Energy in Slovenia

OVERVIEW OF THE STATE OF THE ENERGY INDUSTRY, ITS COURSE, AND ITS CHALLENGES

EZS ENERGETSKA ZBORNICA SLOVENIJE

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Ana Vučina Vršnak

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WHAT IS ENERGY?

CHILDREN:

Mark, 7: Energy is what gives you strength.

Ana, 6: Energy helps you get warm and also get up in the morning. If you have energy, you are not tired. You get most energy from the sun when you go for a walk.

Adam, 3: Energy is water, the sun, the wind.

Iva, 10: Without energy, there is no light, no heat, no life. Energy comes and goes. We get it with food and use it by being active.

Zala, 8: Energy is the key to life. Without energy, we would not exist.

Sisters Lana and Zoja, 10 and 7: Energy is movement. Energy is within us. Energy gives us strength.

FAMOUS PEOPLE:

If you wish to understand the Universe, think of energy, frequency and vibration.
Nikola Tesla

The energy of the mind is the essence of life.
Aristotle

It takes as much energy to wish as it does to plan.
Eleanor Roosevelt

You may not feel outstandingly robust, but if you are an average-sized adult you will contain within your modest frame no less than 7×10^{18} joules of potential energy—enough to explode with the force of thirty very large hydrogen bombs, assuming you knew how to liberate it and really wished to make a point. Everything has this kind of energy trapped within it. We are just not very good at getting it out.
Bill Bryson, A Short History of Nearly Everything

Contents…

1

PROPER INFORMATION: FOUNDATIONS OF DECISION-MAKING

Discussions on various topics of social development are always interesting and occasionally heated. This is understandable, since the issues involve a number of different social groups that do not share the same views (interests). Energy is no exception, as there are differing opinions on energy sources (fossil fuels, gas, renewable energies), energy infrastructure (which plants and which sites are considered suitable), ownership, etc.

However, the one thing everyone agrees on is what such a discussion should stand on. One can discuss and plan only based on true and official information of good quality, i.e., information coming from official institutions dealing with data: Statistical Office of the Republic of Slovenia (SURS) or Statistical Office of European Communities (Eurostat).

In addition, several institutions and companies publish their own reports and analyses, which enjoy the trust of most people. In relation to the energy sector, the most frequently relied upon reports and analyses are those by the Paris-based International Energy Agency (IEA), by the US Energy Information Administration (EIA), by the International Renewable Energy Agency (IRENA), by a number of energy regulators and their associations, and by certain stakeholders and companies (such as Energy Outlook of BP).

The Energy Industry Chamber of Slovenia comprises several sections that relate to various European or global organisations, which should also be trusted. These include:

- Eurelectric, the Brussels-based association of the European electric industry (there is an Eurelectric Section operating within EICS);
- International Association for Energy Economics (IEE), which is based in Cleveland, Ohio;
- European forum for energy Business Information eXchange (ebIX), and
- World Energy Council (WEC).

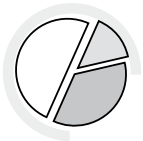
In addition to the quality of information, it is particularly important to pay attention to the use of correct definitions of each phenomenon. When we speak of the energy mix, do we know exactly what the term covers? When we say that greenhouse gases have increased, do we know to which period the statement refers? Or speaking of expensive electricity when our electricity bill feels too high: Do we know exactly what we are paying for and what the prices are in other countries?

The EICS is a member of Energy Statistics Advisory Committee at SURS

The EICS is committed to focusing on the quality of information it uses in its discussions and decisions that regard energy issues both at the national level and at the level of industries or individual companies. The EICS is a member of Energy Statistics Advisory Committee which is one of several statistical advisory committees operating within Statistical Office of the Republic of Slovenia (SURS). The purpose of Energy Statistics Advisory Committee is to give the public an insight into energy statistics and the opportunity to participate in the decision-making process on the course and scope of statistical research in this area.

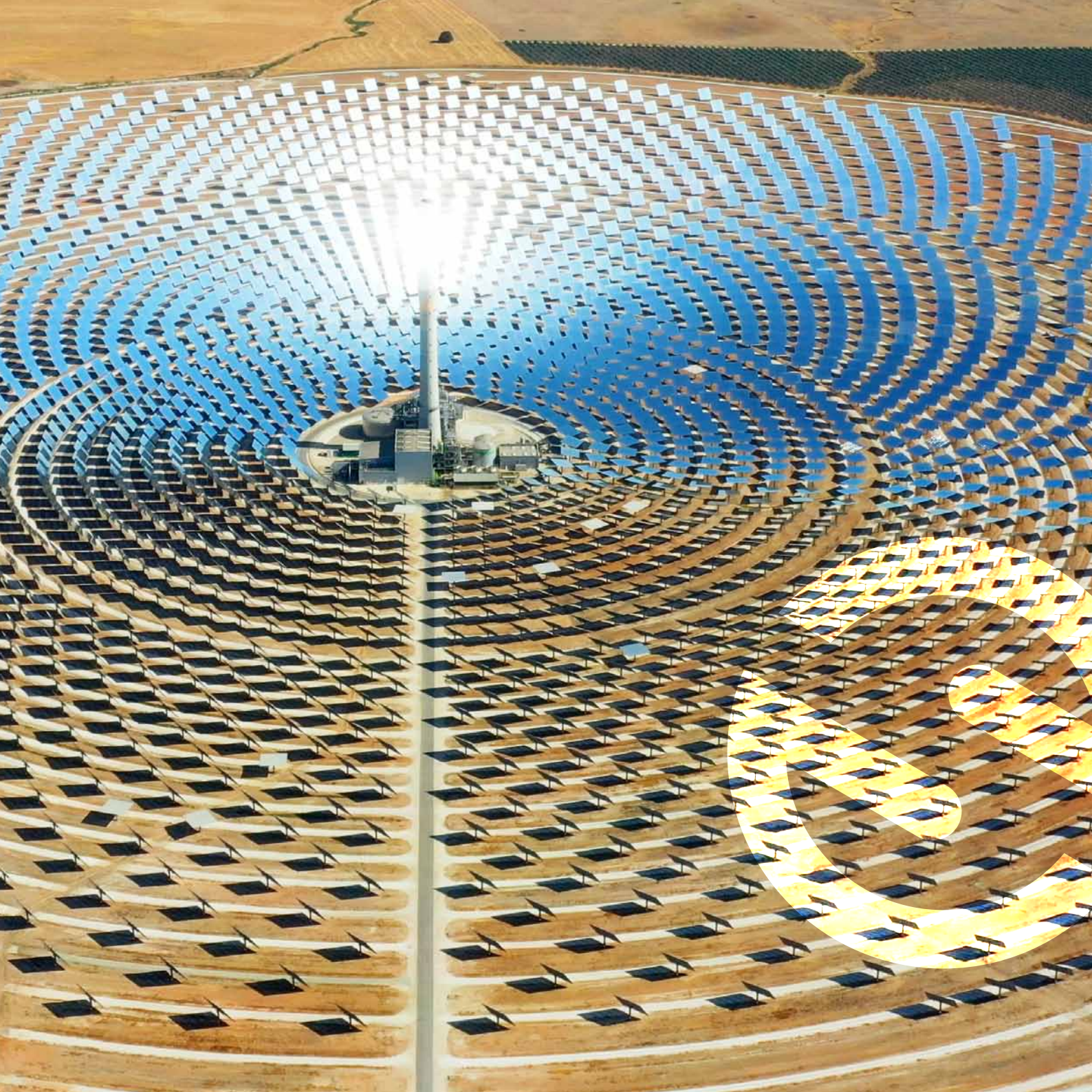
The activities of the committee comprise the following areas:

- Production, purchase, sale, consumption, import, export, and reserves of various energy sources (electricity, solid/liquid/gaseous fuels, heat, renewable energy sources);
- Consumption of energy and fuels in households, and energy poverty.



2

GLOBAL ENERGY: WHICH COUNTRIES ARE THE LARGEST ENERGY PRODUCERS AND EXPORTERS?



Every country produces a certain amount of energy.

Some countries have an abundance of energy sources while others do not.

For example, the US, Saudi Arabia, and Russia are the largest producers of oil, which is produced in Europe by countries such as Norway, the UK, Romania, Denmark, and Italy (Source: US Energy Administration – EIA).

The US and Russia are the leading producers of gas, with Iran, Qatar, Canada, China, Norway, and Saudi Arabia far behind (Source: International Energy Agency – IEA).

China is by far the largest producer of coal in the world, followed by India, the US, Australia, Indonesia, Russia, South Africa, Germany, and Poland (Source: British Petroleum – BP).

Kazakhstan, Canada, and Australia are the main producers of uranium for nuclear power. These three countries account for more than two-thirds of the world's uranium production (Source: World Nuclear Association).

If we consider all renewable energy sources, China is by far the largest energy producer, both in terms of installed capacity and actual electricity generation. In terms of installed capacity, China is followed by Brazil, the US, Canada, Russia, India, Norway, Turkey, Japan, and France (Source: IRENA, 2019), while the countries that follow China in terms of electricity generation are Canada, Brazil, the US, Russia, Norway, India, Japan, Vietnam, and Sweden (Source: IRENA, 2017).

Every country consumes a certain amount of energy.

Energy is used by people (households) and businesses (industry) in various forms – from oil and natural gas or even liquefied natural/petroleum gas (LNG/LPG), to nuclear (uranium), coal, and biomass. All of the above are considered primary energy sources.

- Biomass in the form of firewood, wood chips or wood pellets is considered a renewable energy source, just like energy sources from natural phenomena, i.e., solar energy, wind energy, water energy, and geothermal energy.
- All other sources mentioned above (oil, gas, coal, uranium) are considered non-renewable sources.
- Electricity is not a primary energy source but is derived from primary sources and therefore considered a secondary energy source.

Import/Export

Some countries export their energy sources, while others import them. Based on a country's energy imports, we can calculate its energy import dependency.

The world's number one export commodity today is oil. The largest oil exporters are also the largest oil producers, the only difference is that they rank differently on both lists. Saudi Arabia and Russia head the top 10 list, followed by Iraq, Canada, the United Arab Emirates, Kuwait, Iran, the US, Nigeria, and Kazakhstan (Source: IEA).

The top three exporters of natural gas are Russia, Qatar, and Norway, followed by Canada, the Netherlands, and the US (Source: US EIA).

What about coal? The world's largest exporters are Australia, Indonesia, Russia, the US, and South Africa. China and India, the two largest coal producers, dropped off the list because they consume most of the coal they produce.

3

SLOVENIA AND ITS ENERGY IMPORT DEPENDENCY: FIFTY-FIFTY

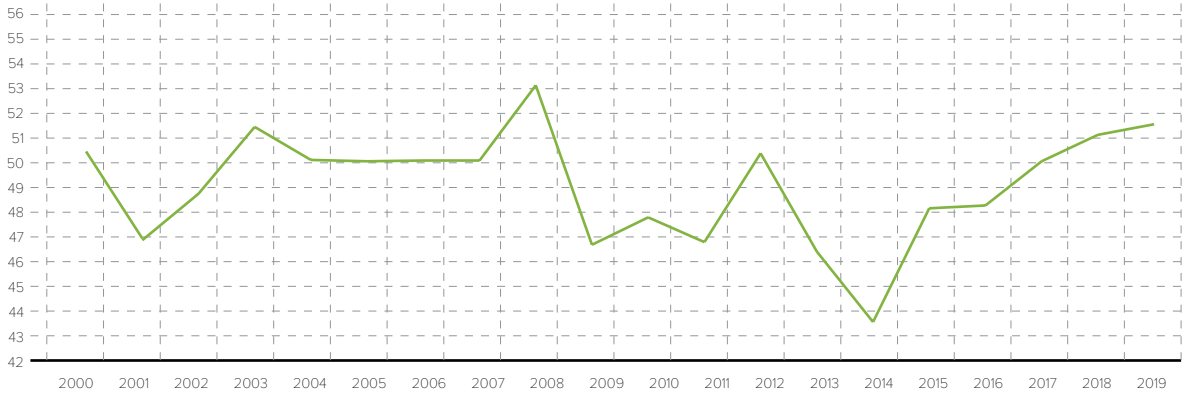
IS SLOVENIA DEPENDENT ON ENERGY IMPORTS?

THE ANSWER IS CLEAR: YES!

To meet the energy needs of both households and industrial consumers, Slovenia does not have enough of its own energy sources and therefore must rely on energy imports. Energy dependency is the ratio between net imports (import-export) and the country's total energy supply.

TABLE AND GRAPH: Energy dependency of Slovenia between 2000 and 2019

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Energy dependency rate (%)	50.4	46.9	48.8	51.4	50.3	50.1	50.2	50.2	53.1	46.8	47.9	46.9	50.4	46.4	43.6	48.1	48.2	50.1	50.9	51.5



Source: Statistical Office of the Republic of Slovenia (SURS)

The table and graph on Slovenia's energy dependency clearly show that the country's import dependency has fluctuated between 43 and 53% over the last 20 years. In the first two decades of the century, Slovenia imported about half of the energy needs of industrial and household consumers. Since 2017, Slovenia's energy import dependency has exceeded 50%.

As far as energy sources such as natural gas and oil are concerned, Slovenia relies exclusively on imports.

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SLOVENIA'S DEPENDENCY ON ELECTRICITY IMPORTS: LOW YET FLUCTUATING!

IS SLOVENIA DEPENDENT ON ELECTRICITY IMPORTS?

THE ANSWER IS: YES, BUT TO A LESSER EXTENT, AS MOST OF ELECTRICITY USED IS PRODUCED BY LOCAL POWER PLANTS.

When we look at electricity alone, Slovenia appears much less dependent on energy imports and thus better off, because the country produces most of electricity on its own. And how does it do that? In its power plants, most of which are hydropower and thermal power plants, and its one nuclear power plant.

Slovenia's dependency on electrical energy imports is thus much lower but fluctuates greatly. Import dependency generally shows the share of domestic consumption covered by local sources, so it depends on the fluctuations of both production and consumption. In 2019, locally produced electricity covered 83.5% of the electricity demand, while in 2020, this share increased to 92.6%.

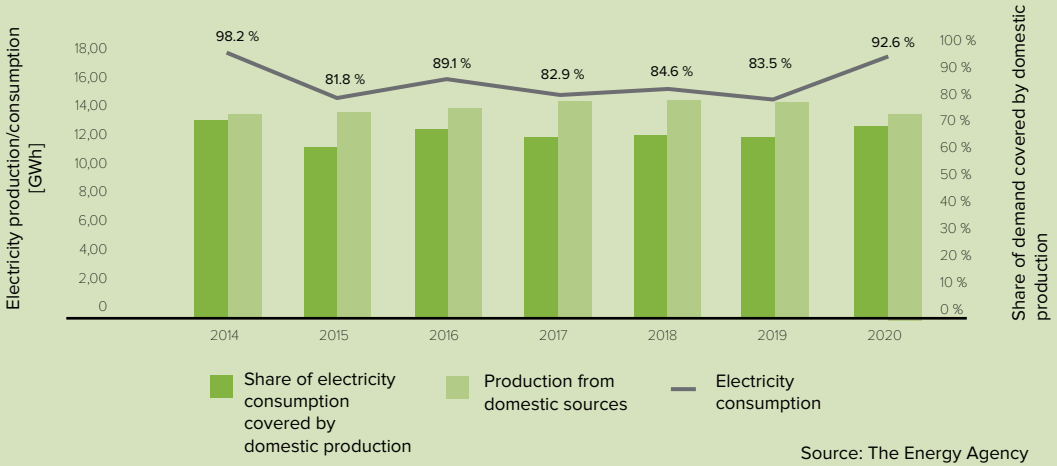
Every year, a report on the state of the energy sector is prepared by the Maribor-based Energy Agency, which is the national regulatory authority of the Republic of Slovenia. The report focuses on electricity, natural gas, and heat. We have taken the following table and graph showing Slovenia's electricity import dependency from the said report, adding only the information for 2020.

TABLE: Proportions of electricity consumption covered by domestic electricity production between 2010 and 2020

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Generation at the transmission level [GWh]	**11,729**	**11,098**	**10,979**	**11,373**	**12,067**	**10,198**	**11,405**	**10,969**	**11,212**	**10,934**	**11,639**
- of which hydropower plants	4,248	3,361	3,730	4,480	5,794	3,708	4,293	3,725	4,421	4,225	4,747
- of which thermal power plants	4,795	4,787	4,633	4,381	3,242	3,809	4,401	4,262	4,049	3,946	3,872
- of which nuclear power plant (50% share)	2,685	2,949	2,616	2,512	3,030	2,681	2,712	2,983	2,742	2,763	3,020
Generation at the distribution level [GWh]	**849**	**833**	**951**	**1.070**	**1.185**	**1.075**	**1.116**	**1.032**	**1.050**	**1.044**	**1.088**
Total electricity consumption [GWh]	**12,578**	**11,930**	**11,930**	**12,443**	**13,252**	**11,273**	**12,521**	**12,001**	**12,262**	**11,978**	**12,727**
Total electricity consumption [GWh]	**13,112**	**13,396**	**13,380**	**13,539**	**13,489**	**13,787**	**14,056**	**14,468**	**14,501**	**14,342**	**13,742**
- of which end user consumption	12,158	12,682	12,631	12,816	12,719	13,041	13,297	13,665	13,736	13,564	12,896
- of which network losses	982	824	877	849	821	864	876	893	880	859	848
- of which export to Italy via distribution system (via Vrtojba and Sežana substations))	-28	-110	-128	-126	-50	-118	-117	-90	-115	-81	-2
Share of electricity demand met by domestic production	**95.9%**	**89.1%**	**89.2%**	**91.9%**	**98.2%**	**81.8%**	**89.1%**	**82.9%**	**84.6%**	**83.5%**	**92.6%**

Source: The Energy Agency

GRAPH: Slovenia's electricity import dependency between 2014 and 2020



Source: The Energy Agency

The largest share of domestic electricity production is contributed by larger hydropower plants, thermal power plants and the nuclear power plant, which are connected to the Slovenian transmission grid. Only a small part of domestic production is connected to the distribution network. Given that hydropower plants play a major role in Slovenian electricity production, the total domestic production is highly dependent on hydrological conditions in a given period, the Report on the State of the Energy Sector in Slovenia notes.

In calculating energy import dependency, one must consider the losses throughout the electric power system in addition to the total electricity consumed by end users in the transmission and distribution systems. In this context, the electricity exported from the Vrtojba and Sežana substations to Italy via the distribution network, is subtracted (i.e., the volumes of electricity distributed to Italy via the Vrtojba and Sežana substations are not included in Slovenia's final consumption). In the chapter on electricity balance, the corresponding volumes are considered as direct consumption from the transmission system (Report on the State of the Energy Sector in Slovenia in 2017, p. 23, and Report on the State of the Energy Sector in Slovenia in 2019, p. 26).

Electricity import dependency is defined as the ratio of domestic electricity generation to gross domestic consumption of electricity. Import dependency fluctuated considerably between 2010 and 2019, influenced not only by changes in domestic electricity generation but also by changes in electricity consumption. In the decade under consideration, import dependency reached its lowest value in 2014 (1.8%) on account of high electricity generation from hydropower plants resulting from extremely favourable hydrological conditions but also on account of lower gross consumption compared to the previous year. In 2017, import dependency increased significantly (17.1%) due to lower domestic production (mainly by hydropower plants) and an increase in electricity consumption (Report on the State of the Energy Sector in Slovenia in 2017, p. 23).

Due to the solid availability of domestic power plants, greater integration of dispersed sources, and excellent international interconnection of its electric power system, Slovenia's electricity supply is characterised by extremely high reliability.

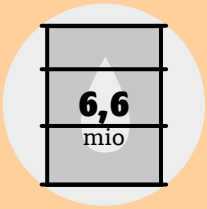
5

ENERGY IN SLOVENIA: RENEWABLE ENERGIES, FOSSIL FUELS, NUCLEAR ENERGY

Energy supply in Slovenia: Half of energy sources are imported, but most electricity is produced domestically

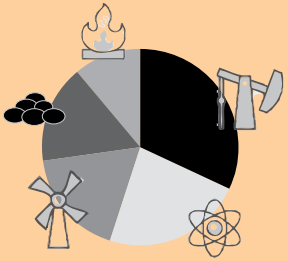
It was noted in section 2 that countries have a certain share of their own energy sources, that they produce energy from domestic and/or imported sources, and that they import some of the energy they need. If we add the imported energy to the domestically produced energy, we get the total annual amount of energy used for conversion to other forms of energy (electricity and heat) or final consumption (refuelling cars), which also includes heat losses that occur on the way to consumers (via transmission lines or heat pipes). Approximately half of Slovenia's domestic energy demand is covered by imported energy.

According to Statistical Office of the Republic of Slovenia, Slovenia's energy dependency in 2019 was 51.1%, which means that 48.5% of the total energy demand came from local sources. The supply of petroleum products is entirely based on imports, and the country also imports natural gas. Coal is produced locally at the Velenje Coal Mine, while the two main renewable energy sources are wood biomass (mainly used in single-family houses) and water (hydropower) from Slovenian rivers.



Slovenia's total primary energy supply in 2019 was 6.8 million tonnes of oil equivalent (toe), which corresponds to 79 TWh or 283 PJ (2% less than in 2018).

The total volume of domestic energy sources in Slovenia in 2019 was 3.5 million toe (Mtoe), which corresponds to 41 TWh or 148 PJ, (0.6% less than in 2018).



As regards the structure of energy supplied in 2019, petroleum products dominated with 33%, followed by nuclear energy with 22%, renewable energy sources (including hydropower) with 18%, coal with 16%, and natural gas with 11%.

How do we measure energy?

The base unit of energy is the joule (J). Because it is a relatively small unit of measurement, it is often preceded by metric prefixes such as kilo (k), mega (M), giga (G), tera (T), peta (P), each of them indicating multiplication by a thousand. Therefore, 1 kJ = 1,000 J; 1 MJ = 1,000 kJ; 1 GJ = 1,000 MJ; 1 TJ = 1,000 GJ; 1 PJ = 1,000 TJ.

In other areas, other units of energy are used, e.g.:

- in the food sector, the unit of energy used is kilocalorie (kcal), where 1 kcal = 4,184 J
- in the energy sector, the unit used is the watt-hour (Wh), where 1 Wh = 3,600 J

1 PJ = 10^{15} J = 24,000 toe = 278 GWh

How do we "measure" the height of our energy bill?

The joule is not the most useful unit when dealing with large amounts of energy consumed in households or industry. For this purpose, it has been agreed to use the kilowatt-hour (kWh) which indicates how many kW (1,000 W) of energy is delivered in an hour.

Example: If a 40 W light bulb is on for 24 hours, we "decant"40 W x 24 h = 960 Wh (almost 1 kWh) from electric current to light and heat.

At the end of each month, electric distribution companies read the meter and electricity suppliers send out the bills. The amount on the bill depends on how many kWh of energy we have "decanted" through our electrical appliances during the month.

Electricity supply: One third from coal, one third from water, one third from nuclear

There are several ways to generate electricity. In Slovenia, the three main actors of electricity generation are large hydropower plants (HPP), thermal power plants (TPP), and the nuclear power plant – all of them are connected to the electricity transmission system, while only a small part is connected to the distribution system.

• **What electricity generation plants are there in Slovenia and by whom they are operated?**

Electricity generation in Slovenia is managed by two holding companies: Holding Slovenske elektrarne (HSE) and GEN Group.

HSE companies

- Dravske elektrarne Maribor (DEM): HPP Dravograd, HPP Vuzenica, HPP Vuhred, HPP Ožbalt, HPP Fala, HPP Mariborski otok, HPP Zlatoličje, and HPP Formin.
- Soške elektrarne Nova Gorica (SENG): HPP Tolmin, HPP Doblar 1 and 2, PSPP Avče, and HPP Plave 1 and 2.
- Termoelektrarna Šoštanj (TEŠ).
- HSE Energetska družba Trbovlje (EDT): two gas-fired units.

GEN Group companies:

- Hidroelektrarne na spodnji Savi (HESS): HPP Boštanj, HPP Arto-Blanca, HPP Krško, HPP Brežice, and HPP Mokrice.
- Savske elektrarne Ljubljana (SEL): HPP Moste, HPP Mavčiče, HPP Medvode, and HPP Vrhovo.
- Nuklearna elektrarna Krško (NEK).
- Termoelektrarna Brestanica (TEB).

• One third from RES

The proportion of electricity generated by hydropower plants and other renewable energy power plants has been changing from year to year. Why? Because there are different environmental conditions – in terms of hydrology, solar radiation etc. However, the share of renewable electricity also depends on the level of investment in renewable electricity generation plants. As on average more than 90% of renewable electricity in Slovenia is generated by hydropower plants, the volume of total production relies heavily on hydrological conditions in a given period, notes the Report on the State of the Energy Sector in Slovenia.

In 2018, the share of renewable electricity in total production in Slovenia was 34.5%, while in 2019, it was 33.6%, which is almost a whole percentage point lower than the year before. This share, i.e., the share of RES in electricity production, is thus higher than the share of RES in the energy mix.

While all renewable energy sources (hydropower, wind power, solar energy, geothermal energy, and biomass) can be used to generate electricity, it is most frequently generated from hydropower, solar energy (photovoltaics), and wind power.

• One third from coal

Fossil-fired power plants – in particular TPP Šoštanj (coal-fired) and TPP Brestanica (gas-fired) – accounted for 28.9% of Slovenia's total electricity production in 2018.

The main representative of the Slovenian coal industry is the Velenje Coal Mine, which produces about 3.5 million tonnes of coal annually, destined for the nearby TPP Šoštanj.

In the past, coal was also produced at the Trbovlje-Hrastnik Coal Mine, which is no longer in operation. Nearby is Trbovlje Thermal Power Plant (TET), which has been operating under a new name, HSE Energetska družba Trbovlje (HSE edT), since early 2018. The power plant includes two gas units, while the coal unit has ceased operation. The Brestanica TPP also includes gas units. As far as natural gas is concerned, Slovenia if fully dependent on imports.

• One third from nuclear

In 2019, the Krško Nuclear Power Plant (NEK) contributed a 37.5% share to Slovenia's total electricity production. It is important to know that NEK is owned by Slovenia (GEN energija) and Croatia (Hrvatska elektroprivreda – HEP), which means that it produces and supplies electricity only to the benefit of its two shareholders, who have rights and obligations on 50% of the available energy and net production. What does this mean? It means that only half of the total production of NEK is used in Slovenia, while the other half is exported to Croatia.

Targets for renewable energy sources

Let us now linger a while on renewable energy sources (RES), considering that each Member State has a binding renewable energy target. All EU Member States have agreed to increase the common share of renewable energy sources in the EU energy mix to 20% by the end of 2020, with each Member State pursuing its own renewable energy target. Slovenia plans to increase the share of RES in the country's energy mix to 25% by the end of 2020 (statistical data for 2020 will be available towards the end of 2021) and further to 27% by 2030.

In Slovenia, wood is the most important renewable energy source, accounting for a 48% share in the country's energy mix (2019 data). As much as 85% of total wood biomass used in 2019 was used by households, mostly for heating. Hydropower takes the second place with 36%. Other renewable energies have smaller shares in the energy mix, although the use of renewable energies is generally increasing.

EU RES share reached 19.7% in 2019

In 2019, the share of renewable energy in gross final energy consumption at EU level reached 19.7%, which is only 0.3% away from the 20% target that the EU should reach by the end of 2020. Let us recall that the share of RES in 2004 was only 9.6%.

Sweden is the Member State with by far the largest share of RES in gross final energy consumption (56.4%), followed by Finland (43.1%), Latvia (41%), Denmark (37.2%), and Austria (33.6%). The share of renewable energy sources is lowest in Luxembourg (7%), Malta (8.5%), the Netherlands (8.8%), and Belgium (9.9%). Fourteen Member States have already exceeded their 2020 targets, six of them are close to doing so, while some countries, including France, the Netherlands, Ireland, and Luxembourg, are quite far from their national targets.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
The share of energy from renewable sources in gross final energy consumption (in %)	21.08	20.94	21.55	23.16	22.46	22.88	21.98	21.66	21.38	21.97

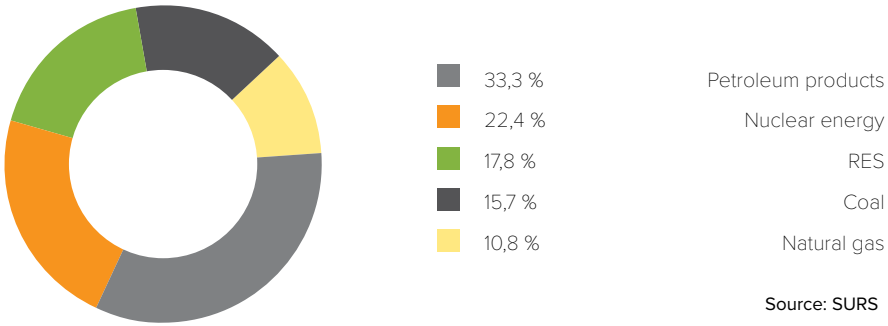
Source: SURS

The share of renewable energy sources in Slovenia's energy supply, 2019 (%)

Wood and other solid biomass resources	8
Hydropower	5,7
Liquid biofuels (biodiesel and biopetrol)	1,4
Geothermal energy and ambient heat	0,8
Solar energy (solar power plants)	0,4
Biogases (landfill gas, gas from wastewater treatment plants etc.)	0,3
Solar thermal energy (solar thermal collectors)	0,2
Wind energy	0,01

Source: SURS

GRAPH: Energy supply in Slovenia, 2019



Source: SURS

Renewable energy sources in EU gross electricity consumption reach 34% in 2019

The EU statistics on renewable electricity generation look like this: wind contributes a good third, hydro a third, and the remaining third is made up of solar (over 1/10 of the total renewable electricity), solid biofuels (under 1/10) and other renewable sources (just under 1/10). To be more precise, RES made up 34% of gross electricity consumption in the EU-27 in 2019, a slight increase from 32% in 2018. Wind energy and hydropower accounted for two thirds (35% each) of the total electricity generated from renewable sources, while solar energy (13%), solid biofuels (8%) and other renewables (9%) accounted for the remaining third. Considering that its share was only 1% in 2008, solar energy is considered the fastest growing energy source.

Two EU Member States with a share of renewable electricity above 70% are Austria (75%) and Sweden (71%). Such a high share of RES in electricity generation mainly reflects the hydrological conditions in the two countries. The countries where the share of renewables in gross electricity consumption in 2019 was above 50% are Denmark (65%), Portugal (54%), and Latvia (53%). The countries at the other end of the scale with a RES share of 10% or less are Malta, Cyprus, Luxembourg, and Hungary.

Fossil fuels and energy transition

Let us focus on fossil fuels, especially coal (since natural gas in Slovenia comes from import). Quite a few industrial sectors across Europe have significantly turned away from fossil fuels, mainly because fossil fuels are closely linked to air pollution and climate change. The combustion of fossil fuels releases various air pollutants (nitrogen oxides, sulphur oxides, non methane volatile organic compounds, and fine particulates) and greenhouse gases (carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and the so-called F-gases which include hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulphur hexafluoride (SF_6)). Biomass burning can have similar impacts on air quality and climate change.

Replacing coal and oil with cleaner alternatives can undoubtedly contribute to significant reductions in greenhouse gas (GHG) emissions from industrial sectors that are large consumers of electricity. Indeed, such replacement contributes to the energy transition we are experiencing in Europe and beyond – it is a shift from a fossil fuel-based energy system to one based on renewable energy sources (RES).

In December 2019, EU Member States agreed on a new growth strategy that aims to transform the Union into a modern and competitive economy where resources are used efficiently, where net-zero GHG emissions are achieved by 2050, where growth does not depend on resource use, and where no one is left out. The agreement on the new strategy is called the European Green Deal.

What can we do with the closed coal mines? The Velenje Coal Mine is considering already today their options once the coal mine is shut down. They see a future in the existing knowhow with a high added value (mining, electrical and mechanical engineering), but they also consider activities like construction, planning, electronics, refits, and mining and construction machinery manufacturing.

Nuclear energy

The EU generates about a quarter (26% in 2019) of its electricity from nuclear energy, which makes nuclear energy one of the most important energy sources, along with fossil fuels and renewable energy sources. Nuclear energy is considered a low-carbon energy source because nuclear power plants do not emit greenhouse gasses into the atmosphere during operation. If we also take into account fuel production and waste disposal throughout the operating cycle, the footprint of a nuclear power plant is small compared to other power generation technologies.

Each country is free to choose its own energy mix independently. This means that the decision for or against nuclear energy can be made solely by the country and cannot be imposed by anyone, including the European Commission within the EU.

Around the globe, a number of nuclear power reactors are still in operation. In 2020, there were about 440 nuclear power reactors operating in 30 countries and Taiwan. In 2019, they generated 2,657 TWh of electricity, accounting for over 10% of the world's electricity.

According to the World Nuclear Association, 55 nuclear power reactors were under construction in 2020 in 15 countries, notably China, India, Russia, and the United Arab Emirates. In Europe, nuclear power reactors were (and are still) being built in Finland, France, Slovakia and the UK, and there are several planned in the Czech Republic, Poland, Hungary, Bulgaria, and Romania. Slovenia is planning to build a second unit at the Krško nuclear power plant (JEK2).

However, some countries, notably Germany, have decided for nuclear decommissioning. Germany and Switzerland have turned away from the nuclear option. Public opinion in Germany is still against the construction of new nuclear power plants, also in the light of incidents such as the nuclear accident that occurred in Fukushima, Japan, in 2011. What had happened? There was an earthquake that did not damage the safety systems of the nuclear facility, which includes several reactors, but a massive tsunami generated after the earthquake flooded the Fukushima Daichii nuclear power plant, causing failure to its safety systems. After the disaster, countries around the world, including Slovenia, conducted analyses of the resilience of their nuclear power plants in case of extreme events and initiated measures to improve safety, which included additional investments in power plant maintenance and security.

Some countries have a long tradition of opposing nuclear energy and try to assert their views against other countries. One of these countries is Austria, which has drawn attention to various aspects of nuclear power plants in its neighbouring countries including Slovenia. An interesting fact is that Austria opted for nuclear energy in the 1960s and built its first nuclear power plant, which was never put into operation due to a referendum in 1978 in which voters declared themselves against it.

People consume energy through their activity.

Energy is used by people (households) and businesses (industry) in various forms.

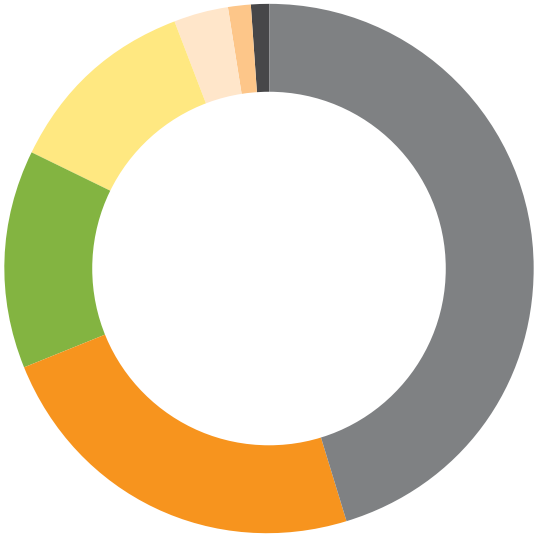
Slovenia's final energy consumption in recent years has been about 5 million toe. In 2019, consumers in Slovenia consumed 2,247,362 toe of oil, 1,184,495 toe of electricity, 650,565 toe of renewable energy sources and waste, 596,747 toe of natural gas, 173,337 toe of heat, 63,601 toe of geothermal, solar and wind energy, and 47,139 toe of solid fuels (4,963,246 toe combined).

In 2019, gross final electricity consumption in Slovenia amounted to 14,423 GWh or 13,564 GWh excluding the losses in transmission and distribution networks. Electricity consumption of industrial and household consumers in the distribution system totalled 11,400 GWh, with households having consumed 3,386 GWh and industrial consumers 8,014 GWh.

At the end of 2019, the number of final consumers connected to the Slovenian electric power system was 960,051.

Natural gas is distributed to final consumers by distribution system operators. In Slovenia, it is distributed through gas transmission pipelines, located in 82 municipalities and supplying gas to 135,205 consumers.

GRAPH: Final consumption of energy in Slovenia (2019)



2,247,362 toe	Oil
1,184,495 toe	Electricity
650,565 toe	Renewable sources and waste
596,747 toe	Natural gas
173,337 toe	Heat
63,601 toe	Geothermal, solar and wind
47,139 toe	Solid fuels

Source: SURS

6

ENERGY IN SLOVENIA: LIMITATIONS AND WIDER CONTEXT

IMPORT DEPENDENCY

TRANSPORT ISSUES

CLOSURE OF COAL MINES AND THERMAL POWER PLANTS

FURTHER EXPLOITATION OF NUCLEAR ENERGY

FURTHER EXPLOITATION OF RES

ENERGY EFFICIENCY IN INDUSTRY AND BEYOND

UNFORESEEABLE EVENTS

Import dependency

We have already noted and supported with data that in order to meet the demand of all household and industrial consumers, Slovenia does not have sufficient energy sources, so the country has to rely on imports. In fact, Slovenia has to import about half of the country's energy needs.

Slovenia is completely dependent on imported oil. This means that it is very vulnerable to any disruptions in oil supply. As this is generally the case for a large part of the EU, the latter has imposed on its Member States the obligation to maintain minimum stocks of crude oil and oil products which they could use in the event of a disruption in oil supply. Member States have generally recognised the importance and the imperative for the EU, as a community, to develop an integrated energy policy combining measures at European and Member State level.

The availability of oil stocks and the safeguarding of energy supply are fundamental elements of public security for Member States and for the EU as a whole. With the aim of ensuring oil security, Council Directive 2009/119/EC imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products, obliges Member States, including Slovenia, to maintain at all times oil stocks that correspond, **at least, to 90 days of average daily net imports or 61 days of average daily domestic consumption,** whichever of the two quantities is greater.

Member States may set up central stockholding entities (CSEs). Slovenia has decided to entrust the task of setting up and maintaining the obligatory stocks of crude oil and petroleum products to the Agency of the Republic of Slovenia for Commodity Reserves, which is of course owned by the Republic of Slovenia. Slovenia started building up the compulsory stocks of petroleum products in 1999. It reached the required 90-day compulsory stocks by 2005 and has complied with the provisions of the Directive ever since.

Slovenia does not import crude oil because it has no refineries of its own. Petrol, the largest petroleum company in Slovenia, imports only petroleum products, i.e., diesel fuel, extra light fuel oil, premium unleaded petrol, kerosene, paraffin liquids, aviation fuel, residual fuel oil, and liquefied petroleum gas (LPG). Petrol imports most of its liquefied fuels from EU refineries in the Mediterranean and North-West Europe, mainly because they guarantee adequate quality of the products. Petrol's purchasing strategy focuses on seaborne supply, although inland refineries in South-East Europe are equally important, as they complete the supply chain and improve the stability of supply, especially for products typical of local demand.

Slovenia is also completely dependent on natural gas imports. Slovenia does not have its own natural gas wells, natural gas storage facilities, or liquefied natural gas terminals, so the natural gas available on the Slovenian wholesale market is the gas imported from neighbouring countries and delivered through transmission pipelines. The wholesale market is thus supplied with gas from Austria, Italy, and Croatia.

Baumgarten is a gas storage facility or gas hub in Austria, not far from Slovenia, from where Slovenia purchases most of its natural gas. The Baumgarten hub accounts for about 10% of all gas flows delivered to Western Europe, distributing around 40 billion cubic metres of natural gas each year. A good fifth of this is delivered to Austrian consumers (8.5 billion cubic metres), the rest to other countries. The gas trade at the Baumgarten hub is physically based on incoming gas deliveries (e.g., from the direction of Slovakia and Germany), and the use of gas storage facilities (loading/unloading) and the natural gas sources in the direction of the gas pipelines leading to Baumgarten. There is not enough solid data to make a concrete assessment regarding the physical source of the natural gas at the Baumgarten hub, but it is generally assumed that most of it comes from Russia.

In 2019, 88% of all natural gas, imported into Slovenia by Slovenian natural gas traders or suppliers came from Austria via the Baumgarten gas hub and from Austrian gas storage facilities. The remainder was imported from Russia, while trade with Italy, where Slovenia used to purchase gas from Algeria, has ceased completely.

The liberalisation of the market has led to a reduction in the number of long-term contracts normally concluded directly with Russian gas producers. They have been replaced by short-term contracts at gas hubs, exchanges, or elsewhere within the EU. In 2019, 82% of natural gas was purchased through short-term contracts with duration of less than one year. This is a huge change compared to 2016, when the share of natural gas purchased through short-term contracts was almost the same as the share of natural gas purchased through long-term contracts. The duration of contracts or the ratio of short-term contracts to long-term contracts could threaten supply security and lead to inadequate gas supplies in the event of a gas shortage if it were not possible to buy the required volumes at the spot markets.

As we noted in Section 1 of this booklet, Slovenia is much less dependent on electricity imports. The country's electricity import dependency varies considerably, mainly due to changes in precipitation (hydrology) and the resulting volumes of electricity generated by hydropower plants.

While on the one hand, Slovenia could reduce its dependency on oil and gas imports, by "only" reducing the consumption, as it has no production capacity of its own, it could, on the other hand, increase its electricity generation capacity to reduce the country's electricity dependency. Even if electricity consumption was to be further reduced by means of energy efficiency measures, it is expected to increase due to electrification in all areas of life. Slovenia currently produces electricity from both renewable sources and fossil fuels, but we are in 2021 and it is high time to think about the future, when all countries within the EU and most countries around the world will start replacing fossil fuels with cleaner technologies. We need to start preparing today for the construction of major energy facilities in the future.

Every country, every economy and, just as importantly, every household needs energy, which needs to come from somewhere. Being dependent on energy imports, that is, relying on foreign countries, means less security, high vulnerability, and unpredictable prices, so we must all aim for maximum level of energy self-sufficiency for every country.

Transport issues

Apart from the fact that all the oil used in transport has to be imported, we must not forget that oil is a fossil fuel that causes greenhouse gas emissions. If oil were not essential to every economy, we might cynically comment that we have been paying foreign producers (of oil) for the emissions that damage our local environment. Also, the number of cars on the roads is increasing and we are continuously stuck in traffic jams in the mornings and afternoons, especially on arterial roads and ring roads. And usually, there is only one person in each passenger car.

According to Slovenian Environment Agency (ARSO), the level of motorisation in Slovenia in 2016 was 523 passenger cars per 1,000 inhabitants, which is about 50% more than in 1995. In addition, an increase in the number of privately owned passenger cars owned per household was also recorded. An average Slovenian household owned almost a third more cars than in 1991. At the end of 2019, 1,608,000 road vehicles were registered in Slovenia, of which more than 1,555,000 were motorised vehicles and 53,000 were trailer vehicles. The number of both was 2% higher than in 2018.

Neither Slovenia nor the EU have set any goals or targets that would regulate the number of privately owned passenger cars at the national level. The goals are more related to fuel consumption and emission standards, which set limits for pollutants released into the environment by passenger cars. We mentioned the increasing electrification of transport, which is also reflected in the statistics. In 2019, first-time registrations of new electric passenger cars in Slovenia increased by a third compared to 2018. The number of hybrid passenger cars increased by 48% from 2018 to 2019, exceeding 6,800, while the number of electric passenger cars increased by 53% in the same period, reaching almost 2,000. In one year, the number of first-time registrations of new electric passenger cars increased by 33%.

Transport, of course, also includes freight transport. In 2019, more than 99,000 trucks and special vehicles, more than 25,000 trailers, and almost 13,000 semi-trailers were registered in Slovenia. However, Slovenia's freight transport includes both domestic and foreign vehicles. Road freight transport increased sharply after Slovenia's accession to the EU, as the volume of tonne-kilometres performed by Slovenian haulers increased by 52% in the period between 2004 and 2007 (the increase between 2004 and 2014 was 80%), and transit movements of road freight through Slovenia also experienced a huge growth - the number of transport vehicles crossing the border with Hungary increased by 112% between 2004 and 2007 (i.e., in the first years after the EU accession).

The swelling of road freight transport in Slovenia continued despite the economic downturn in the EU. After 2011, the share of road transport stabilised. From an environmental point of view, the increasing road transit through Slovenia is worrying, as it pollutes the air locally and contributes to overall greenhouse gas emissions.

The environmental impact of transport is a serious problem. Transport infrastructure is in itself a physical intrusion into space, transport poses a number of risks due to accidents and possible cargo leakage, and finally, transport pollutes the air, which is the most acute problem in our battle against climate change. In Slovenia, transport is the main source of greenhouse gas emissions among the sectors that are not included in the Emissions Trading System (ETS), accounting for 50%. Agriculture accounts for about 16%, buildings for about 14%, non-ETS industry for about 10%, waste for about 5%, and non-ETS energy sector for about 4%. Transport consumes one third of total primary energy (in 2019 it accounted for 40% of final energy consumption) and is one of the largest and most dispersed consumers of non-renewable energy sources, but it is a strong driver for further development.

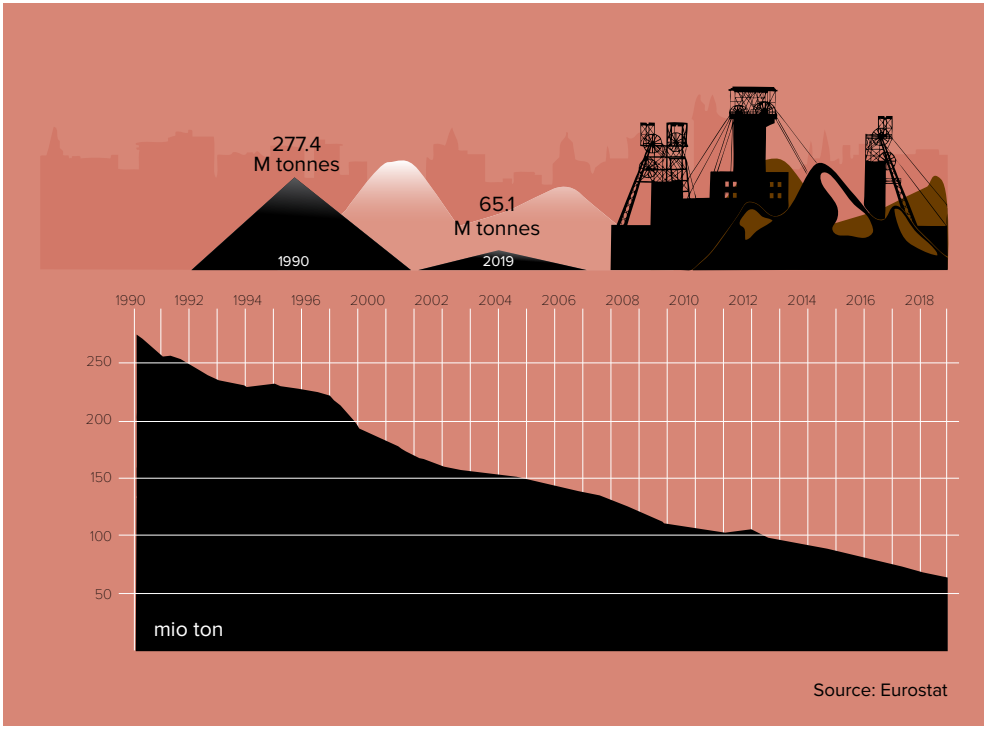
Closure of coal mines and thermal power plants

Mining is an industrial activity that deals with the extraction of mineral resources and includes prospecting, exploration, and exploitation of mineral resources, but also the cessation of mining activities. Slovenia belongs to the group of countries where mineral resources are scarce, so they do not play an important role on the world market. The Velenje Coal Mine is the main player in coal mining in Slovenia, supplying coal to the nearby TPP Šoštanj. In the past, coal was also produced by the Trbovlje-Hrastnik Coal Mine, which is no longer in operation.

Slovenia, like other European countries, is phasing out coal. Coal production and its consumption have steadily declined over the past decades. In 2019, 65 million tonnes of hard coal were produced in the EU. As recently as 1990, the EU production totalled 277 million tonnes, which means that it declined by 77% in almost three decades. In 2019, it was able to cover 37% of internal consumption, as opposed to 71% in 1990. In 1990, coal was produced in 13 EU Member States, while today, only two remain: Poland and the Czech Republic. The largest consumers of coal in the EU are Poland and Germany, followed by France and the Netherlands.

In the case of brown coal, both production and consumption have fallen considerably. The use of this mineral resource, which has been exploited for decades, is now being abandoned.

IMAGE: EU COAL PRODUCTION BETWEEN 1990 AND 2019



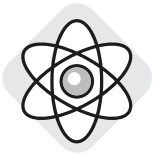
Policies to reduce carbon emissions, which include emissions from coal-fired power plants, are aligned with the goal of reducing coal production and consumption in the EU. This presents Slovenia with a major challenge. Thermal Power Plant Šoštanj will be shut down at some point in the future and Slovenia will have to secure a third of its electricity needs, currently supplied by TPP Šoštanj, from other sources or import it.

The problem goes beyond mere coal replacement, as it has wider social and economic implications. It affects entire regions that were dependent on coal production and for which new development solutions must be found. In addition to Velenje and Šoštanj, several other localities in Slovenia will be affected, namely, Trbovlje, Hrastnik, and Zagorje, all of which are located in the Zasavje region. Here, the thermal power plant and coal mines have already been closed down. The European Commission has launched the Platform for Coal Regions in Transition, which aims to facilitate the development of projects and long-term strategies in the coal-intensive regions of the EU. Within this framework, Slovenia is preparing a *national strategy for phasing out coal and the restructuring of coal regions in line with the principles of a just transition*. The most ambitious plan has been prepared for the Savinjsko-Šaleška region (phase-out by 2033). The plan for the Zasavje region envisages a harmonious transition with a balanced investment strategy focusing on human resources and entrepreneurship. Views on the year of closure of the Velenje Coal Mine and the coal phase out in TPP Šoštanj are understandably quite different.

Further exploitation of nuclear energy

Nuclear energy is an important issue in Slovenia. Industry is largely in favour of a continued use of nuclear energy. There has been a long-standing debate in Slovenia about whether or not to build a second unit at the Krško nuclear power plant. The initial investigations at the Krško polje, when it became a possible site for the planned nuclear power plant, were carried out between 1964 and 1969 by a working group of the Business Association of Slovenia's Energy Industry. In cooperation with the investment group, the investors of the first nuclear power plant, Savske elektrarne Ljubljana and Elektroprivreda Zagreb, completed site preparation, prepared a tender, and selected the best bidder. In August 1974, the investors signed a contract for the supply of equipment and construction of a 632 MW nuclear power plant with the American company Westinghouse Electric Corporation. Gilbert Associates Inc. designed the power plant, two local companies, Gradis and Hidroelektra, carried out the construction work at the site, while Hidromontaža and Đuro Đaković were involved in the installation. The foundation stone for the Krško Nuclear Power Plant was laid in December 1974 and the plant received an operating licence in January 1984. After the expiry of the originally planned life of 40 years, the operating life of the nuclear power plant will be extended for another 20 years, until 2043.

The nuclear issue is always a political issue as well. And when it comes to such issues, a broad public debate is expected. It is important that the discussion is based on credible data and information.



Further exploitation of renewable energy sources (RES)

The issue of renewable energy sources is in no way politically controversial, as countries in the EU and around the world are encouraged to use them. Slovenia's target was to have a 25% share of RES in its energy mix by the end of 2020, which it has not achieved (or will not achieve, as the final statistical results on the share of RES in 2020 will only be clear towards the end of 2021). The share of RES in Slovenia's gross final energy consumption was 21.97% in 2019, which is 3.03% below the target of 25%. In 2018, the share was 21.38%, which shows that Slovenia has been rather slow in increasing the share of RES in its energy mix.

Slovenia's renewable energy sources include hydro, solar, wind, and geothermal energy. Hydro energy is always somewhat problematic, as it usually implies larger projects, i.e., hydropower plants, the siting of which usually takes several years. To give an example, a concession agreement with HSE and an understanding with local communities were signed in October 2020, finally allowing, after 16 years of discussions, the environmental impact assessment, and the start of site selection for new HPPs on the Middle Sava. Slovenia has been building new solar power plants, but their installed capacity remains low, even though sun is a limitless source of energy, accessible to everyone and with the greatest potential of all. Apart from two wind turbines, Slovenia has no wind power plants, although plans for three wind farms (Rogatec, Ojstrica, and Paški Kozjak) are in the pipeline.

Slovenia is leaning towards decentralised, or dispersed renewable energy sources, which goes hand in hand with e-mobility, demand response, and net metering. And the country already has its first self-sufficient energy community, located in Luče.

Energy efficiency in industry and beyond

Energy efficiency (EE) is about using those technologies and measures that require less energy to achieve the same goals. As we consume less, the use of energy is more efficient and this is the future guideline for the whole world, across industries.

Energy efficiency is a means to improve the competitiveness of our society, to achieve green growth, but also green jobs. Moreover, energy efficiency makes an important contribution to ensuring strategic security of supply by reducing dependency on fossil fuel imports. Indeed, energy efficiency is one of the most cost-effective measures to reduce greenhouse gas (GHG) emissions and meet RES targets. From a household perspective, energy efficiency is crucial to control expenditure, increase purchasing power, and improve quality of life (reducing energy poverty), also in light of adjusting to climate changes.

The National Energy Efficiency Action Plan 2017-2020 (AN URE 2020) is the second action plan prepared by Slovenia in line with EU Energy Efficiency Directive 2012/27/EU and the fourth national plan adopted since 2008. The latest national plan outlines the main measures to improve energy efficiency, including expected and achieved energy savings, the objective of which is to achieve the national target of improving energy efficiency by 2020 and contribute to the common EU target of increasing energy efficiency by 20%. The aim is to keep Slovenia's primary energy consumption below 7.125 Mtoe, which means that it should not increase by more than 2% compared to the base year 2012. The success of the implementation of the Action Plan is of course closely linked to the goals of reducing GHG emissions and increasing the share of renewable energy sources, as energy efficiency is one of the most cost-effective ways to achieve these two goals. Finally, it also contributes significantly to improving air quality.

In Slovenia, several incentive programmes have been implemented over the years, aiming at improving energy efficiency and promoting the use of renewable energy sources. In addition, Slovenia has issued several regulations that mainly concern the energy efficiency of buildings and household appliances or similar products. We should not forget to mention the programmes for information, awareness raising, and training of energy consumers, investors and other target groups, as well as activities such as energy counselling for consumers, promotion of counselling services, and promotion of investments in energy efficiency and renewable energy sources.

Financial instruments have also been established. These include grants from the state budget or loans at a subsidised interest rate for the investments of both companies and individuals; guaranteeing favourable purchase prices for electricity from renewable energy sources or generated by CHP systems from high-efficiency fossil fuels; or granting an exemption from the payment of the carbon tax for the companies that implement certain energy efficiency measures.

Unforeseeable events

An ordinary fire can make a big difference and leave consequences. Not to mention massive unpredictable events that we may not have even thought about. However, if we do think about them, we can be properly prepared. Still, there are certain events, like an epidemic, that we can never be fully prepared for. It is not for nothing that we mention unforeseeable events here – they can change our lives dramatically.

- Natural disasters

Fires, earthquakes, floods, severe storms, landslides, avalanches, freezing rain, heat waves – we have seen all of these Slovenia and they are not that rare at all. In 2014, for example, freezing rain hit the whole of Slovenia, causing not only massive damage to forests, but also millions in damage to energy infrastructure.

- Cyberattacks

On the one hand, rapid technological development can help people overcome many a challenge, but on the other hand, it also brings with it many risks. Cyberattacks are either intentional (attacks, espionage, criminal acts) or accidental (technical errors) cyber security threats. In any case, it is important that the critical energy infrastructure is protected against cyberattacks.

- Epidemic

Humanity has faced epidemics of contagious diseases throughout its history. The epidemics always left a large death toll and undermined the structured world and society. The recent COVID-19 pandemic affected the entire world. Of course, it did not leave out the energy industry. The pandemic has changed energy consumption in households and industry, has cut fuel supplies, has caused energy investments to decline either because lockdowns or supply interruptions. But it is crucial to ensure that the of critical infrastructure operations are not disrupted.

7

IDEAL VS. REALISTIC TARGETS

IDEAL	REALISTIC
100% ENERGY SELF-SUFFICIENCY	50/50
USING OWN SOURCES	PARTLY
DOMESTIC KNOW-HOW	EXTENSIVE
HIGH AWARENESS	LOW
CONSENSUS	NONE (YET)

It would be ideal if we were 100% energy self-sufficient in all areas. It would be ideal if we had inexhaustible resources and first-class local know-how in all areas of the energy industry. It would also be ideal if people were fully aware of all the possibilities and opportunities that energy transition offers.

Furthermore, it would be ideal if we did not have to deal with issues like import dependency, transport issues, closure of coal mines and thermal power plants, greenhouse gas emissions, environmental improvement measures, etc. It would be ideal to live an ideal life where there is no large energy demand, where we have no emissions, and where everyone is happy.

But the ideal is also to know that people have to keep coming together to face the challenges and find the best possible solutions. We have to look for compromises, which means taking into account different situations, interest groups and their specialities.

From all that has been written so far in this booklet, we have learned that energy in Slovenia is diverse and that it is necessary to think about how to continue after 2020. For this reason, we as a community, need to find a common ground on Slovenia's energy in the future, especially if we really want to pursue the goal of climate neutrality by 2050. We are only 30 years away from what we sometimes like to think is a very, very distant future.

It is an arrangement, an agreement, a compromise, certainly not a consent. It is a consensus that we must reach hand in hand.

8

SLOVENIA'S ENERGY CHALLENGE:

CERTAIN WAY TODAY. WHAT ABOUT TOMORROW?

The idea that the only constant is change is one that everyone has probably heard. Or: changes are the only constant in life.

The most relevant ones are undoubtedly climate changes. They dictate different ways of doing things in all walks of life, in all industries, in all countries, and on all continents.

Climate change is closely linked to the energy transition, that is, the phasing out of fossil fuels and the accelerated use of renewable energy sources.

If we use fossil fuels today, simply because we have been used to them for years, this may no longer be possible tomorrow. And then what?

And if every day something new is discovered in energy production and storage, how do we know what will be available to meet our needs tomorrow?

In the following section, we will see the framework in which we live and work around the year 2020, and what limitations and opportunities it brings. Once we can see the big picture of the climate and energy targets and policies set, we will better understand the challenges Slovenia (and the whole world) is facing.

9

THE "GREEN" BOTTOM LINE:

LONG-TERM GLOBAL, EU, AND SLOVENIA'S ENVIRONMENTAL AND CLIMATE POLICY

Everything is interwoven. And all fields of action concern everyone and everything: people, climate, environment, energy, countries, regions, the world. Climate changes affects us all, all regions, the whole planet. The way people do things and the way they live affects both the local and the global environment, and thus the whole world. The energy we use comes from the earth (coal, ore, oil, gas, water), the sun, and the wind. In other words, it comes from everywhere. And all around us, we produce emissions that effect everything and everyone in one way or another.

A large part of these emissions are greenhouse gases. Our planet is facing climate changes caused by greenhouse gases from human activities. And what are those activities? Practically everything: our breathing, our living in buildings (heating, electricity), our journeys to work and everywhere else (passenger transport), the transport of goods by road, rail, sea or air, and the functioning of the economy and public administration (healthcare, education, etc.).

The set goals and policies

THE WORLD ➔ Paris Agreement (2015; action plan to limit global warming)

THE EU ➔ Energy Union (2015) + European Green Deal (2019; climate neutrality)

SLOVENIA ➔ Slovenian Development Strategy 2030 (low-carbon circular economy) + Long-term Climate Strategy by 2050 (in preparation) + Integrated National Energy and Climate Plan (NEPN)

What will the world do?

The whole world is on its feet. Because of its global nature, climate change and the battle against it requires the cooperation of all countries around the globe. It is for this reason that in 2015, world leaders agreed on a new set of ambitious targets to fight climate change. The Paris Agreement represents an action plan to limit global warming.

Paris Agreement

Its long-term goal is to limit global warming to well below 2 degrees Celsius compared to pre industrial levels, or at least not let the temperature rise exceed 1.5 degrees. And why do we need to curb global warming? The consequences of climate change can be seen in all corners of the world: the eternal ice at both poles is melting, the sea levels are rising. Both together lead to flooding and erosion in coastal and lowland areas. Some parts of the world are experiencing increasing frequency of extreme weather events and rainfall, while others are suffering from extreme heat waves and drought.

Climate changes are expected to intensify in the coming decades. And they are occurring at such a rapid pace that many animals and plants are finding it difficult to adapt. Several terrestrial, freshwater, and marine species have already migrated to new locations. If average global temperatures continue to rise uncontrollably, an increasing number of species will be on the brink of extinction.

The Paris Agreement entered into force on 4 November 2016, after meeting the condition of being ratified by at least 55 countries collectively responsible for at least 55% of total global greenhouse gas emissions. The Agreement was ratified by all EU Member States, with Slovenia following towards the end of 2016.

People seem to be very aware of the impact we have on the environment and therefore on the climate

Europeans seem to be very concerned about climate change. They are aware of and support the measures to mitigate climate change, according to a 2019 Eurobarometer survey which showed that:

- 93% of EU citizens consider climate change a serious problem and 79% a very serious problem.
- 92% of respondents think it is important that their national government sets ambitious targets to increase the use of energy from renewable energy sources (RES) and 89% believe governments should support energy efficiency improvements by 2030.
- 84% of respondents believe that the transition to clean energies should receive greater public financial support, even if this means reducing fossil fuels subsidies.
- 92% of respondents – and over 80% in each Member State – agree that greenhouse gas emissions should be reduced to a minimum and the remaining emissions offset to make the EU economy climate neutral by 2050.

Eurobarometer

What will Europe do?

The European Union wants to take the lead in the fight against climate change. It has already adopted the 20-20-20 climate and energy targets in 2007, followed in 2009 by the necessary legislation to achieve them (reduce greenhouse gas emissions by 20% compared to 1990 / increase the share of renewable energy sources (RES) to 20% / improve energy efficiency by 20%) by 2020. In October 2014, the EU set new targets until 2030, which were further tightened in 2018 to 40 32 32.5. In order to achieve all the targets set, in February 2015, the EU adopted the Energy Union strategy, which revolves around five dimensions: energy security, internal energy market, energy efficiency, climate action with decarbonisation of the economy, and research, innovation and competitiveness .

In December 2019, European leaders signed the so-called European Green Deal, which supports the goal of making the EU the first climate-neutral continent by 2050, in line with the goals of the Paris Agreement. On this basis, the EU Council adopted a *Long-term low greenhouse gas emission development strategy of the EU and its Member States* – a contribution to the United Nations Framework Convention on Climate Change (UNFCCC) on behalf of the European Union and its Member States. The EU and its Member States are fully committed to the Paris Agreement and its long-term objectives and call for an urgent increase in global ambition in the light of the latest scientific evidence, including the recent reports of the Intergovernmental Panel on Climate Change (IPCC).

And what does Slovenia plan to do?

In December 2017, the Government of the Republic of Slovenia adopted Slovenian Development Strategy 2030, which is a comprehensive development framework that emphasizes quality of life for all. In line with this Strategy and taking into account the dimensions of the Energy Union, Slovenia's main priorities until 2030 will be the transition to a low-carbon circular economy and sustainable management of natural resources. To quote the Strategy, "A reliable, sustainable and competitive supply of energy is crucial for development, whereby giving priority to energy efficiency (EE) and renewable energy sources (RES) is one of the basic principles of the development of the energy sector. One of the key factors for increasing the use of RES is the development of technologies for storing energy and digitalisation of the electricity system (the introduction of the so-called smart network). The priority increase in EE and the increased proportion of RES will allow us to reduce emissions of greenhouse gases (GHG), which is also part of Slovenia's commitment within the EU's climate and energy package and the Paris Climate Agreement."

In December 2017, Slovenia's Smart Specialisation Strategy (S4) was adopted, which includes priority areas, such as smart cities and communities (energy conversion, distribution and management), smart buildings and homes, including the wood chain, and networks for the transition to the circular economy (technologies for biomass conversion, generation of energy based on alternative sources).

In February 2020, the Slovenian government adopted the Integrated National Energy and Climate Plan (NEPN). The objectives of NEPN are to reduce greenhouse gas (GHG) emissions by 36% compared to 2005, to push the share of renewables in final energy consumption to at least 27% by 2030, and to improve energy efficiency by at least 35% by 2030 (so that with systematic implementation of the adopted policies and measures, final energy consumption in 2030 will not exceed 54.9 TWh or 4,717 ktoe). Converted to the primary energy level, the consumption will not exceed 73.9 TWh (6,356 ktoe) in 2030. Another goal is to contain and reduce energy poverty.

Slovenia's Long-term Climate Strategy by 2050 and Climate Policy Act, which are in preparation, have the same goal of achieving climate neutrality, i.e., net zero GHG emissions by 2050.

10

WHAT IS THE PATH TO A "GREEN" FUTURE?

THROUGH CLEANER PRODUCTION ...
THROUGH LOWER CONSUMPTION ...

EZS ENERGETSKA ZBORNICA SLOVENIJE

EZS ENERGETSKA ZBORNICA SLOVENIJE

The answer to the question of what can be done for a greener future is generally quite simple: we should consume less and produce everything we consume in a cleaner way. This means reducing the consumption of energy in all its forms and producing electricity and heat from the cleanest—renewable and low carbon—energy sources.

The question that immediately follows is: how can we consume less? Is it by using the car less often? Is it by heating the room by lowering our thermostats one degree? Is it by improving the insulation in our home or manufacturing facility? Is it by using electronic devices less often? Is it by producing fewer appliances? It is clear from the outset that these are extremely multifaceted issues that affect society as a whole, with all its subsystems. They affect the way we live and work, intertwining our personal and professional lives.

If we were to forego driving to work (thus using less fuel, producing less emissions, saving our money, but bringing less revenue to fuel producers), our employer would have to agree to that. That immediately raises the trust issue and the question of whether working from home is even a realistic option (it definitely is not for healthcare workers or people responsible for maintaining energy infrastructure). And even if we could switch to working from home, we would need to drive to work at least occasionally, which means we would need efficient transport, properly maintained roads and railways, and adequate energy infrastructure for alternative fuels.

EZS ENERGETSKA ZBORNICA SLOVENIJE

Let us recapitulate:

Everything is interwoven. And all fields of activity affect everyone and everything: people, climate, environment, energy, countries, regions, the world. Reduced energy consumption affects the way we work and live, which in turn affects the global as well as the local environment. If we try to save only part of the system, we will only be partially successful. We need to think about connecting all individuals, our lives, and our economy.

This is one of the reasons why the goals, policies, and actions from the Integrated National Energy and Climate Plan (NEPN) address multiple dimensions of the Energy Union: (1) decarbonisation (greenhouse gas emissions and renewable energy sources), (2) energy efficiency, (3) energy security, (4) internal energy market, and (5) research, innovation and competitiveness.

The trends that define a green future:

- Decarbonisation
- Digitalisation
- Decentralisation
- Cross-sector electrification

EZS ENERGETSKA ZBORNICA SLOVENIJE

WHAT IS THE VIEW OF THE EICS ON KEY CLIMATE AND ENERGY ISSUES?

The EICS supports the efforts of all stakeholders and in particular the efforts of countries, industries, civil society, and individuals in the fight against climate change. We support the Paris Agreement and the European Green Deal. We are aware that a transition to a low-carbon and climate-neutral circular economy requires coordinated action by the Slovenian government and numerous stakeholders from all sectors and at all levels of government and society, including those who are members of the EICS. For this reason, we appeal for a harmonised approach to the adoption of various strategic documents of the Republic of Slovenia (climate-energy-space), as both the economy and the energy sector in Slovenia need a stable framework for action. Already today, we have to make decisions on the construction of future energy facilities, as both the preparation of the documents and the siting of the plants are very lengthy procedures.

What we seek in particular is:

1. to pursue the objectives of a ***resilient Energy Union***, the aim of which is to provide a reliable, sustainable, competitive, and affordable energy supply for consumers (households and industry) across the EU;

2. to support ***sustainable energy solutions***, including through research and innovation, which will eventually make Slovenia an economically successful low-carbon society;

3. to ***raise awareness*** of energy-related issues among EICS members and the public.

EZS ENERGETSKA ZBORNICA SLOVENIJE

WHAT IS THE VIEW OF THE EICS ON LOW-CARBON SOCIETY?

Every country, every economy, and finally, but importantly, every household needs energy, which has to come from somewhere. Dependency on imported energy, that is, dependency on foreign countries, means less security, greater vulnerability, and unpredictable prices, hence the need to strive for maximum energy self-sufficiency of the country.

We have been warning that it will be difficult to achieve energy security and decarbonisation goals without new investment in renewable energy sources (RES). For this reason, we do not support decisions that do not lead to the construction of new renewable production facilities, particularly hydropower ones. Also, we should not overlook other renewable energy sources, including solar and wind energy, as Slovenia needs to increase the share of RES in its energy mix.

We would also like to point out that society needs to take a stand on all types of energy so that energy companies are able to prepare the basis for investment decisions which regard energy infrastructure today and in the future.

We are aware that the implementation of climate and energy policies and measures has an impact on both society and the environment, so we strive to improve the quality of the environment through careful and prudent use of natural resources in Slovenia.

In short, we are in favour of Slovenia achieving the highest possible degree of energy self-sufficiency where this is possible, that is, in electricity generation; we are in favour of using the energy sources available to us; and finally, we are in favour of using domestic sources of knowledge.

EZS ENERGETSKA ZBORNICA SLOVENIJE

WHAT IS THE EICS DOING TO RAISE AWARENESS AND WHO ARE ITS PARTNERS?

The EICS promotes climate and energy discussion at all levels, including the debate on the ambition of future targets, which should be based on a technical background. The future lies in close cooperation and integration. To this end, the EICS maintains an energy dialogue with all its members within the Assembly, the Management Board, and the Expert Council on Energy Supply. In order to inform and educate the public on energy issues, the EICS has been producing news and organising various events. EICS members and representatives regularly participate in various events, such as conferences, consultations, and seminars.

The EICS adopts positions and presents them to key decision-makers in Slovenia and abroad, keeping in mind the broader framework in which Slovenia is involved, including the Paris Agreement, the European Green Deal, and the Development Strategy of Slovenia. Through the networking of its members and through its specialist sections, the EICS ensures that energy companies and other industries are informed about the most important energy-related developments. However, the EICS is also open to the general public and the media, and regularly publishes news on its website, in its e newsletter, and on its LinkedIn page.

As one of the employers' organisations in the Republic of Slovenia, the EICS also participates in the economic and social dialogue in its homeland. The EICS is the representative of employers within the Economic and Social Committee for Energy Industry (ESOE), a tripartite committee of social partners in Slovenia, which deals with issues and measures that regard economic and social policies, and other issues concerning specific areas discussed among social partners in the Republic of Slovenia in relation to companies in the energy sector and fuel supply. The party representing the state within the ESOE is the Ministry of Infrastructure, while the employees are represented by the Trade Union of Energy Sector Workers of Slovenia (SDE).

As the representative of the employers, the EICS has signed two collective agreements with the worker's party:

- the Collective Agreement for the Slovenian Electrical Industry (2017) and
- the Collective Agreement for the Slovenian Coal Mining Industry (2019).

EZS ENERGETSKA ZBORNICA SLOVENIJE

THE EICS IS A COHESIVE AGENT COMMITTED TO EXPLOITING THE POTENTIAL OF ENERGY TRANSITION

The Energy Industry Chamber of Slovenia (EICS) is a signatory to the paper of the Union of the Electricity Industry – Eurelectric, entitled 15 Pledges to Customers. Although the EICS does not deal directly with household consumers, it is nevertheless committed to ensuring a reliable, sustainable, and competitive energy supply for all customers (households and industry alike). And the electric industry sector must be the right partner for carbon-neutral solutions for all consumers, especially those concerning energy efficiency, renewable energy sources, and e-mobility, which form the basis of the 15 Pledges.

Electricity suppliers that are members of the EICS have always been in touch with their consumers. However, they need to take a step further towards a carbon-neutral society. This is about the opportunities that would be lost without the active involvement of consumers (including households). Some consumers are already active in managing their consumption, while others simply "connect and forget" that they are using energy and paying for it. Climate action is undoubtedly a collective game that requires close cooperation between industries, public authorities, and citizens. This is why 92 European electricity suppliers have committed to offering their more than 200 million residential customers new user-friendly services that will be affordable, transparent, and simple.

15 Pledges to Customers:

Energy Transition and EU Funds Group

In December 2020, the EICS established the Energy Transition and EU Funds Group to work with the authorities responsible for receiving EU funds. The aim of this group is to establish a two-way communication: to provide EICS members with the information about programmes and calls for proposals concerning Slovenian energy companies and to receive the information from EICS members about their energy transition projects. The goal is that the green energy projects of EICS members will receive maximum support from EU funding and various European programmes in the period 2021-2027.

Energy transition:

Addendum

SLOVENIA'S "GREEN" KNOWLEDGE

Considering the fact that Slovenia has various sources of energy, various ways of generating electricity, and numerous business entities dealing with various aspects of energy, Slovenian society can be proud of a diverse and extensive know-how in this area. It is not self-evident that a country is able to build a hydropower plant by itself, let alone master nuclear energy.

Slovenia has experts in various types of power plants, from thermal to hydro to solar, and people who have mastered DHC based on fossil fuels or renewable energy sources (including geothermal energy). In fact, Slovenian district energy has its own section within the EICS, namely the District Heating Section. Moreover, there is a rather large number of Slovenian companies working in the fields of energy efficiency and renewable energy, with projects in different parts of the world as well as on home ground.

Power generation

Slovenian companies have sufficient knowledge to build hydropower plants on their own. The Fala hydropower plant on the Drava River, for example, has been in operation since 1918, that is, for over a century. Slovenia also has extensive knowledge in solar power generation and the use of geothermal energy.

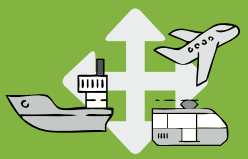
Since Slovenia is one of the 30 countries that have their own nuclear reactors and one of the 50 countries that operate research reactors, it goes without saying that it has many nuclear experts. These experts work at the Krško Nuclear Power Plant (NEK) and the TRIGA research reactor, which is part of the Jožef Stefan Institute (JSI). Both the Reactor Centre of the IJS and TRIGA reactor play a key role in training personnel for the Krško Nuclear Power Plant. Almost all nuclear experts in Slovenia, including all professors of reactor physics and nuclear engineering at Ljubljana and Maribor Universities, as well as key experts at the Krško NPP, Slovenian Nuclear Safety Administration and the Agency for Radwaste Management (ARAO), started their careers or received practical training at the TRIGA reactor.

In the areas related to nuclear power generation, GEN Energija conducts several specialized programmes – technical training courses held at the Krško NPP simulator, at the Maintenance Personnel Training Centre of the Krško NPP, and within the Milan Čopič Nuclear Training Centre (ICJT) at the Jožef Stefan Institute, Ljubljana.

As the Krško Nuclear Power Plant is a pressurized water reactor (PWR), Slovenia has extensive knowledge and experience in this technology, acquired by all stakeholders, from the operator and the owner of the NPP to the administrative authority, NPP's subcontractors, and research and education institutes. For all the above reasons, it is argued that pressurized water technology should be chosen also for the second unit at the Krško Nuclear Power Plant.

Energy use

Although we have so far focused mainly on electricity generation, we should not neglect Slovenia's vast knowledge and experience in energy consumption. Energy consumers, as we have seen so far, include transport, industry, energy industry, buildings, and households. We have numerous energy efficiency solutions and can produce smart metres and construct energy-efficient buildings with sustainable materials.



Transport

Industry

Energy industry

Buildings

Households

Research and development (R&D)

The Jožef Stefan Institute (IJS) is the leading research organisation in Slovenia. Its mission is the creation, dissemination, and transfer of knowledge in natural sciences, engineering, and life sciences. The Institute focuses on cutting-edge research and development of technologies such as nanotechnologies, new materials, biotechnologies, production and control technologies, communication technologies, computer and knowledge technologies, environmental technologies, and nuclear engineering.

There are two research divisions within the IJS, namely, the Reactor Physics Division, and the Reactor Engineering Division. Reactor physics research focuses on the development of new methods for research and power reactor calculations. The Institute has developed several programmes for reactor calculations, which are used at their Ljubljana-based TRIGA research reactor and the Krško Nuclear Power Plant (NEK). Since the first commissioning of the Krško NPP, the Institute has been in charge of preparing the entire core design reports and performing physics start-up tests using their own rod insertion method. The team have also been studying fourth generation reactors, advanced neutron sources, and fusion technology data and materials. In the field of plasma physics, research activities are focused on computer simulations and experimental work in the laboratory, which will be applicable to the future fusion reactor project.

The research activities of the Reactor Engineering Division belong to the broad field of nuclear engineering and safety. The interdisciplinary research integrates thermal-hydrodynamic, structural, and probabilistic safety analyses. The fundamental objective of the research on thermal hydrodynamic phenomena is to improve their modelling, and to evaluate the accuracy and uncertainty of computer simulations and predictions of transients in nuclear power plants. Understanding the physics of these phenomena will aid the development of new risk assessment methods and techniques and necessary mitigation measures in the event of a severe accident. Most degradation processes that are the subject of structural safety analyses can limit the time window within which nuclear power plant components can guarantee safe operation. Probabilistic safety analyses provide a tool for evaluating and improving the safety of complex systems. The aim of the research is to develop a method for identifying, evaluating, and analysing the human contribution to the operational reliability of complex technological systems.

One of the departments of the Jožef Stefan Institute (IJS) dealing with energy is the Energy Efficiency Centre (EEC). It is a collection and transfer point of energy-efficiency technologies at the interface between energy consumers, government, energy, service and equipment providers, and other stakeholders. At the same time, it covers the environmental impacts of energy use and conversion. The most important part of EEC's activities is cooperation with national institutions in the field of efficient energy use, energy planning, the environmental impact of energy use, and emissions trading. Nevertheless, the EEC continues to have strong links with industry and organisations, as an advisory body for energy-related issues. The EEC also runs the European EnergyManager (EUREM) training programme. During this training, participants acquire skills that enable them to prepare an in-house energy audit, design, manage and present energy efficiency projects to management from both technical and organizational perspective, evaluate and realise energy saving potentials, and ensure continuous improvements within the company. This training is intended for anyone who wants to gain a comprehensive overview of the work areas of an energy manager and acquire relevant skills for successful energy management. It is specifically tailored for those responsible for energy management in the public and private sectors, building managers, plant and process managers, process engineers. The EISC and the EEC have worked well together.

The leading Slovenian engineering and scientific research organisation working in the field of electric power engineering and energy industry in general is the Milan Vidmar Electric Power Research Institute (EIMV), which is also a member of the EICS. The Institute deals with issues related to electricity generation, transmission, and distribution from an economic and technological point of view. It also conducts feasibility studies and implementation research, writes expert reports, conducts technological, environmental and other analyses, and monitors the quality and operation of electric power systems and facilities to cater to the needs of electric utilities, ministries and regional as well as national authorities. The Institute's experts also carry out research / development projects at EU and regional levels.

The areas in which the EIMV is active include energy industry in general and power system design; management and operation of electric power systems with a focus on advanced and smart grid technologies; high-voltage systems, power plants, and other power facilities; impact of electric power facilities on the environment; diagnostics of power transformers (physical and chemical); and support to the energy sector, local communities, and the government in environmental protection (resource efficiency and low-carbon economy).

Education and training – formal and informal

Several faculties in Slovenia offer energy-related study programmes. The core mission of the Faculty of Electrical Engineering, which is a member of the University of Ljubljana, is to educate professionals in the field of electrical engineering. The Faculty of Mechanical Engineering, especially the Power Engineering department, focuses on the conversion of energies from primary sources (renewable and non-renewable) into final energy (mechanical work, electrical energy, thermal energy) and rational use of the latter, on energy machines and devices (internal combustion engines, wind turbines, gas and water turbines, pumps and compressors, steam boilers and industrial heat exchangers), and on complex energy systems (hydropower and thermal power plants and various technological processes). The Faculty's Thermal and Environmental Engineering department includes three laboratories: (1) Laboratory for Heating, Sanitary, Solar and Air Conditioning Engineering, (2) Laboratory for Refrigeration and District Energy, and (3) Laboratory for Sustainable Technologies in Buildings.

The Faculty of Electrical Engineering and Computer Science under the University of Maribor also offers several study programmes: Electrical Engineering, Computer Science and Information Technologies, Mechatronics, Informatics and Technologies of Communication, Telecommunications, Economics Engineering (field of study: electrical engineering), etc. The Faculty of Energy Technology, which opened its doors in 2007, is one of the youngest faculties at the University of Maribor. With its headquarters in Krško and a separate unit in Velenje, the Faculty is present in Slovenia's largest energy pools.

Energy-related programmes are also offered by the University of Novo Mesto, more specifically by its Faculty of Mechanical Engineering. The programme aims to equip students with the necessary knowledge in the most modern technologies and systems of mechanical engineering and to properly prepare them for a successful and efficient career in the industrial environment.

In addition to university education, young people can choose from a range of energy-related training opportunities outside academia. With the aim of preserving and expanding knowledge, many Slovenian companies and organisations that are members of the EICS take care of the youth. For example, the company GEN energija has launched the World of Energy, an interactive multimedia centre that provides complete and evidence-based information on the importance of energy and its use in daily life, on electricity generation technologies, and on the economic, social and environmental aspects of energy. The Sustainable Energy web portal, launched by Slovenian power market operator Borzen, is an online information centre that delivers information on energy efficiency and renewable energy sources in Slovenia. Elektro Maribor has launched the Distribution Academy, which aims to preserve and develop the knowledge accumulated in the company over many years, while providing an opportunity for integration within the environment and the society through information, education, and presentation activities.

Many other members of the EICS across Slovenia have taken different approaches to bringing energy and the energy industry closer to the public. The Slovenian transmission system operator ELES, the company GEN energija, and two research and educational organisations—the Milan Vidmar Electric Power Research Institute (EIMV) and the Faculty of Electrical Engineering at the University of Ljubljana—have joined forces to create a scientific festival called ELektrofest, dedicated to promoting energy literacy among secondary school students.

Not to forget iEnergija, which is an educational and research platform on flexibility and security of supply, providing a space where experts, e.g., from ELES, can present reliability of transmission system operation or advanced energy storage systems. The aim of the iEnergija platform is to provide students of different study programmes or other people interested in energy an insight into the emerging interrelationships within the energy sector, with a focus on the importance of flexibility and the active role of energy consumers. iEnergija was launched as part of a project by EN-LITE, the Society for the Promotion of Energy Literacy.

Slovenian Qualifications Framework (SQF)

The Slovenian Qualifications Framework (SQF) represents a unified system of qualifications in the Republic of Slovenia, intended for the classification of qualifications into levels in terms of learning outcomes. It consists of 10 levels. The SQF can serve as a means for individuals to check to which level their educational or other qualification corresponds in the European Qualifications Framework (EQF) or in the Qualifications Framework for the European Higher Education Area (QF-EHEA).

The field of "Engineering, Manufacturing and Construction" and its sub-field Electrical Engineering and Energy cover the following qualifications:

SQF 4 / EQF 4:
- Electrician SI
- Electrician

SQF 5 / EQF 4:
- Electrotechnician SI
- Electrotechnician
- Master electrical installation technician
- Inspector of less complex electrical installations and lightning protection installations
- Electrical power switch operator

SQF 6 / EQF 5:
- Dispatcher in a power system control centre
- Inspector of complex electrical installations and lightning strike protection installations
- Power engineer

SQF 7 / EQF 6:
- Academic bachelor's degree in electrical engineering
- Professional bachelor's degree in electrical engineering
- Academic bachelor's degree in power engineering
- Professional bachelor's degree in power engineering

SQF 8 / EQF 7:
- Master's degree in electrical engineering
- Master's degree in power engineering
- Master's degree in nuclear engineering

SQF 9 / EQF 8:
- Pre-Bologna research master's degree in the field of electrical engineering
- Pre-Bologna research master's degree in the field of nuclear engineering

SQF 10 / EQF 8:
- Doctorate in the field of electrical engineering
- Doctorate in the field of power engineering
- Doctorate in the field of nuclear energy and technology

SECTIONS WITHIN THE ENERGY INDUSTRY CHAMBER OF SLOVENIA (EICS):

The Eurelectric Section focuses on the development and competitiveness of the electric industry and promotes the role of low-carbon electricity generation in social progress. The members of the section usually meet before the board meetings of the Brussels-based Union of the Electricity Industry – Eurelectric.

The section has been active since 2004.

EZS
SEKCIJA EURELECTRIC

The Energy Market Data Exchange Section (IPET) strives for effective data exchange in the energy market and promotes the use of open data exchange standards that would allow unification of the approaches in the computerisation of data exchange processes among all market participants, based on an effective and standardised model.

The section has been active since 2010.

EZS | IPET
SEKCIJA ZA IZMENJAVO PODATKOV NA ENERGETSKEM TRGU

The Slovenian Association for Energy Economics Section (SAEE) brings together the members of the International Association for Energy Economics (IAEE), which is based in Cleveland, Ohio. The Section functions as an association of individuals interested in energy economics and creates a forum for professional discussion.

The section has been active since 2015.

EZS | SAEE
SEKCIJA SLOVENSKO ZDRUŽENJE ZA ENERGETSKO EKONOMIKO

The District Heating Section (DO) brings together companies from the field of district heating with the aim of exchanging their experiences and good practices, and planning development models in accordance with the EU and Slovenian district energy policy.

The section has been active since 2016.

EZS | DO
SEKCIJA ZA DALJINSKO OGREVANJE

The Electricity Suppliers Section (SVDEE) unites electricity suppliers and focuses on the exchange of opinions and mutual information, and on cooperation between members in the field of regulated energy activities.

The section has been active since 2016.

EZS | SVDEE
SEKCIJA ZA VPRAŠANJA DOBAVITELJEV ELEKTRIČNE ENERGIJE

The Slovenian National Committee of the World Energy Council (SNC WEC) Section has collaborated with the World Energy Council (WEC) on several projects, including the World Energy Trilemma.

The section has been active since 2020.

EZS | SNK WEC
SEKCIJA SLOVENSKI NACIONALNI KOMITE SVETOVNEGA ENERGETSKEGA SVETA