



A Sustainable Energy Future

An Energy Policy to the year 2050

Government of Iceland
Ministry of Industries and Innovation





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Preface

The new energy policy outlined in this document represents a clear vision of a sustainable energy future. It is a valuable and important feature of the policy that a consensus has been reached across the political spectrum on a future vision, guidelines and twelve fundamental goals in Iceland's energy affairs. The policy was prepared in co-operation across party lines and in consultation with the general public and interested parties. Members of all parliamentary parties and four ministries served in the working group that put together the policy. The support for the end result was unanimous.

The policy extends to the year 2050; it is the first long-term energy policy for Iceland that is prepared in this way. The policy has the objective of protecting the interests of both the current generation and future generations. The underlying guideline is sustainable development, striking a balance between economic, social and environmental factors.

With the new energy policy we now have a clear future vision, highlighting the numerous prioritised energy actions that we

can agree on across party boundaries. This will focus a stronger spotlight on the tasks ahead than before, which should promote more rapid progress.

The energy policy will not resolve all disagreements. What it will do is to bring to the foreground the things that we can agree on as we address in earnest the task of establishing our fundamental objectives. This not only an important roadmap for the future, but an essential one.

I would like to express my gratitude to all those who contributed to the work on the policy for the ambition and dedication that the end product reflects. It was of key importance in this sensitive policy area for the policy to be established through broad consensus and consultation. And so it was.



Þórdís Kolbrún Reykfjörð Gylfadóttir
Minister for energy

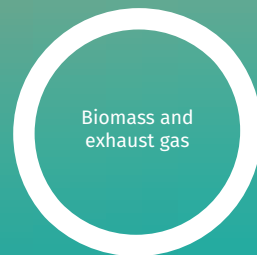
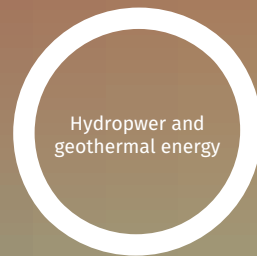
Introduction

This document represents a proposal for a long-term Energy Policy for Iceland to the year 2050.

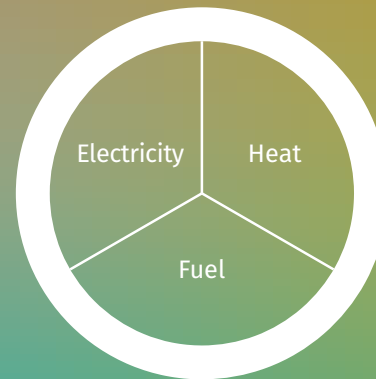
Energy concerns all Icelanders and is an essential part of their daily lives. Access to energy, meaning heating, electricity and fuel, is fundamental to the general quality of life in Iceland and at the same time a prerequisite for keeping the wheels of the Icelandic economy turning. Value creation from renewable energy resources is therefore one of the foundations of Icelandic living standards. Energy security and security of energy supply are fundamental features of Iceland's national security. Energy transition, where fossil fuels are replaced by renewable energy sources, is necessary to combat the climate crisis, one of the most urgent challenges currently faced by humankind.

The establishment of a long-term Energy Policy has the objective of protecting the interests of both the current generation and future generations. The Policy is guided by the objective of sustainable development, and reflects a balance between economic, social and environmental factors. The policy is structured on the basis of a future vision, firm guidelines and principal objectives. It also focuses attention on the pillars on which the policy rests, taking into account the entire energy value chain, from resource to consumer.

Energy source/input



Power system/energy carrier



Energy service



Energy value chain

Working group

The policy is the product of work conducted by a working group appointed by the Minister of Tourism, Industry and Innovation in 2018.

The working group was composed as follows:

Guðrún Arnbjörg Sævarsdóttir

Chairman

Páll Jenson

Vice-chairman

Halla Signý Kristjánsdóttir

Nominated by the parliamentary group of the Progressive Party

Albertína F. Elíasdóttir

Nominated by the parliamentary group of the Social Democratic Alliance

Árni V. Friðriksson

Nominated by the parliamentary group of the Centre Party

Kristín Vala Ragnarsdóttir

Nominated by the parliamentary group of the Icelandic Pirate Party

Kolbeinn Óttarsson Proppé

Nominated by the Left-Green Movement

Njáll Trausti Friðbertsson

Nominated by the parliamentary group of the Independence Party

Þorsteinn Víglundsson

Nominated by the parliamentary group of the Liberal Reform Party¹

Ólafur Ísleifsson

Nominated by the People's Party²

Magnús Júlíusson

Nominated by the Ministry of Finance and Economic Affairs

Harpa Þórunn Pétursdóttir

Nominated by the Ministry of Industries and Innovation

Brynhildur Davíðsdóttir

Nominated by the Ministry of the Environment and Natural Resources

Ólafur Kr. Hjörleifsson

Nominated by the Ministry of Transport and Local Government

Erla Sigríður Gestsdóttir

Senior advisor of the Group, nominated by the Ministry of Industries and Innovation

Kristinn Hjálmarsson

Consultant, worked with the Group

Steering group

The Steering Group was composed of the following members of the Working Group.

Guðrún Sævarsdóttir

Páll Jenson

Erla Sigríður Gestsdóttir

Kristinn Hjálmarsson

¹ Took over from Jón Steindór Valdimarsson at the outset of work of the working group.

² Guðmundur Borgþórsson was nominated in his place but did not work with the committee.

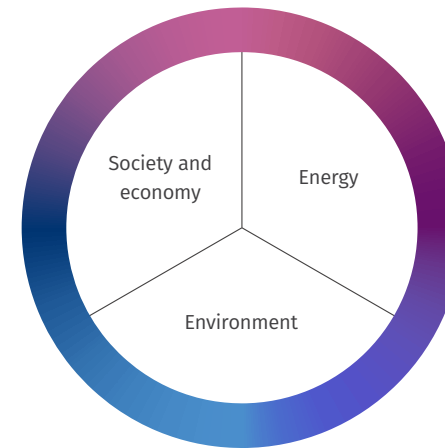
Future Vision

Iceland is a land of clean energy, where all energy is derived from renewable sources. Energy production from renewable sources plays a fundamental role in the battle against the climate crisis. The energy is utilised in a sustainable manner for the benefit of society and the public. All energy needs are met in a secure manner for the near and distant future. The country is a leader in sustainable energy production, energy transition, energy efficiency and efficient multi-use of energy sources. There is a general public acceptance of nature conservation and utilisation of energy sources, as environmental impact is minimised.

Social benefits from energy are maximised for the good of the nation. Energy is the driving force of a diversified economy with equal countrywide access to energy at competitive prices. The country possesses advanced knowledge and vision in energy matters, resulting in robust value creation and innovation.

The future vision encompasses the need for sustainable development and the importance of energy for the lives of the entire population. It reflects the interaction between energy utilisation, environmental protection and economic development and the importance of these factors working together in harmony.

The Energy Policy presents a scenario for the year 2050 and describes the progress aimed for over a period of thirty years. By 2050, fossil fuels will have been entirely replaced by renewable energy sources. The country will have achieved carbon neutrality by 2040, as planned. Energy security has been achieved through a supply of varied renewable energy options and sound infrastructure. There is a general consensus on energy matters, the use of energy sources concurrently with nature conservation and the development of energy infrastructure. Consumers have equitable and secure access to energy at competitive prices in an efficient energy market. The energy network is smart and flexible, with no waste. The economy benefits from the value creation, knowledge and innovation arising out of the energy sector.



2020

- Fossil fuels in transport on land, sea and in the air
- Traditional energy options the mainstay
- Limited efficiency in the energy market
- Need for infrastructure development
- Discord regarding development and benefits
- Unequal access to energy and infrastructure
- Uncertain energy supply

2050

- Renewable energy replaces fossil fuels
- New diverse energy options added
- Smart and flexible power system
- Secure supply and infrastructure
- Efficient market and users
- Benefits to society
- Consensus on nature conservation
- Equal access
- Carbon neutrality
- Competitiveness



Guidelines

There are five energy guidelines with 12 objectives and three pillars. The Energy Policy is based on core values and supported by a consistent administration and support environment, combined with a powerful knowledge-based system consisting in research, innovation and development.

Future Vision

Sustainable Energy Future

Iceland is a land of clean and secure energy

Energy is the driving force
of a diverse economy

The nation reaps the benefit of the energy resources and
there is consensus on nature conservation and utilisation

Energy

Society/economy

Environment/nature

Energy security

- Public energy needs met at all times
- Infrastructure sound and resilient
- Energy system diversified

Energy transition

- Measures taken for energy transition to make Iceland independent of fossil fuel for transport on land, on the sea and in the air

Energy efficiency and economisation

- Energy efficiency improved and waste minimised
- Multi-use of resources

Society/economy

- The nation reaps the benefits of its energy resources
- Efficient and competitive energy market
- Equal access to energy countrywide

Environment

- Nature conservation taken into account in energy use
- Minimisation of environmental impact
- Sustainable use of energy resources

Electricity



Heat



Energy

Fuels



Harmonisation

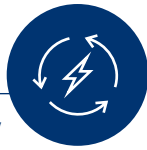


Values



Knowledge

Pillars



- Security of people and society

- Supply meets demand

- People given precedence

- Intervention in the event of market failure

- Resilient power system

- Clear accountability

- Stability and foreseeable development

- Efficient process

- Domestic energy enhances energy security

Energy security

Public energy needs met at all times

All economic activity and all activities of daily life require secure access to energy at a competitive price. Whether for geothermal water for domestic heating or electricity for interiors and electrical appliances, people rely on a secure delivery of electricity for all their activities. Access to electricity is taken for granted to such an extent that we hardly even notice it until it goes missing. To create value and ensure quality of life, society needs to be assured that its energy needs will be met at all times. Energy supply and energy infrastructure are matters of national security, as the safety of people, society and the economy are dependent on these important and fundamental factors.

Energy security means ensuring a sufficient and reliable supply of energy, electricity, hot water and fossil fuels for households, basic services and the industries, and also protecting the infrastructure of the energy industry from disturbances caused by natural disasters, sabotage or other causes.

One of the principal objectives of an energy policy is to ensure a balance between supply and demand in the energy market, and thereby energy security. The supply of energy needs to be able to meet growing demands resulting from energy transition, technological development and population growth, as well as the normal development of diversified economic activity around the country, as access to energy provides the foundation for value creation in the economy and is a prerequisite for positive regional development and living conditions.

The role of the power system, supply and infrastructure, is to meet expectations and develop in line with changing requirements. Economic development and the points of focus of society will change, as always, and the supply of energy will need to change accordingly. Energy supply supports a sound business development policy based on advantageous risk diversification and value creation featuring secondary domestic business activities and balanced interaction with other industries. The quest to achieve the objectives of energy security will be founded on the concept of sustainable development and other values.

Security of energy supply needs to be ensured for all three energy segments: electricity, heat and fuel. Disruptions in supply can have widespread effects and pose a threat to public welfare and economic stability. The demand for electricity, heat and renewable fuel needs to be met with an adequate supply for the long term. Energy shortfalls, whether unexpected or anticipated, are met with government intervention when needed, through reserve power, emergency supplies and contingency plans. Energy security can be threatened by natural disasters, sabotage or acts of terror, accidents or other incidents, war, climate change or disruptions in imports of fuel. When prioritising energy supply, whether in the short term or long term, the public and public services will always take precedence over other interests. The energy network shall be operated so as to be well prepared to meet disasters. It should also be resilient, so that Icelanders and Icelandic enterprises can rely on secure energy supply with minimal disruptions.

The responsibility for energy security will rest with the government: the minister, the ministry and its agencies. According to law, enterprises in the energy market also play an important role in energy security. The regulatory framework provides for the clear accountability, oversight and role of these parties. The state of energy security needs to be monitored and proper security indicators need to be used that show the situation as it is at any time and trends.

The process of developing power facilities and infrastructure further needs to be efficient and simple, and at the same time conform to the professional requirements that construction work needs to fulfil, for instance with regard to safety, the environment and the rights of the people. The licensing and regulatory framework needs to be transparent, simple and efficient, and no longer or more time-consuming than in other comparable countries.

Developing new power generation facilities takes a long time. For this reason action needs to be taken in a timely manner if there are any indications of impending energy shortfalls. Long-term plans need to provide for development options to meet future needs in order to enhance foreseeability and stability. It is therefore important for there to be room for future power development options. An active and open energy market needs to be in place in order to ensure a balance of supply and demand. The high proportion of domestic energy used in Iceland enhances energy security, as the country is self-sufficient as regards energy.

It needs to be ensured that district heating systems have secure access to geothermal sites to enable them to meet future demand, and at the same time the development of geothermal energy needs to be sustainable. To this end, planning should extend 50-100 years into the future. Long-term land-use planning and licensing must ensure access for the population and industries to secure heating for the future.

An adequate supply of fuel is a prerequisite for security in many areas, for instance in food security, general transport, law enforcement and ambulance services. Emergency reserves of fuel need to be available to ensure energy security and economic stability until energy transition has been completed. The use of fuel from renewable domestic sources will enhance energy security.

It needs to be ensured that the market system is efficient and open and thereby that demand is met by supply. The role of government is to lay the foundation for a system that is sustainable in this regard. In the last resort there need to be clearly demarcated options for intervention available to government in the event of market failure if it appears evident that supply will not meet general market needs. Stability and foreseeability are important factors for the people and businesses of Iceland. The importance of energy forecasts and monitoring of energy security is stressed. A comprehensive overview will exist of the options for meeting demand, taking into account the anticipated energy supply and restrictions. Energy forecasts are important administrative tools, so they need to be prepared and used in an effective manner.

³ The general market includes households and businesses beneath the level of intensive users in the Electricity Act.

-
- Sound infrastructure is necessary for acceptable energy security
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- Infrastructure needs to be ready for future development — new energy options and energy transition
-
- Resilient infrastructure and reserve power
-

Reliable and resilient infrastructure

Sound infrastructure for electricity and heat is a precondition for acceptable energy security for the public and industries in Iceland. The power transmission and distribution system needs to transmit and distribute energy from source to consumer with minimum disruptions. There needs to be sufficient transmission capacity between regions in the transmission grid, and security of supply of electricity needs to fulfil established criteria. Inadequate transmission capacity in the electricity grid reduces the efficient use of power stations and the possibility of responding to failures in the system or natural disasters and at the same time restricts opportunities for diversified economic development. Improved interconnection also reduces transmission losses, thereby promoting a more efficient use of energy.

The hot water infrastructure conveys heating to consumers and requires regular maintenance and normal renewal in the course of time.

The infrastructure for district electric and heating systems will need to develop and grow in line with the needs of society. With the advent of energy sources such as solar power and wind power, the requirement of flexibility, capacity and reliability in the transmission and distribution systems will become even more stringent, as balancing power will need to be ensured when needed. The transmission and distribution systems need to be strengthened to meet the increasing needs of society with minimum environmental impact; this

needs to be done in consultation with interested parties and other affected parties to ensure the best possible consensus on a transmission system that supports the communities and the economy. Transmission and distribution systems need to be developed in line with technological innovations that enable greater efficiency and flexibility. The expanded role of electricity will also require development of the energy infrastructure.

The infrastructure needs to be secure and resilient. Resiliency can be improved, among other things, by adding adequate transmission capacity and or ring closing, underground cables depending on natural circumstances and other technical constraints. The viability of options will be assessed by cost/benefit analysis. Steps need to be taken to ensure that energy storages and reserve power use renewable fuel. The viewpoints of sustainable development and other fundamental values of this Policy apply to infrastructure development in the same manner as to other objectives.

-
- A diverse system is more secure
-
- More users and producers
-
- New energy options
-
- Small power plants and own production
-
- Open and accessible system
-

Increased diversity in the energy system

Diversity in energy production promotes the improved energy security and flexibility of the energy network. Even though Iceland still possesses unharnessed hydropower and geothermal energy, it is a sensible course to increase diversity in energy production by harnessing wind power and other alternative renewable energy sources to produce electricity. The availability of traditional and efficient development options that can be utilised when needed is an important matter. Technological development and improvements could potentially make more options feasible in the course of time, such as harnessable tidal power, deep drilling and low-temperature power stations, so this will require careful monitoring. It is important for structures and systems to be ready for all potential renewable energy options.

There are various fuel options under development that could replace fossil fuels in the energy transition currently under way and impending. Renewable fuel can be of organic and non-organic origin. It can also be utilised in other ways in energy systems than exclusively for energy transition. For instance, energy sources such as hydrogen and methane offer various possibilities, as they can be used for energy storage, which will counterbalance new, less steady energy sources, such as wind power. In addition, extraction of gas from organic waste is an important energy and climate issue and a link in the creation of a circular economy.

The objective of increased diversity in the energy system is for renewable energy options to be developed and made

accessible to entities that wish to produce energy for their own use or for sale. This innovation will require increased smart technology, an efficient and open energy market and a regulatory framework that supports the development. Diverse user groups serve to reduce market risk and thereby support improved energy security for Iceland.

There are various possibilities around the country for small hydropower and wind power projects that would serve to improve local energy security, promote local energy solutions, improve the use of the transmission and distribution systems for electricity and reduce the total energy needs. The legal and regulatory framework needs to support access by new power developers with intermittent power to the market and supply of balancing power at reasonable rates.

With the advances made in high voltage cables it has become technically possible to install an interconnector from Iceland to other countries. Detailed public analyses have been conducted in recent years to assess the social, economic and environmental impact of a project of this kind, and it is clear that there would be both advantages and disadvantages. In accordance with current law there will be no such connection unless it serves the interests of the country as a whole, and then only with the prior approval of the Icelandic Parliament.



Energy transition

Iceland unreliant on fossil fuel

Rapid climate change is among the most serious challenges to the world at present. The global warming resulting from the anthropogenic greenhouse effect is one of the most far-reaching challenges that humankind is facing. The government's policy is to achieve carbon neutrality before 2040, and energy transition is an essential factor in reducing greenhouse gas emissions and one of the two key factors of the government's action plan on climate matters.

There are a number of urgent reasons for the energy transition. Most prominent of these factors is the environment, that is to say the need to reduce greenhouse gas emissions and releases of other pollutants deriving from the use of fossil fuel. But there are other reasons, no less compelling, such as increased energy security through the use of domestic energy sources, reduced outflow of foreign currency, innovation and development, and Iceland's image as a clean-energy country. Imported fossil fuels are also subject to fluctuations in supply and oil prices. Another benefit is the development of a new industry: a domestic, environmentally sound fuel industry, which will create jobs with a resulting multiplier effect. This would be an industry that could meet the domestic demand for fuel and possibly result in a new export product. Various alternative energy options are being developed in preparation for the energy transition, and many of these options are suitable for different uses. There are some considerable possibilities for domestic production of fuel based on renewable energy sources. Domestic production will support the objective of increased energy security in Iceland

and will make Icelandic society less dependent on imports. Another benefit from domestic production would take the form of new industries and a reduced outflow of foreign currency. In addition to all of this, there are macroeconomic benefits from conserving foreign currency by using domestic energy, currency that would otherwise be used on imported fossil fuel.

Iceland has in recent decades achieved remarkable success in energy transition in its district heating and electricity systems, where fossil fuels have been replaced by renewable energy (geothermal and hydropower). This earlier energy transition has proven advantageous for the country and macroeconomically beneficial. The population has enjoyed improved energy security, lower energy prices and a cleaner environment. It is important to maintain for the future the 100% proportion of renewable energy in the production of electricity and heating.

The energy transition is now in progress in land, sea and air transport. With the exchange, fossil fuel will finally be replaced by renewable energy sources. The long-term objective of the energy transition is for Iceland to be unreliant on fossil fuel and to meet all the energy needs of the country using renewable energy sources. The energy transition is well under way in transport on land, but other areas, such as transport on sea and in the air, are in the initial stages. It is therefore an important matter to expand the strategic planning and actions on energy transition so as to cover all the areas that remain largely dependent on the use of fossil fuel.

• Energy transition on land, the sea and in the air

• Unreliant on fossil fuel

• Use of domestic fuel

• Energy transition will improve the economy, environment, quality of life and energy security

Economic incentives will be used that encourage energy transition. Income from economic instruments should be channelled into energy-exchange related or projects involving energy innovation.

Important steps have been taken in recent years in transport on land, although full energy transition still has a long way to go.

The objective of energy transition on land is for motor vehicles to be powered by energy from renewable sources. The infrastructure for energy transition will need to be in place, with easy access for the entire population to the kinds of energy that that end up prevailing. In addition, the transmission and distribution systems for electricity will need to be able to cope with the increased demand throughout the country.

The objective of energy transition at sea is for all ships, boats and other seagoing vessels, whether for fishing or transport of cargo and people or any other use, to be powered by energy from renewable sources, but also for vessels in port to be required to connect to the electricity distribution system or use

other renewable energy in ports. Infrastructure will need to be ensured in harbours to serve the needs of vessels for the renewable energy sources that will prevail as energy transition occurs in ships and boats.

The development of environmentally sound air transport is in general not as far advanced as in the case of transport on sea and land, but it has begun. Significant advances have been made in the fuel efficiency of aircraft, and electrically powered aircraft have begun to take to the air. Biofuel has been taken into use, mixed with traditional fuels. The objective should be energy transition in air transport as quickly as technology and feasibility will permit.



Energy efficiency and energy conservation

Improved energy efficiency and minimised waste

Sustainable development means that a community will at any time fulfil its needs in such a way that the opportunities for the coming generations to do the same are not curtailed. This means minimising waste in everything we do. It is therefore important to utilise all environmental resources, minimise losses and recycle energy wherever possible. The entire value chain of energy efficiency will need to be taken into account, from resource to user. In looking at both new and older energy options, solutions will be found that ensure maximum utilisation of all energy. Improved energy efficiency and less waste will reduce the need for new power development projects. Even though Icelanders are fortunate to have at their disposal a vast quantity of renewable energy, the energy resources will always need to be treated with respect and with the attitude that these resources are among the country's most precious assets.

A great deal of progress has been made in recent years as regards the energy consumption of appliances. Domestic appliances and office equipment are now available with energy labelling that guides consumers in their choice of products that make the best use of energy. Also, a great deal of energy saving is possible through the use of more energy efficient buildings using more efficient energy systems and improved insulation. Smart technology of all kinds entails potentials for improved energy efficiency.

The technological innovation offered by smart technology must be used to improve system efficiency and flexibility. To give an example, smart meters play an important role in improved energy efficiency. Energy storage, e.g. with the production of

electrofuels, is a part of fully utilising energy, coping with fluctuations in the system and promoting energy transition.

By using energy in a sensible manner, objectives of value creation can be achieved at less cost to the environment and society. By choosing energy efficient options in energy transition, choosing energy saving machinery and equipment, and by recycling heat where feasible, the needs of society can be fulfilled and the opportunity cost from the use of natural resources can be minimised.

All energy resulting from other manufacturing activities must be utilised where technically and economically feasible, whether in energy production, industrial manufacturing (waste heat) or waste from households or agricultural production

Multiple use of resources

One factor in maximising the value of energy in Iceland is to encourage the fullest possible use of all potential by-products from energy development and waste management wherever feasible. The objective of multiple-use of resources is for all energy that has been created to be used to the fullest extent. If the use of energy results in by-products, then these will be used for continued energy use or value creation. Multi-use of material and energy from geothermal developments and waste heat from industry can benefit a number of sectors, from high technology and industrial processes to tourist services. Opportunities need to be identified to develop a circular economy where practicable, both in energy development and use (energy value chain).

- All energy will be fully utilised

- Energy saving is the cheapest development

- Multiple-use is value creation

- Smart technology

An organised development of industrial complexes, like geothermal power plants, is one successful way to maximise the value of energy production and make the fullest possible use of energy resources. Industrial complexes of this kind would encompass clusters of different industrial and energy enterprises that could use the products and/or surplus material from one another, for instance in the foodstuffs sector, fuel production, plant growing, biotechnology, the chemical industry, paper production etc.

Environment

Nature conservation taken into account in energy use

Iceland possesses vast areas of natural beauty, uninhabited wilderness and vulnerable vegetated areas that need to be protected to the extent possible. All human activity has an impact on the environment. Iceland's nature represents quality of life and diverse opportunities for job creation, in addition to energy use, for instance in tourism and scientific work, which must be seen as valuable resources. It is important for land use to be based on an economic and social assessment of such options for job creation, in addition to an assessment of the value of protection in the short term and long term. Where there is harnessable hydropower in any quantity there is also dramatic landscape, waterfalls and rapids. By the same token, geothermal sites are often characterised by complex geological formations, hot springs, lava, crater rows and volcanos. It can therefore be assumed that natural preservation in areas with harnessable potential will generally have a high value in comparison with other geographical areas.

Production facilities for electricity, whether hydropower, geothermal energy or wind power, will have a visible impact on the environment. Future energy production needs to be found a place in planning where the greatest consensus can be achieved regarding their location, and where environmental impact can be minimised to the extent possible. It is a matter of importance for the regulatory framework in this area to be clear and foreseeable and based on a comprehensive assessment of the economic, social and environmental impact of power production and infrastructure development.



- Attention given to nature conservation
- Environmental impact minimised
- Sustainable energy development

The transmission and distribution systems for electricity should be planned in accordance with the policy established by the government regarding the installation of electricity transmission systems. Technological development will need to be carefully monitored and new environmentally sound options will need to be taken into use as they become feasible.

Environmental impact minimised

The most important task of the present time is to reduce the use of fossil fuels, which causes climate change. Renewable energy sources play a key role in climate matters, as they reduce the need for fossil fuels. The switch in Iceland to geothermal warming was an example of such progress that reduced air pollution resulting from coal heating. However, the use of renewable energy sources is not without environmental effects, such as the release of greenhouse gases and pollutants. All possible care should be taken to minimise all environmental effects and to undertake mitigating measures to counteract any impact that cannot be avoided. Development will be based on professional standards of work in compliance with environmental and planning laws.

Sustainable use of energy resources

All utilisation of energy resources for the production of electricity, heat or fuel needs to be sustainable. In deciding on protecting geographical areas or utilising energy resources, as well as developing the power system, a balance should be struck between the three dimensions of sustainable development: the environment, society and the economy. Sustainable development should be based on accepted norms.

The production of biofuels needs to be sustainable to avoid encroaching on sensitive areas or areas that are needed for food production. The production needs to meet minimum criteria on reduced releases of greenhouse gases, as compared to fossil fuel, when everything is taken into account that is needed for the production. All imported and domestic biofuel, as well as electrofuels, need to meet the sustainability criteria provided for by law.



Society and economy

Nation to reap the benefits of energy resources

All existing generations have become used to relying on, and trusting, the privilege of utilising renewable energy sources for the production of electricity and heat for houses. This trust is of great value. A prerequisite for a consensus on energy matters in the long term is for the nation to reap the benefit of the utilisation of energy resources in diverse ways, direct and indirect.

Society is composed of a number of economic sectors that need access to energy, and they utilise the country's resources in various ways. The benefit of society lies in a macroeconomically efficient power system where the total benefit results from maximising the value of power development, minimising environmental impact, generating foreign revenue from exports and ensuring reasonable pricing for consumers. The social benefit from the utilisation of the country's energy sources is maximised, and the nation reaps the benefit. All economic activity and daily life in a modern society requires secure access to energy. Competitive energy prices support quality of life. One aspect of this is for the utilisation of energy resources to generate revenue for the collective consumption of the nation. Energy resources in public ownership shall remain in such ownership and a resource fee shall be paid for their use.

It is fair for local communities (municipalities) to reap benefits from the power development that is conducted in their neighbourhood. A fair apportionment of these benefits among the local communities that are affected by power development needs to be ensured.

The benefits of society from the utilisation of energy resources derive from:

- activity and value creation in the economy
- better living conditions
- favourable energy prices for the public
- competitive energy prices to the industries
- improved competitiveness of the country
- dividend payments from enterprises to society
- resource rent
- taxes
- revenue to land owners from power development
- minimising of environmental effects
- improved energy security

Effective, competitive energy market

It has been seen as being to Iceland's advantage to have access to clean energy at competitive prices and an efficient power system that has benefited people and the industries. The power system is the basis for various economic activities that generate foreign earnings for the national economy.

- Benefits of energy resources accrue to the nation as a whole and to local communities
- Efficient competitive market
- Equal access for all Icelanders
- Value creation and exports

In order for Iceland to remain competitive it is important for the country to have an effective competitive energy market that provides energy to diverse users of differing sizes at reasonable prices. An effective and transparent market contributes to a balance in supply and demand, and thereby improved energy security.

The electricity grid needs to be economically efficient to support the industries and regional development. Supply and demand should be constantly in tune so that energy price formation reflects production cost and value in a transparent manner. The energy market shall be open and receptive to the advent of new production. It is necessary to ensure an adequate supply that meets the needs of society. The energy market will have a more diverse market participation, ranging from household users, who are also producers, to organisations or communities of smaller producers. Increased participation contributes to increased flexibility of the power system and also enhances the social acceptance of power development projects. The Icelandic energy market forms a part of the European energy market and is thereby required to comply with common rules, subject to Iceland's special position as regards energy matters. Iceland offers an operating environment that is competitive with the neighbouring countries that we can reasonably compare ourselves with. It is important for power systems and infrastructure to be efficient, to serve the interests of users and to be developed in a cost-effective manner, taking into account environmental and conservation viewpoints, and to ensure non-discrimination among market players.

The Icelandic power transmission company (Landsnet) is a concessioned undertaking that plays a prominent role in the electricity market. It is an important matter to complete the separation of ownership of the transmission enterprise so as to bring it fully into public ownership.

Impartial ownership is fundamental to transparency and non-discrimination in the energy market.

The ownership policy of public energy enterprises needs to take account of the values and guidelines of the Energy Policy. This means that public enterprises need to take into account long-term viewpoints in their operations. They operate in an efficient and profitable manner, taking advantage of possibilities for advances. Sustainable business development is the basis for the governance of energy enterprises and supports continued growth and value creation for the future. Good governance in public enterprises promotes increased economic efficiency and the competitiveness of the energy sector.

Equal access to energy countrywide

Domestic sustainable energy needs to be accessible at a competitive price all around the country and thereby support the regional and local economies around the country. The objective is for local economies to thrive through secure access to electricity. In order to achieve this objective energy cost needs to be equalised between rural and urban areas by evening out the distribution cost of electricity and subsidising heating costs in non-geothermal areas. Access to geothermal heating is not the

same around the country because of natural barriers, and for this reason there are areas that carry a higher cost of heating premises. Efforts will continue to even out differences resulting from location (subsidies, support for the establishment of district heating systems, heat pumps etc.). In order to achieve these objectives the transmission and distribution system for electrical energy will need to be developed to ensure security of supply and sufficient power capacity to meet the needs of society at any time, regardless of location.



Objectives



Public energy needs met at all times



Infrastructure sound and resilient



Energy system diversified



Iceland unreliant on fossil fuel
Energy transition on land, on the sea and in the air



Energy efficiency improved and waste minimised



Multi-use of resources



Nature conservation taken into account in energy use



Minimisation of environmental impact



Sustainable use of energy resources



The nation reaps the benefits of its energy resources



Efficient and competitive energy market



Equal access to energy countrywide

Foundations



Harmonisation

Energy administration
and processes to be efficient
and harmonised



Values

Sustainable development
Carbon neutrality
Macroeconomic efficiency
Public interests
Equality, transparency
and consultation
Technological neutrality
Market laws
Value creation
and competitiveness



Knowledge

Strong research and
innovation environment and
an internationally competitive
knowledge industry

Foundations

Fundamental values

The fundamental values of the Energy Policy are reflected in all its principal objectives. Iceland's Energy Policy is based on sustainable development, where efforts will be made to meet contemporary needs without curtailing the opportunities of coming generations to meet their needs. Sustainable development is based on three dimensions: social, environmental and economic, where none can exist without the other. The fundamental values are reflected in these three dimensions and the balance among them.

Environment

All sections of society and the economy need to participate in Iceland's progress toward carbon neutrality, and the power system, which will now and for the future be based on renewable energy, will do its part in that progress. The decision-making process will be guided by actions against climate change. The basic principles of environmental law on the precautionary principle, the polluter-pays principle and best available technology (BAT) will apply to all activities and decisions.

Community

Carefully considered decisions relating to the power system will be based on research and extensive knowledge of economic developments, social factors and environmental protection. Decisions regarding development options in the power system

Fundamental values of the Energy Policy

Environment

- Sustainability
- Carbon neutrality
- Precautionary principle
- Polluter-pays principle
- Best available techniques

Community

- Macroeconomic efficiency
- Quality of life
- Public interests
- Non-discrimination

- Knowledge

- Technological neutrality

- Transparency

- Consultation

Economy

- Competitiveness

- Efficiency

- Stability

- Market law

- Value creation

will take account of the common interests of the population and include consideration of internal and external factors with a view to achieving macroeconomic efficiency. Precedence will be given to the public interest.

Access to energy impacts people's daily life, work and environment and is fundamental to the nation's quality of life and one of the well-being goals. Decision-making processes should be transparent and decisions shall be taken in consultation with the public and industries of the country. Market participants, whether corporations or the public, will enjoy non-discrimination, e.g. as regards access to infrastructure and systems. Also, the government will be technology-neutral, so that all renewable energy options will enjoy the same conditions, e.g. are regards concessions or support. However, it may be justifiable for renewable energy options which are more environmentally sound to benefit through greater concessions.

Economy

The energy markets will be competitive and efficient in that they will be based on market laws. Business activity requiring concessions will be subject to effective public supervision. The utilisation of valuable energy resources will need to promote value creation for the benefit of the country as a whole. Stability and foreseeability will facilitate decision-making for the long term and support cost-effective development of the power system. The Energy Policy will support and increase the competitiveness of the country.

Knowledge and development

The foundation for value creation is an active environment of research, development and innovation. One part of promoting energy security for the future is to ensure the existence of fundamental knowledge regarding potential energy development sites in the country for electricity, heat and fuels. It is important to foster vigorous research, analyses and forecasts for this purpose. Government has a prominent role to play in promoting a dynamic research and innovation environment. Efforts will be made to promote an efficient and harmonised system. Funds relating to energy matters should be integrated and merged in order to simplify administrative aspects and improve efficiency. Grants should be allocated on the basis of open and transparent competition.

Innovation in energy matters has a key role to play in taking on the challenges posed by climate change and energy transition. It is important for funds used in support of research and development to reflect the points of focus of the Energy Policy. The emphasis will be on the development of green technological solutions in Iceland in the direction of increased sustainability in the industries and society. New solutions in the interests of sustainability could also play a prominent role in increasing Iceland's competitiveness.

It is important to maintain and promote knowledge and transfer of technology among professionals in energy and environment-related work and administration. The knowledge creation inherent in education and research is the driving

force of innovation and economic development. Innovation in the energy sector and related operations is rooted in Iceland's strengths and unique position. An internationally competitive knowledge industry will develop, which will contribute to increased value creation and a resulting multiplication effect in the economic environment. Iceland's policies on sustainability and renewable energy will contribute to increased value for the energy and the export of green solutions.

In order to meet the energy needs of the future through renewable energy sources and support energy transition, there will be a need for innovation in the entire energy value chain, from production and infrastructure to the user. New energy options and renewable fuels are emerging. The power system needs to adapt to changed circumstances, where there will be expectations of participation by households, small power plants and more scattered and fluctuating production from new energy options. Smart technology is advancing rapidly in all areas, which supports better energy efficiency, new market solutions and increased flexibility in the production and use of energy. Solutions are needed that will facilitate the sale of excess energy from households and demand response. Energy storage will play a role in bridging the gaps in fluctuating use and production.

Harmonisation

Administration structure and efficient administrative procedures will be designed to support the objectives of the Energy Policy and will be grounded in the values set out in the Policy. Government administration will have an important role to play in supervising enterprises operating under concession contracts and in monitoring significant benchmarks, e.g. regarding energy security, statistics and the preparation of forecasts that are necessary for the government in deciding on policies. Also, administrative organisations and municipalities will watch over a regulatory framework designed to protect communities and businesses while at the same time giving consideration to environmental matters and compliance with law. Also, there will be agencies and complaints boards that the public can consult if they believe their rights have been violated.

In establishing a regulatory framework that affects the Icelandic economy, care must be taken to ensure that requirements imposed on business enterprises are not disproportionate and that regulation is swift, efficient and understanding of the needs and conditions of the industries. The objective will be for all necessary information to be transparent and accessible to businesses and the public.

It is important to have in place effective administration that is capable of fulfilling its functions in an efficient manner so as to support the needs of society regarding energy. The licensing process must ensure that applicants meet requirements; at the same time it has to be simple and efficient with reasonable processing times in comparison with the best practices in the countries that we compare ourselves with.

Conclusion

This document lays down a future vision and a guideline for Iceland's long-term Energy Policy. On the basis of this Policy it is suggested that measurable goals should be set, along with performance indicators to lead the country into a sustainable energy future. The outcome of effective policy making in the energy sector on which there is a general consensus will ensure the prosperity and security of Icelanders and future generations of Icelanders far into the future.



