Iceland – land of energy

Past, present, and future

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Islandsbanki Research

Introduction

In recent decades, energy-related matters have changed radically in Iceland, with broad-based impact on society, the business community, and the economic position of the country. Iceland has evolved from relying primarily on coal and peat to being at the forefront globally in the use of renewable energy. Not only has this transformation improved living standards and enhanced sustainability; it has also strengthened Iceland's image as an international leader in environmental affairs and the harnessing of natural resources.

This report covers developments in the energy sector in Iceland from the beginning of electrification to the present day and into the future, with an eye to the challenges and opportunities ahead. Particular emphasis is placed on the economic significance of the transition to green energy and its impact on exports, investments, and the competitive position of Icelandic companies.

The report is based on the most recent available data, official forecasts, and analysis. It also focuses on policy issues of key importance for the country's continued growth and prosperity.

Iceland’s energy history

From coal and peat to green energy

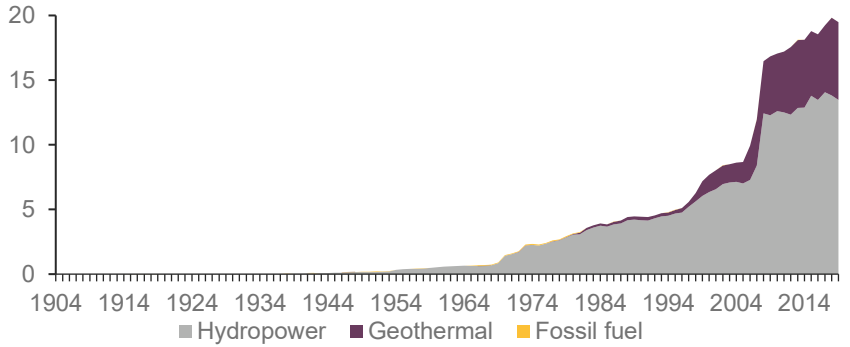
The history of energy use in Iceland reflects the social and technological advances that have taken place in the past century. In the 1930s, coal was by far the most prominent energy source, peat was still important, and hydropower and geothermal energy accounted for a small share of total use. At that time, energy consumption per capita was only a fraction of what it is today, and Icelanders’ living standards were accordingly lower. In just over a generation, Iceland metamorphosed from one of the most primitive societies in Western Europe, where electricity and central heating were a rarity, to being one of the most technologically advanced societies in the world. In addition to improving living standards and making life more comfortable and convenient, it has created new opportunities for businesses in general and for exports.

It is interesting to consider the rapidity of this change. The ancestors of now-living generations grew up under entirely different conditions in the first half of the 20th century, with limited energy consumption and little access to modern technology. In just a few generations, the energy situation has undergone a seismic shift, enabling Iceland to harness its natural resources sustainably and economically.

Historical data show clearly how hydropower and geothermal energy supplanted fossil fuels and peat, and how renewable energy came to dominate Icelanders’ energy consumption. This transformation has been fundamental to Iceland’s ability to build up a strong welfare society and become a global role model for sustainable energy use.

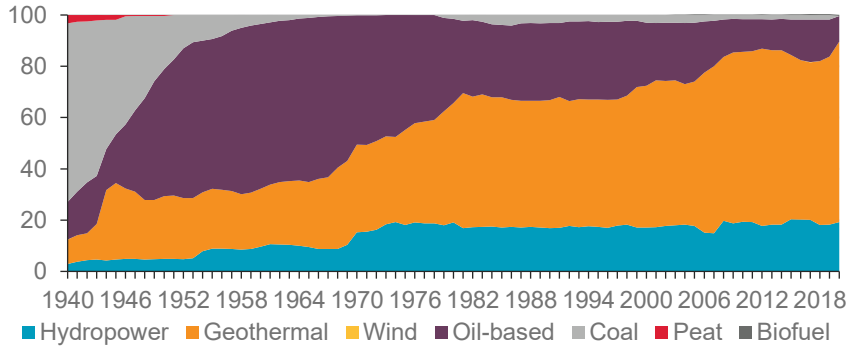
Electricity production in public power plants

Terawatt hours (TWh)



Total usage

Energy sources, share in total energy use



Sources: Statistics Iceland

Iceland – land of clean energy

World champions in renewable energy share

Today Iceland is world champion in terms of the share of energy consumption from renewable sources. Four of every five energy units in the country's primary energy supply are from eco-friendly sources, which is exceptional in international comparison. Fossil fuels are used almost solely in transportation, while energy for indoor heating and electricity comes from domestic natural resources, primarily hydropower and geothermal power.

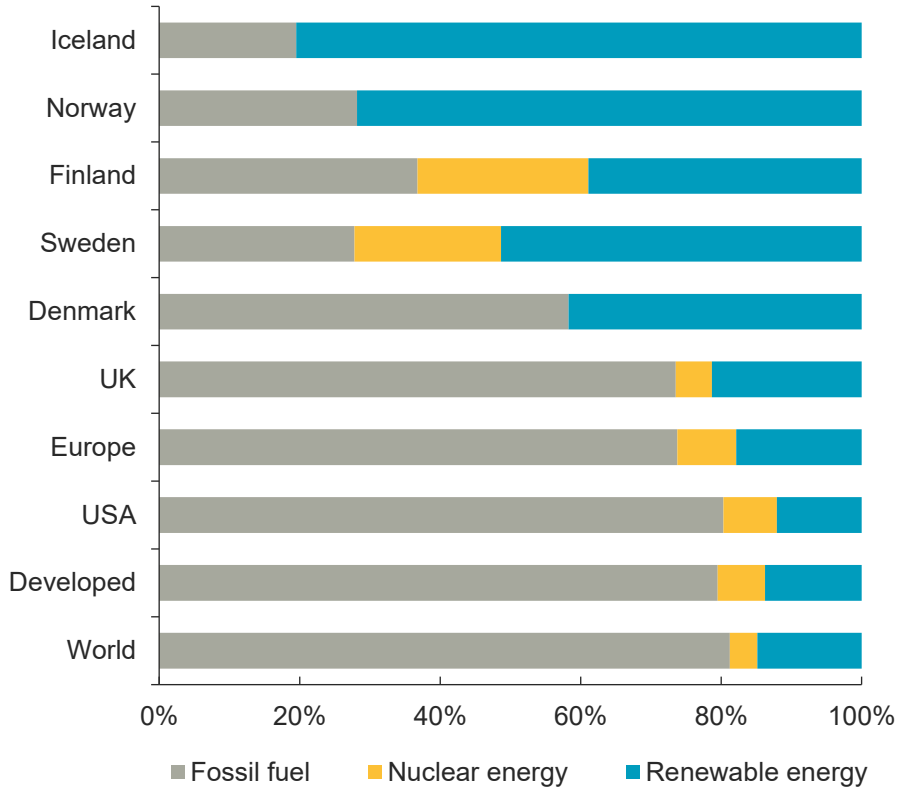
Iceland is very strong in international comparison, not only in the Nordic region but globally as well. Whereas fossil fuels are the predominant energy source in most countries, Iceland stands at the forefront with its large share of renewable energy, followed mainly by the other Nordic countries.

This progress is based on targeted strategy formulation and utilisation of natural resources, with emphasis on sustainability and environmental protection. Iceland's success in harnessing geothermal and hydropower makes it a model for other countries in energy affairs.

It is also worth noting that this leading position has enhanced Iceland's economic competitiveness in myriad ways. Access to cheap, clean energy has attracted foreign investment and supported the development of new sectors such as energy-intensive industry, data centres, and intellectual property.

Thus Iceland has not only retired peat and coal from its energy repertoire, it has also created for itself a unique position internationally as a country that harnesses its natural resources sustainably and responsibly.

Composition of primary energy consumption 2024
%



Sources: IEA

Geothermal power: Iceland a pioneer in a growing sector

Geothermal indoor heating unique in Iceland

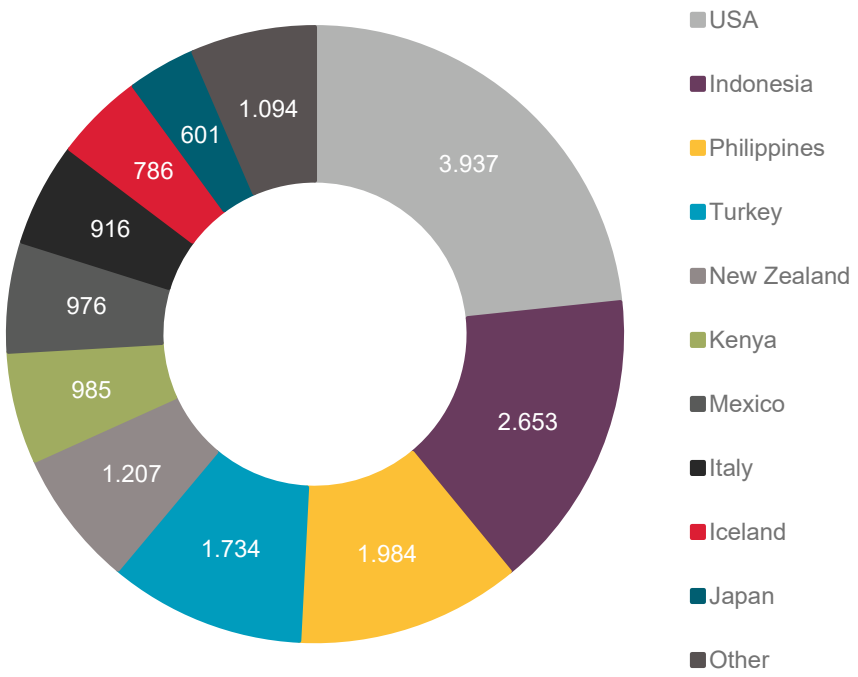
Iceland stands out in terms of geothermal energy harnessing. About 30% of electricity is produced with geothermal power, and 90% of indoor heating is geothermal-based. Iceland ranks ninth in the world in total geothermal energy production but places first in geothermal production per capita.

The geothermal sector is rapidly growing worldwide, with Icelandic companies leading in development and consultancy. The sector is projected to grow by 20-25% through 2030, which creates significant opportunities for the Icelandic economy and for exportation of knowledge and expertise.

In addition to producing 30% of the country's electricity, geothermal power generates indoor heating for nine of every 10 homes in Iceland. This unique situation reflects favourable natural conditions and successful energy strategy formulation. Geothermal power has enabled Icelanders to scale down their use of fossil fuels, improve air quality, and lower energy costs for households and businesses.

In addition, Icelanders' knowledge and experience in the field of geothermal energy has become an export product, as Icelandic firms and experts participate actively in geothermal development products the world over. This has strengthened Iceland's position as a leader in sustainable energy consumption and created new opportunities for innovation and the economy.

Global geothermal energy production capacity
MW in 2024, according to ThinkGeoEnergy



Sources: ThinkGeoEnergy, Grand View Research, IEA

The future is green

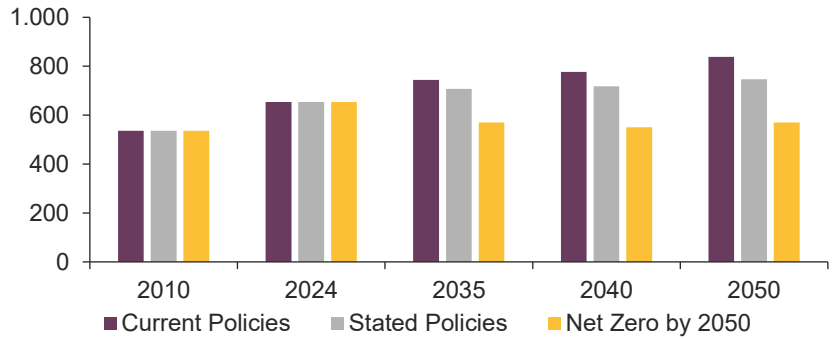
Global renewable energy supply set to grow exponentially

International forecasts assume that the supply of renewable energy will grow exponentially through 2050. According to the International Energy Agency (IEA), green energy could account for 26–70% of total energy supply by 2050, as compared with 13% in 2024. This demands increased investment and new thinking in energy matters, with emphasis on sustainability and carbon neutrality.

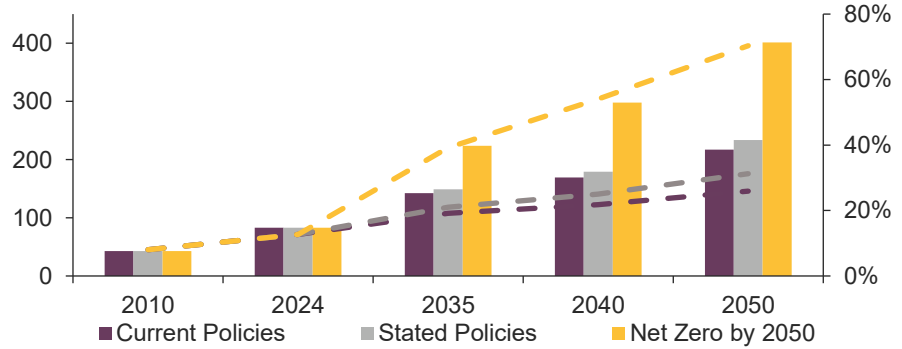
Energy matters have been a focal point of discourse in recent years. The world is facing the gargantuan task of reducing greenhouse gas emissions at a time when the need for energy is growing by leaps and bounds. IEA forecasts show that most scenarios assume that the energy supply will grow. Renewables will increase as a share of the total supply, according to all scenarios, and will grow substantially if carbon neutrality goals are to be met.

This calls for a new approach to policy formulation, investment, and resource utilisation, with sustainability and innovation as key ingredients.

Global energy supply, total energy
ExoJoule, IEA forecast in *World Energy Outlook* 2025



Global energy supply, renewable energy
ExoJoule (left) and share of total (right), forecast in *World Energy Outlook* 2025



The global investment need is enormous

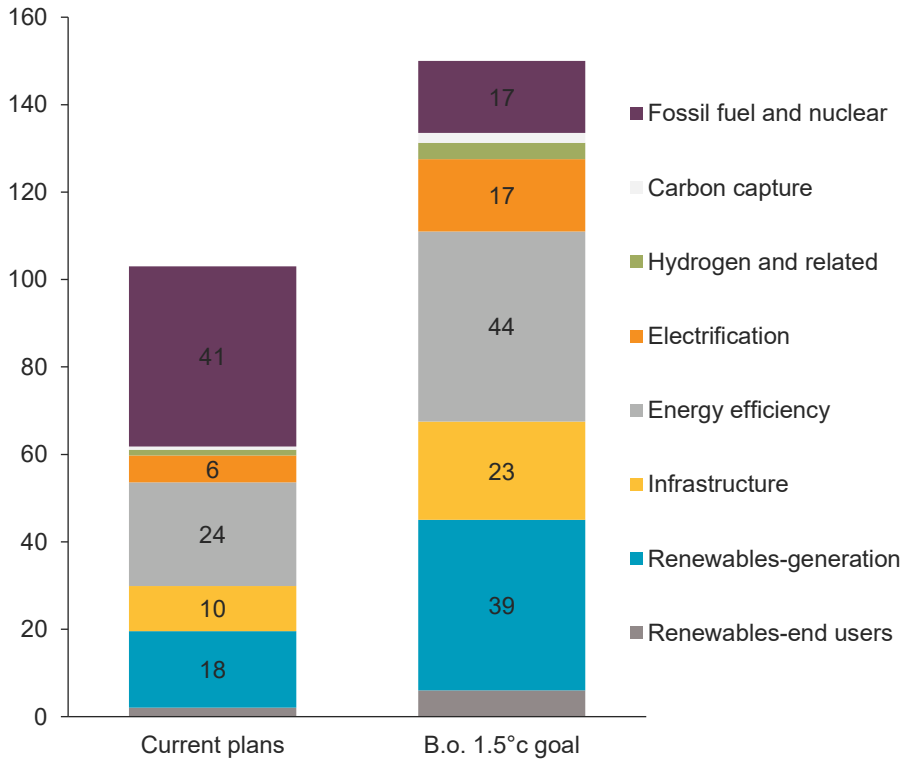
Energy switching and further global economic development require enormous investment in energy and related sectors

Energy transition and further development of economies around the world will require substantial development in the energy sector. The International Renewable Energy Agency (IRENA) recently issued an estimate of the possible scope of investment in the sector through 2050. The Agency currently estimates that investment totalling USD 103 trillion will be needed during the period, and that investment will have to increase by an additional 50% relative to keep global warming at the 1.5°C target. This is equivalent to 4–6% of global GDP per year. Assuming a roughly similar percentage, Iceland's investment need would come to ISK 200–300 billion per year.

This need for investment is not limited to energy production and distribution; it also includes energy switching on the user's side, storage technology, and improved energy efficiency, among other things. This requires a coordinated effort made by public entities, companies, and investors, with an eye to long-term perspectives and sustainability.

Like their peers in other countries, the Icelandic Government and business community must respond to this by creating a favourable environment for investment, ensure access to financing, and support innovation and development in fields relating to energy.

Forecasted investment in energy and related sectors 2024–2050
USD trillions



Sources: IRENA

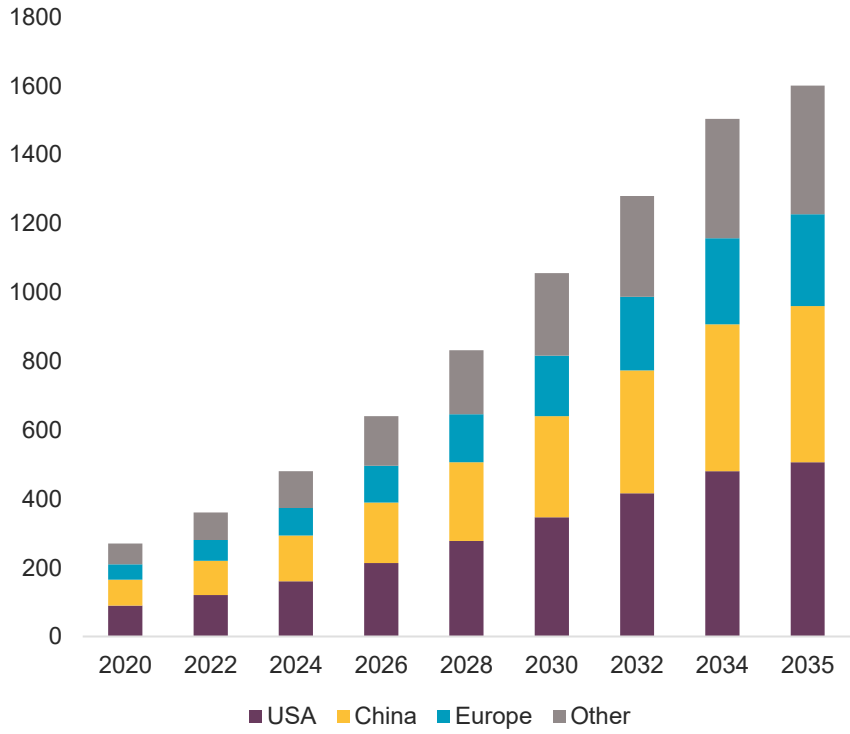
Artificial intelligence: An energy-intensive tech revolution

As we face a historically immense challenge in transitioning from fossil fuel combustion to eco-friendlier renewable energy sources, we face another turning point as well: Artificial intelligence (AI) is becoming a major user of energy worldwide, and its share in total consumption will grow rapidly in the years ahead. Energy consumption by data centres totalled an estimated 400–500 TWh in 2024 and could triple in the next decade. The vast majority of this consumption stems from increased use of AI.

Data centres, which house the computational capacity for AI, will consume a constantly increasing share of the world's energy and create new challenges and opportunities for Iceland. Today, seven data centres owned by three companies are operated in Iceland. Their roles extend beyond computational capacity for AI, however; for instance, they host nearly all of Iceland's digital infrastructure. Nevertheless, AI plays a growing role in the activities of data centres in Iceland, as it does in other countries. This trend will affect nationwide and worldwide energy needs as data centres and other energy-intensive activities become an ever more important part of exports and the business community.

While AI offers innumerable possibilities for innovation and advancement, it also requires increased consumption of energy and a new approach to energy matters. Iceland has the opportunity to take advantage of this by offering clean, sustainable energy to data centres and other energy-intensive activities.

Data centres' global energy needs
Bloomberg NEF forecast, TWh



Sources: Bloomberg NES, IEA

Data centres: Exporting electricity via fibre optic cable

Advances in AI stimulate demand for data centres' computational power

Icelandic data centres have grown rapidly in recent years and are now an important part of the country's infrastructure. They host nearly all of Iceland's digital infrastructure and provide a forum for indirect exportation of electricity via fibre optic cable, with computational power and data processing sold in international markets. The share of AI in data centre operations has been growing concurrent with a decline in activities such as cryptocurrency mining.

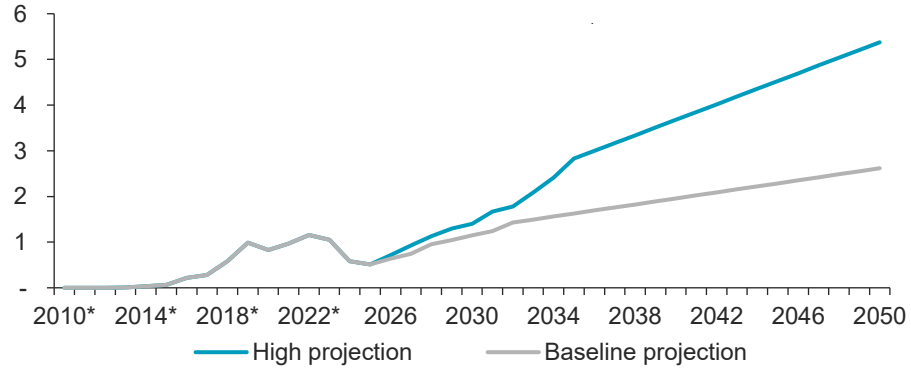
Data centres' energy consumption has surged, and recent forecasts assume it will grow by a factor of anywhere from four to nine in the next quarter-century. This trend creates both opportunities and challenges for Iceland, as it is important to ensure that energy procurement and infrastructure keep pace with growth in demand.

Advances in AI and increased need for computational power foster this trend and make Iceland a desirable place for data centre activities, as the country offers clean, cheap, and reliable energy.

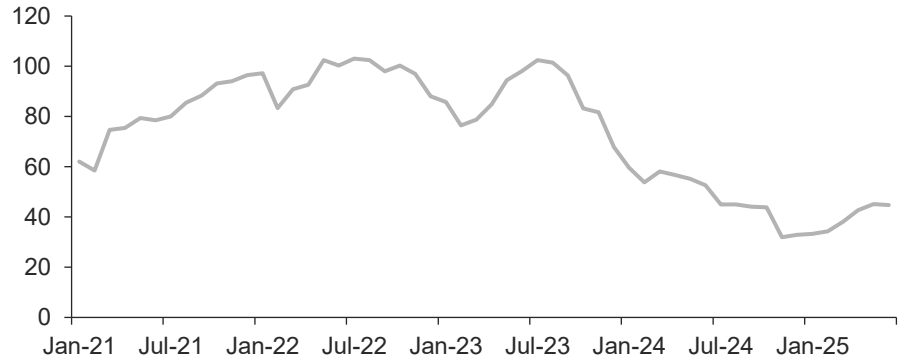
From the Landsvirkjun website (article published 17 October 2025)

"Now is the right time to shape our own future. Energy companies, Governmental authorities, and municipalities must join hands to create the best possible framework, so that AI can be a genuine opportunity for Iceland."

Data centres' energy consumption
TWh, Iceland Energy Forecast 2025



Data centres' energy consumption
GWh



Sources: Iceland Energy Forecast 2025

The advent of electric cars

Road transportation will change radically in the next quarter-century

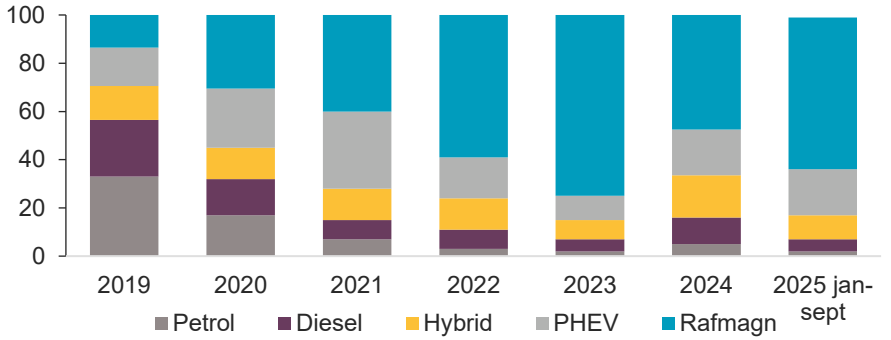
Adoption of electric cars is one of the most visible signs of energy transition in Iceland. In the first nine months of 2025, nearly two-thirds of newly registered personal vehicles were fully electric, while fewer than 10% were petrol- or powered. The shift has been slower for other vehicle classes, but forecasts assume that the share of fossil fuels in road transportation will drop steeply in the decades ahead.

Governmental authorities in Iceland and abroad have set ambitious targets for all new vehicles to be powered by renewable energy by the middle of the century. The switch to renewables has a positive impact on air quality, reduces greenhouse gas emissions, and promotes a reduction in fossil fuel imports.

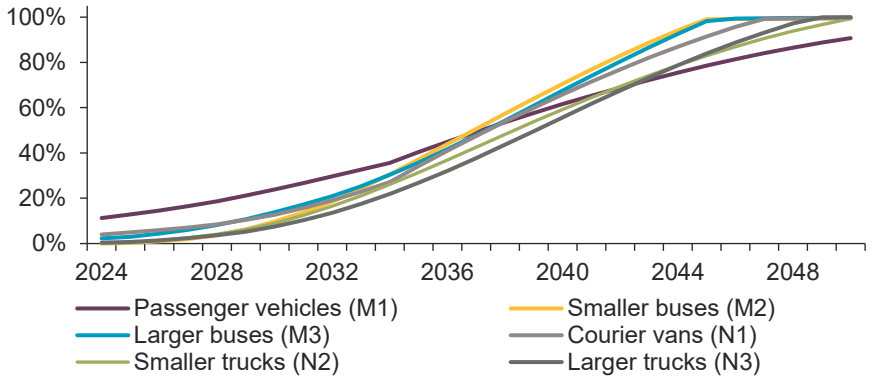
The adoption of electric vehicles reflects both technological advances and changes in consumer behaviour, with strong emphasis on environment-friendly solutions and lower operating costs. The pace of energy switching varies by vehicle type, however, as most rental cars and larger vehicles are still powered by conventional fuels. Iceland Energy Forecast 2025, a cooperative endeavour of Landsnet, the Electricity Regulatory Authority, and the Icelandic Environment and Energy Agency, projects that the share of fossil fuels in road transportation will be down to 4% by 2050.

The European Union (EU) has already adopted rules banning new petrol- and diesel-powered cars from 2035 onwards, which will further expedite energy switching. Iceland is well placed to remain in the lead in adoption of electric cars and to take advantage of the opportunities inherent in sustainable transportation.

Energy sources in newly registered personal vehicles %



Share of clean energy-powered vehicles
Baseline forecast from Iceland Energy Forecast 2025



Sources: Iceland Energy Forecast 2025, Bílgreinasambandið, European Parliament,

Energy use of various types is growing steadily in Iceland

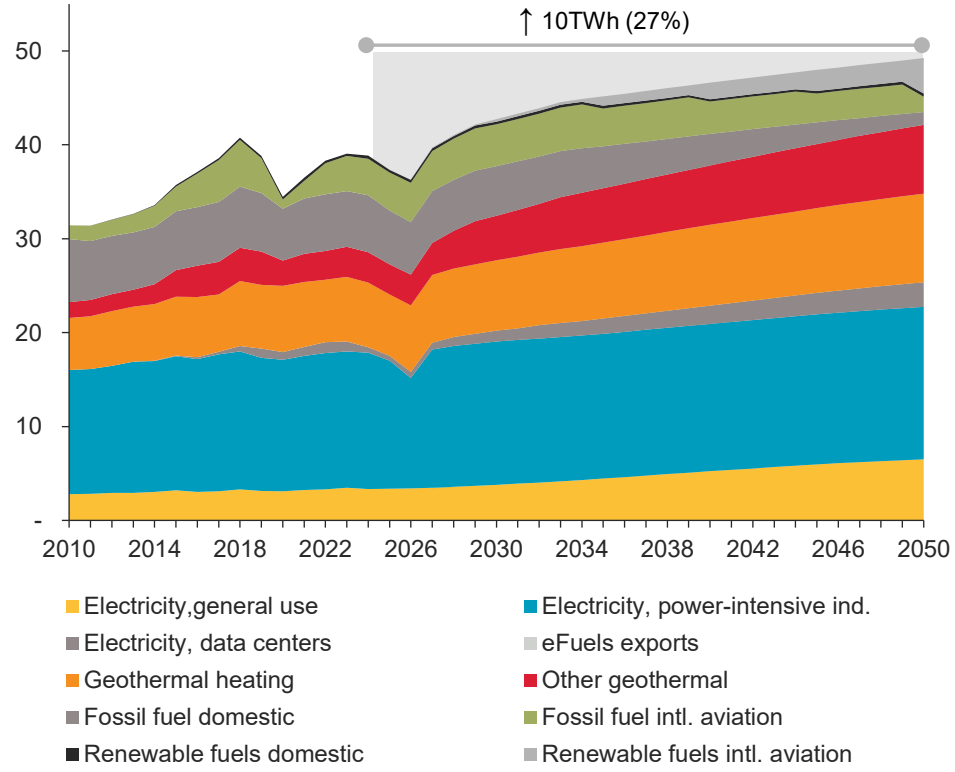
Increased economic activity, energy switching, and demand from new energy-intensive sectors – all of these point in the same direction: Demand for renewable energy in Iceland will inevitably surge in the coming term, although shocks to the energy-intensive sector will cause demand to dip temporarily in the quarters just ahead. The baseline forecast from Iceland Energy Forecast 2025 assumes that the total amount of energy used in 2050 will be just over a fourth more than in 2024, while the high projection assumes an increase of up to 67%.

The surge depicted in the high projection reflects stronger activity in the economy, more rapid energy switching, and growing demand from new energy-intensive sectors such as data centres and land-based aquaculture.

Increased energy consumption requires targeted strategy formulation and infrastructure investment, so as to ensure that supply keeps pace with demand and energy transition proceeds smoothly. The trend also shows that harnessing renewable energy will grow continuously in importance for Iceland's economic sustainability and competitiveness.

Energy consumption, total

TWh, baseline forecast in Iceland Energy Forecast 2025



Sources: Iceland Energy Forecast 2025

Electricity consumption expected to surge

Demand for electricity looks set to grow steadily

The newly published Iceland Energy Forecast 2025 also presents two forecasts of electricity use in the coming quarter-century. The assumptions underlying the forecasts differ considerably, and the outcome differs somewhat as well, although both of them assume strong growth.

The baseline forecast assumes that electricity use will grow by just over a third through 2050, while the high projection assumes that demand will double. This increase is based on continued growth in energy-intensive industry, data centres, land-based aquaculture, and adoption of electric transportation equipment.

Assumptions in Iceland Energy Forecast 2025:

Baseline forecast

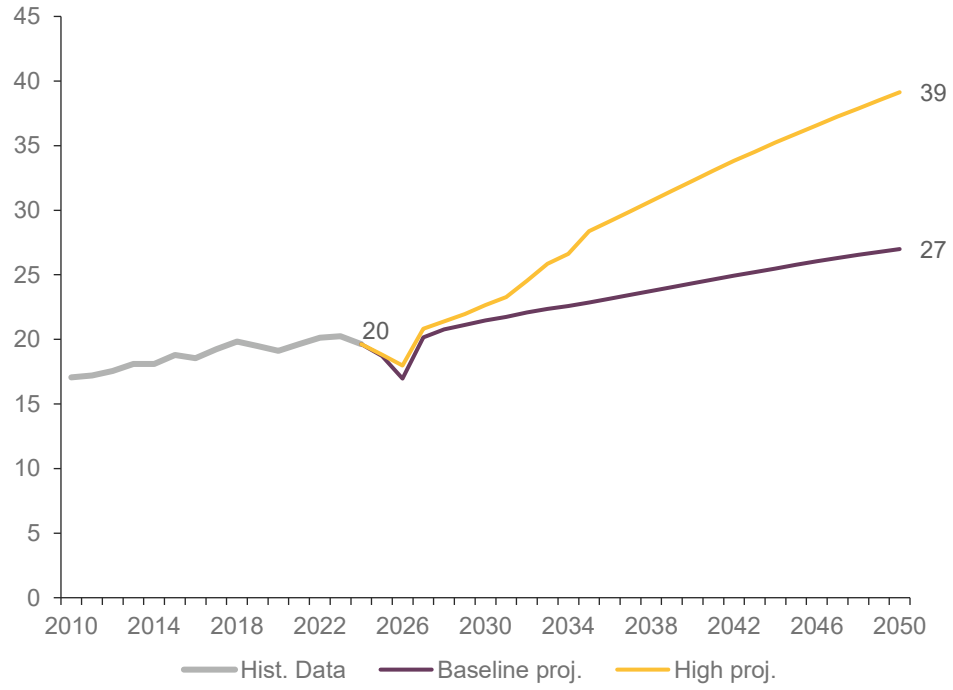
- Based on median population and tourism forecasts, in terms of current energy switching trends.
- Assumes that heavy (industrial) use will grow broadly at the pace set in recent years.
- Planned projects or actions are not included in the baseline forecast.

High projection

- Based on high projections in population and tourism forecasts and assuming more rapid energy switching.
- Assumes increased activity among large-scale users, including those in food manufacture, data centres, and e-fuel production.
- The entire increase in the category is based on developers' plans.

Electricity consumption forecasts

Electricity consumption forecasts, TWh



Sources: Iceland Energy Forecast 2025

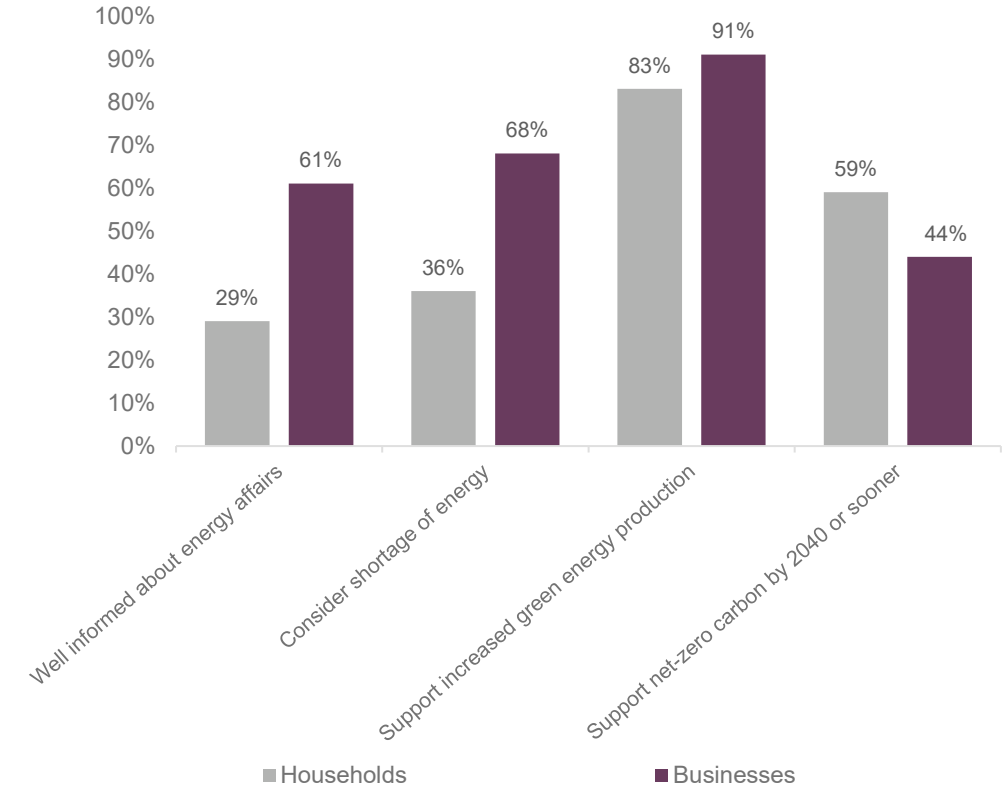
Positive attitudes towards bolstering production of eco-friendly energy

Clearly, if Iceland intends to remain at the forefront in clean energy harnessing and attract new large-scale users, it must ensure that electricity production and transmission systems are prepared for growing demand. This calls for a coordinated effort by Governmental authorities, energy companies, and investors in order to ensure sufficient supply and robust infrastructure.

Even though energy needs are forecast to surge, the supply of new energy has not grown accordingly. However, a survey carried out by Gallup for the Confederation of Icelandic Employers (SA) in autumn 2024 indicates a general understanding of the need to scale up clean energy production. The survey suggests that boosting energy production is broadly supported by the public and corporate executives, although the general public appears less convinced that there is a shortage of energy in Iceland than the corporate sector is.

When it comes to locations for new power plants or infrastructure development, however, those who live close to the sites in question are often opposed. Furthermore, opposition to new options such as wind farms has grown in recent years, whereas wind and solar power were previously considered the most favourable power generation options from an environment perspective.

Attitudes towards energy affairs
SA/Gallup 2024



Sources: Gallup, SA

The need for energy is urgent, but growth in supply is uncertain

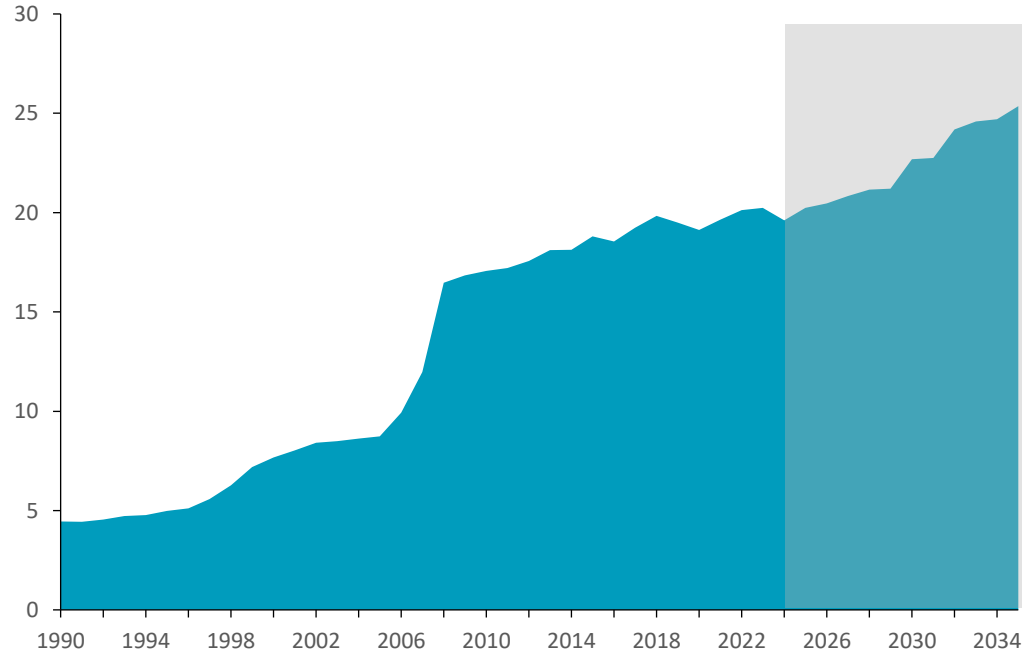
Is eco-friendly energy never “eco-friendly enough”?

According to Iceland Energy Forecast 2025, it is reasonably likely that increased energy supplies could suffice to meet growing needs in the next decade, provided that demand develops in line with the baseline forecast and there are no delays in developing the new power plants and transmission systems already in the pipeline. The forecast assumes new supply in the amount of 2.4 TWh through the end of the 2020s and nearly 6 TWh through end-2035. It should be noted that the forecast does not take into account any limitations in the transmission system or any draught-related difficulties in hydropower generation.

On the other hand, it is clear that if economic developments are more in line with the high projection, or if development projects are delayed, there could be a shortage of energy in the coming decade, with the associated negative impact on Iceland’s economy and competitiveness.

This highlights the importance of expediting permit issuance, simplifying the formal environmental and social impact assessment process, enhancing consultation, and ensuring that energy infrastructure development keeps pace with growth in demand.

Energy supply through 2035
Forecast in Iceland Energy Forecast 2025, TWh



Sources: Iceland Energy Forecast 2025

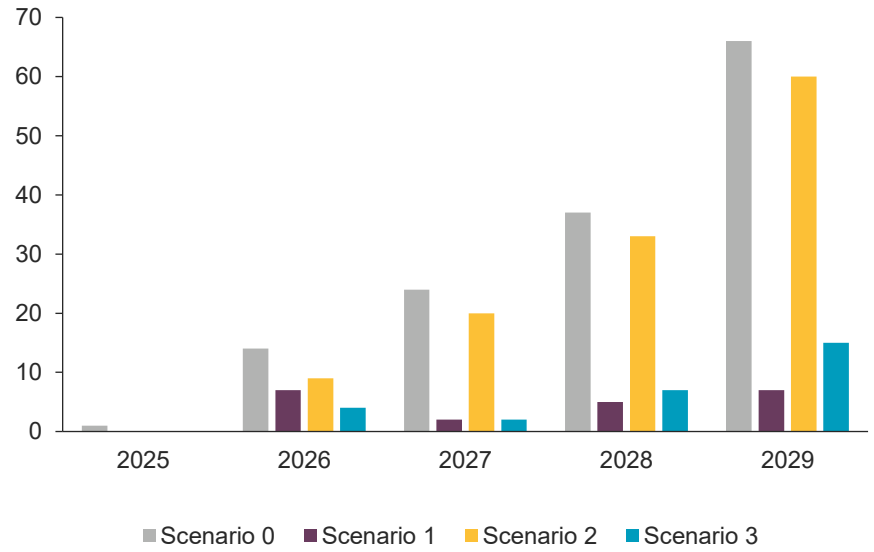
The risk of an energy shortage will grow swiftly in coming years

Landsnet's energy system balance scenarios for the years ahead indicate that shortages of power and energy will escalate rapidly if necessary transmission system development is not undertaken and the supply of new energy is not increased.

In the most pessimistic scenarios, which assume no increase in supply, there could be a severe shortage of electricity before the end of the decade, which would limit large-scale users' options and have a negative impact on businesses and households more generally.

It is therefore vital that Governmental authorities, energy companies, and municipalities join hands and expedite infrastructure development and new power plant construction, so as to ensure energy security and continued growth. Furthermore, it must be ensured that decisions are made on the basis of reliable data and that consultation with stakeholders is targeted and transparent.

Probability of energy shortage
%, Landsnet's 2025 scenarios for energy system balance



System balance scenarios 2025:

Scenario 0

- No development of transmission system
- No change in energy supply

Scenario 1

- Strengthening of transmission system
- Increased energy supply

Scenario 2

- Strengthening of transmission system
- No change in energy supply

Scenario 3

- No development of transmission system
- Increased energy supply

Eco-friendly energy prices projected to be relatively high

Closer alignment with global market prices

Pricing in the electricity market has been more efficient in recent years, and the National Energy Authority's forecasts assume that prices will be relatively high relative to the past several years.

More diverse use of electricity – including use due to energy switching and data centres – could cause electricity prices to approach the global market price, boosting profitability in the energy sector. This creates an incentive for continued investment in the sector and supports the development of new projects.

Closer alignment with global market prices and more effective price formation will promote energy saving and greater efficiency in resource utilisation. Thus it is important to continue developing the electricity market and ensure that price formation reflects actual costs and demand.

Wholesale electricity prices and National Energy Authority forecast
(ISK/MWh, irreducible priority energy 1–3 years ahead)

Sources: National Energy Authority (energy forecast 2024)

Blazing new trails in export revenue generation

Growth in intellectual property, data centre operations, and land-based aquaculture depends on access to energy

Presumably, increased indirect exportation of energy will account for a fair share of export growth in the years ahead. Apart from data centres, we have the land-based aquaculture sector, which uses both electricity and geothermal power in its operations. It is worth noting here that Iceland Energy Forecast 2025 assumes that by mid-century, the land-based aquaculture sector's use of geothermal power will be three to four times greater than it was in 2024.

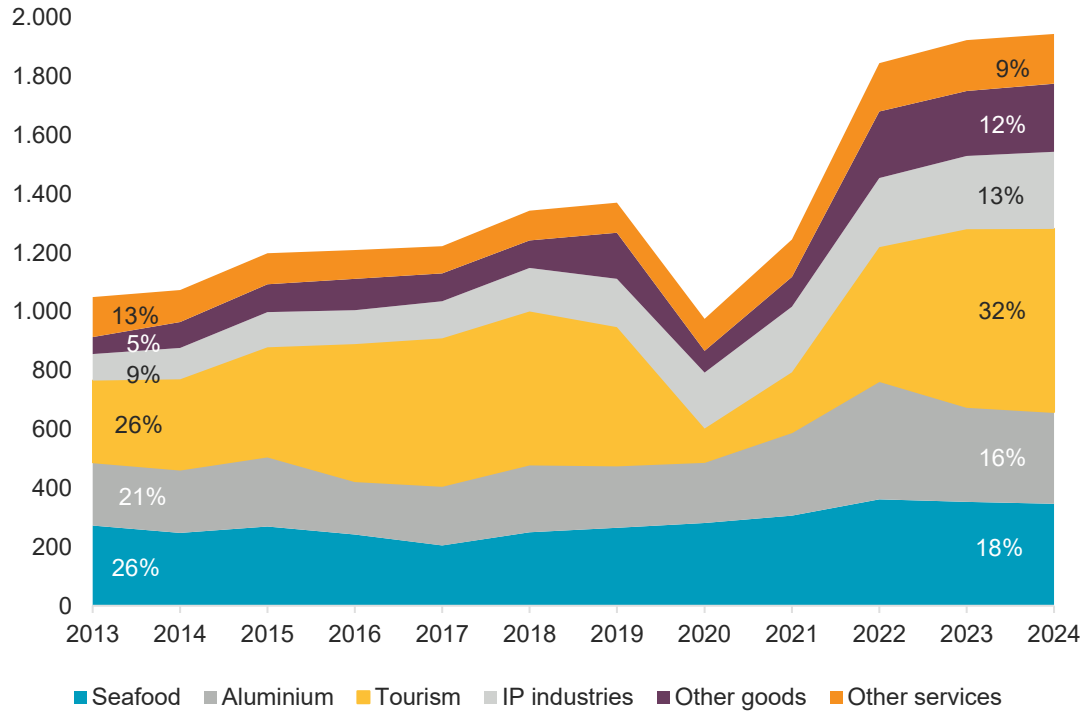
Development of these sectors is important for diversity of exports and for economic sustainability, particularly in view of the headwinds that have battered the fishing industry in recent quarters.

It is important to ensure that access to energy does not become the bottleneck that impedes the growth of new export sectors, as such barriers have a profound impact on the business community and the domestic economy.

Export revenues from intellectual property

- **2022:** ISK 234bn
- **2023:** ISK 249bn
- **2024:** ISK 261bn

Export revenues, by key sector
ISK bn at current prices



Sources: Statistics Iceland

What options are there for boosting energy production?

Opinion is divided on where the boundary between utilisation and nature conservation lies

Iceland's energy resources are not inexhaustible, but according to the Master Plan website, there is still considerable scope for further utilisation. About a third of harnessable hydropower and two-thirds of exploitable geothermal power are still untapped.

The wind energy sector is virtually untilled ground, and Vaðölduver wind farm, Iceland's first serious project in the field, could mark a turning point. The rhetoric on harnessing wind power has been quite negative recently, but it is hoped that new projects will quiet dissenting voices and pave the way for increased exploitation of this energy source.

It is vital to continue developing and harnessing available resources in a sustainable way, guided by the interests of the community and the environment.

Current Master Plan:

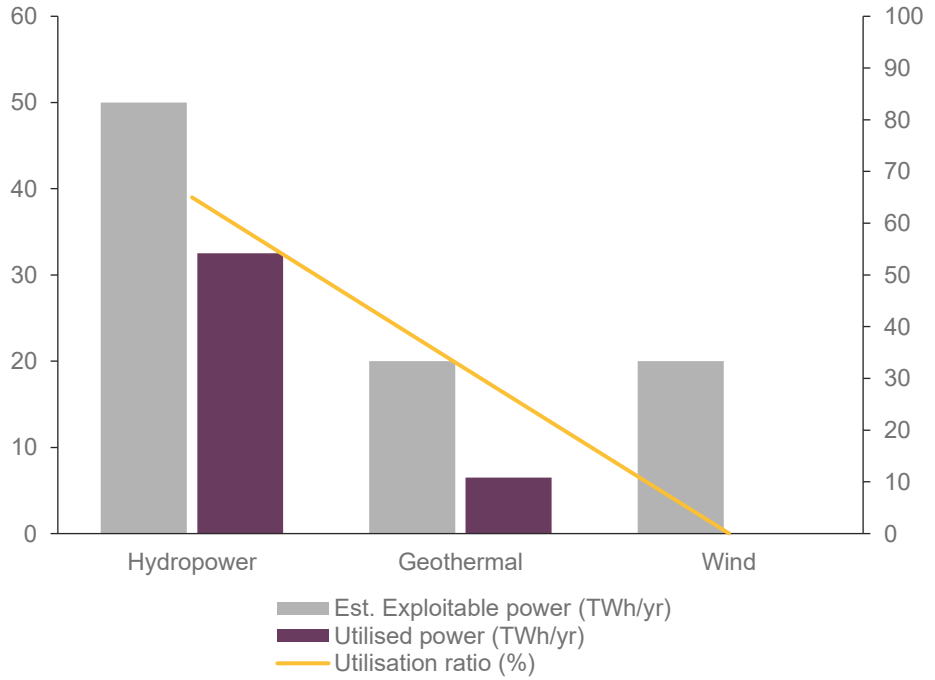
Utilisation category:

- Hydropower: 1.4 TWh
- Geothermal: 7.1 TWh
- Wind energy: 0.8 TWh

Pending category:

- Hydropower: 4.7 TWh
- Geothermal: 3.3 TWh

Iceland's key energy resources
TWh (left) and share (right)



Sources: Master Plan website

Major investments in the pipeline

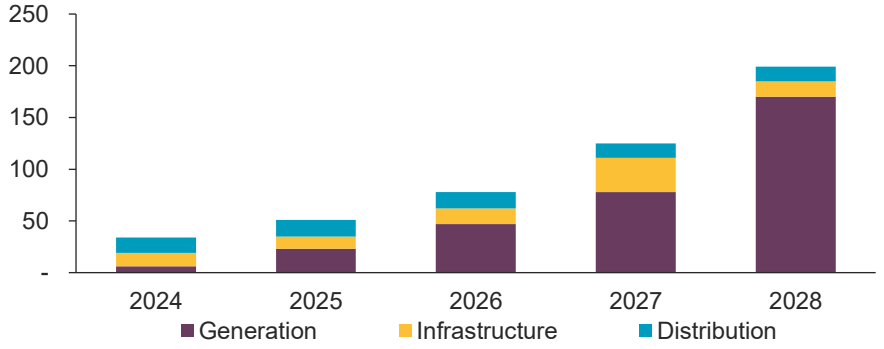
Energy and distribution companies plan to narrow the infrastructure gap and boost output

Recent surveys and projections indicate large-scale investment in the energy sector in the years ahead. The National Energy Authority's Energy Indicators and the Samorka survey show that investments in processing, transmission, and distribution of electricity will total tens of billions of Icelandic krónur -- even hundreds of billions -- in coming years.

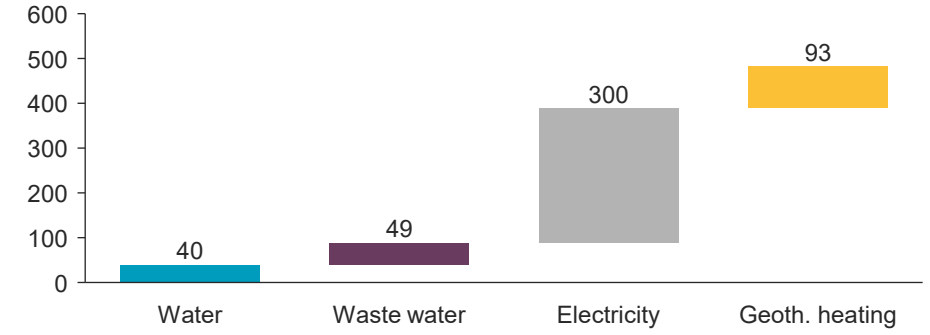
For an economy whose GDP was ISK 4,600bn in 2024, these are substantial sums, and they require careful prioritisation and long-term thinking. Increased energy production, a smaller infrastructure gap, and further development of the distribution system are key elements in ensuring continuing growth and competitiveness.

Public investment is limited, as the State and local authorities have numerous other projects on their hands, and they have little scope for taking on debt. Energy companies themselves bear most of the burden of investing in new power plants and infrastructure. Landsvirkjun's planned investments account for a fourth of all investments by public entities over the next two years, and more or less the same can be said of energy transmission companies. It is therefore important to ensure that investments in the energy sector are sustainable and that a broad group of investors participate in infrastructure development.

Estimated investment, energy companies and utilities
ISK bn according to the Environment and Energy Agency's Energy Indicators 2025/02



Estimated investment in the energy and utilities sector 2026–2030
ISK bn Samorka survey 2025



Sources: National Energy Authority, Samorka, Federation of Icelandic Industries

Infrastructure investment and institutional investors

Pension funds are desirable participants in infrastructure development, according to the Central Bank

Given how large the amounts at stake are and how important infrastructure development is for future growth, it is appropriate to consider domestic institutional investors, not least the pension funds that administer the vast majority of Icelanders' long-term savings.

The Central Bank of Iceland (CBI) has pointed out recently that infrastructure investment is an intriguing option for the pension funds as regards both risk diversification and long-term planning. The funds have already invested rather handsomely in energy infrastructure and other physical infrastructure. The CBI estimates that such investments currently come to about ISK 262bn, or just under 3% of the pension funds' total assets. Of that amount, investment in domestic energy infrastructure totals just over ISK 100bn. Nevertheless, there is still considerable room for the pension funds to step up their participation in financing energy infrastructure.

Including institutional investors in energy infrastructure development could ease the burden on the public sector and expedite construction. Such investment can also align quite well with the pension funds' objectives for long-term investment and risk diversification in their asset portfolios.

Infrastructure investment and pension funds
ISK bn Q1/2025, according to *Financial Stability* 2025/02

Sources: Central Bank of Iceland.

Big projects bring big challenges

Maintaining consensus with the public, other sectors, and the international community is important

Increased electricity production and infrastructure development enhances the quality of life, but it also brings challenges regarding efficiency, resource utilisation, and energy security.

Obtaining permits is often time-consuming, and new harnessing options frequently meet with opposition. Uncertainty about increased energy supplies could lead to lost investment potential and negatively affect the economy.

It is important to maintain a consensus with the public, the business community, and the international community, and it is likewise important that harnessing of energy resources be undertaken in a manner consistent with Iceland's image as a country of clean natural surroundings and responsible resource utilisation. Nevertheless, it will probably never be possible to obtain unanimous agreement on increased energy utilisation. It should also be noted that history contains a host of examples of extremely controversial development projects that are considered in retrospect to have been of national urgency, both in the energy sector and elsewhere.

Advances in technology and innovation within the energy sector are key to meeting ambitious objectives for sustainability and growth in reasonable harmony with Icelanders and the international community.

“As the saying goes, the Stone Age did not end because we ran out of stones; we transitioned to better solutions.

The same opportunity lies before us with energy efficiency and clean energy.”

Steven Chu

Nobel laureate in Physics and former US Secretary of Energy

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