Forum Energii
Analizy i dialog

Energy transition in Poland

Edition 2020

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Forum Energii is a think-tank focused on the energy sector. Our mission is to create the foundations for an effective, safe, clean and innovative energy sector based on data and analyses.

TABLE OF CONTENTS

MARCH 2020

Foreword

This is already the third edition of the annual report on the energy transformation of Poland. It presents the most important data showing the state of the Polish power industry. We focus on the production mix, emissions, electricity prices, balance of imports and exports of energy resources and electricity.

The most important phenomena of the past year include a record increase in electricity imports and a decrease in production in domestic power plants. The rapid development of solar power generation can also be seen, the installed capacity of which exceeded 1.5 GW. However, the pace of development of gas installations has slowed down.

The changes in the energy sector are noticeable, although it is doubtful whether they result from the state's energy policy. Recently, an increase in energy production has been expected, but we are dealing with a record decline - admittedly for various reasons, but the most important one is the low price competitiveness of production. Electricity imports must be assessed positively, as this keeps its prices in check, although the question of its maximum level still remains to be answered. What is worrying is the stagnation in the reduction of greenhouse gas emission. It should, however, be noted that presented data concerns the year 2018, as they are published with delay.

We wish you a good read
Dr Joanna Maćkowiak-Pandera
President of Forum Energii

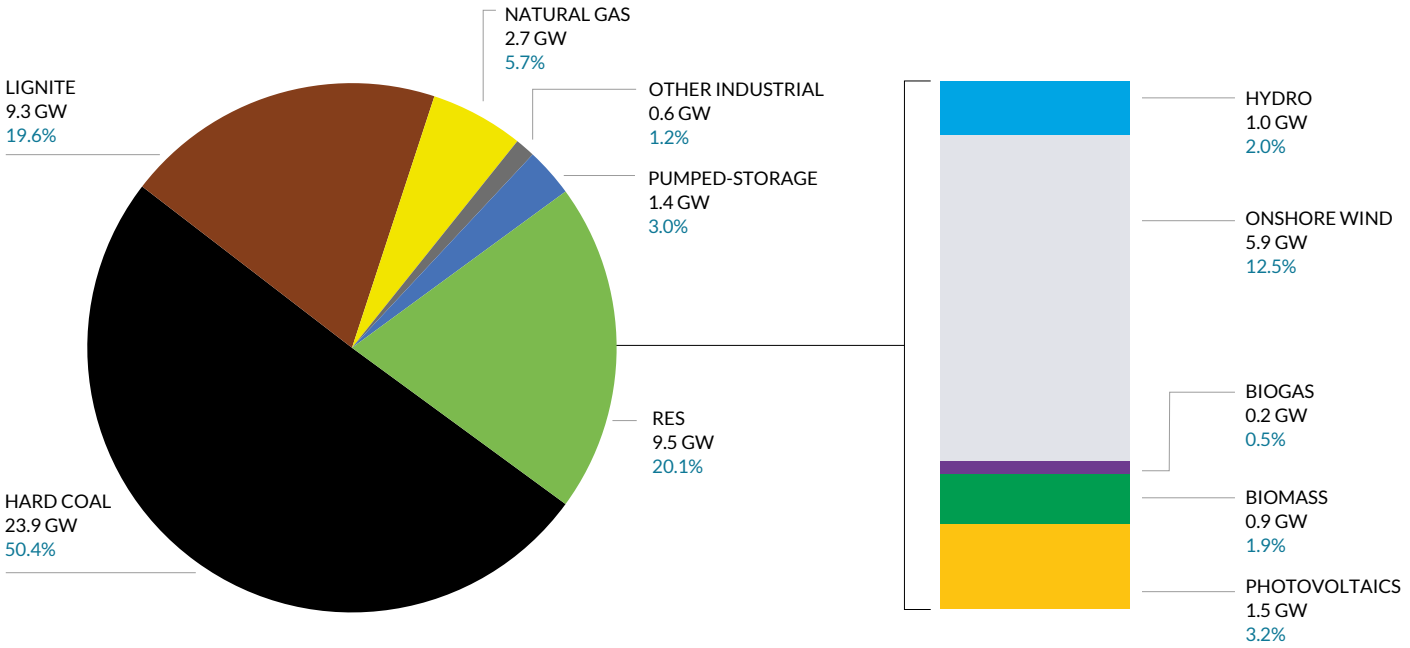
Main conclusions

- Decrease in electricity production, mainly from lignite and hard coal.
- Increase in electricity imports.
- Slow rise of RES, mainly due to prosumer photovoltaics.
- The paradox of the domestic coal market: the constant demand for this fuel – decline of mining output - growing stockpiles.
- Diversification of gas supply.

Generation capacity

Installed capacity in the Polish system in 2019

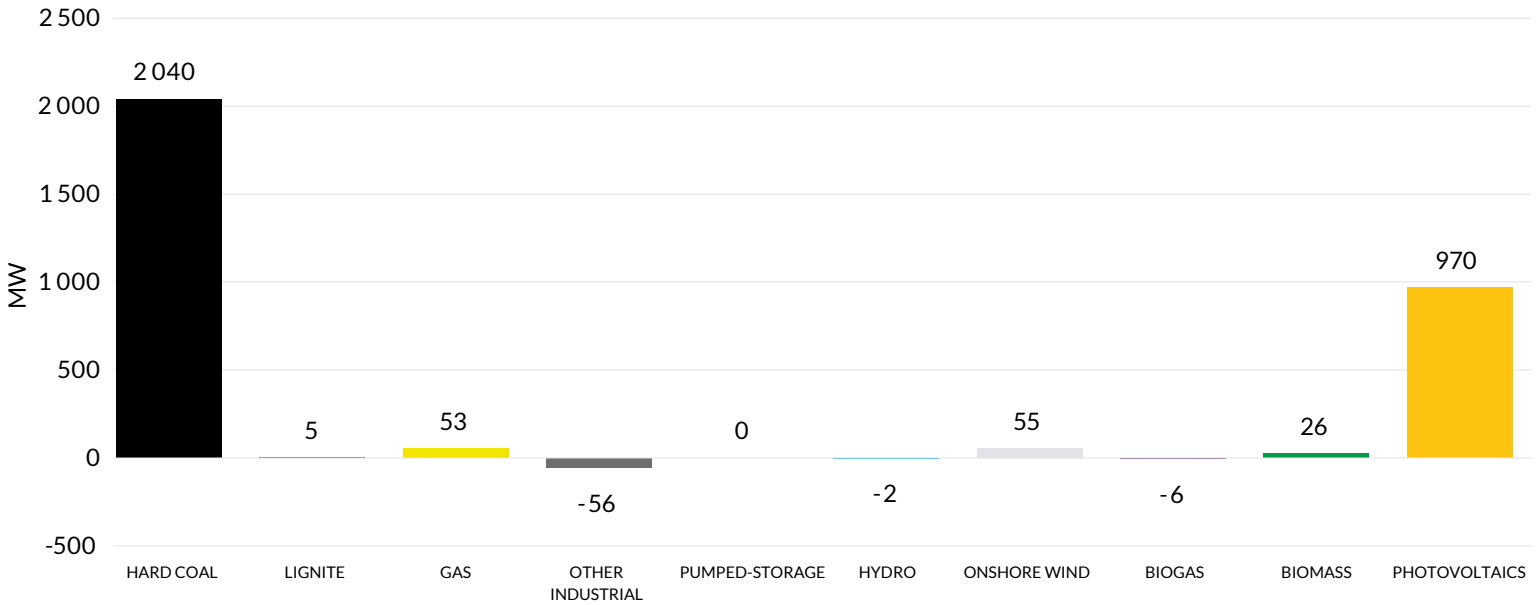
- The share of installed capacity in lignite and hard coal remains at 70%.
- Renewable energy sources account for over 20% of installed capacity.



Source: based on data of the Agencja Rynku Energii S.A. (ARE).
As of 31.12.2019

Change in installed capacity in 2019 as compared to 2018

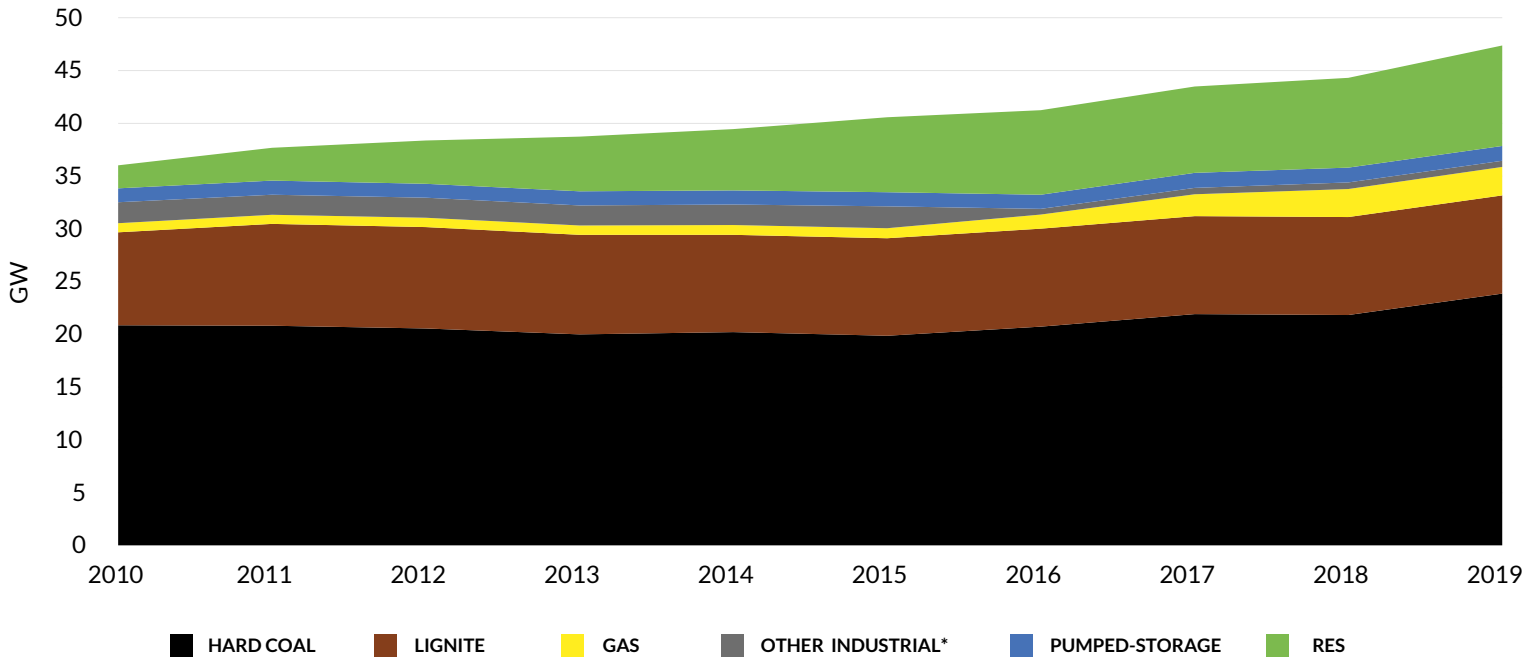
- The increase in the installed capacity for hard coal is mainly the result of the completion of construction of two new 900 MW units, both in Opole.
- In 2019, a more than 3.5 times increase in photovoltaic installations being put into operation compared to the previous year.



Source: based on data of ARE.

Changes in installed capacity over the last decade

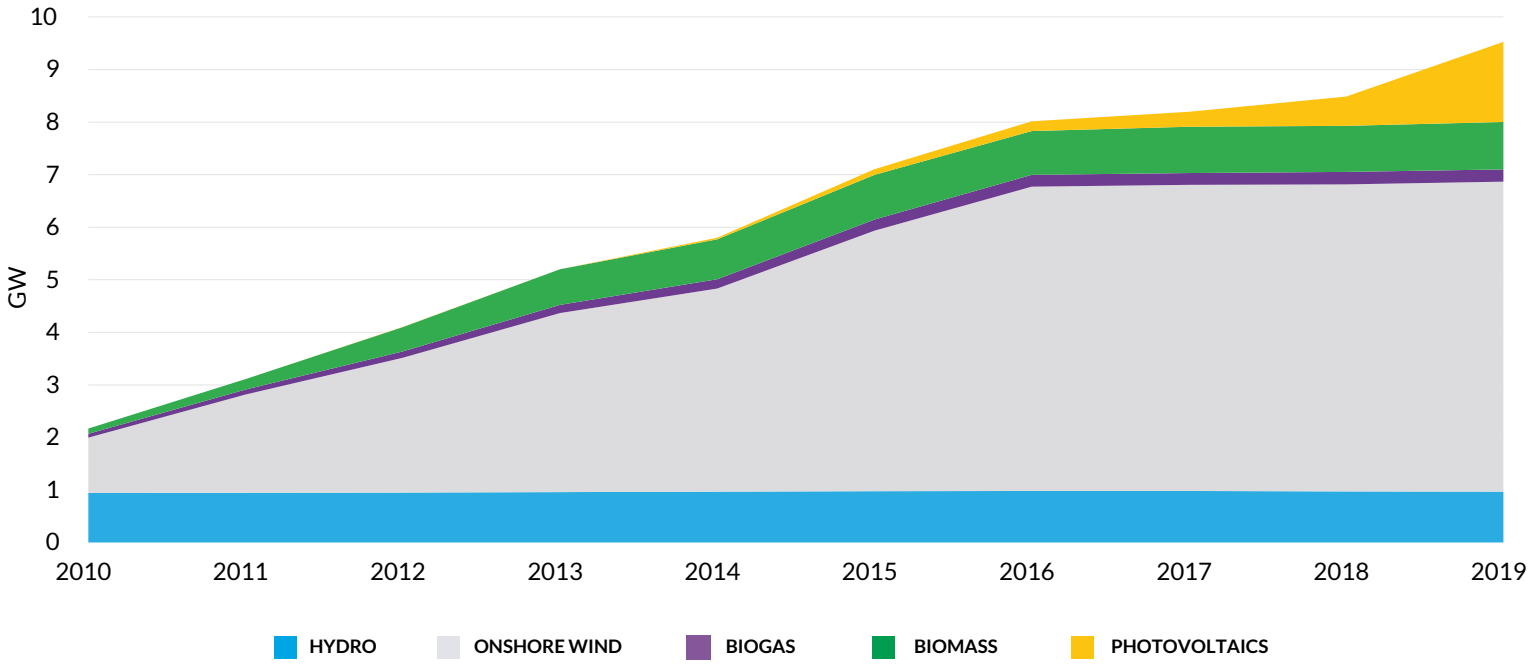
- Over the last decade, the level of capacity installed in the system has been systematically increasing.
- Between 2011 and 2015, RES installations were the ones being developed. After 2016 it was mainly conventional units.



Source: based on data of ARE.
* Since 2016, the "industrial" category has been disaggregated by fuel type.

Changes in installed RES capacity

- At the end of 2019, 9.5 GW were installed in RES, of which 1.5 GW in photovoltaic installations.
- The development of RES in the last two years is mainly due to investments in prosumer installations.

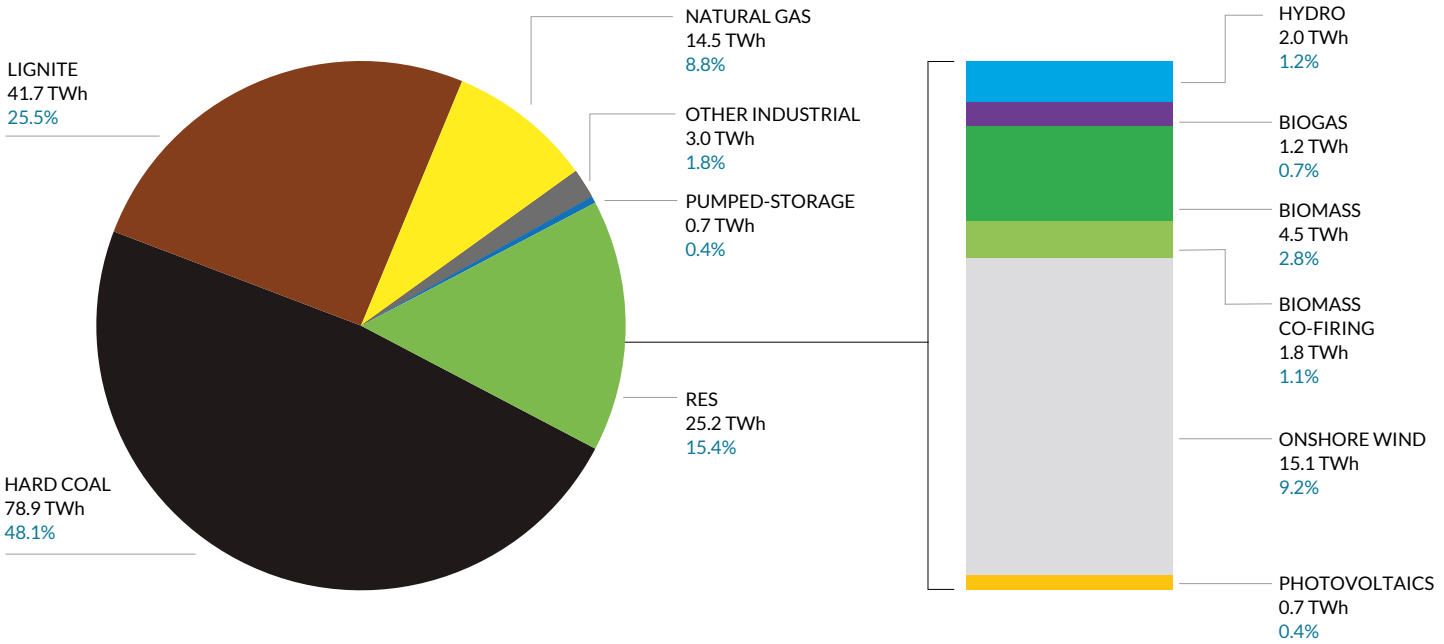


Source: based on data of ARE.

Electricity production

Electricity production in 2019

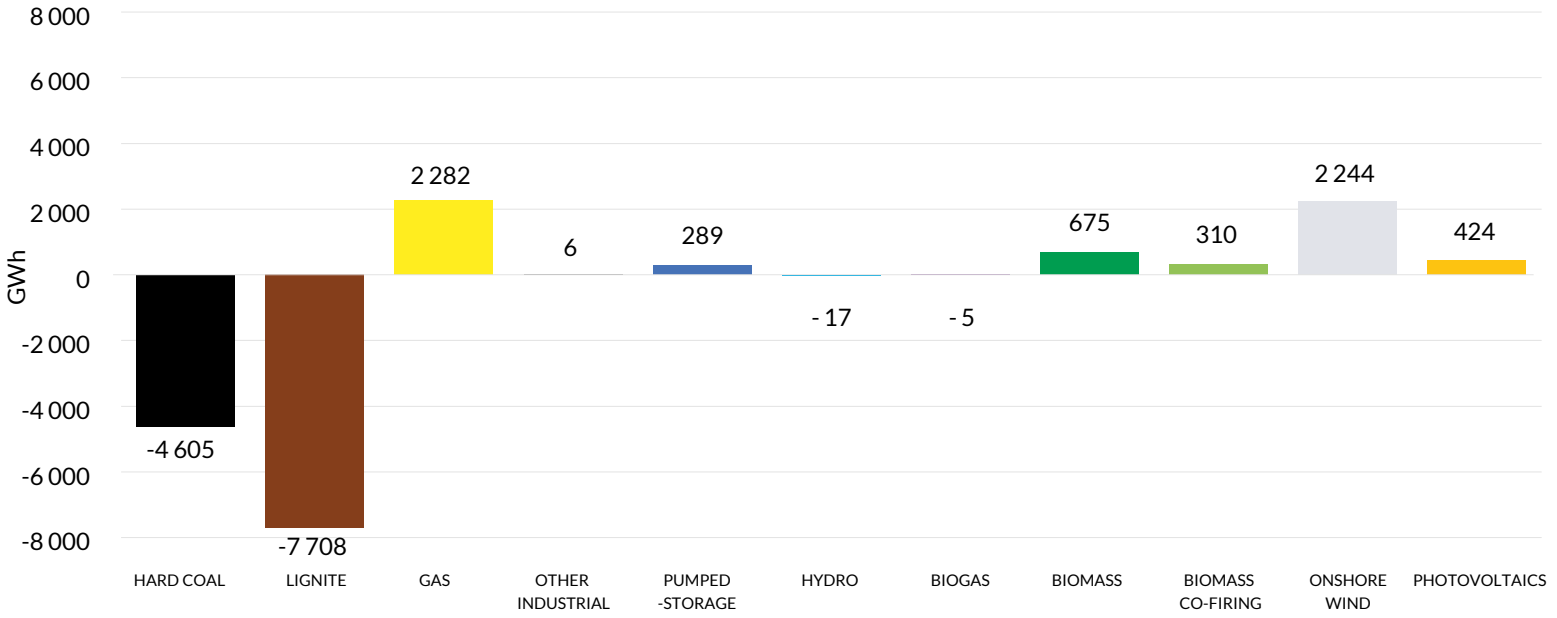
- The share of coal in electricity production in 2019 was 73.6%. This is 4.8 p.p. less than the year before.
- The importance of gas continues to grow. Its share in the energy mix was 8.8% compared to 7.2% in 2018.
- The share of RES in electricity production was 15.4%, the highest in history.



Source: based on data of ARE.

Change in electricity production in 2019 as compared to 2018

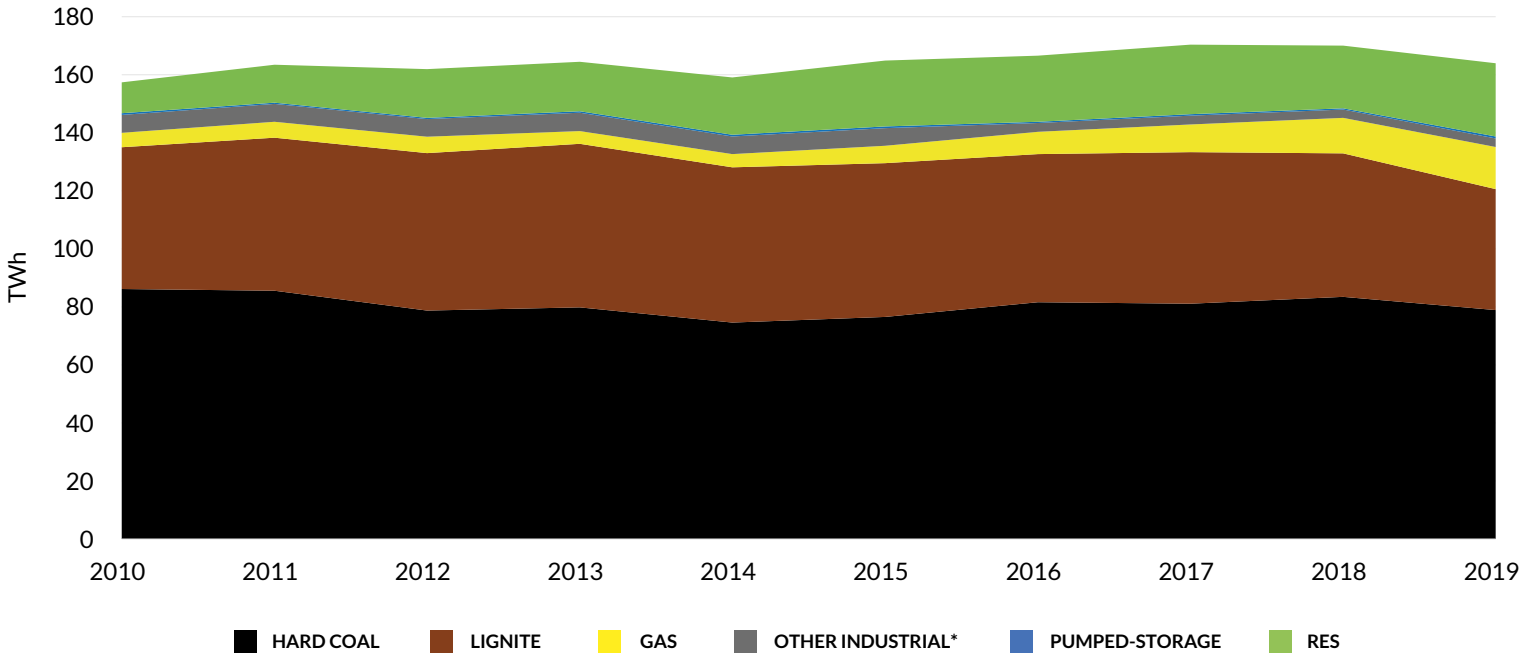
- Significant reduction of electricity production from coal results from a number of phenomena, including an increased share of RES and gas, competitively priced electricity imports, as well as renovations and shutdowns (e.g. B1 unit in Bełchatów PP).
- The increase in electricity production by wind power plants was a consequence of weather conditions.



Source: based on data of ARE.

Change of electricity production over the last decade

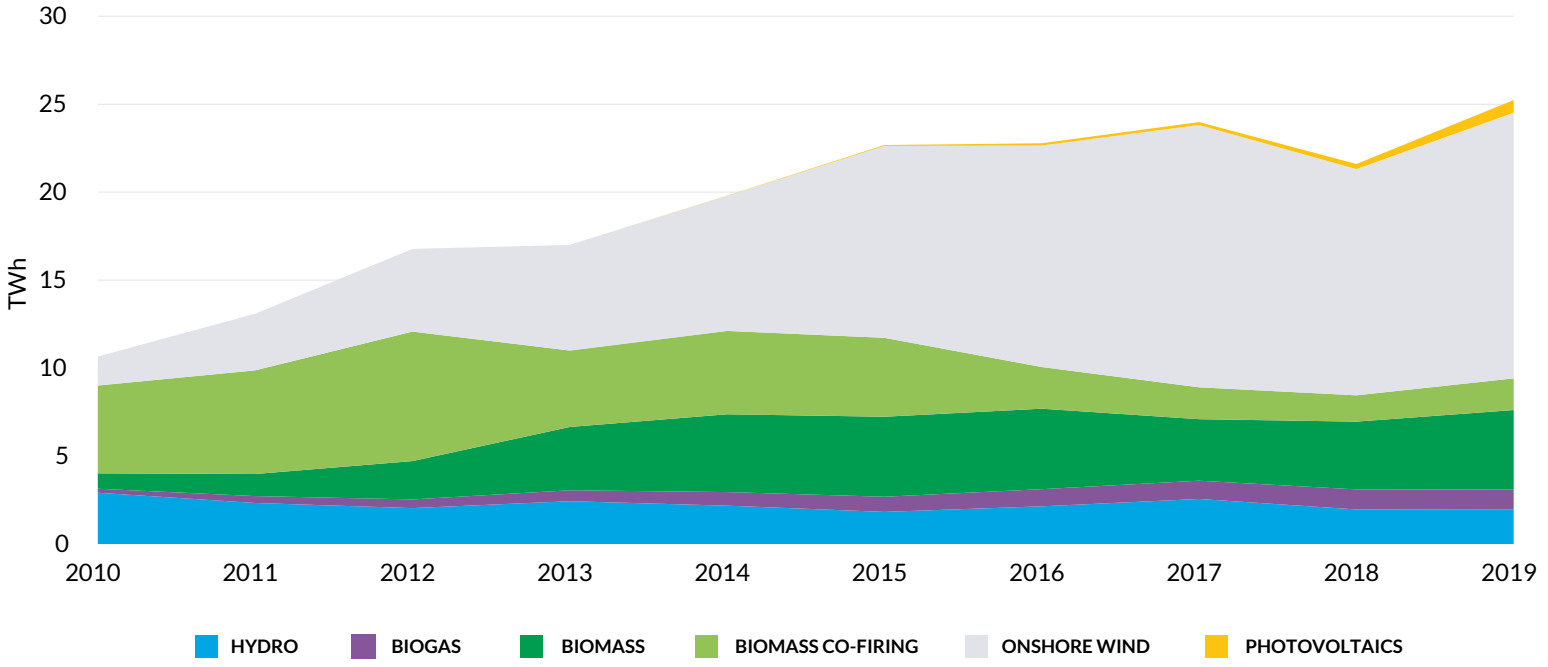
- In 2019, electricity production dropped by 3.6% as compared to 2018.



Source: based on data of ARE.
* Since 2016, the "industrial" category has been disaggregated by fuel type.

Change of electricity production from renewable energy sources over the last decade

- In 2019, the largest amount of electricity in history was produced from RES, - over 25 TWh. However, this is still less than the assumed trajectory required to meet international obligations.
- The increase in the prices of certificates of origin of energy from renewable sources, i.e. so-called green certificates, translated in 2018 and 2019 into an increase in production from biomass combustion plants.

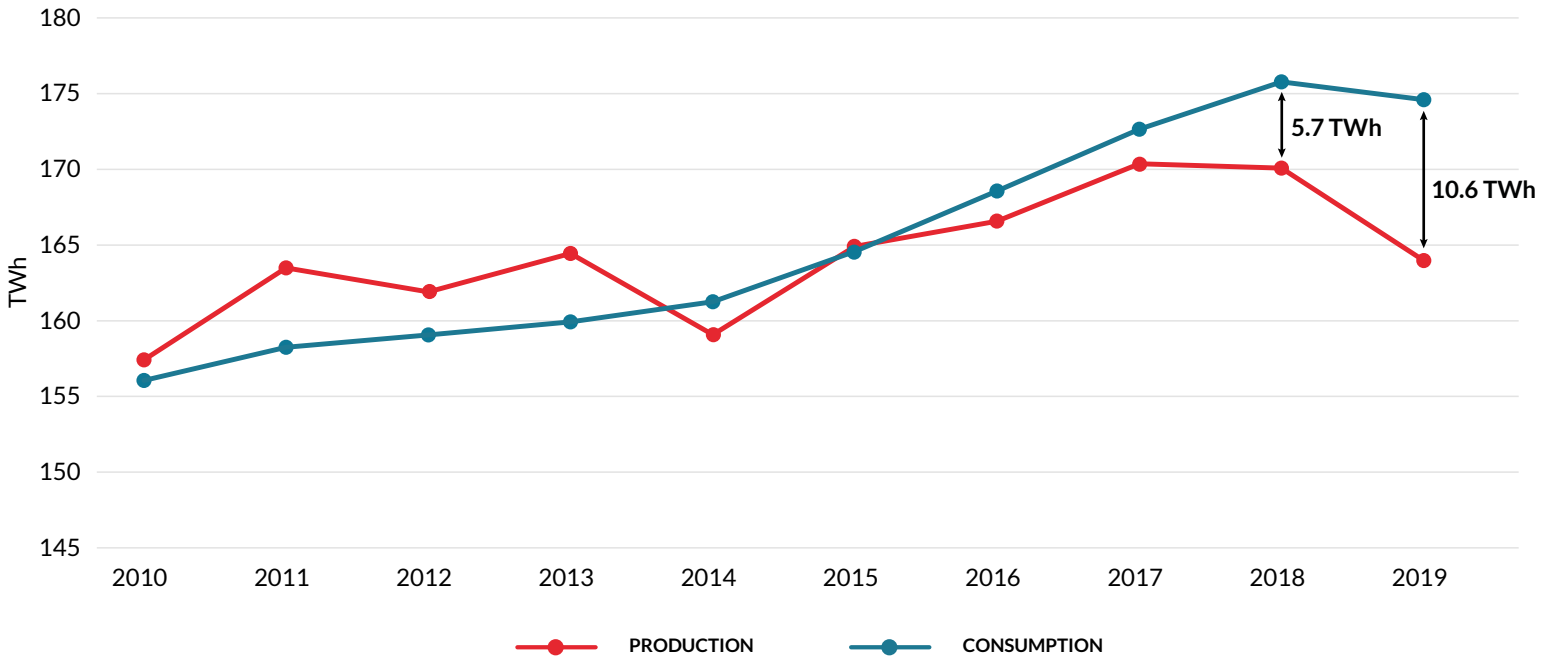


Source: based on data of ARE.

Energy balance

Balance of domestic electricity production and consumption

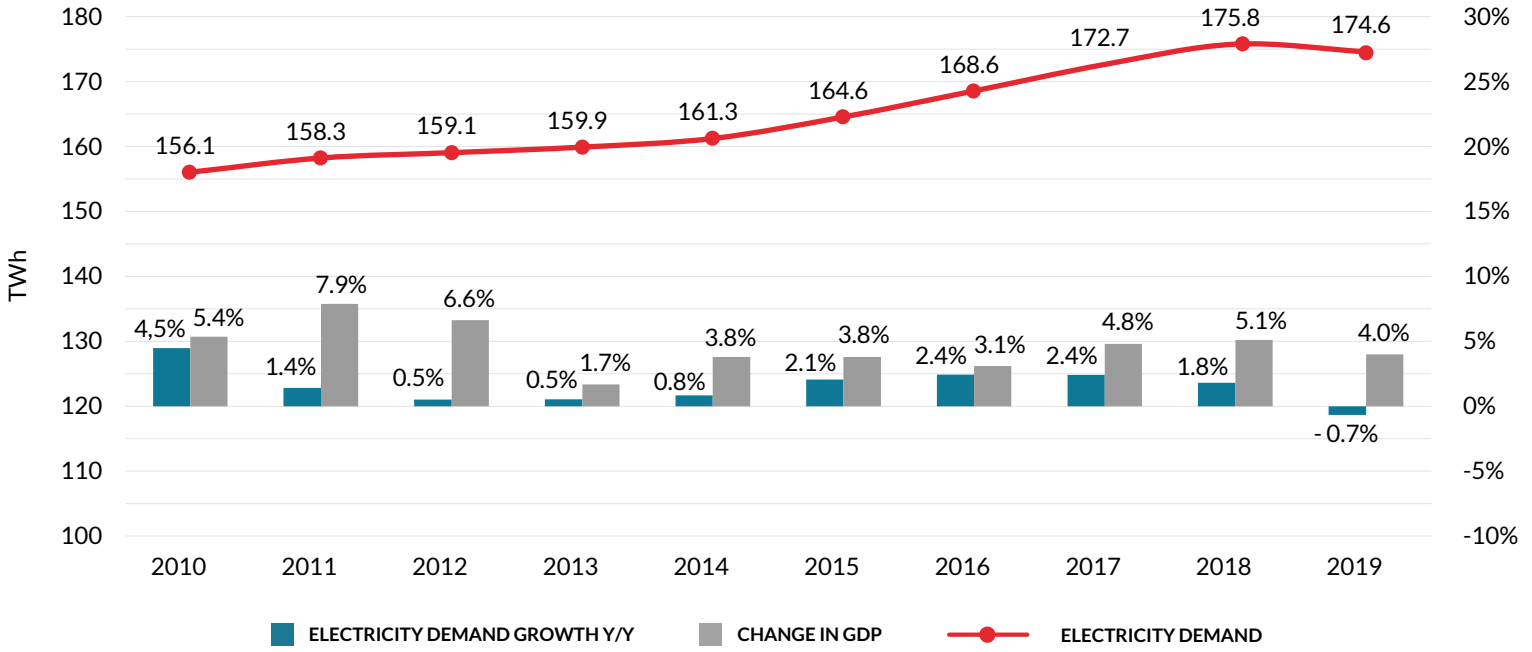
- Electricity production in 2019 was the lowest in five years. It amounted to 164 TWh.
- Electricity imports almost doubled, to 10.6 TWh.
- Estimating the exact domestic demand for electricity is difficult due to the growing importance of prosumer installations.



Source: based on data of ARE.

Change in electricity demand

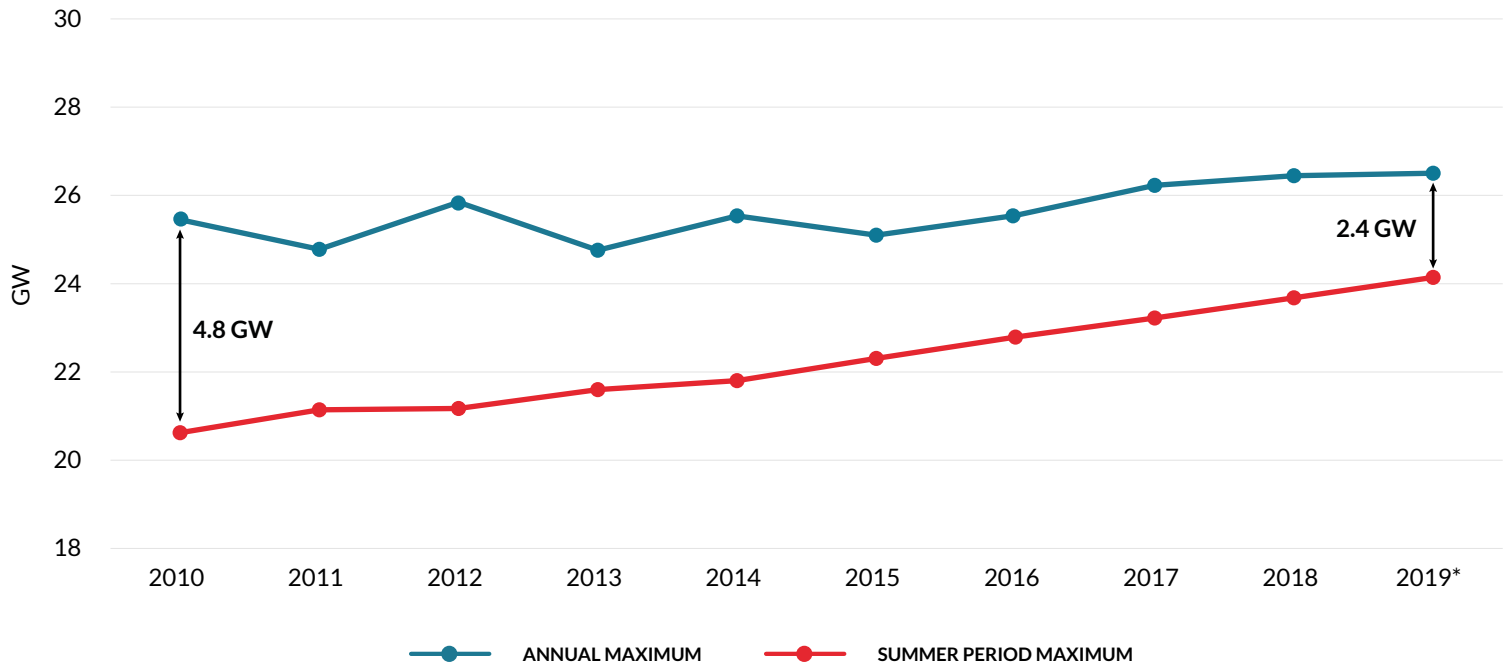
- Between 2010 and 2019, the demand for electricity in Poland grew on average by 1.1% and the GDP by 4.1%.



Source: based on data of ARE and Główny Urząd Statystyczny (GUS).

Change in peak power demand

- The annual growth of the maximum power demand in the system is slowing down. In 2019 it amounted to about 26 500 MW, i.e. only 50 MW more than in the previous year.
- In turn, the demand for peak capacity in summer increased by almost 500 MW.

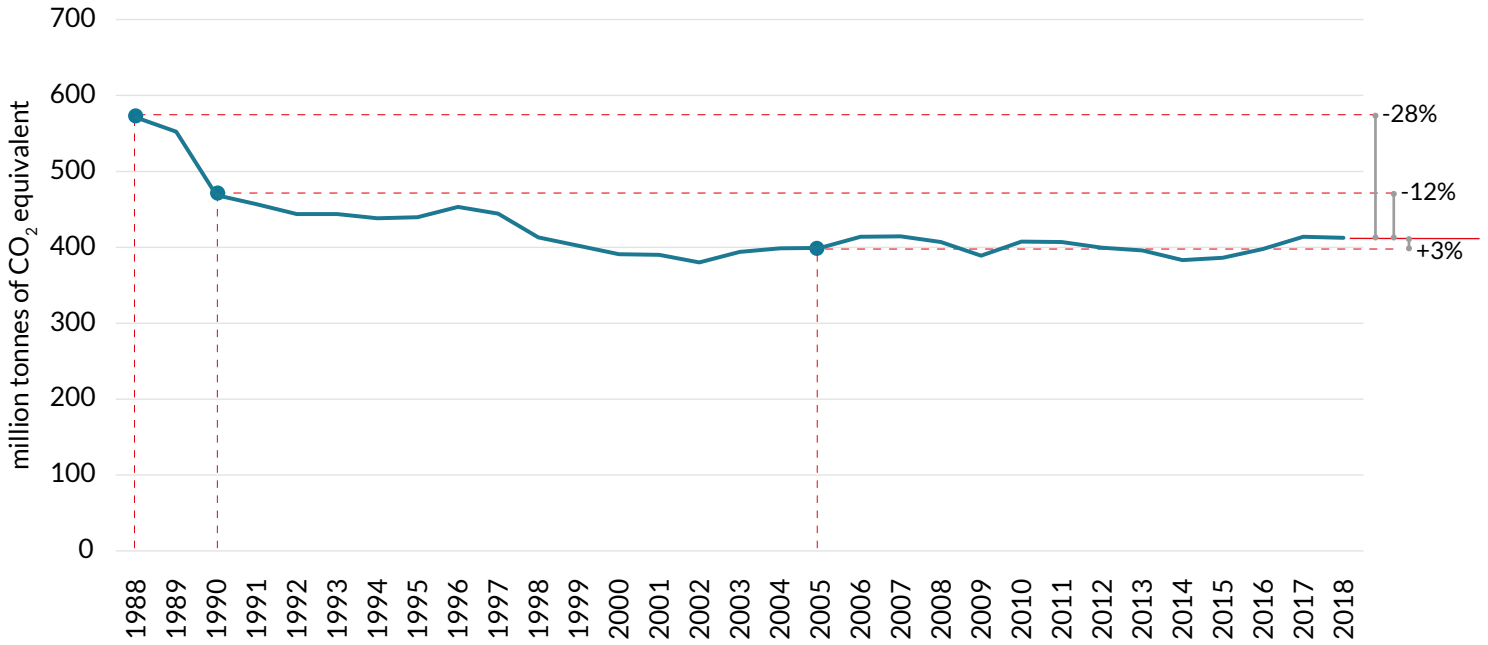


Source: based on data of the Polskie Sieci Elektroenergetyczne S.A. (PSE).
*preliminary data

Emissions

Total national greenhouse gas emissions

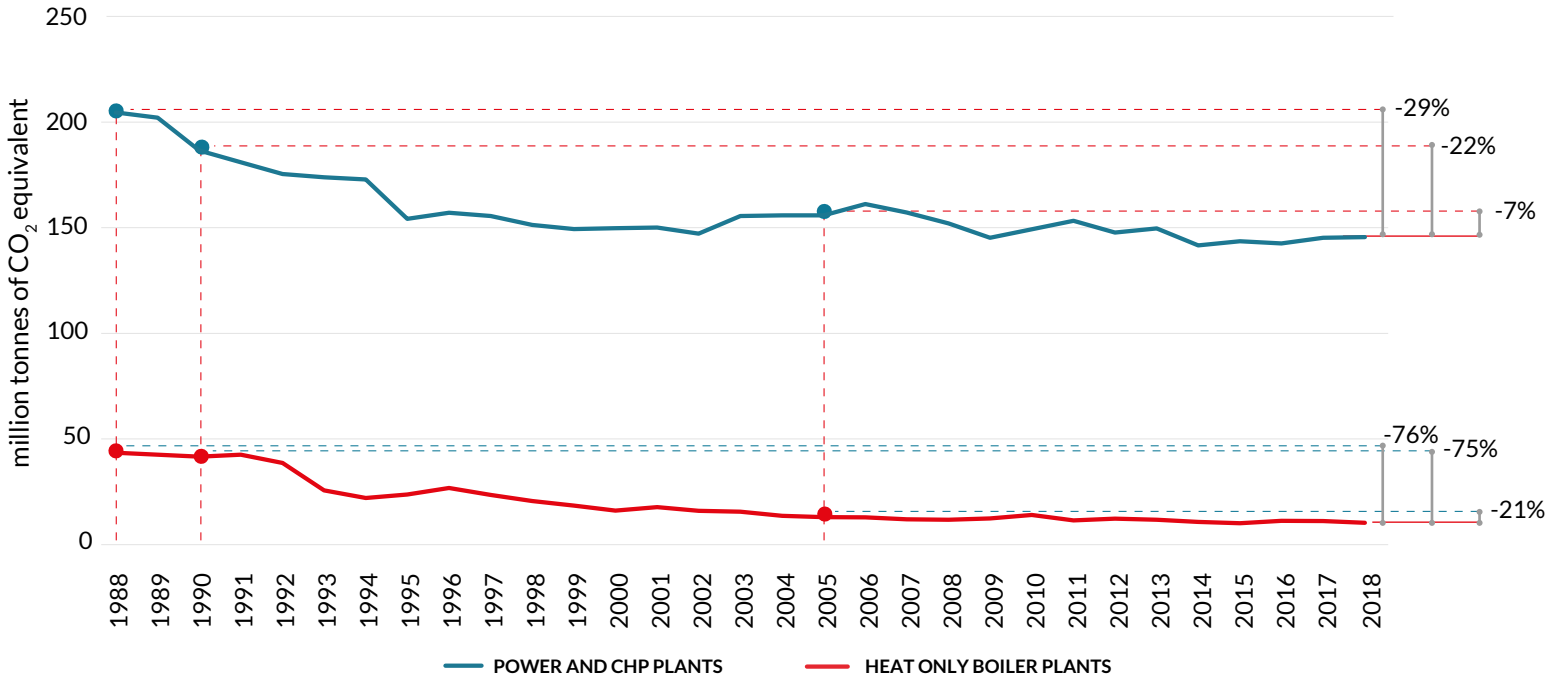
- In 2018, greenhouse gas emissions (mainly CO_2, methane and nitrous oxide) remained stable at 412.5 million tonnes of CO_2 equivalent.



Source: based on data of the European Environment Agency (EEA).

Power and heating sector greenhouse gas emissions

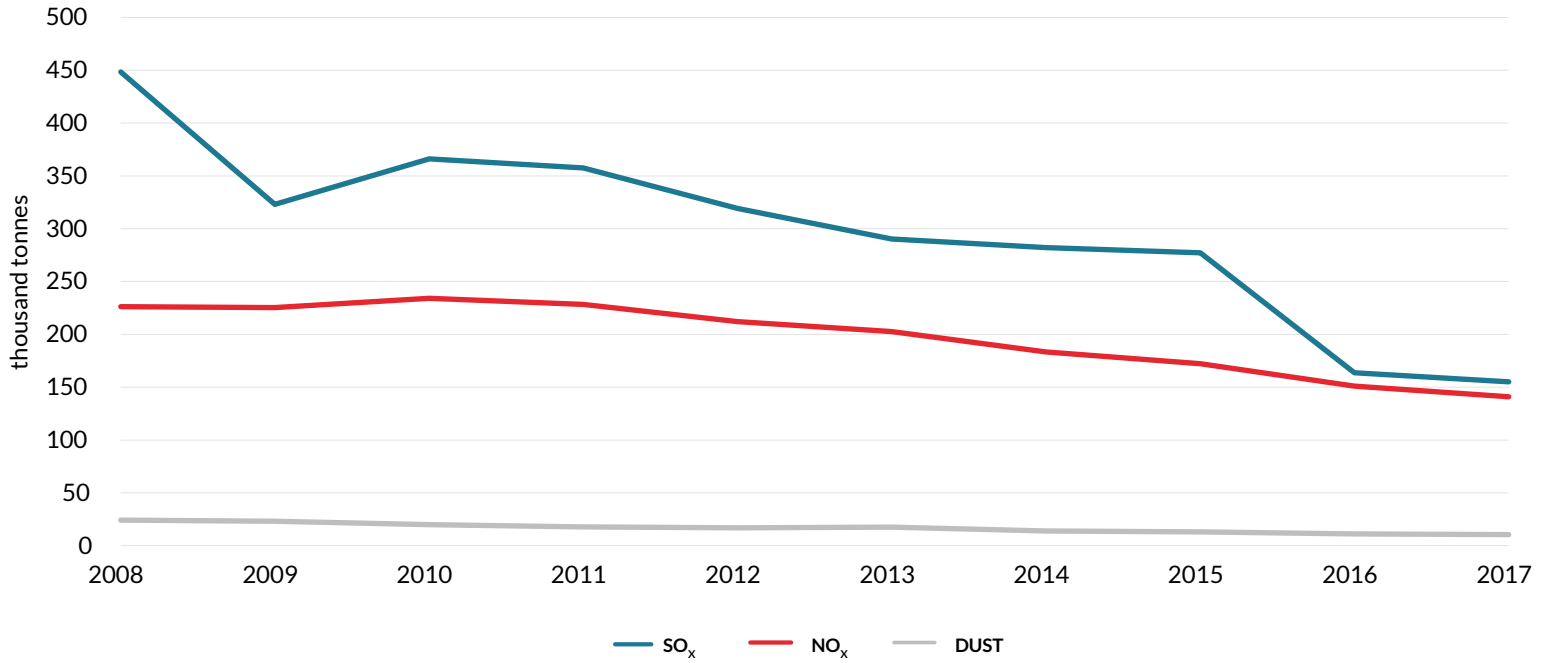
- In recent years, there has been no real reduction in greenhouse gas emissions in both the power and heating sectors.



Source: based on data of EEA.

Emissions of gases, dust and harmful substances from power generation

- Reduction of emissions of sulphur and nitrogen oxides and other air pollutants is progressing as a result of continued implementation of environmental protection solutions in power plants and combined heat and power plants.

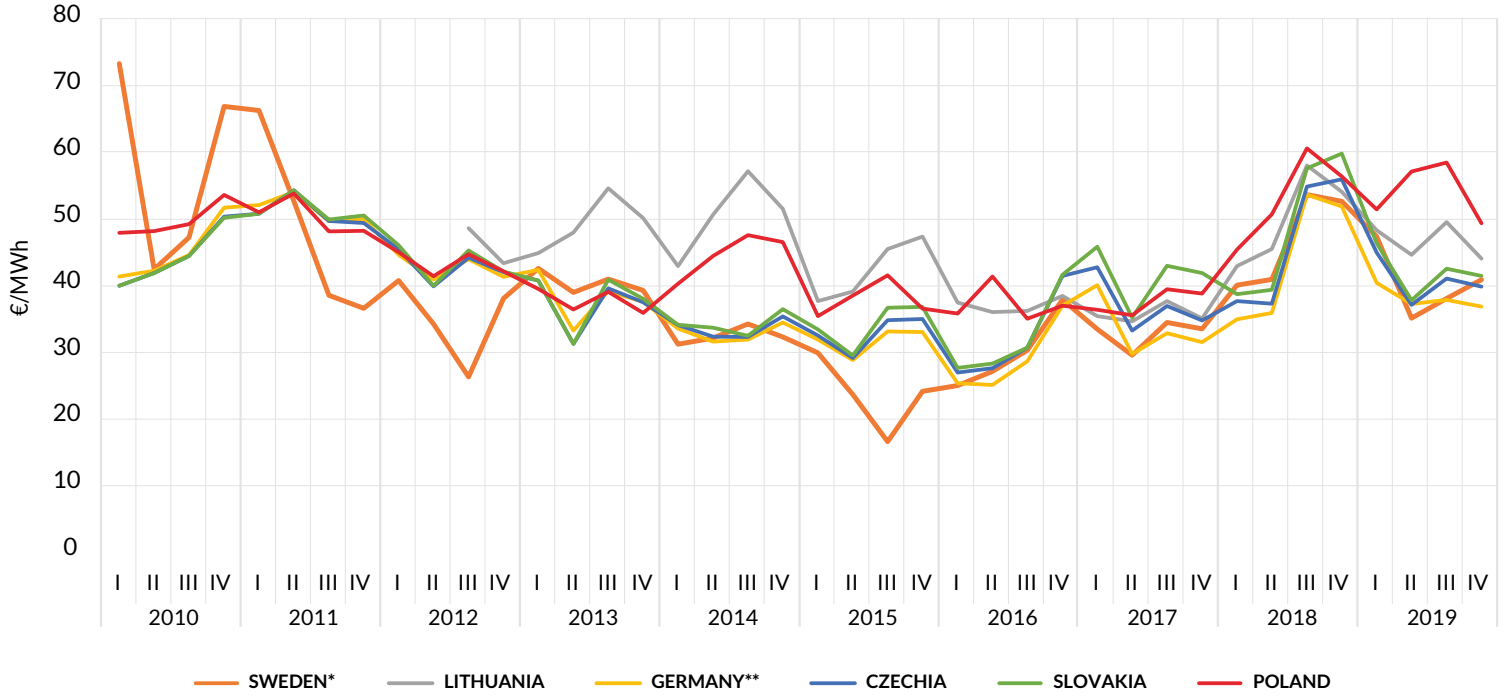


Source: based on data of GUS.

Electricity prices

Comparison of SPOT prices of electricity on neighbouring countries' markets

- After a sudden increase in the second half of 2018, last year electricity prices on the day-ahead markets in Poland's neighbouring countries returned to the level of two years ago.
- Prices in Poland are at the highest in the region.

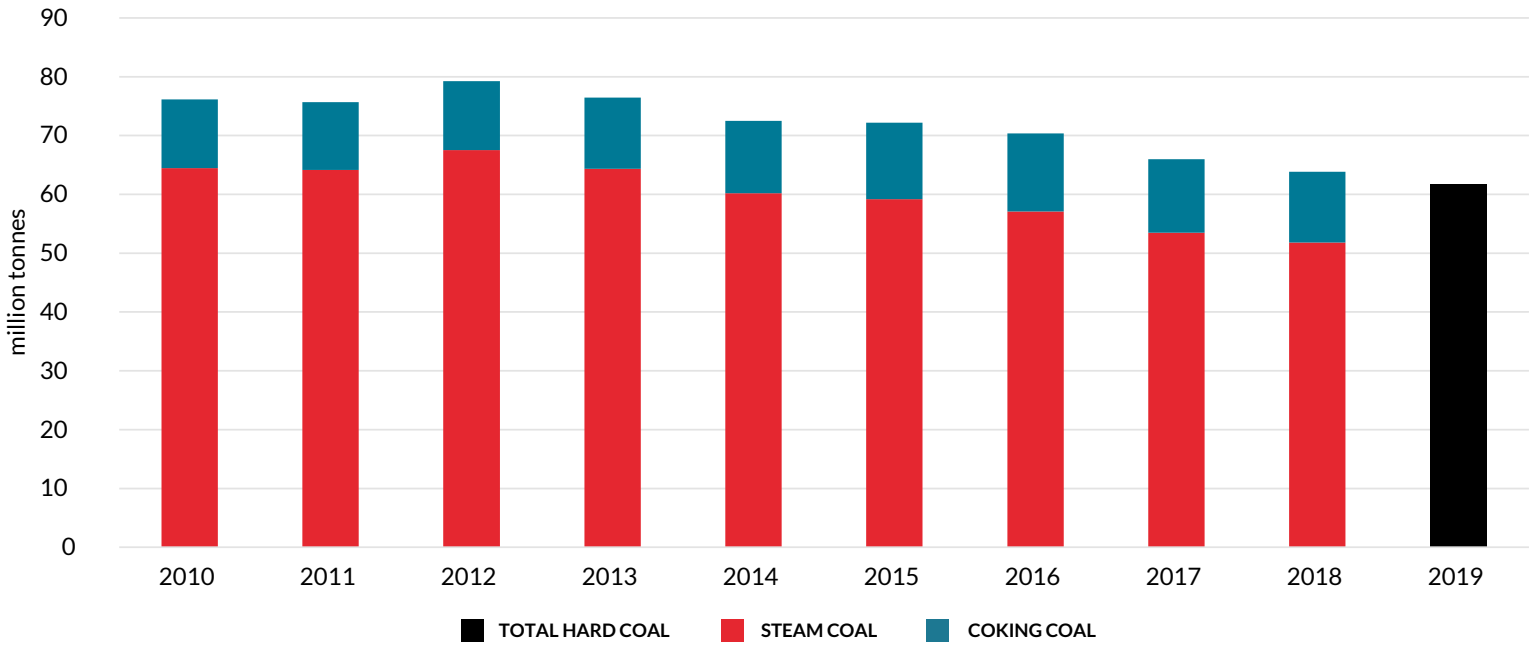


Source: based on data of Towarowa Giełda Energii S.A. (TGE), European Energy Exchange AG (EEX), Nordpool, OTE, a.s.
*from Q4 2011 on the basis of prices for the SE4 area;
** due to data unavailability, the price in 2019 is expressed as the arithmetic mean of daily prices. Other prices are expressed as a volume-weighted daily average

Power sector fuels

Domestic hard coal production

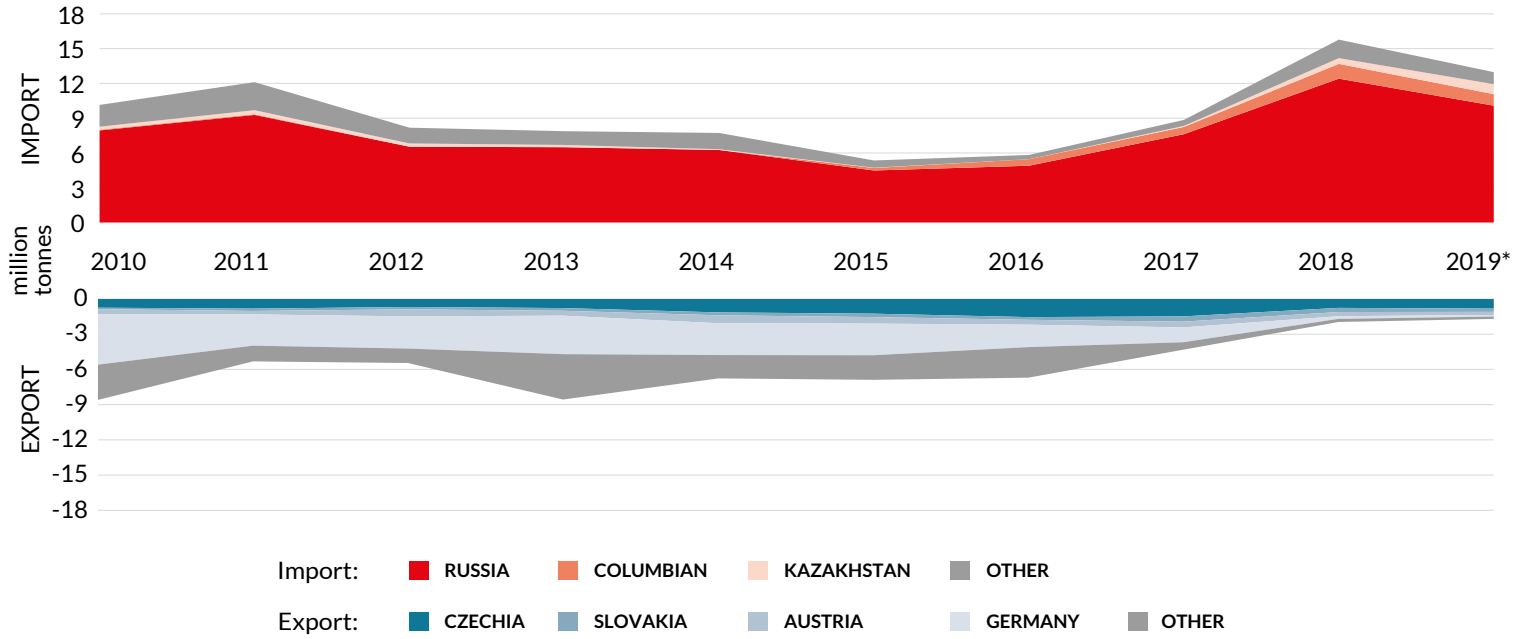
- In 2019, hard coal mining fell by almost 2 million tonnes compared to 2018. This trend has been ongoing for years.



Source: based on data of GUS and Polski Rynek Węgla

Trade balance of steam hard coal

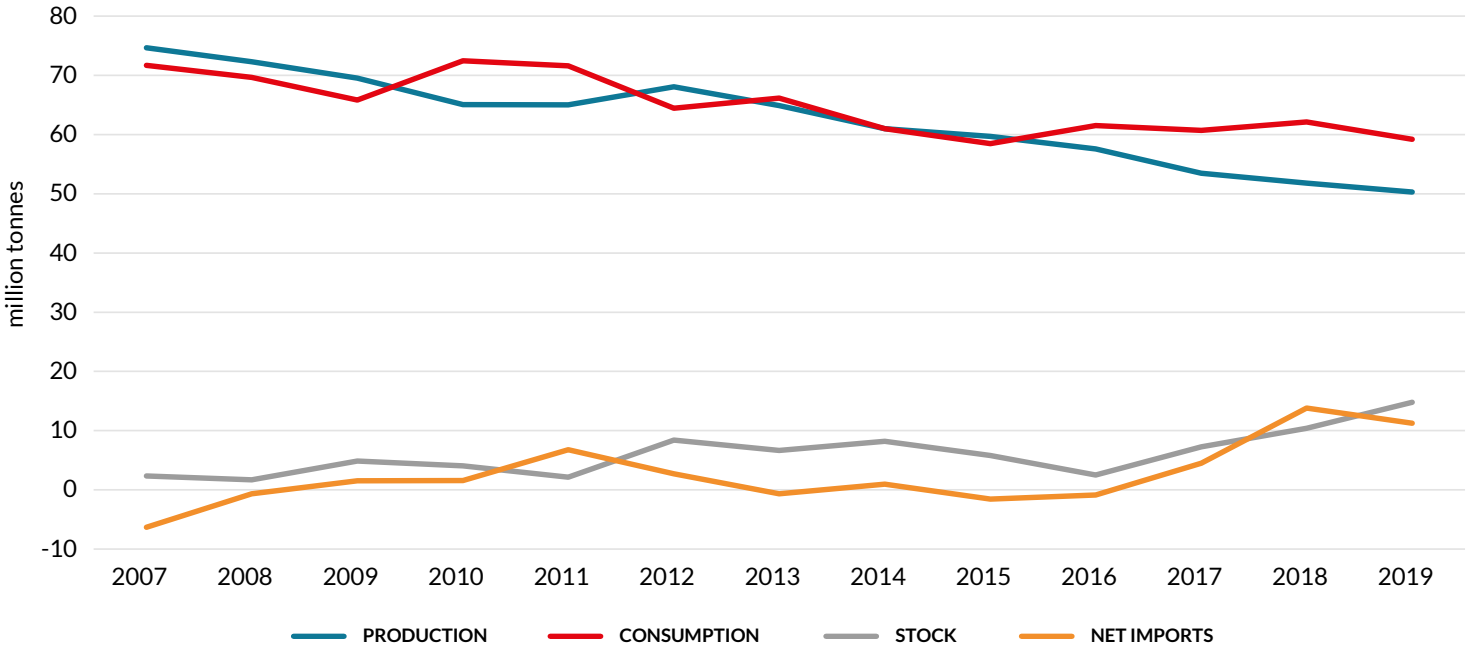
- In 2019, imports of steam hard coal amounted to over 13 million tonnes, i.e. about 3 million tonnes less than in 2018.
- Over 10 million tonnes came from Russia. Other import directions were Colombia, the USA, Kazakhstan and even South Africa.
- Coal exports, mainly to the Czech Republic, amounted to 1.7 million tonnes.



Source: based on data of Eurostat.
*preliminary data

Comparison of basic coal data

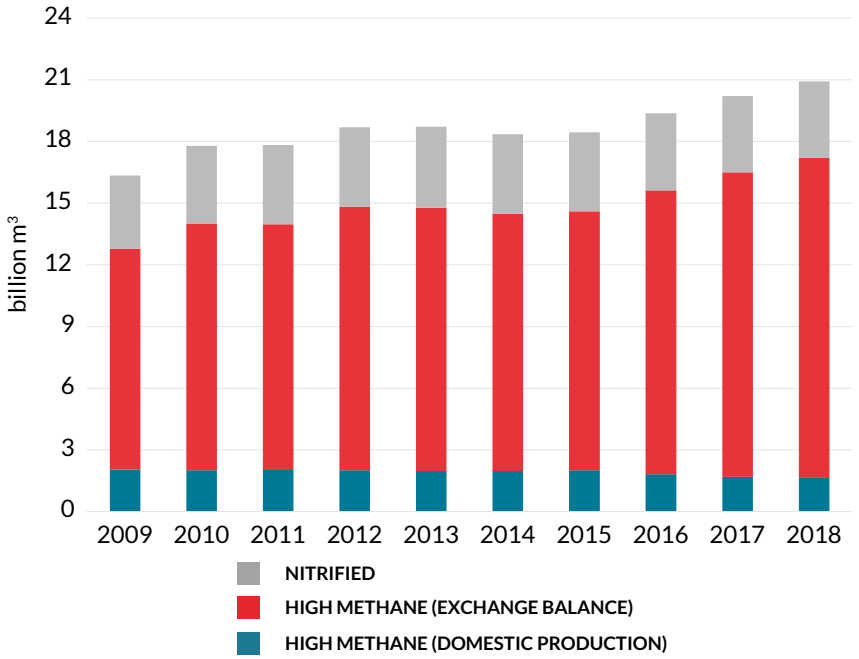
- Even with electricity production declining, domestic consumption of hard coal has remained at a similar level in recent years.
- The quality and price advantage of the imported fuel makes it necessary to store unsold domestic coal.

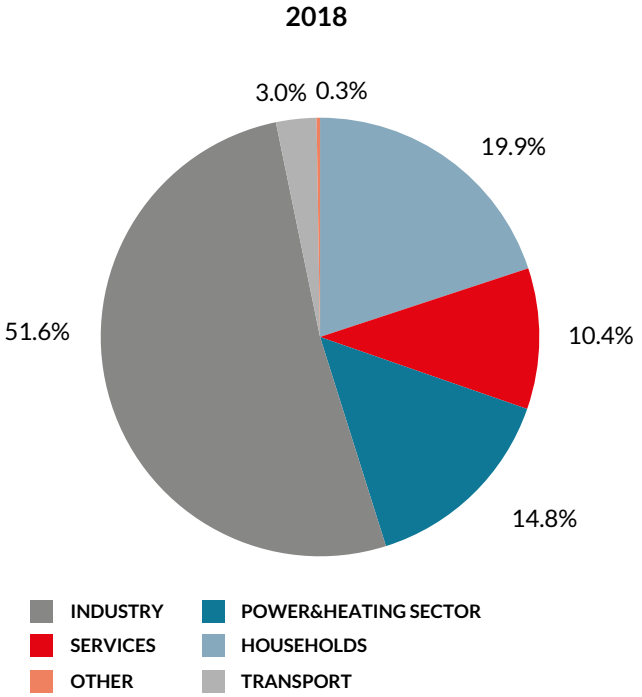


Source: based on data of GUS and Polski Rynek Węgla.

Domestic consumption of natural gas

- The consumption of high-methane gas was 17.2 billion m³ in 2018 - 0.8 billion m³ more than the year before.
- The largest increase in gas consumption was recorded in transport and services.
- The use of nitrified gas remains stable at around 3.8 billion m³ per year. It is fully covered by domestic extraction of this fuel.

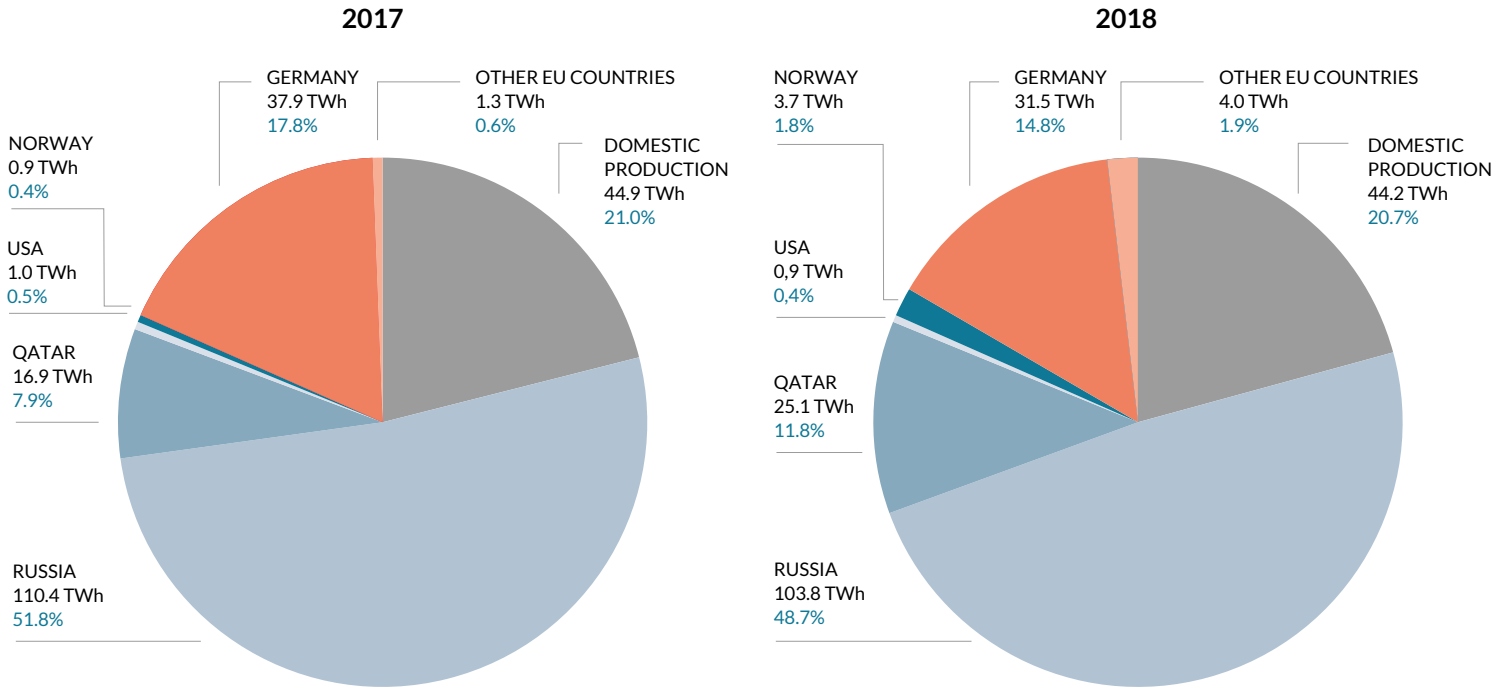




Source: based on data of GUS, URE, and Ministry of Energy.

Supply of high-methane natural gas

- Natural gas imports from Russia account for less than 50% of its supplies.
- In 2018, the importance of other directions of supply increased significantly, mainly due to contracts for the purchase of liquefied gas.
- Domestic production of high-methane natural gas, covering approximately 1/5 of this fuel demand, is decreasing year on year.



Source: based on data of GUS, URE, and Ministry of Energy.

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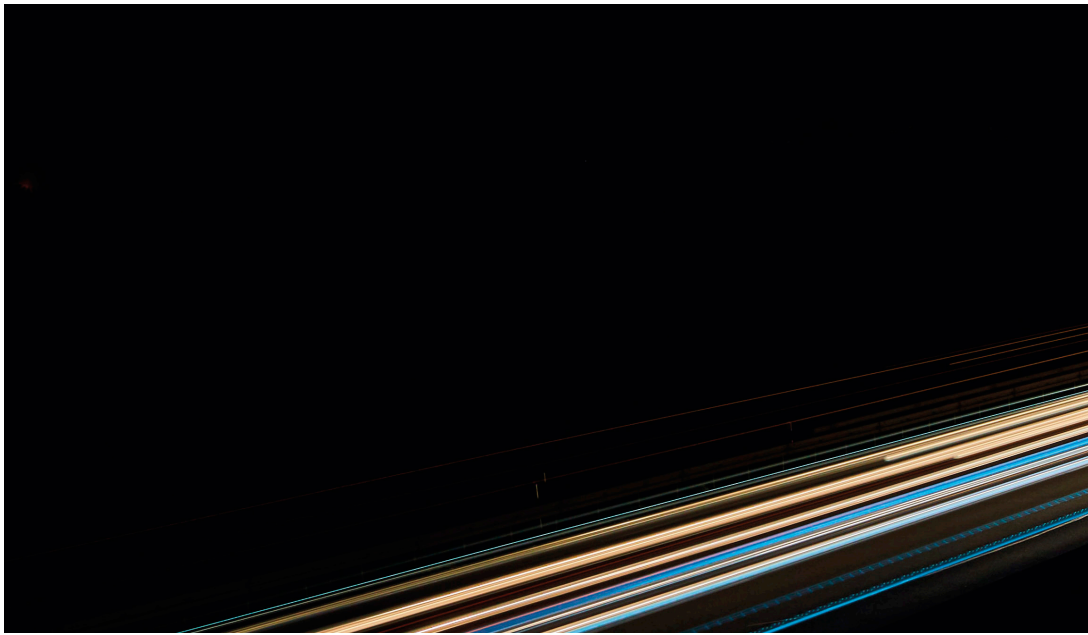
Energy transition in Poland Edition 2020



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