

A Spotlight on Renewables in the Slovak Republic



The Slovak Republic (SR) became an independent nation in 1993. In 2000, it became a member of the Organization for Economic Cooperation and Development (OECD), a Member State of the European Union (EU) in May 2004, a member of the International Energy Agency (IEA) in 2007, and then in 2016 joined the IEA SHC Programme.

The Slovak Republic places great weight on reducing greenhouse gas (GHG) emissions, mitigating climate change, and ensuring energy security and affordability. At the policy level, the country is taking numerous proactive steps.

In November 2014, the Government of the Slovak Republic approved the Energy Policy (EP SR), which set goals and priorities for the energy sector until 2035 with a view to 2050. The strategic objective of the EP SR is to achieve competitive low carbon energy, ensuring a secure, reliable, and efficient supply of all forms of energy at affordable prices while taking into account consumer protection and sustainable development.

In 2019, the Slovak Republic committed to achieve carbon neutrality by 2050. SR has reasonably balanced the share of nuclear fuel and fossil fuels in gross domestic consumption. The development of an energy policy in the Slovak Republic is aimed at optimizing the energy mix so that GHG emissions and pollutants are reduced as much as possible while maintaining and responsibly increasing energy security and affordability of different types of energy.

The Energy Policy of the Slovak Republic (EP SR) is based on four fundamental pillars:

- energy security,
- energy efficiency,
- competitiveness, and
- sustainable energy.

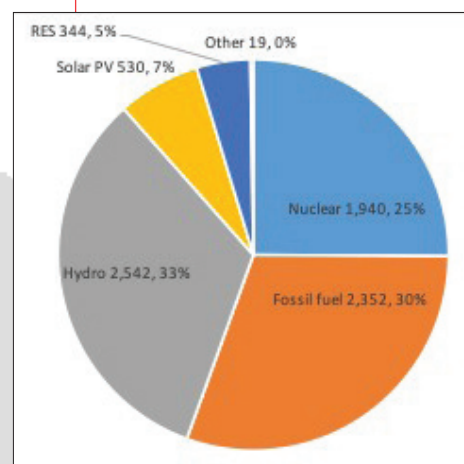
The EP SR also includes science, research, and innovation.

The National Energy and Climate Plan (NECP) updates the EP SR extending it with the dimension of decarbonization.

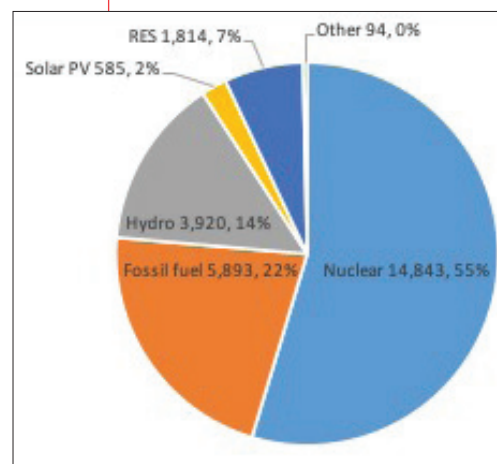
Sustainable development must meet the current needs of the population without limiting the possibilities for future generations to meet their own needs. Therefore, it is necessary to change technologies, procedures, and habits both on the production side and on the consumption side.

The main quantified energy and climate targets for 2030 across the European Union are a reduction in GHG emissions by at least 40% compared to 1990 (individual Member States have fixed shares according to local conditions). The binding target level of the EU is to achieve the share of energy from renewable sources (RES) in gross final consumption energy consumption of at least 32%, with the share of RES in transport in each Member State at least 14%, the national contribution to energy

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▲ Figure 1. Installed capacity in MW (2018).



▲ Figure 2. Production in GWh (2018).

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efficiency at least 32.5%, and interconnected electrical systems at a level of at least 15%.

The main quantified goals of the NECP for the Slovak Republic until 2030 are to reduce GHG for the non-ETS sectors by 20%. The use of RES for final energy consumption is set in 2030 in the amount of 19.2% with the fulfillment of the required target of 14% RES in transport.

Electricity Production in the Slovak Republic

The installed capacity of electricity generation facilities reached 7.728 MW in 2018.

Renewable Sources of Electricity

Of the total installed capacity of 2,542 MWe hydropower plants, 1,626 MWe are in flow power plants and 916 MWe in pumped storage power plants. The largest hydroelectric power plant is Gabčíkovo with an installed capacity of 720 MWe. Its annual production (2,200 GWh) is almost half of the total electricity production of hydroelectric power plants in the Slovak Republic.

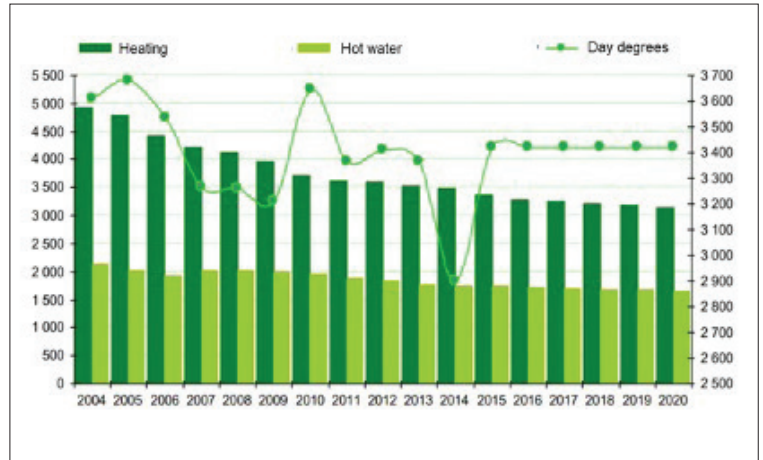
There are currently five wind turbines in operation in the Slovak Republic with a total installed capacity of 3.1 MW and annual production of approximately 5.5 GWh of electricity. Wind turbines in the conditions of the Slovak Republic fail to compete with other sources of electricity.

Biomass generates 1,185 GWh annually with an installed capacity of 224 MWe.

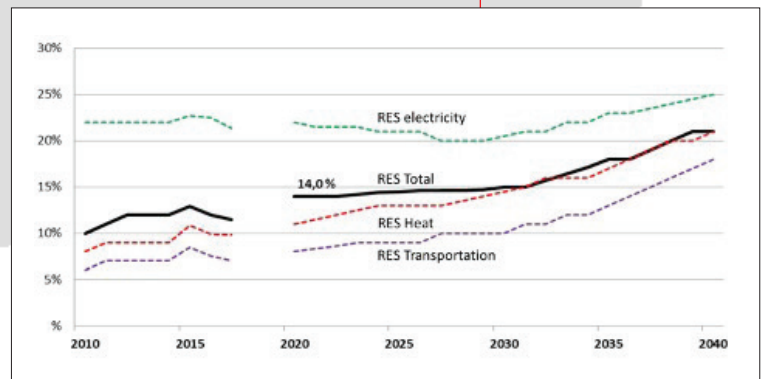
Photovoltaic power plants recorded the greatest development between 2011 and 2013, reaching 530 MWe of installed capacity, with the annual usability around 1,000 hours, reaching an annual production level of 530 GWh. Since 2013 no new installations were launched until the end of the first quarter of 2020.

At the beginning of February 2020, the Ministry of Economy announced a pilot auction for electricity produced from renewable energy sources in Slovakia. It promised a total of 30 MW of new installed capacity from the sun, wind, biomass, biogas, water, etc. The projects were to be operational over approximately two to four years, depending on the type of installation, and subsidies being paid for 15 years of operation.

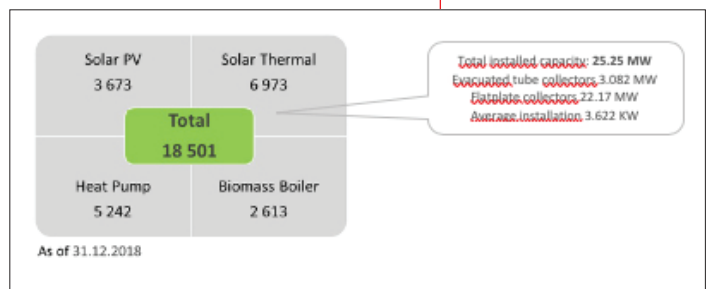
The first auction for the production of green energy in Slovakia was canceled on March 31. While Hungary and Estonia recently announced the results of their first auctions, in other countries, including Slovakia, the dates of further auctions and deadlines are postponed due to problems in supply chains as a consequence of the worldwide COVID-19 pandemic.



▲ **Figure 3. Real (and forecasted 2019, 2020) heat consumption in GWh in a block of flats, supplied by District Heating Systems.**



▲ **Figure 4. Indicative trajectory based on current policies and measures.**



▲ **Figure 5. Number of installations by technology.**

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Forecasted Development until 2030

The development of electricity consumption will be affected by the success of measures in the area of energy efficiency (energy savings) and the rate of growth of electromobility.

By 2030, enough power is projected to be in place, and there are no expectations to build-up larger resources. After completion of Nuclear power plant Mochovce (EMO) 3 and 4, the system will be from the point of view of securing power electricity, safe even in the event of non-operation of the largest fossil fuel sources of electricity (PPC Malženice, PPC Bratislava, TE Vojany and TE Nováky). It is assumed that the total installed capacity of production facilities in 2030 will be at the level of 8 720 MW, of which RES (including installed capacity hydropower plants) 3 790 to 4 630 MW. The maximum load will increase in proportion to 1.2% year-on-year growth in consumption up to 5250 MW.

The Heat Sector

It is expected that the decline in heat consumption will continue, but no longer in such a significant way that it has been for the last 15 years. Estimates and forecasts until 2020 indicate a decline in heat consumption by 8.5%, respectively, about 450 GWh.

The forecast of the development of heat consumption for the coming years was determined based on an analysis of the potential for energy efficiency of heating systems, mainly the expected development of heat consumption for heating in apartment buildings (block of flats). In addition to reducing heat consumption in apartment buildings, a significant reduction is expected in the heat consumption of public buildings with the supply of heat from District Heating Systems (DHS).

Renewables

The policy in the field of RES and the measures based on it follow from the previous strategic documents approved by the Government of the Slovak Republic (Energy Security Strategy - 2008, National Action Plan for energy from renewable sources - 2010 and Energy Policy of the Slovak Republic - 2014) and supports an increase in the share of renewable energy sources in energy consumption and a reduction in the share of fossil fuels. Among the set of measures, one is related to so-called prosumers - support for small power plants for the production of electricity and heat in family and apartment houses. The beneficiaries are motivated to consume as much electricity as possible and minimize supply to the system from the small-scale electricity generation installations. This approach addresses their energy self-sufficiency and reduces the impact of variable RES on the electricity system (prosumerism).

Growing Prosumerism

During 2014-2020 the Green for Households projects was launched in connection with the Operational Program Quality of Life. The Operational Program focuses on the transition to a low-carbon economy using renewable energy sources and improving energy efficiency (increasing production heat and electricity from renewable energy sources, systematic reduction of greenhouse gas emissions, and development of efficient DHS). In contrast, the Green for Households project focuses on small renewable resources in homes and apartment buildings to increase the share of renewable energy use.

Green for Households Project Results

Phase 1 started in 2016 and ended in 2018. During this period, 41.19 million EUR were provided as subsidies for 18,501 households, and the total installed capacity was 141.33 MW (Solar PV 10.01 MW, Solar Thermal 25.25 MW, Heat Pumps 44.28 MW, and Biomass boilers 66.07 MW).

Indicator	Unit	Result
Installed capacity for production of electricity	MW	10.01
Installed capacity for production of heat	MW	131.3289
Savings of CO2 emissions per year	t/year	55,494
Public expenditure per unit of installed capacity	€/kW	317.7
Public expenditure per CO2 emissions reduction (15 years)	€/t	54.06

Phase 2 started in 2019 and is expected to last until 2023. The budget allocation is 48 million EUR. The goal is to have 21,000 small RES systems up and running with an installed capacity of 140 MW.

As of the end of the first quarter of 2020, there were 2,046 Solar Thermal systems installed with a total installed capacity of 7.56 MW (evacuated tube collectors 0.67 MW, flat plate collectors 6.88 MW) with an average installation 3.69 kW.

Prepared with the data from NECP published by the Ministry of Economy and internal data of Slovak Innovation and Energy Agency (regarding the Green for Households project). Article contributed by Artur Bobovnický, the Slovakian SHC Executive Committee representative.