVs are also beginning to appear on Azerbaijan's roads, albeit in very modest numbers, with less than 600 registered in 2022.

Number of cars by fuel in Azerbaijan, 2017-2022



IEA. CC BY 4.0.

Source: Republic of Azerbaijan (2023), Number of motor vehicles 1995 – 2022 (dataset) accessed 26 June 2024

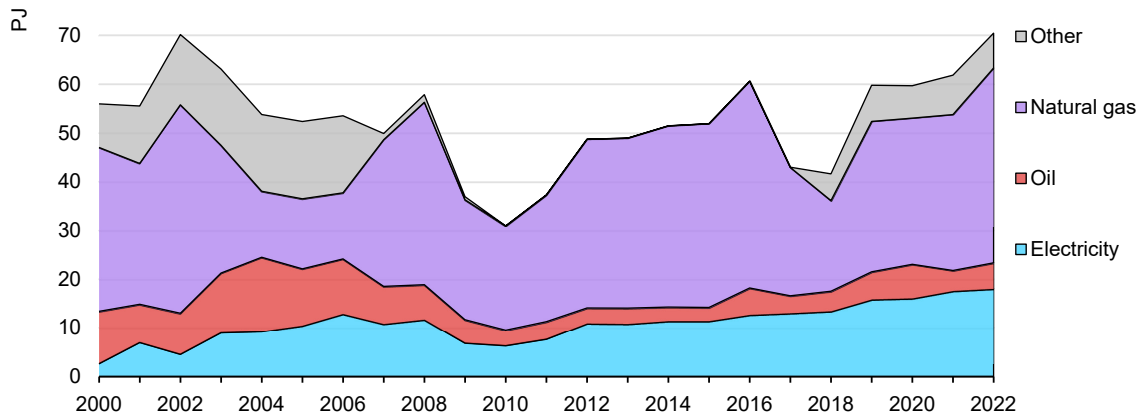
Industry

Representing 30% of the country's TFEC, Azerbaijan's industry sector is roughly equivalent to the transport sector. However, it is noteworthy that more than half of this consumption is for non-energy uses (e.g. natural gas for fertiliser and chemical production). In only a few other countries does consumption for non-energy purposes exceed that of energy uses in the industry sector.

From the perspective of improving energy efficiency, consumption for non-energy uses is commonly excluded from the analysis. Thus, the share of *energy* consumption is 16% of TFEC.

Gas is the predominant fuel used in industry, although the share of gas in industry TFEC has decreased slightly, from 60% in 2000 to 57% in 2022. Annual gas usage in industry fluctuates based on economic factors, with the global economic crisis leading to a significant drop between 2008 and 2012. Meanwhile, annual electricity consumption in industry has increased nearly sevenfold, rising from around 5% of industry TFEC in 2000 to 26% in 2022.

industry sector energy consumption by fuel in Azerbaijan, 2000-2022

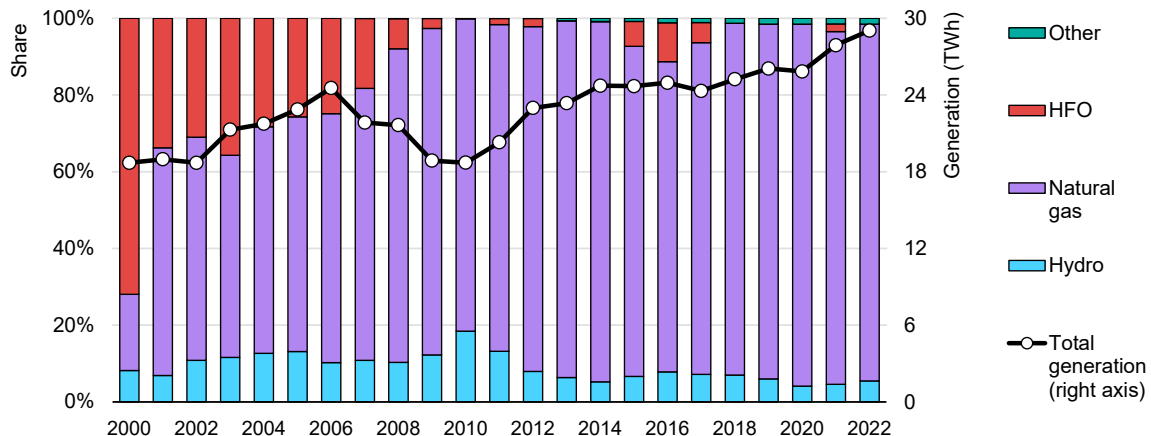


IEA. CC BY 4.0.

Note: 'Other' includes purchased heat and solid biofuels.

Regarding the growing share of electricity, it should be emphasised that the power consumed by industry (and other sectors) is generated almost exclusively from natural gas, which has largely displaced other energy sources such as heavy fuel oil (HFO) and hydropower.

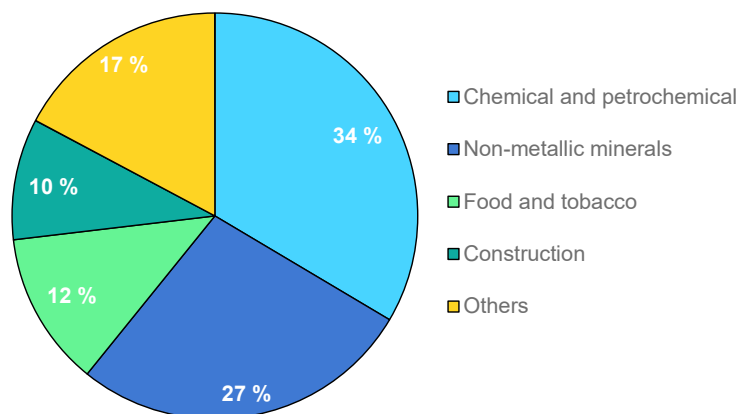
Shares of fuels in electricity generation in Azerbaijan, 2000-2022



IEA. CC BY 4.0.

Reflecting the magnitude of the country's oil and gas industry, the chemical and petrochemical subsector stands out as the largest energy consumer in Azerbaijan's industry sector, accounting for 34% of the total.

Subsector shares of industry final energy consumption in Azerbaijan, 2022



IEA. CC BY 4.0.

Note: Chemicals and petrochemicals dominate final energy consumption in industry subsectors.

Agriculture and services

Compared with other sectors, energy use in agriculture and services is relatively low, at around 16% of TFEC in 2022, with electricity accounting for [nearly 50% of total demand](#). However, almost 40% of Azerbaijan's working population is employed in the agriculture sector alone, which contributes 6% of the country's GDP according to [2021 data](#). Little information is available on the number, types and energy consumption of technologies used in agriculture.

Advancing energy efficiency in Azerbaijan

Introduction

Azerbaijan's extensive reliance on heavily subsidised fossil-based energy, notably natural gas in the buildings and industry sectors, has made it highly challenging to promote energy efficiency. While a legal framework for energy efficiency has entered into force and Azerbaijan's draft NEEAP proposes a series of secondary legislation and other measures, the country needs a holistic and comprehensive energy efficiency strategy. Such a strategy should take a long-term view and be deployed in conjunction with Azerbaijan's wider industrial strategy and decarbonisation commitments under the Paris Agreement.

Energy efficiency policies and measures also need to be mutually reinforcing and deployed in tandem with wider energy sector initiatives, notably market and tariff reforms as well as renewable energy development. The latter is particularly important as the country enlarges electrification and heat pump deployment as part of its shift away from near-total reliance on natural gas for heating and many other purposes.

To aid Azerbaijan's efforts, this section proposes measures and recommendations to boost energy efficiency across the country's economy generally and in key sectors specifically, drawing on international best practices in, among other areas, tariff reform; building efficiency improvements; efficient technology promotion (with a focus on heat pumps); energy efficiency financing; and market development. High-quality data collection for key energy efficiency indicators is an important cross-cutting theme in all these recommendations.

The roadmap at the end of this section summarises our headline recommendations and measures to 2040.

IEA building blocks for an energy efficiency strategy

Based on its extensive global engagement with energy efficiency policymakers, the IEA has developed [ten strategic principles](#) and a set of energy efficiency policy packages to provide governments with economy-wide and sector-specific guidance. We believe the Government of Azerbaijan may find the building blocks

offered in these policy packages useful for developing its own comprehensive and holistic approach to energy efficiency.

Foundationally, the IEA recommends that sector-specific and cross-sectoral energy efficiency strategies and policy frameworks be based on:

- **Targets** that provide clear signals to market stakeholders and consumers.
- Regulations such as MEPS that remove the worst-performing equipment from the market and drive up average efficiency levels for devices.
- Information to help market actors and consumers make informed decisions about how to use energy and choose the most appropriate energy-efficient technologies and service options.
- Incentives that make efficient options more attractive and accelerate the deployment of efficient equipment and practices.
- Implementation plans – considered as critical as policy design – that involve deploying resources for capacity building, enforcement and monitoring to ensure policies are put in place successfully and are assessed for effectiveness over time, with robust data collection being a key component.

While these building blocks are by no means novel and are indeed cited as part of Azerbaijan's recent energy efficiency legislation, the Government of Azerbaijan will need to carefully assess how they can be most effectively deployed given the particularities of the country's economy, energy system and governance arrangements.

Cross-cutting efforts

Implementing and enhancing the legal framework

With the Law on the Rational Use of Energy Resources and Energy Efficiency now in force and several important pieces of secondary legislation and other measures either adopted or drafted, Azerbaijan has an opportunity to implement and enhance its emerging legal framework for energy efficiency. The draft NEEAP proposes a range of additional secondary legislation and other measures to promote energy efficiency across the economy and within specific sectors. While a number have been adopted or drafted, the provisions cited in the draft can provide an indication of additional or supporting policy levers and instruments that could support Azerbaijan's efforts on energy efficiency.

Selected draft National Energy Efficiency Action Plan policies and measures by sector/area

Sector/topic	Policy/measure
Buildings	Guidelines for cost distribution of heat and hot water supplies in multi-apartment buildings with heat and hot water meters installed at the heat exchange point or at the entrance of the building
Appliances and equipment	Law on Standard Product Information on Labelling (Marking) of Energy-Consuming Products and Energy and Other Resource Consumption
	Minimum energy performance standards (eco-design requirements) for priority product groups
	Energy labelling requirements for energy-consuming products
	Compliance and enforcement procedures
ESCOs	Regulatory acts and amendments to existing legislation to develop ESCO market in public sector
Public procurement	Amendments to the Law on Public Procurement to introduce energy efficiency requirements for procuring certain goods
Industry	MEPS (eco-design requirements) for industrial motors and other industrial energy-consuming equipment
	Cost-benefit analyses for further eco-design requirements for other categories of energy-consuming industrial equipment
	Compliance and enforcement procedures
Transport	Stricter fuel efficiency requirements and emission norms for road transport vehicles
	Energy labelling for tyres in line with EU best practices
	Mandatory control of emissions for road transport vehicles
Utilities	Energy efficiency obligation scheme

Adopting these and other measures would solidify Azerbaijan's legal and policy framework for energy efficiency and provide positive signals to market participants, enabling a shift away from gas while stimulating economic growth and offering other benefits. However, success in these efforts will require, among other things, dedicated resources, high-level endorsement and effective co-ordination across government departments. In parallel, achieving wider energy sector reforms such as increasing competition in the energy sector and rectifying tariffs will have a determining impact on energy efficiency policies and measures. We therefore recommend that the Government of Azerbaijan place energy efficiency reforms at the heart of its wider sector reform efforts.

Setting targets

Targets are an important impetus for energy efficiency progress, as they provide signals to policymakers, investors and market participants such as suppliers of energy-efficient equipment. Examples of targets being deployed or considered by governments include:

- Doubling economy-wide improvement in energy efficiency, based on energy intensity improvements or volumetric reductions in gas usage.
- Full cost recovery for gas and electricity to create incentives for energy efficiency on supply and demand side.
- Tariff increases in specific end-user segments, e.g., households and industry, whereby policy makers need to carefully assess and address social impacts of rising energy costs for consumers.
- Increasing deployment of energy-efficient equipment, such as LED lighting and A or higher rated appliances in buildings, or energy-efficient motors, drives, and transformers in industry.
- Increasing the share of hybrid vehicle and EVs in passenger transport.
- Increasing the portion of electricity use in transport, residential and industrial TFC in line with renewable energy targets and heat pump deployment

The action plan contained in the Socio-economic Development Strategy of Azerbaijan for 2022-2026 indicates that the Ministry of Energy will perform diagnostics in various economic sectors, households and energy production and supply chain to determine efficiency potentials and set sector-specific targets.

Building on existing efforts, the public sector has a key role to play in providing exemplary leadership during the pursuit of these targets. Public sector action can help to increase popular support for measures and send signals to markets and investors that energy efficiency is a priority in Azerbaijan. To further boost these efforts, public sector bodies could be required to devote a dedicated portion of their budget to energy efficiency initiatives.

Ensuring robust data collection and quality

For Azerbaijan's emerging policy and other efforts on energy efficiency to be successful, it will be critical to ensure progress towards targets can be tracked and quantified, whereby developing a tracking methodology is recommended already at the preparatory stage of target setting. Relevant stakeholders, notably the State Statistical Committee, should be consulted to confirm whether the existing data collection already produces the necessary information for tracking, or whether additional data collection should be considered. Recent IEA guidance on the design of a national roadmap for energy efficiency indicators can provide an important resource for policy makers in Azerbaijan (IEA, 2023g).

Azerbaijan's existing level of data collection and governance presents an important advantage for energy efficiency policy makers going forward. Existing methods can be expanded and used to monitor the impact and effectiveness of policies targeting demand side energy efficiency improvements. Data collection methods can also be expanded to assess the penetration of energy-using technologies, such as appliances, for which little data is currently available.

Expanding data collection to support more detailed energy efficiency analysis (including quantitative energy efficiency indicators) will require dedicated focus and an assessment of whether currently unused information (so called 'administrative data') might already exist to support energy efficiency analysis. In addition, close collaboration between the Ministry of Energy and the State Statistical Committee will be critical to extend statistical data collection to cover items not available through any other means. Active coordination between these and other departments will be key to ensure the right data is available for energy efficiency planning and policy decisions.

Developing demand-side data and energy efficiency indicators for tracking progress

Energy efficiency indicators are key to tracking energy efficiency progress for a variety of purposes (e.g. policy making, monitoring targets, making energy projections, developing scenarios and planning, and benchmarking).

However, choosing and developing appropriate indicators to support the development of policies is not straightforward. Over the years, the IEA has developed methodological materials to enable energy analysts and policy makers to:

- Identify priority areas for the development of energy efficiency indicators.
- Define which sectors offer the greatest potential to further improve energy efficiency.
- Select the data and indicators that best support policy development in these sectors.
- Develop a strategy to advance policy development through the improved use of indicators to track progress of energy efficiency policies.

Energy Efficiency Indicators: Essentials for Policy Making (IEA, 2014)

<https://www.iea.org/reports/energy-efficiency-indicators-essentials-for-policy-making>

The document introduces the concepts of an energy efficiency indicator and discusses the most applicable indicators for each energy-consuming sub-sector.

Energy Efficiency Indicators: Fundamentals on Statistics (IEA, 2014)

<https://www.iea.org/reports/energy-efficiency-indicators-fundamentals-on-statistics>

The document focuses on the details of compiling energy efficiency indicators and provides a range of country examples on how to obtain the underlying data needed for the development of the indicators.

Demand-side Data and Energy Efficiency Indicators: A guide to designing a national roadmap (IEA, 2023)

<https://www.iea.org/reports/demand-side-data-and-energy-efficiency-indicators>

The document helps countries to develop a tangible roadmap on improving the accuracy and coverage of the end-use energy data and thus the indicators derived from this information.

While the draft NEEAP proposes that targets be set for renovating public and state-owned buildings and recommends support for municipalities setting energy efficiency targets, the government is still elaborating further details. In addition, Azerbaijan has not proposed or set any economy-wide or sector-specific targets for energy efficiency.

In addition to prioritising building renovations and municipal energy efficiency, the Government of Azerbaijan has a prime opportunity to incentivise energy efficiency in other areas, for example by targeting:

- A doubling of economy-wide energy efficiency, based on energy intensity improvements or volumetric reductions in gas usage, for instance by instituting full cost recovery for gas and electricity to encourage supply- and demand-side energy efficiency, and tariff increases for specific end-user segments (e.g. households and industry), with policymakers carefully assessing and addressing the social impacts of rising energy costs for consumers.
- Wider deployment of energy-efficient equipment, such as LED lighting and appliances rated “A” or higher in buildings, and energy-efficient motors, drives and transformers in industry.
- Larger shares of hybrid vehicles and EVs in passenger transport.
- Greater portions of electricity use in transport, residential and industry TFEC in line with renewable energy targets and heat pump deployment.

The Government of Azerbaijan, in collaboration with all relevant ministries and authorities, will have to decide on an appropriate selection and mixture of targets. While pursuing these targets and building on existing efforts, the public sector should provide exemplary leadership to help raise popular support for the measures and signal to markets and investors that energy efficiency is a priority in Azerbaijan. To reinforce these efforts, public sector bodies could be required to dedicate a portion of their budget to energy efficiency initiatives.

Ensuring robust, high-quality data collection

To guarantee the success of Azerbaijan's emerging policy and other efforts on energy efficiency, tracking and quantifying any progress made in meeting its targets will be critical. It is therefore recommended that a tracking methodology be developed early, at the preparatory stage of target setting. Relevant stakeholders, notably the State Statistical Committee, should be consulted to confirm whether the existing data collection system already produces the information necessary for tracking, or whether additional data collection should be considered. [Recent IEA guidance](#) on designing a national roadmap for energy efficiency indicators could be a very useful resource for the country's policymakers.

Azerbaijan's established data collection and governance systems provide important advantages for energy efficiency policymakers. Existing methodologies can be expanded to monitor the impact and effectiveness of policies targeting demand-side energy efficiency improvements. Data collection methods can also be enlarged to assess the penetration of energy-consuming technologies such as appliances, for which little data are currently available.

Expanding data collection to support more detailed energy efficiency analysis (including quantitative energy efficiency indicators) will require dedicated work and an assessment of whether currently unused information ("administrative data") might already exist to enable energy efficiency analysis. In addition, close collaboration between the Ministry of Energy and the State Statistical Committee will be critical to extend statistical data collection to items not covered through any other means. Active co-ordination among other departments will also be necessary to ensure the right data are available for energy efficiency planning and policy decisions.

Developing demand-side data collection and energy efficiency indicators to track progress

Energy efficiency indicators are essential to track energy efficiency progress for a variety of purposes (e.g. drawing up policies, monitoring targets, formulating energy projections, developing scenarios, planning and benchmarking).

However, choosing and elaborating appropriate indicators to support policy development is not straightforward. Over the years, the IEA has prepared methodological materials to help energy analysts and policymakers to:

- Identify priority areas to formulate energy efficiency indicators.
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<https://www.iea.org/reports/demand-side-data-and-energy-efficiency-indicators>

This publication helps countries develop a tangible roadmap to improve the accuracy and coverage of end-use energy data, and thus the indicators derived from this information.

Reforming tariffs and subsidies

Azerbaijan's existing tariff regimes, which are closely tied to energy sector governance and competition issues, have a determining role not only for the success of energy efficiency policies, but also for investments in energy efficiency across sectors. For example, low energy prices discourage building owners and occupants from investing in insulation, efficient lighting and heat pumps. In industry, heavily subsidised gas prices translate into longer payback times and

generally less favourable investments for efficient motors, pumps and drives. In transport, very low gasoline and diesel taxation disincentivises vehicle upgrades and EV purchases.

Much like the project of developing Azerbaijan's nascent legal framework for energy efficiency, tariff reform efforts will undoubtedly require dedicated resources, time and support from across government. Compensation mechanisms for vulnerable population segments will also need to be incorporated into these efforts, complemented by communication and awareness-raising campaigns to encourage societal buy-in and ensure that the country's poorest citizens are not disproportionately impacted.

The Government of Azerbaijan is aware of the importance of this issue and has already begun implementing a reform programme. Nevertheless, tariffs remain one of the most complex and challenging socio-economic issues to navigate for policymakers, not only in Azerbaijan but in many other countries. International tariff reform experience and best practices can therefore provide guidance for the Government of Azerbaijan as it deliberates its next steps. In addition to regulatory and institutional reforms, however, significant investments in energy efficiency, renewable energy and other domains will need to be included in a holistic long-term approach to this issue.

The global energy crisis of 2022 and related EU gas shortages offer a poignant example of tariff-system complications. Based on [IEA estimates](#), a total investment of around EUR 100 billion is required to close a gap of 27 bcm of gas demand for the European Union in 2023, whereby cost savings from reduced natural gas imports would allow the European Union to recoup its initial investments within two to three years, with USD 30 billion of savings in 2023 alone. Roughly half of this investment is needed for efficiency improvements, mainly building retrofits; 40% is for renewables; and the remainder is for heat pump installations, biomethane development, and projects to cut flaring and methane emissions. While Azerbaijan is not facing a similar gas shortage, considerable investments are required to ensure a long-term transition from gas.

Attracting investment

Spurred by carbon reduction pledges and technological innovations, global annual [investments in clean energy nearly doubled between 2015 and 2023](#), outpacing annual fossil fuels investments, which decreased by USD 2 billion over the same period. Government stimulus programmes for in key technologies such as heat pumps and EVs have also spurred investments. Globally, [annual energy efficiency investment has increased by 45% since 2020](#).

Efforts by the Government of Azerbaijan to increase investments in energy efficiency would therefore align strongly with global trends, with opportunities

available to tap into growing supply chains and markets for energy-efficient technologies. Beyond enacting energy sector and tariff reforms to create favourable conditions for energy efficiency investments, Azerbaijan's government can also use several sector-specific measures to raise funding for projects such as building renovations, more energy-efficient technology deployment and other objectives.

The creation of the Energy Efficiency Fund is an important pillar for progress in this area, although developing it will take several years, and details of its funding sources and operation are still being defined. A National Renovation Programme, as cited under the Socio-economic Development Strategy of Azerbaijan for 2022-2026, is also under development in collaboration with international partners. The recommendations contained in the draft NEEAP may offer examples to inform further effort regarding financing energy efficiency.

Draft National Energy Efficiency Action Plan energy efficiency financing and investment measures

Sector/area	Action
Buildings	Provide a support scheme (e.g. grant) for energy audits of state-owned buildings and financial mechanisms to implement the prescribed measures
Buildings	Make necessary changes to legislation to ensure municipalities are allowed to receive credits for energy efficiency and are allowed to use the energy savings to repay investments
Buildings	Provide a support scheme (e.g. grant) for energy audits of residential buildings and incentives for implementing the prescribed measures
Street lighting	Provide a support scheme (e.g. grant) for energy audits of street lighting systems and financial mechanisms to implement the prescribed measures
Industry	Lead discussions with donors and IFIs to support the establishment of a dedicated credit line to provide long-term loans for energy efficiency projects in industry
Industry	Define project eligibility criteria, including technical assistance to be provided for preparing applications, and facility operational procedures
Industry	Define eligibility criteria for state support (Art. 8.8 of the energy efficiency law) for small and medium-sized industrial enterprises – e.g. by establishing a public-private partnership mechanism
Industry	Provide energy efficiency credits and state support (e.g. grants) for energy efficiency improvements in industry, when applicable
Agriculture	Establish financial mechanisms and dedicated credit lines to implement energy efficiency measures in agriculture
Agriculture	Provide technical assistance for preparing credit application forms

Further recommended financing and investment measures include:

- A dedicated financing instrument for ESCOs, featuring state- or third party-backed guarantee mechanisms to reduce risks associated with, for example, longer payback periods, data collection challenges and project performance monitoring. International experience and best practices in this area are available for Government of Azerbaijan consideration.
- Bulk procurement of efficient technologies, such as energy-efficient appliances or industrial equipment, as discussed in subsections.
- Tax breaks to incentivise consumers (especially in industry) to deploy energy management systems and conduct audits, which could in turn enable the development of investment proposals for energy efficiency improvements.
- In addition to existing tax exemptions, low-interest loans to purchase EVs, along with charging infrastructure investments, to boost electric mobility development in Azerbaijan. Similarly, in agriculture for example, such loans could encourage the uptake of energy-efficient pumps.

Building capacity and raising awareness

Most energy efficiency experts consider that building capacity across institutions and markets while creating public awareness and buy-in for energy efficiency are more than just complementary or optional measures. Governments can face significant hurdles – as well as social and political disruptions – if these building blocks are not adequately developed as part of their policy frameworks. We therefore recommend several focus areas for the Government of Azerbaijan to consider for capacity building as it progresses in its energy efficiency efforts.

Institutions

The newly created Department for Energy Efficiency within the Ministry of Energy is one of the most important stakeholders for advancing the country's energy efficiency agenda. Ensuring this department is sufficiently staffed, resourced and trained will be critical to develop and implement a far-reaching and complex policy programme that cuts across multiple sectors and establishes strong collaboration and co-ordination with other ministries and departments.

Creating a dedicated energy efficiency agency is recommended to support the department, especially for policy formulation and implementation. Such an agency could work with a range of other government stakeholders (for example to develop standards and technical norms or to write tenders for energy efficiency grants) while engaging with the market participants that provide efficient services and technologies, and the support of an independent energy regulator could further

enhance the agency's work. Although the Azerbaijan Energy Regulatory Agency currently operates under the Ministry of Energy, its independence has been considered in strategic documents.

Supply chains

Market actors all along the energy efficiency supply chain (e.g. energy auditors, equipment manufacturers, installers and service providers) are not only central to improving energy efficiency in Azerbaijan but are also focal points for job creation and economic growth. The dedicated training and certification programmes are therefore important capacity-building measures.

Financial institutions

Banks and other financial institutions are also key links in the energy efficiency value chain. Increasing awareness and understanding of lending and investment opportunities for energy efficiency is critical to develop dedicated financial instruments such as preferential loans and grants, which are often deployed in markets through collaboration with lenders. Consumers and businesses need access to such instruments to purchase more energy-efficient technologies, retrofit homes and commercial buildings, improve the energy performance of industrial facilities and implement many other efficiency-related projects.

Public and market awareness

Across the abovementioned and other focal areas for capacity building, awareness-raising activities are important to inform both the public and market participants about the benefits of energy efficiency. Educational campaigns in schools and universities, posters and television advertisements, and national awareness days or weeks featuring thematic events can raise understanding considerably across a range of population and market segments. Events such as the [Baku Energy Week](#), for example, provide important models.

Sector-specific energy efficiency measures

Improving efficiencies and transforming energy use in buildings

Combined with robust energy efficiency performance, electrifying end-use energy in buildings, enabled by greater renewable energy production and storage capacity in power systems, is considered by most experts the most sustainable way to reduce carbon emissions from the buildings sector. To enable this kind of

decarbonisation, making the building stock more energy efficient is critical not only for heat pump deployment (as discussed in this section) but also to support more rational grid electricity usage.

In adopting minimum energy efficiency norms for buildings (by Resolution No. 287 of 26 August 2023 of the Cabinet of Ministers of the Republic of Azerbaijan), Azerbaijan has taken its first steps towards making the building stock more energy efficient. Although significant work remains to develop a more comprehensive policy framework for energy efficiency in buildings, the draft NEEAP proposes several measures.

Draft National Energy Efficiency Action Plan buildings sector measures

Topic	Mechanism
Institutions and governance	Condominium associations in multi-apartment residential buildings
Targets	National and specific targets for renovating public/state-owned buildings (e.g. number of m ² to be renovated)
Secondary legislation	Guidelines for cost distribution of heat and hot water supplies in multi-apartment buildings with heat and hot water meters installed at the heat exchange point or at the entrance of the building Regulations on energy performance certification of buildings, including a calculation methodology for energy class definitions, energy certificate contents, types of buildings to be certified, and requirements for experts issuing energy certificates
Financing and investment	Specific targets, financial mechanisms and incentives to scale up energy efficiency renovations of residential and public buildings
	National renovation programme for residential buildings, including financial mechanisms and incentives
	Support scheme (e.g. a grant) for energy audits of state-owned buildings, and financial mechanisms to implement the prescribed measures
	Legislative changes to ensure municipalities are awarded credits for energy efficiency and can use the energy savings to repay investments
	Support scheme (e.g. a grant) for energy audits of residential buildings, and incentives to implement the prescribed measures
Energy efficiency market development	Register of experts authorised to issue building energy performance certificates
Data	Study on technical and economic energy efficiency potential in residential and public buildings
	National software for buildings' energy performance calculation methodology

Topic	Mechanism
Monitoring and reporting	Energy management information system for state-owned buildings and reporting system for implementing NEEAP sectoral measures
Information, awareness and capacity building	Guidelines for energy efficiency measures in residential buildings
	Guidelines on technical and economic best practices, materials and technologies in the construction sector
	Programmes to promote the latest construction technologies and materials, and new highly efficient and near-zero-emissions buildings
	Training and certification of experts for buildings' energy performance certificates
	Capacity building of competent authorities for quality control of implementing energy certificates for buildings

To ensure the timely adoption and successful implementation of these and/or other types of measures, the Government of Azerbaijan will need to deploy significant technical resources to institute standards and norms, along with supporting mechanisms. A national renovation programme or similar effort, backed by binding targets (for renovations or new low-carbon buildings), would be a major enabler.

Communication, awareness raising, and capacity building are also essential to ensure effective implementation and end-user buy-in. Pilots and demonstration projects are crucial to showcase not only the effectiveness of energy efficiency improvements, but also the potential for buildings to “interact” with the energy system.

In commercial and public buildings, for example, controls, automation and analytics (software) can be used not only to improve energy efficiency and operational control but to enable demand-response services that power down building systems at peak electricity generation times. This can reduce excess power generation and improve system integration of renewables. Furthermore, the integration of EV charging, distributed renewable energy technologies (e.g. solar PV) and storage (batteries), particularly in new constructions, can transform buildings from end users of energy to critical nodes or “prosumers” in the energy system – i.e. generators of on-site renewable power and aggregators of demand services, power storage and load-balancing assets. Funding and launching pilots that demonstrate the potential of these technologies could generate strong market interest in the sector and stimulate demand for these services.

Additionally, the government could introduce technology-specific targets (e.g. percentage increases in numbers of buildings insulated, heat pumps deployed, EV charging points connected at the building level, etc.) to amplify the effects of pilots and demonstration projects.

At the same time, wider energy sector issues have a potent impact on energy efficiency in buildings and need to be addressed through robust inter-ministerial co-ordination with high-level endorsement. For example, gas subsidies disincentivise investments in energy efficiency since they invalidate the business case for equipment upgrades and retrofits, creating a significant barrier for ESCOs. The way TSOs and distribution system operators (DSOs) are remunerated or encouraged to deploy distributed renewable energy sources can also have an important impact on how much renewable energy is used to, for instance, power heat pumps in homes.

Transforming heating

Azerbaijan risks becoming locked into gas dependency for its buildings sector heating needs as the population increases and more new heating systems come online. If growing energy demand for space heating continues to be met by individual boilers that burn subsidised gas, and if the buildings sector is characterised by low levels of energy efficiency, policymakers will find it increasingly challenging to decarbonise space heating. There are, however, [efficient, cost-effective low-carbon alternatives](#) the Government of Azerbaijan can explore, such as modern district heating and cooling (DHC) systems, heat pumps, waste heat use and thermal storage, combined with more efficient electricity generation.

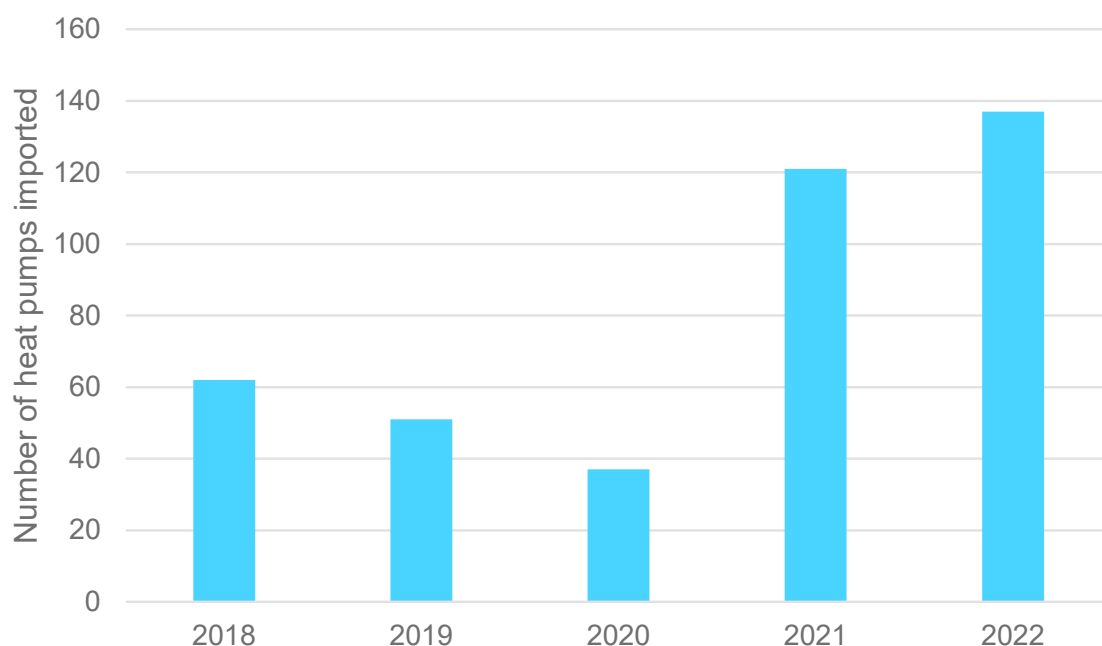
For district heating, which currently covers less than 5% of the country's heating needs, the Government of Azerbaijan could consider replacing all Soviet-era DH systems with smaller compact heating units for residential apartment buildings while piloting the use of large-scale heat pumps. The draft NEEAP suggests implementing a district heating roadmap or optimisation plan as part of a wider development strategy; this strategy is currently being developed by the Government of Azerbaijan.

Beyond district heating, a national strategy for the entire heating sector is recommended to enable the Government of Azerbaijan to deploy more direct measures such as bans or phaseouts of fossil fuel technologies to stimulate a shift towards greater energy efficiency. For example, in conjunction with aggressive renovation of existing buildings and future-proofing of new ones, energy efficiency could be boosted by banning gas connections in new residential buildings from mid-2030.

To provide sustainable and reliable heating in Azerbaijan's buildings as gas-burning technologies are phased out, the government would have to prioritise

aggressive, wide-scale heat pump deployment. Given the very modest uptake of this technology to date, robust support measures would be required to enact such a major expansion. Although its heat pump imports have more than doubled since 2018, the country brought in fewer than 150 units in 2022.

Heat pump imports in Azerbaijan, 2018-2022



IEA. CC BY 4.0.

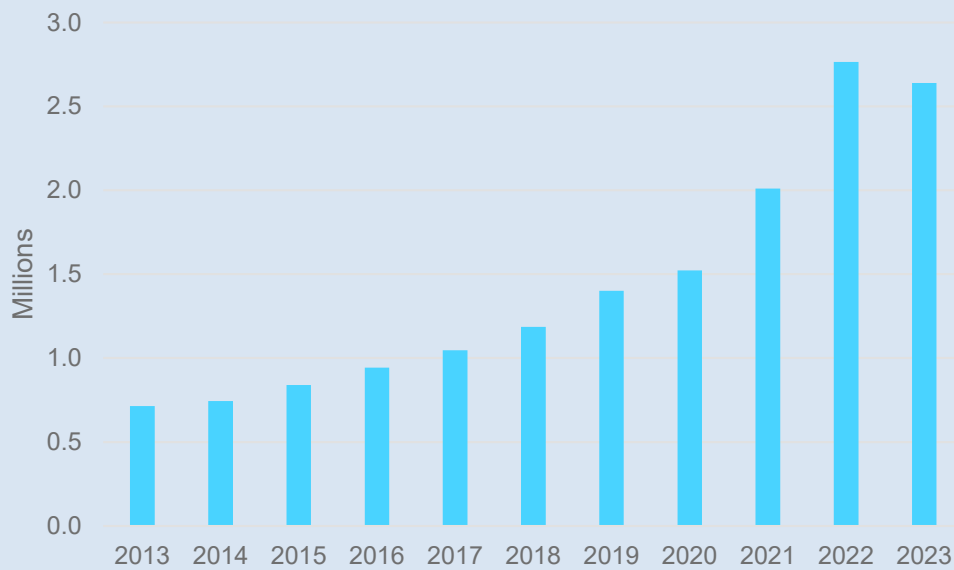
Source: IEA analysis based on data from the Republic of Azerbaijan, State Statistical Committee, 2024.

Low heat pump market penetration is clearly an important challenge for Azerbaijani policymakers. However, strong growth in heat pump sales globally – especially in Europe – could be fortuitous for the country: by leveraging global and regional best practices to “leapfrog” over other nations’ missteps in heat pump deployment, Azerbaijan could achieve rapid market growth.

Heat pump use is on the rise

Global heat pump sales have been on an upward trajectory since 2020 as many countries actively encourage heat pump deployment in homes and businesses through targeted incentives such as rebates. More consumers have also started purchasing heat pumps in response to sharp increases in gas prices and gas market volatility tied to geopolitical events. In Europe, annual heat pump sales have more than doubled since 2015, reaching over 3 million units in 2022 – an increase of nearly 40% from 2021. While sales have since declined, 30% more heat pumps were sold in 2023 compared to 2021, and annual sales are over 70% above 2020 levels.

Europe annual heat pump sales, 2010-2023



IEA. CC BY 4.0.

Source: IEA analysis based on data from the European Heat Pump Association (EHPA), [Market Data](#).

While concerns have been raised about the effectiveness of heat pumps in colder climates, a growing body of evidence suggests that the technology is effective even at very low temperatures. For example, Norway, Finland and Sweden (the countries with the coldest climates in Europe) have the continent's [highest heat pump sales](#) per 1 000 inhabitants. Heat pumps have also provided opportunities for economic growth and job creation. In Poland, for example, a "[heat pump valley](#)" has emerged in adjoining regions in the central part of the country, where global suppliers have set up major manufacturing facilities to meet growing demand for the technology.

Leveraging data from metering

Data obtained from metering can support energy efficiency progress in Azerbaijan by helping policymakers track the impacts and gauge the success of policies and measures. Smart meter data can also promote optimal energy use by enabling the application of time-of-use tariffs and giving consumers a clear picture of their energy consumption (including consumption trends, e.g. peaks). The draft NEEAP's recommendations in this area include conducting a consumer survey to monitor behavioural changes as new metering and related billing practices are introduced; it also suggests that billing be aligned with metering.

Not only would implementing these and other metering-related measures support policy implementation: they would also create the data points that market participants and investors require when seeking energy service and technology deployment opportunities.

Rolling out more efficient appliances and lighting technologies

According to IEA member country experiences, MEPS are among the world's [most effective and economical](#) energy efficiency policy instruments. In Azerbaijan, where MEPS have never been used, there is significant potential for energy efficiency gains through more efficient technologies, notably lighting and residential refrigeration. Combined with efficiency gains in other sectors, [deploying energy-efficient technologies](#) could deliver annual electricity savings of over 1.2 TWh by 2040 – worth more than USD 60 million – while reducing CO₂ emissions by the equivalent of nearly 500 000 passenger cars annually.

In the absence of an established MEPS and labelling framework for appliances and equipment, additional regulatory and incentive mechanisms will likely be required to generate momentum in this area among consumers and market participants. Measures used in other countries include bans on imports of inefficient appliances, financial support for replacements, and tax incentives for equipment manufacturers.¹

Fortunately, Azerbaijan has the advantage of being able to leverage global best practices in these areas. In Ghana, for example, used-refrigerator imports were banned in the early 2010s and the government, with international donor support, implemented a [replacement scheme](#) whereby private citizens could trade in their old refrigerators for vouchers to purchase new, efficient models. Ten thousand refrigerators were replaced under this programme, reducing electricity use by approximately 400 GWh and saving households an estimated USD 140 on average per year. Other countries have deployed [similar incentives](#), including rebate schemes in Switzerland and appliance-swap projects in Malta, Bulgaria and Hungary.

Incandescent lamps are another inefficient technology for which Azerbaijan should ban imports. Other countries where they have remained in circulation have [taken this measure](#): for instance, Kazakhstan phased out 25-W incandescent lamps in January 2014, and Uzbekistan banned 40-W and stronger incandescent lamps in January 2017. To guarantee consumers access to more efficient alternatives (e.g. LED lamps), the Government of Azerbaijan could consider bulk procurement and innovative financing mechanisms to deploy LED lighting at scale. In India, for

¹ Since electrical appliances and other equipment currently account for over 22% of Azerbaijan's imports, expanding the local market for these technologies could be a prime [opportunity for economic growth](#).

example, consumers can purchase LED lamps at one-fifth their market cost through the [UJALA lighting programme](#) and pay back the difference through instalments on their electricity bills.

In the future, for consumer segments that can afford it, deploying digitally controlled appliances could help transform Azerbaijan's buildings sector from an end user of energy to an interactive "participant" in the energy system. Smart devices can act as [flexible-load sources](#) that help improve energy security while optimising energy management and system efficiency. In contrast, a large increase in traditional appliance usage resulting from economic growth and rising living standards would raise both average power consumption and peak loads.

Along with these and other measures, targeted awareness-raising campaigns will be critical to ensure consumers understand the need and urgency to shift to more efficient equipment and are made aware of affordable and/or digitally controlled alternatives.

Improving transport efficiency and advancing electric mobility

Standards – especially for fuel economy – are a policy foundation in transport, used by many countries globally to reduce CO₂ and particulate emissions and improve energy efficiency in the sector. The Government of Azerbaijan introduced Euro-4 standards in 2014, and ongoing modernisation of the Heydar Aliyev Oil Refinery, which supplies almost all the country's transport fuel, will enable the production of high-quality Euro-5 diesel and gasoline. While additional research and data are needed to develop baselines for fuel efficiency standards and related fiscal policies, transitioning to the Euro 5 (and eventually Euro 6) standard should be a cornerstone objective of Azerbaijan's future transport policy efforts.

In addition, while the country already has a regime in place to prevent the import of vehicles more than ten years old, we recommend that it ensure rigorous enforcement – and eventual tightening – of vehicle import controls. Introducing mandatory vehicle inspections that include testing the functionality of emissions control technologies and verifying odometer readings and roadworthiness would further ensure that the most polluting vehicles are taken out of circulation.

In parallel, increasing the share of EVs in Azerbaijan's vehicle fleet will require targeted efforts, including to expand EV charging infrastructure. A [presidential decree](#) signed in March 2024 to encourage EV use therefore tasks the Cabinet of Ministers with proposing enhancements to secondary legislation to promote both EVs and the deployment of more charging points, among other measures. Azerenergy, which is responsible for developing EV infrastructure, and Azerishig have been appointed to determine how much state budget funding will be necessary to meet the decree's objectives.

While developing mechanisms as part of this decree, the government could offer dedicated incentives for the private sector to increase investments for new charging points in both urban centres (e.g. Baku) and surrounding areas. Wider access to charging infrastructure would be an important catalyst for EV uptake, especially among upper- and middle-income segments of the population.

Greater procurement of EVs for public sector use (e.g. for public bus fleets) would also stimulate electric mobility uptake, and intensive utilisation and lower charging costs would help ensure quicker amortisation of the higher capital costs associated with EVs. The Government of Azerbaijan has already launched an [electric bus programme](#) in the city of Baku and, as part of the Decree 34 of the Cabinet of Ministers of the Republic of Azerbaijan (January 2024), steps are being taken to ensure the use of electric buses in public transport and renewal of the bus fleet through local production. Similarly, requirements and incentives for EV adoption in private fleets, for instance aimed at car rental agencies, taxi operators and ride-sharing companies, could initially target groups with lower capital constraints that could pay the higher purchase price of EVs more easily.

Very similar to heat pumps, Azerbaijan is starting from a relatively low base of less than 600 EVs currently in use. Nevertheless, growing momentum in EV uptake across the globe means that by leveraging lessons learned in other parts of the world, the country could deploy this technology at a rapid pace.

Building on tightening fuel economy and import standards, adopting targets for road and rail electrification could signal to manufacturers, investors and consumers that Azerbaijan is serious about transitioning to EVs soon. In parallel, indicating to suppliers that the country's existing gasoline- and diesel-powered vehicle fleet is nearing the end of its lifetime would help shift investments towards electric mobility (fleet renewal programmes such as “cash for clunkers” are a valuable initiative in this respect).

In fact, setting targets for banning such vehicles is already under way or completed in many countries, with the European Union recently voting to adopt its [ban for 2035](#). Furthermore, as infrastructure expansion is critical to enact these measures, target setting (e.g. deployment of at least 100 000 charging points by 2030) is also recommended to spur investments in this area.

Once initial policy actions have raised EV visibility on Azerbaijan's roads, their increased presence could send strong market signals and create favourable circumstances for economic growth and employment. In upcoming decades, Azerbaijan's policymakers would be able to exploit opportunities to ensure their country is not left behind in the global transition to electric mobility. Fuel tax increases, accompanied by compensation mechanisms (e.g. tax revenue reallocation) for vulnerable population segments, would boost these efforts.

Beyond specific measures targeting electric mobility, this is a prime opportunity for the Government of Azerbaijan to deploy a suite of urban planning projects such

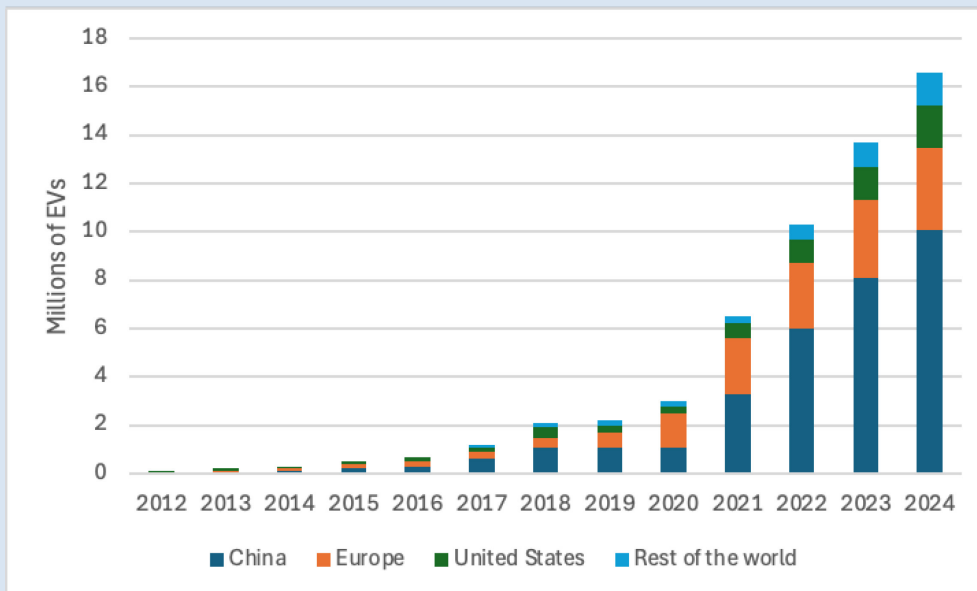
as bicycle lane development and public transport expansion (along with incentives to use it). These measures could be guided by the [Avoid-Shift-Improve](#) (A-S-I) framework, which has become an internationally recognised standard for sustainable mobility policy approaches.

Under the A-S-I framework, the “avoid” aspect recommends holistic transport system improvements, whereby planners aim to reduce the need for motorised transport and enable greater use of walking and cycling, for example by ensuring that residential, work and leisure districts are near one another. The “shift” component promotes instruments to encourage modal shifts from polluting forms of transport (e.g. internal combustion engine cars) to cycling or public transit. Under “improve”, policymakers target higher overall efficiency of private and public motorised transport. Because automated data collection and software tools allow policymakers to better design and monitor the impact of transport policies, all A-S-I pillars and measures can be enabled and enhanced by digital technologies and analytics.

Electric vehicles are on the move

Global annual EV sales have nearly quadrupled since 2018 and are expected to grow thanks to government incentives, consumer demand and supply chain improvements, with nearly all major vehicle manufacturers now offering electric alternatives to internal combustion engine vehicles.

Growth in global Electric Vehicle sales, 2012-2024



IEA. CC BY 4.0.

Note: 2024 values are estimated.

Source: IEA (2024), [Electric Vehicles](#)

International best practices are available to guide the Government of Azerbaijan in its efforts to develop the country's domestic EV market. In Norway, for example, the government collaborated with manufacturers and supply chains to expand the country's market to 350 000 EVs in 2020, an almost fourfold increase from 2015. Among the [promotional measures](#) deployed by the Government of Norway are:

- no purchase/import taxes
- exemption from 25% VAT on purchases
- no annual road tax
- no charges on toll roads or ferries
- free municipal parking (1999-2017)
- access to bus lanes
- 50% reduced company car tax.

While the Government of Azerbaijan has already implemented incentives related to duties and taxation, including a full VAT exemption on EVs, Norway's actions are additional levers for policymakers to consider. EVs can also be promoted by policies for targeted market segments, such as taxis. In Tirana, Albania, for example, licences for EV taxis are less expensive, and the licensing process has been streamlined. Backed by mandates for taxi companies to shift a portion of their fleet to EVs, such measures can promote electric mobility in a way that is visible and accessible to consumers.

Enhancing energy efficiency in industry

Azerbaijan's industry sector has considerable energy efficiency potential, as natural gas and electricity subsidies have strongly disincentivised energy efficiency investments for some time. Furthermore, a lack of MEPS for motors or pumps has resulted in widespread reliance on inefficient machines across all industry subsectors. [Deploying more efficient industrial motors](#) could therefore reduce electricity consumption by as much as 1.5 TWh and save Azerbaijan USD 70 million by 2040. Such significant savings are particularly important given the country's strong increase in industrial electricity usage in recent decades.

Nearly 60 countries currently have [MEPS in place for industrial motors](#): 45 mandate some of the most efficient options available (IE3), and in 2023 the European Union, Norway, Republic of Türkiye, Switzerland and the United Kingdom stipulated the highest-efficiency technologies (IE4) for certain motor types. Like Türkiye and India, what could benefit Azerbaijan's industry sector

significantly is a targeted campaign featuring bulk procurement and deployment of energy-efficient motors, combined with an ESCO model that allows investments to be recuperated through energy savings.

International experiences in deploying efficient motors in industry

Given their relatively short payback period (generally two to three years), energy-efficient motors are a sound investment for most industries, delivering both immediate and long-term energy savings that translate into important cost cuts for manufacturers as well as economy-wide GHG emissions reductions. Estimates suggest that [deploying efficient motors in 156 countries](#) could deliver energy savings equivalent to nearly 200 000 MW of power generation capacity, reduce CO₂ emissions by 430 Mt, and save USD 35 billion in electricity costs.

However, the high upfront cost of efficient motors can be an obstacle for industry owners, particularly in developing and low-income countries. To address this barrier, international organisations, governments, the private sector and other stakeholders have launched bulk procurement and ESCO schemes to purchase and deploy more efficient motors at scale in targeted industries:

- In Türkiye, 363 motors were replaced in 48 SMEs during a [pilot project](#), achieving energy savings of approximately 1.5 GWh/year while mitigating nearly 700 t CO₂e of GHG emissions. The scheme also featured technical assistance and the creation of a dedicated ESCO mechanism to finance investments based on energy savings.
- In India, a [dedicated programme](#) is aiming to procure 120 000 efficient (IE3) motors to replace inefficient ones in a range of industries. Bulk procurement of the motors offers economies of scale, lowering unit costs by 35%, and an ESCO mechanism allows the investments to be recovered through the resulting energy and cost savings.

There are also opportunities for Azerbaijan to improve energy management within industry – especially in high-energy-consuming sectors such as manufacturing, chemicals and petroleum – through voluntary (i.e. incentive-backed) or mandatory energy audits, neither of which have been used before in the country. Among a range of other measures, the draft NEEAP proposes provisions for audits. If deployed, details such as types of enterprise affected, audit frequency, etc., would need to be defined. Establishing an industrial energy efficiency improvement target could also strengthen audit uptake and the implementation of prescribed measures.

Draft National Energy Efficiency Action Plan measures for industry

Topic	Actions
Secondary legislation	Develop cost-benefit analyses for further eco-design requirements for other categories of energy-using industrial equipment
	Develop enforcement and compliance procedures
Financing and Investment	Define project eligibility criteria, including technical assistance to be provided for preparing applications and facility operational procedures
	Define eligibility criteria for state support (Art. 8.8 of the energy efficiency law) for small and medium-sized industrial enterprises (e.g. by establishing a public-private partnership)
Market development	Develop guidelines for energy audits of industrial enterprises
	Organise training for energy auditors and on industrial energy management systems
	Conduct energy audits on a mandated minimum number of enterprises of various sizes in different industry subsectors
	Assess the multiple benefits of energy efficiency in industry, beyond energy and monetary savings
	Based on the results of mandatory and other energy audits, establish a database for energy efficiency measures according to industry subsector, and their potential and benefits
	Establish a mandatory reporting system for all industrial enterprises to include information on required and voluntary energy audits, energy management systems introduced, and energy efficiency measures implemented
	Organise training sessions to raise the qualifications and capacity of technical personnel and managers of industrial enterprises to implement energy efficiency projects
	Facilitate the exchange of best practices and best available technologies among industrial enterprises by organising dedicated industrial energy efficiency days
	Identify barriers to EPC/ESCO project deployment in the industry sector

A further recommendation to consider would be to track progress against eventual industrial efficiency targets, with measurement and data collection at the process level (e.g. kWh per tonne of production in key sectors). This would also permit comparison and benchmarking with best available technology (BAT) options and performance ranking of industries and operators with respect to energy efficiency

and GHG emissions, for example. Such efforts could be applied initially to the highest-consuming subsectors (i.e. manufacturing, chemicals and refining) as priority and/or pilot areas. Plus, economies of scale could be realised for purchasing and deploying standard technologies if several similar industries were targeted together as part of one single efficiency programme. This tactical approach, which would require dedicated co-ordination and capacity, could then be replicated in other subsectors.

Automation and software, including artificial intelligence (AI) applications, can be used to optimise processes and improve the efficiency of a wide range of industries, with a rapidly growing scope of solutions available, including to support efforts being assessed by the Government of Azerbaijan's to modernise modular power plants and other sources of generation. These technologies could be implemented affordably while delivering significant measurable reductions in operational costs, CO₂ emissions and energy use, in addition to other benefits. We therefore recommend that Azerbaijan research and develop suitable software and AI options – as well as other emerging technologies such as robotics – for use in the industry and other sectors.

Exploring efficiency opportunities in agriculture

Much like in the industry sector, subsidised natural gas prices have strongly disincentivised investments in energy-efficient agricultural equipment such as motors and pumps, which account for a significant share of the sector's energy demand and energy efficiency potential. Collecting data on the numbers and types of motors and pumps currently in use in the sector would be an important first step to identify opportunities for energy efficiency improvements. In parallel, bulk procurement programmes and targeted information campaigns for farmers would provide options and raise awareness about the benefits of adopting more efficient devices to not only save energy but improve agricultural yields.

While we cannot explore this topic in depth in this roadmap, we do recommend that the Ministry of Energy and the Ministry of Agriculture work together to gather data and develop strategies to identify options for improvements in the sector.

Conclusions

The Government of Azerbaijan has made important advances in recent years to improve energy efficiency both across the country's economy and in key sectors. A new legal framework and supporting legislation have been adopted, and a new Department for Energy Efficiency has been created to help unlock Azerbaijan's significant energy efficiency potential in buildings, industry, transport and beyond. There is growing awareness that longstanding reliance on subsidised natural gas creates risks for the country's long-term development prospects, particularly as multiple factors – i.e. climate change, declining gas reserves, population and GDP growth, and rising global oil and gas market volatility – simultaneously exert pressure on the economy.

While the country's advances are encouraging, significant additional efforts will be required to ensure it stays on track to improve its energy efficiency. For instance, natural gas and electricity subsidies remain high, creating strong disincentives for energy efficiency investments. The new legal framework for energy efficiency needs to be enhanced with additional secondary legislation, while policymakers need to ensure measures are being implemented effectively. Formally adopting the draft NEEAP and its many measures would also be an important step, along with capacity building and awareness raising to ensure policy success and buy-in from market participants and the wider public, especially consumers affected by rising energy prices resulting from subsidy reforms and/or global energy market fluctuations.

Fortunately, Azerbaijani policymakers, market participants and other energy efficiency stakeholders have access to a growing body of global best practices on energy efficiency, as governments across the globe have been testing established policy levers such as MEPS and stimulus measures such as bulk procurement to improve energy efficiency. Applying the lessons learned from these and other programmes can allow Azerbaijan to deploy energy efficiency mechanisms quickly and at scale in upcoming decades to transition towards more efficient and rational use of its energy reserves while exploiting opportunities for GHG emissions reductions and economic growth. The creation of a dedicated energy efficiency agency would support the government's efforts, especially in policy and strategy formulation and implementation.

Furthermore, hosting the COP29 climate conference in November 2024 gives Azerbaijan a unique opportunity to place energy efficiency at the forefront of its wider energy system reform programme and reduce emissions in line with its global commitments. To help it achieve these objectives, the data and

recommendations contained in this report and its summary roadmap can offer valuable insights and starting points for the country to make further progress in a range of areas.

Energy Efficiency Roadmap for Azerbaijan

Based on the preceding analysis, the three tables of this summary roadmap present critical, important and supporting measures and milestones across a timeline to 2040. The tables are divided into cross-sector measures (grey) and sector-specific topics for buildings (green), appliances and equipment (blue), transport (orange) and industry (yellow). A colour code key appears below each table for reference. Energy efficiency is abbreviated as EE when applicable.

Critical measures

	2024 to 2030	2030 to 2040
Cross-sector	<ul style="list-style-type: none"> • Adopt a national EE target • Complete legal framework with secondary legislation and technical norms • Implement State Programme and Strategy • Subsidy reforms • Develop EE data collection and tracking methodology 	<ul style="list-style-type: none"> • Meet and update national EE target • Complete subsidy reforms • Implement and expand data collection and tracking methodology
Buildings	<ul style="list-style-type: none"> • Implement MEPS and codes • Set targets 	<ul style="list-style-type: none"> • Achieve at least 1.5% annual renovations of existing buildings • Ensure all new buildings are nearly or net zero
Appliances and equipment	<ul style="list-style-type: none"> • Implement MEPS and labelling schemes • Ban incandescent lighting and imports of incandescent lamps • Formulate a heat pump target 	<ul style="list-style-type: none"> • Phase out/ban gas boilers in new buildings • Ensure that most appliances are equipped with digital controls
Transport	<ul style="list-style-type: none"> • Collect data to enable enhanced vehicle efficiency standards and related fiscal policies • Introduce mandatory vehicle inspection regimes • Increase fuel taxes along with appropriate social compensation mechanisms 	<ul style="list-style-type: none"> • Phase out/ban internal combustion engines • Increase the EV share to 30%, with separate targets for public buses (rapid adoption), cars and trucks
Industry	<ul style="list-style-type: none"> • Introduce MEPS for industrial motors and equipment • Set targets based on benchmarks and indicators 	<ul style="list-style-type: none"> • Develop and launch a chemical and petrochemical efficiency strategy

Important measures

	2024 to 2030	2030 to 2040
Cross-sector	<ul style="list-style-type: none"> • Deploy the Energy Efficiency Fund • Introduce incentives and capacity building across sectors 	<ul style="list-style-type: none"> • Create a dedicated EE agency • Create an independent energy regulator • Make a range of financial products for energy efficiency available
Buildings	<ul style="list-style-type: none"> • Introduce annual renovation targets • Launch a national renovation programme • Develop a heating strategy 	<ul style="list-style-type: none"> • Deploy and achieve milestones identified in the heating strategy • Establish dedicated energy efficiency financing
Appliances and equipment	<ul style="list-style-type: none"> • Collect technology-specific data • Develop a heat pump strategy • Introduce import controls • Introduce subsidies and promotions 	<ul style="list-style-type: none"> • Develop and launch time-of-use tariffs and a grid service strategy • Develop the domestic appliance market
Transport	<ul style="list-style-type: none"> • Develop an EV strategy including additional incentives • Set targets for charging points 	<ul style="list-style-type: none"> • Deploy 100 000 to 200 000 EV charging points
Industry	<ul style="list-style-type: none"> • Introduce a bulk replacement programme for drives and pumps • Offer training and accreditation for auditors, with free or subsidised energy audits 	<ul style="list-style-type: none"> • Develop a strategy for digitalisation, automation and artificial intelligence (AI) • Introduce carbon-based obligations and taxation

Supporting measures

	2024 to 2030	2030 to 2040
Cross-sector	<ul style="list-style-type: none"> • Conduct awareness-raising campaigns • Study barriers to efficiency in the utilities sector 	<ul style="list-style-type: none"> • Develop a new NEEAP • Develop a strategic investment programme
Buildings	<ul style="list-style-type: none"> • Conduct awareness-raising campaigns • Develop a heating and cooling strategy 	<ul style="list-style-type: none"> • Offer financing for DH and residential retrofits to boost grid integration and heating sector decarbonisation • Launch commercial Super ESCOs

	2024 to 2030	2030 to 2040
Appliances and equipment	<ul style="list-style-type: none"> • Conduct market-promotion and awareness-raising campaigns • Develop a bulk procurement strategy 	<ul style="list-style-type: none"> • Launch pilot programmes for intelligent appliances
Transport	<ul style="list-style-type: none"> • Develop an urban planning strategy 	<ul style="list-style-type: none"> • Establish domestic manufacturing of EVs and/or components
Industry	<ul style="list-style-type: none"> • Develop an energy efficiency strategy for the manufacturing, chemicals and refining subsectors • Offer auditor training sessions 	<ul style="list-style-type: none"> • Ensure that at least 30% of industries are certified with EMSs • Launch AI pilot and demonstration projects

Annexes

Current energy efficiency policies (in Azerbaijani):

- [Law of the Republic of Azerbaijan on the Rational Use of Energy Resources and Energy Efficiency](#)
- [Decree of the President of the Republic of Azerbaijan on Application of the Law of the Republic of Azerbaijan on the Rational Use of Energy Resources and Energy Efficiency](#)
- [Form of qualification certificate and rules on its issuance to energy auditors; suspension or cancellation of certificates; and rules on the register of energy auditors and energy audit organisations, as well as state control over their activities](#)
- [Rules on energy audits, the submission of energy audit reports and their form](#)
- [Criteria for determining entities and non-residential buildings subject to mandatory energy audits](#)
- [Requirements for energy managers and rules on their attestation](#)
- [Requirements for energy management systems](#)
- [Regulations on the formation and use of the vehicle disposal fund](#)
- [Energy service company \(ESCO\) terms and template, and rules on energy efficiency services](#)
- [Rules on labelling of energy-related products](#)
- [Eco-design requirements for energy-related products](#)
- [Rules on state control over the rational use of energy resources and energy efficiency](#)
- [Rules on assessing efficiency potential in electricity and heat production and natural gas refining, and assessment criteria](#)
- [Rules on increasing energy efficiency in construction facilities and saving energy resources](#)
- [Minimum energy efficiency norms for buildings](#)

Abbreviations and acronyms

A-S-I	Avoid-Shift-Improve
BAT	best available technology
EMS	energy management system
EPC	energy performance contract
ESCO	energy service company
EU	European Union
EV	electric vehicle
GDP	gross domestic product
GHG	greenhouse gas
HFO	heavy fuel oil
IEA	International Energy Agency
HFO	heavy fuel oil
MAB	multi-apartment building
MEPS	minimum energy performance standards
NEEAP	National Energy Efficiency Action Plan
SFH	single-family home
TFC	total final consumption
TFEC	total final energy consumption
U4E	United for Efficiency
USD	US dollars

Weights and measures

kWh	kilowatt hour
kWh/m ²	kilowatt hours per square metre
Mt	megatonne
TWh	terawatt hours

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