



Energy transition in Poland

Edition 2021

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Foreword

Pandemic accelerates coal phase-out

The year 2020 knocked Poland off balance and was exceptional for everyone. The pandemic has had a huge impact on how the energy sector operates and its effects on the environment.

Worldwide, coal and gas prices fell. In Poland, electricity demand decreased, especially in the first months of the pandemic. All this has changed the energy mix.

There is a clear shift in coal power generation. In 2020, for the first time ever, the share of black energy was less than 70%, even though new hard-coal capacity was put into operation.

2020 also saw rapid growth in photovoltaics, largely due to attractive support schemes. Photovoltaics, in which many jobs have been created in recent years, is becoming an increasingly important field of energy and an important branch of the economy. On the other hand, the wind energy sector is still in crisis—despite some growth in onshore wind energy production, the still binding law on the so-called “10h rule” effectively blocks the development of new projects. Investments in offshore wind energy are beginning to gain momentum, but it will certainly take several more years before we will be able to report its share in the mix.

It is also important to quickly and significantly diversify the directions of gas supply. Currently, Poland imports only 44% of its gas from Russia, compared to nearly 80% a few years ago.

However, the pandemic has not reversed one thing—wholesale electricity prices in Poland have been the highest in the region for years.

In this report, we take a look at the changes in the Polish energy sector for the fourth year in a row.

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

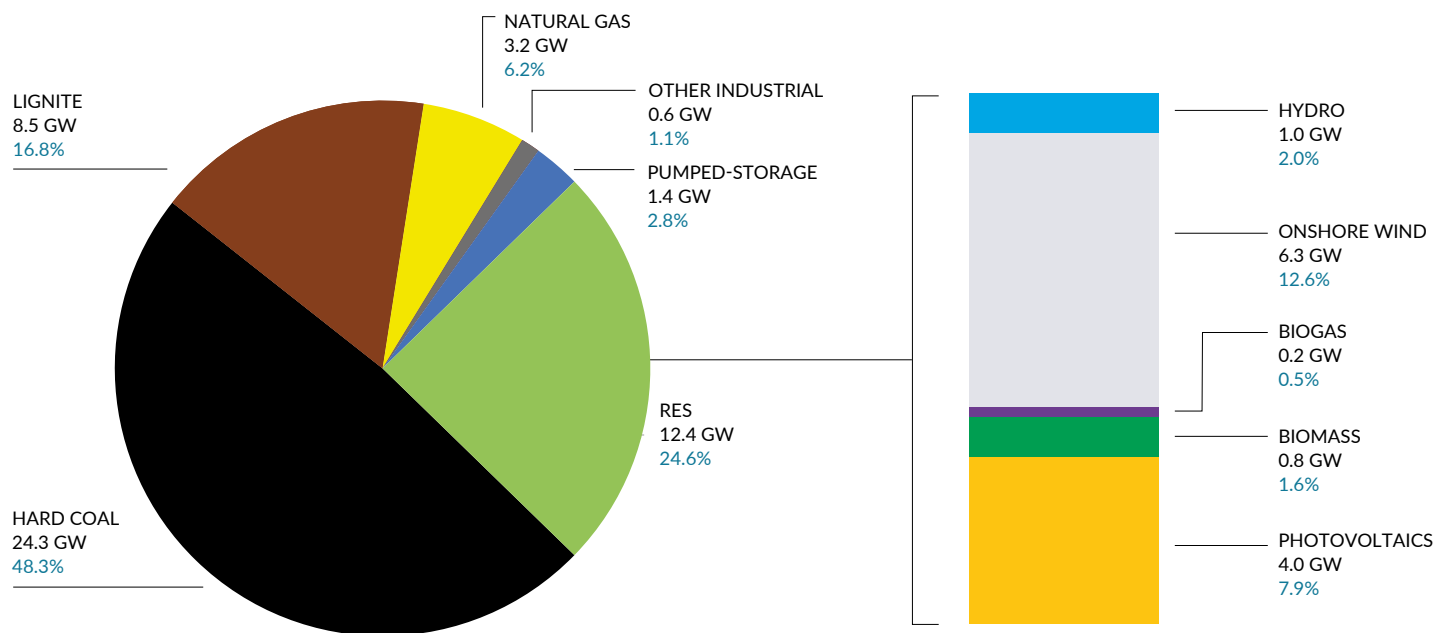
Main conclusions

- The share of coal in electricity generation fell below 70% in 2020.
- On the other hand, the share of RES increased thanks to prosumer photovoltaics and onshore wind power plants. There was also an increase in gas-fired cogeneration units.
- Installed photovoltaic capacity rose to 4 GW.
- Electricity generation declined by 3.8% and demand decreased by 2.1%.
- Net imports of electricity reached a record 13.3 TWh, accounting for 7.8% of electricity consumption in Poland.
- Both consumption and production of steam coal declined. Coal reserves increased, reaching 15 million tonnes at the end of 2020.

Generation capacity

Available capacity in the Polish system in 2020

- The share of achievable capacity of lignite and hard-coal power plants decreased to 65% (from 70%). This is a result of the construction of new gas units and RES.
- Renewable energy sources account for more than 24% of capacity.

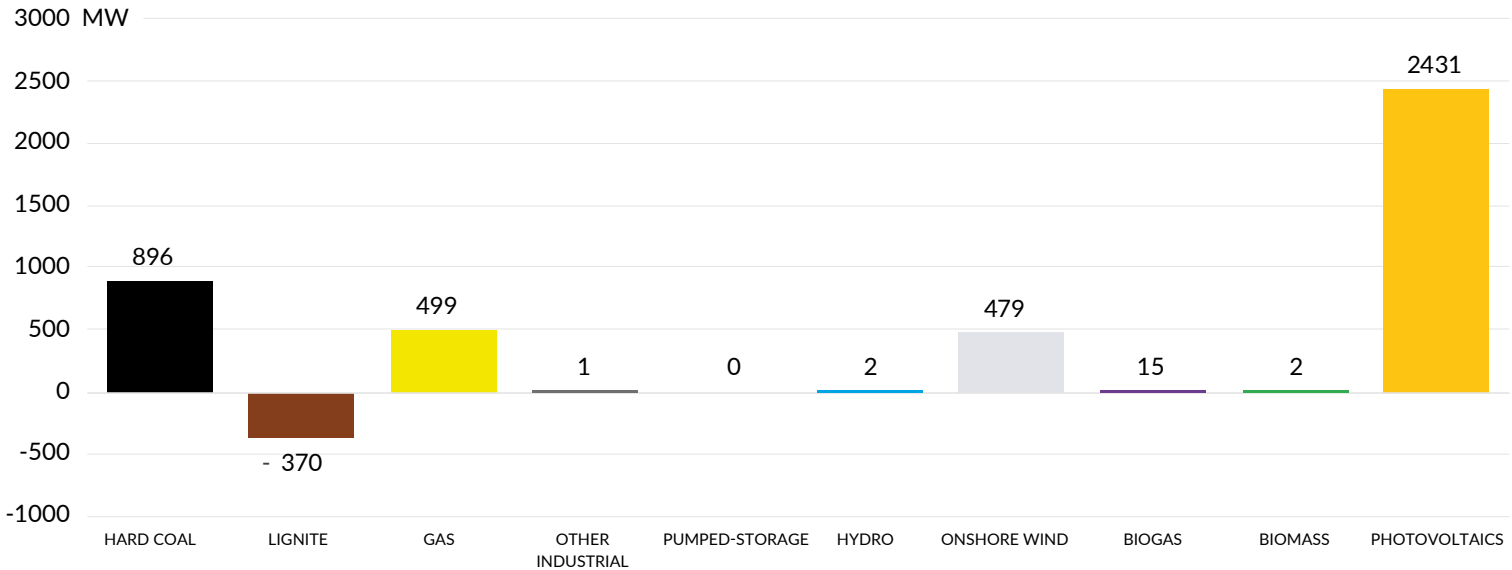


Source: based on data of the Agencja Rynku Energii S.A. (ARE)

As of 31.12.2020

Change in available capacity in 2020 as compared to 2019

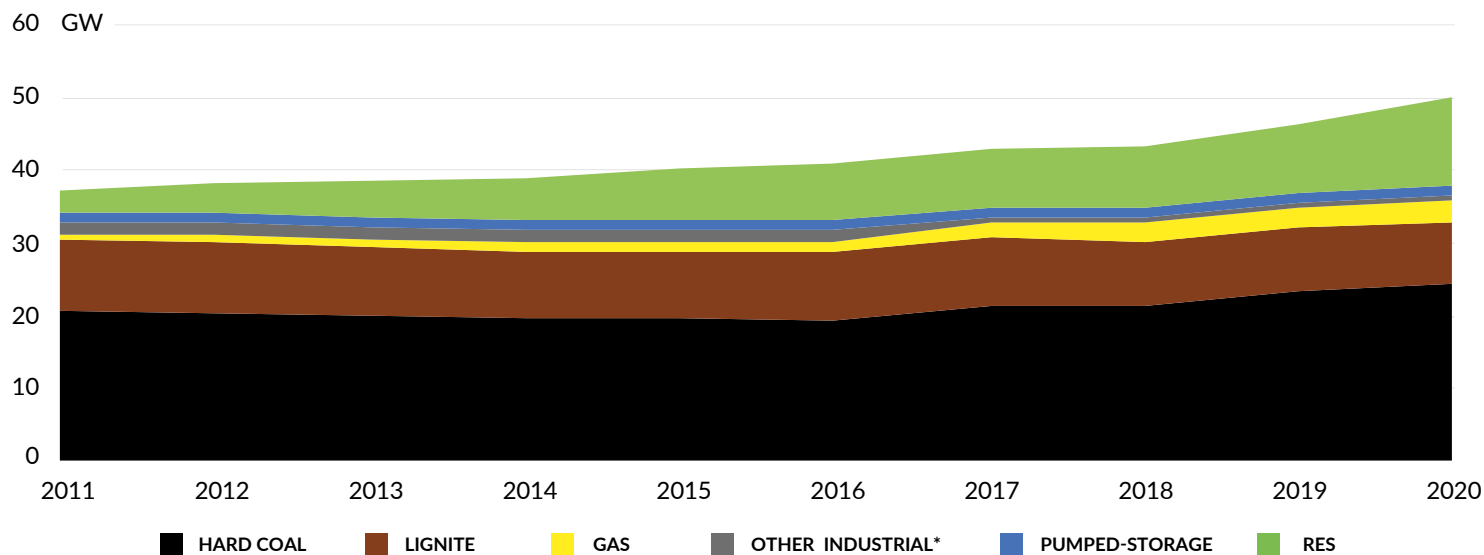
- The increase in coal-fired power plant capacity is mainly due to the commissioning of a 910 MW block at the Jaworzno power plant.
- A 450 MW gas-steam block at the Stalowa Wola power plant was commissioned.
- The decrease in the capacity of the lignite-fired power plant results from the decommissioning of blocks at the Pątnów power plant.
- Solar energy developed significantly in 2020.



Source: based on data of ARE

Changes in available capacity over the last decade

- The level of available capacity in conventional thermal power plants has increased in recent years. This is a result of the completion of recent coal-fired blocks in Kozienice, Opole, and Jaworzno, as well as the development of gas-fired cogeneration.
- The share of RES capacity also has been systematically increasing.

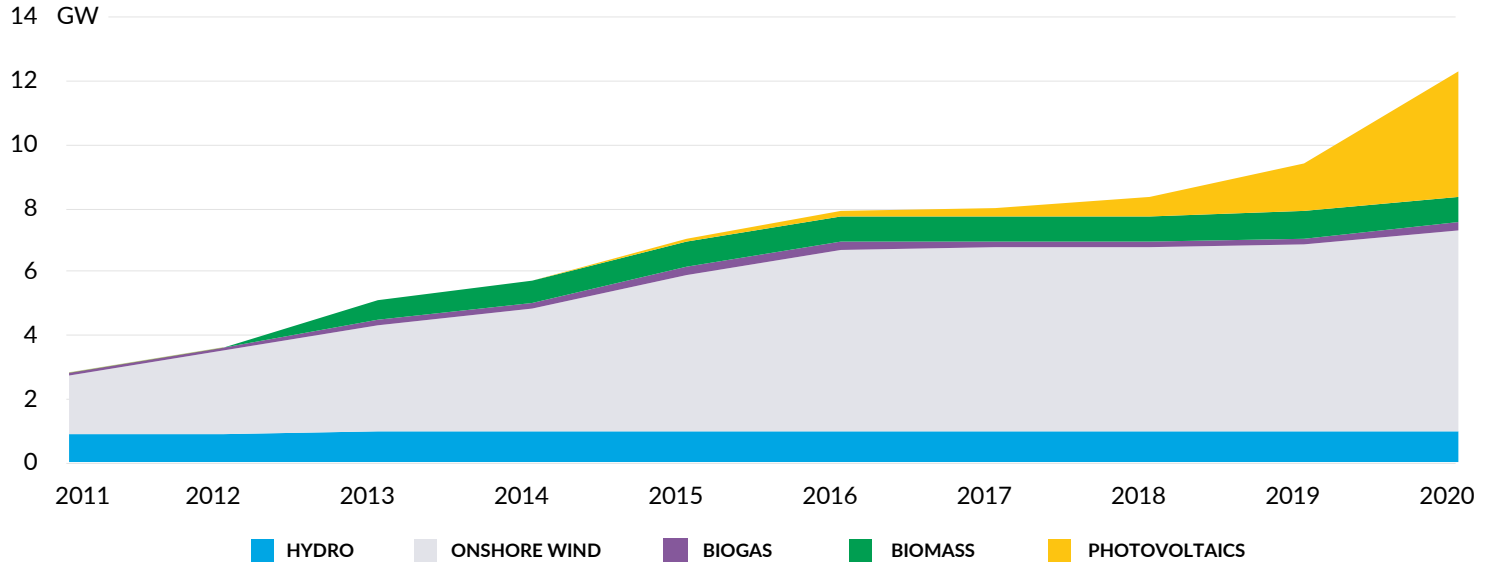


Source: based on data of ARE

* Since 2016, the "industrial" category has been disaggregated by fuel type

Changes in available renewable energy sources capacity

- At the end of 2020, 12.5 GW was installed as RES, including 4 GW in photovoltaic installations. This is 2.5 GW more than the year before.
- RES development in 2020 was driven by the rapidly growing number of prosumers and the commissioning of large-scale solar and onshore wind power plants built with the support of the RES auction system.

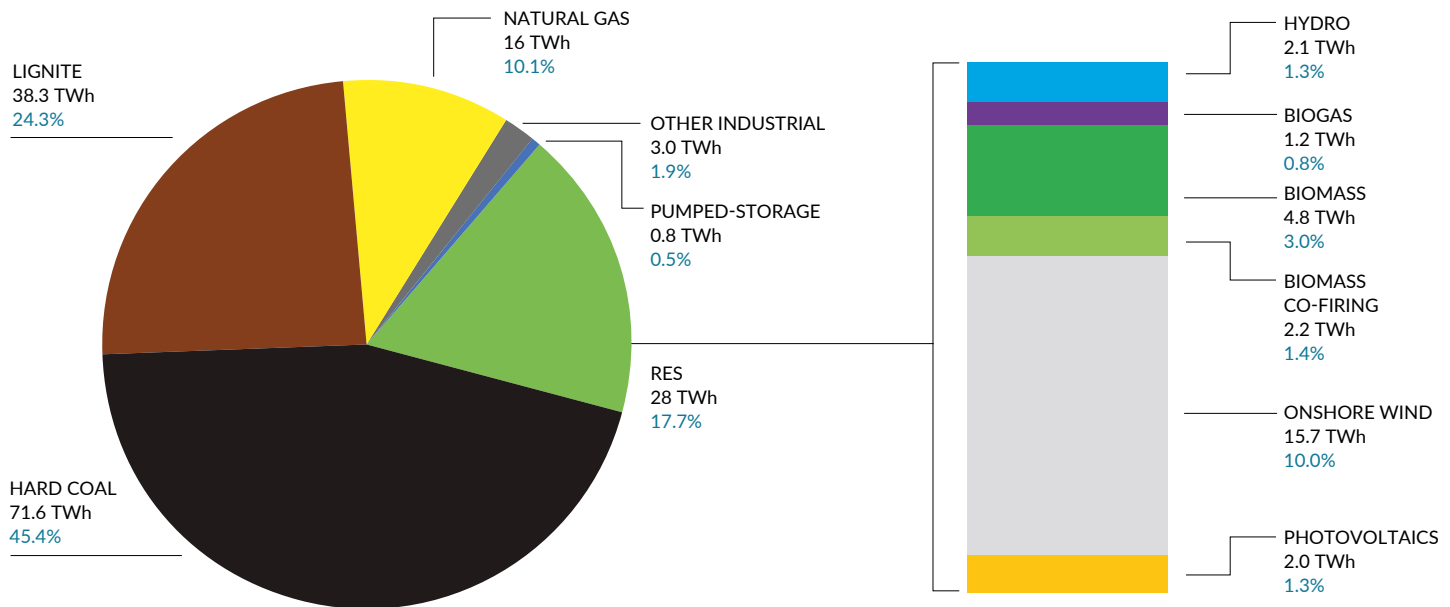


Source: based on data of ARE

Electricity production

Electricity production in 2020

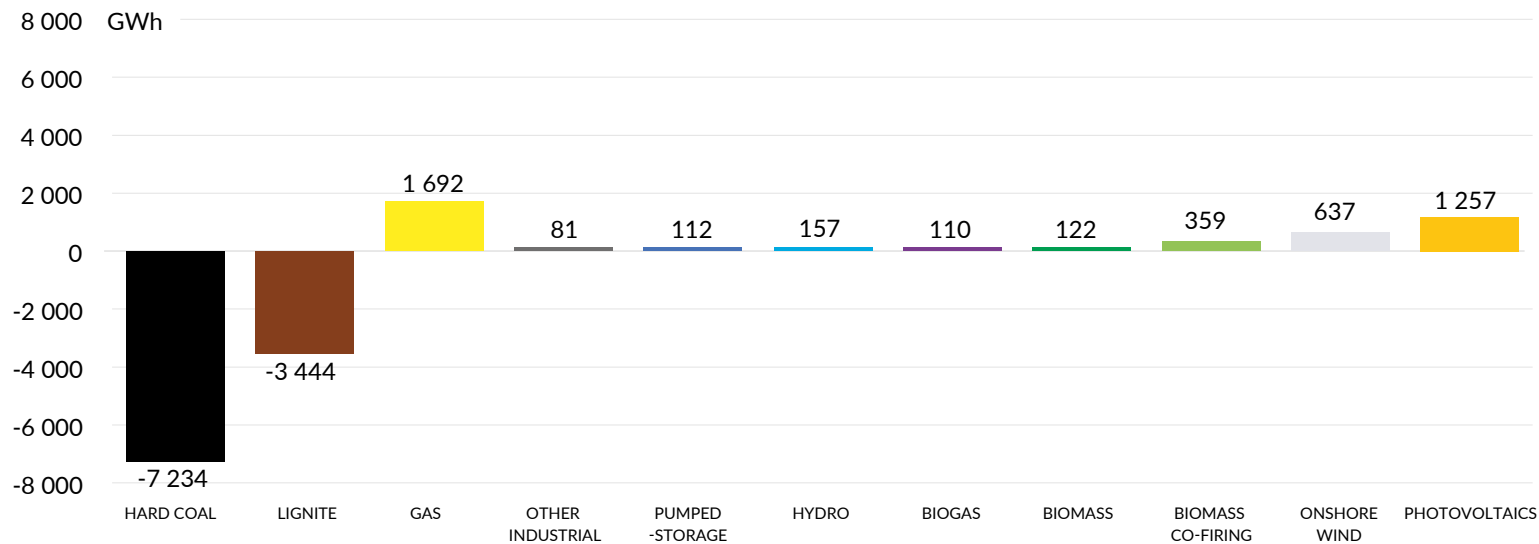
- The share of coal in electricity generation was 69.7%, down 3.9 p.p. from 2019.
- The share of RES in electricity production reached 17.7%.
- The importance of gas increased, its share in the energy mix rose to 10.1% compared to 8.8% in 2019.



Source: based on data of ARE

Change in electricity production in 2020 as compared to 2019

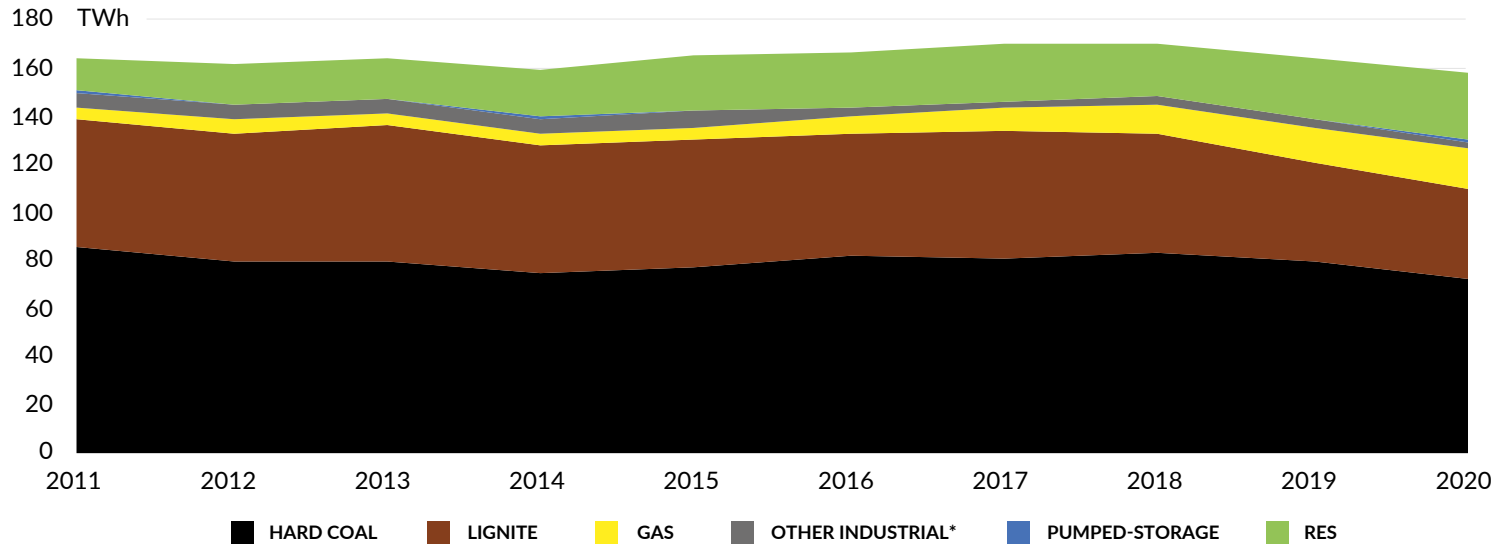
- In 2020, energy production from coal collapsed, mainly hard coal but also lignite. In contrast, power generation from other sources increased.
- The significant reduction in the use of coal was due to a decline in energy demand because of the pandemic, the deteriorating competitiveness of domestic generation, cheap energy imports, and an increase in generation from other sources.



Source: based on data of ARE

Changes in electricity production over the last decade

- Electricity production in 2020 decreased by 3.8%. The decrease in generation from hard coal is particularly notable. Lower generation in lignite was due to, among other things, unit decommissioning.
- This was the second consecutive year of decreasing domestic production.
- Declining competitiveness of coal-fired generation reduces the use of domestic resources.

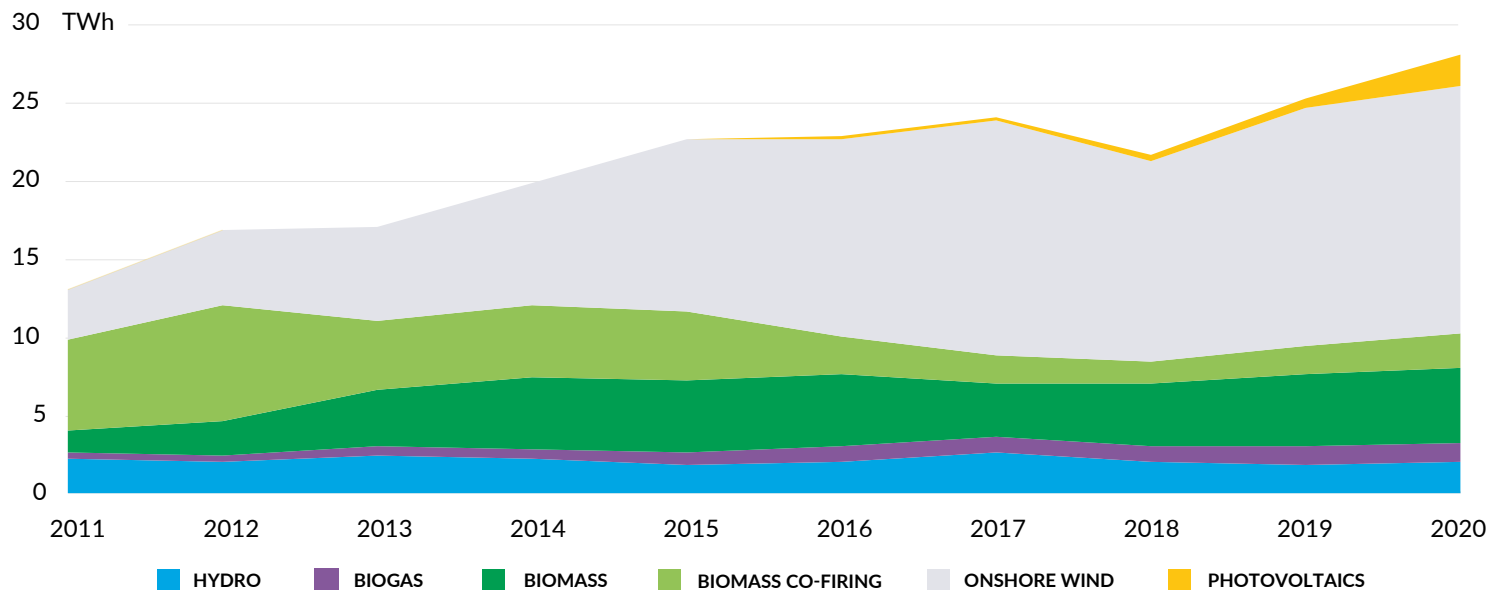


Source: based on data of ARE

* Since 2016, the "industrial" category has been disaggregated by fuel type

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

- In 2020, nearly 28 TWh of electricity from RES was produced. Despite another growing and record-breaking year, the share of RES in energy production is lower than the level that meets EU obligations for 2020.
- The most dynamic growth was observed in photovoltaics. Electricity production from PV grew in 2020 and was 3.5 times higher than in 2019.

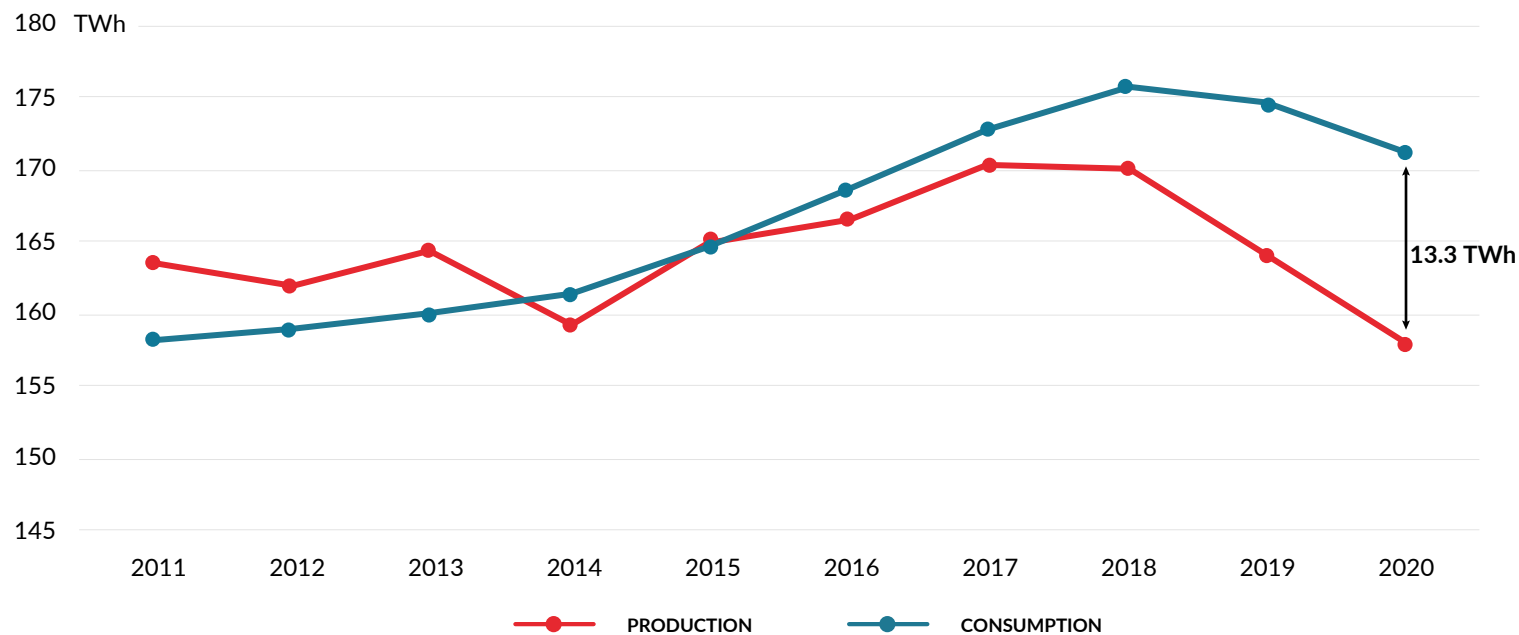


Source: based on data of ARE

Energy balance

Balance of domestic electricity production and consumption

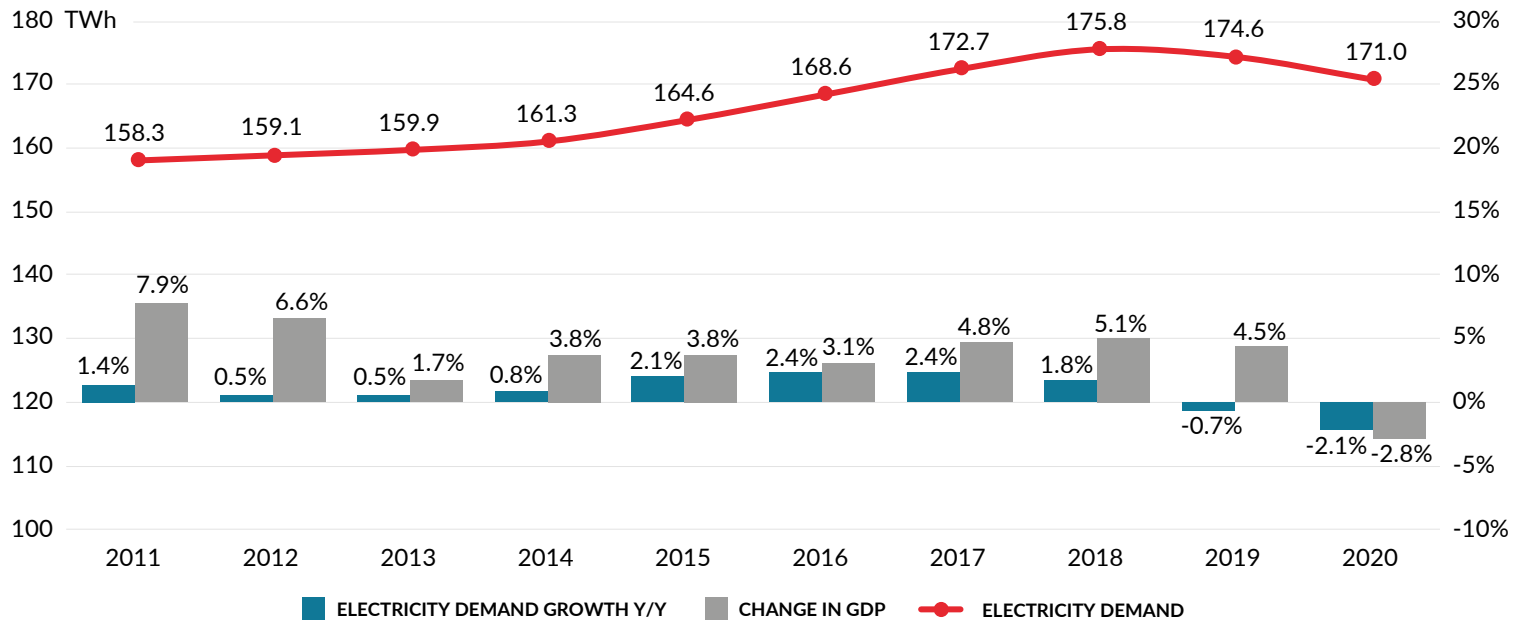
- Electricity production in 2020 was at a decade-low: 157.7 TWh.
- Net energy imports increased to 13.3 TWh, accounting for 7.8% of consumption.



Source: based on data of ARE
Gross energy consumption shown

Change in electricity demand

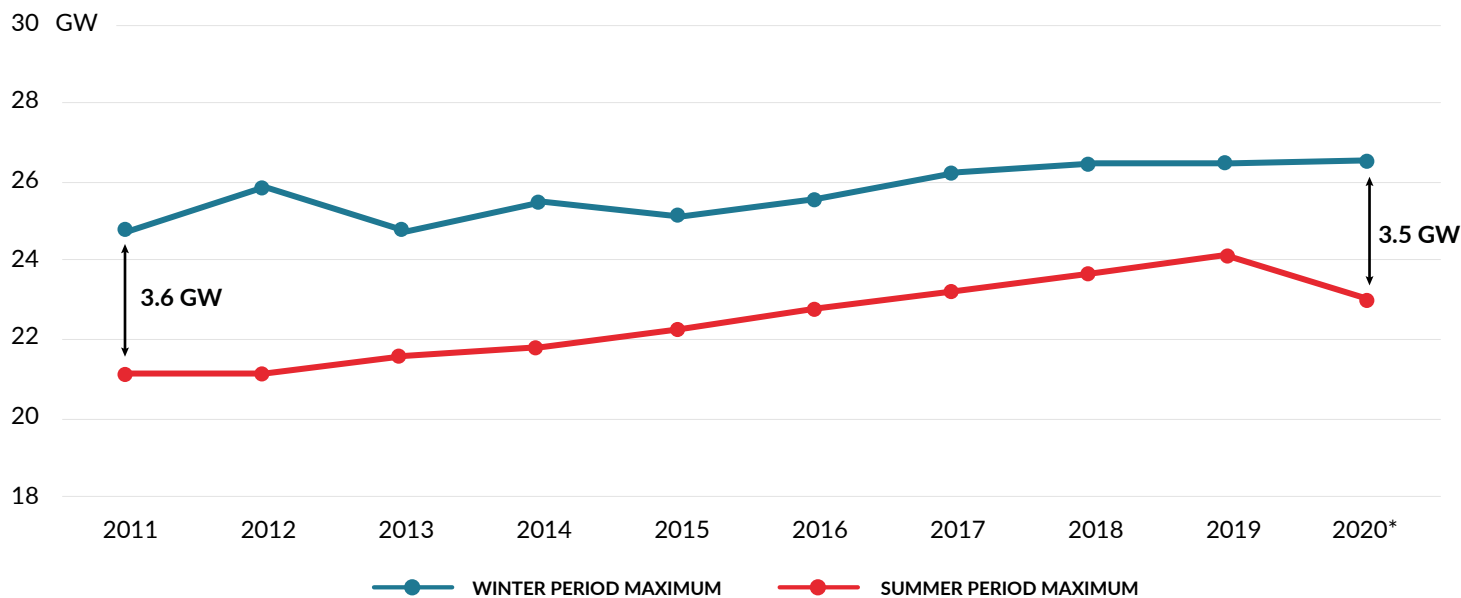
- The year 2020 was marked by the first recession in the Polish economy in 30 years. GDP fell by 2.8% and energy demand by 2.1%.



Source: based on data of ARE and Statistics Poland (GUS)

Changes in peak power demand

- Peak power demand in the winter period is growing at a slower rate. In 2020, it was around 26.5 GW, only 0.03 GW more than in the previous year. This is due to a warming climate.
- Peak power demand in the summer period fell to 23 GW. This was due, on the one hand, to lower electricity consumption in the first months of the pandemic and, on the other hand, to the increasing influence of prosumers on the power balance.



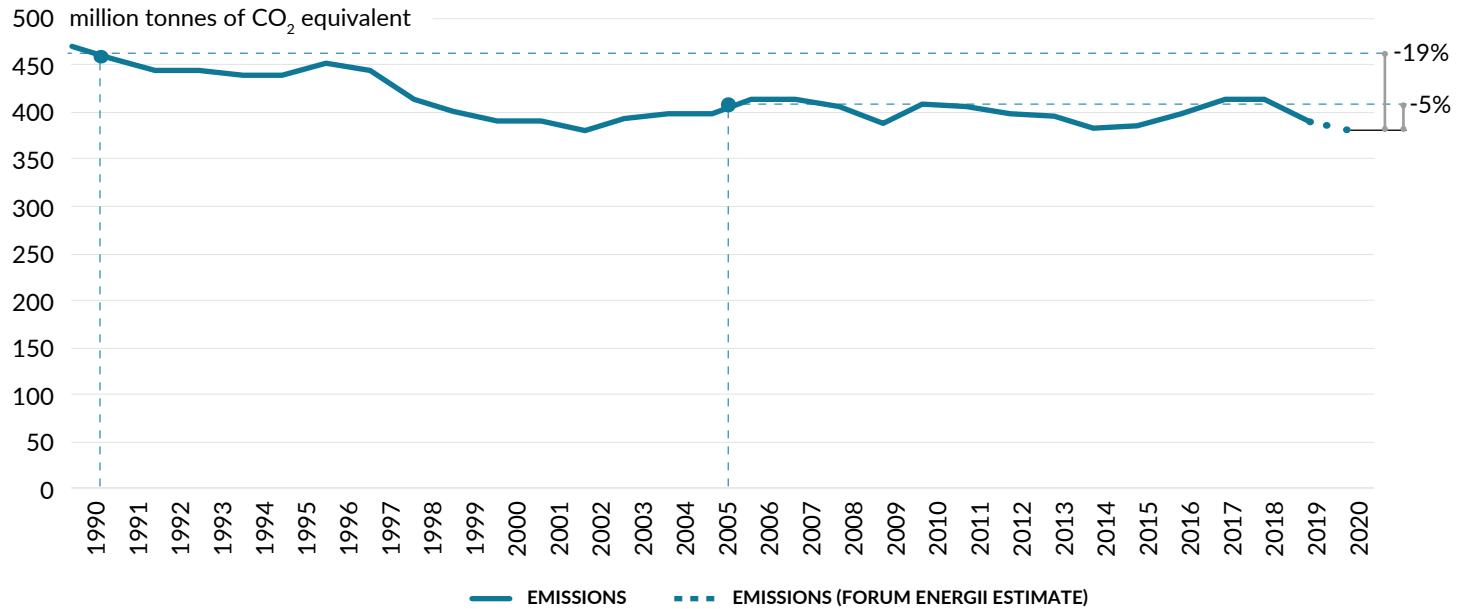
Source: based on data of the Polskie Sieci Elektroenergetyczne S.A. (PSE)

*preliminary data

Emissions

Total national greenhouse gas emissions

- In 2019, GHG emissions decreased by 5.3% y/y and amounted to 390.67 million tonnes of CO₂ equivalent.
- Emissions of these gases are also estimated to decrease by at least 3% y/y in 2020.

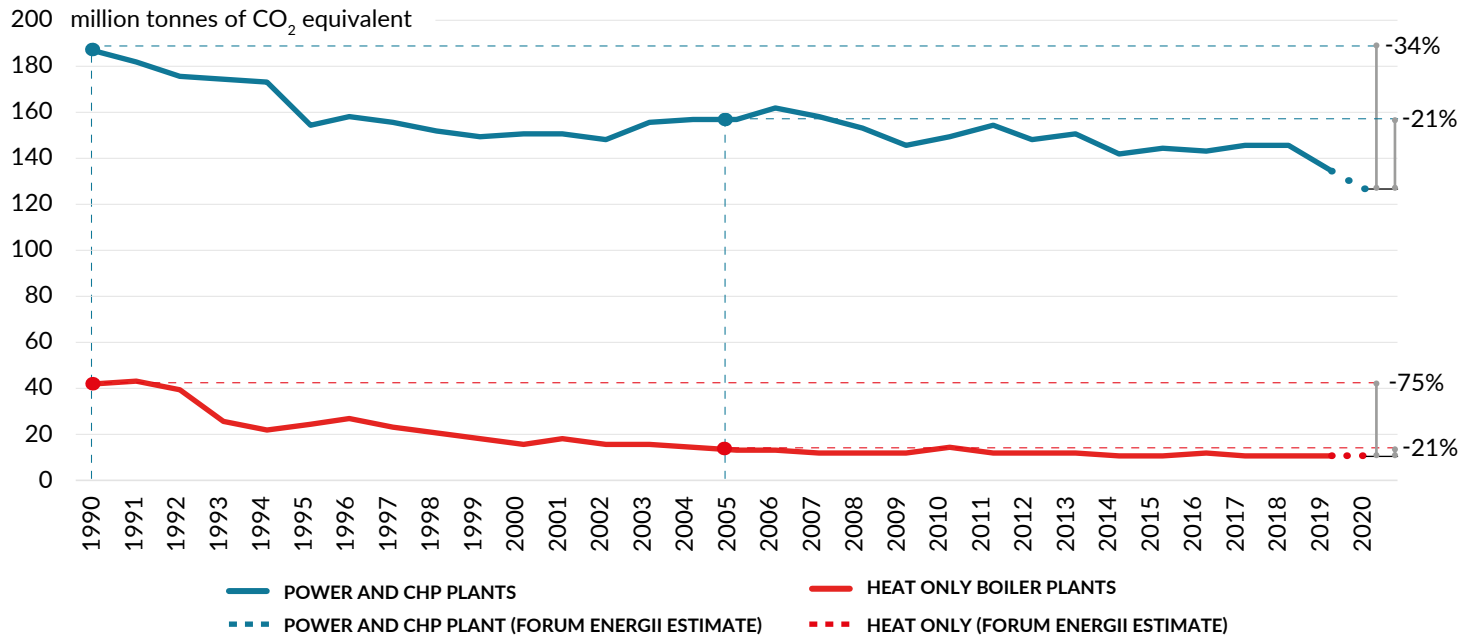


Source: based on data of the European Environment Agency (EEA)

Greenhouse gases: mainly CO₂, methane, nitrous oxide

Power and heating sector greenhouse gas emissions

- The electric power industry saw a sharp decline in GHG emissions in 2019, mainly due to a reduction in coal-fired power plant output, increased generation from cleaner sources, and increased energy imports.
- In 2020, emissions are estimated to decline by about 7.4%.

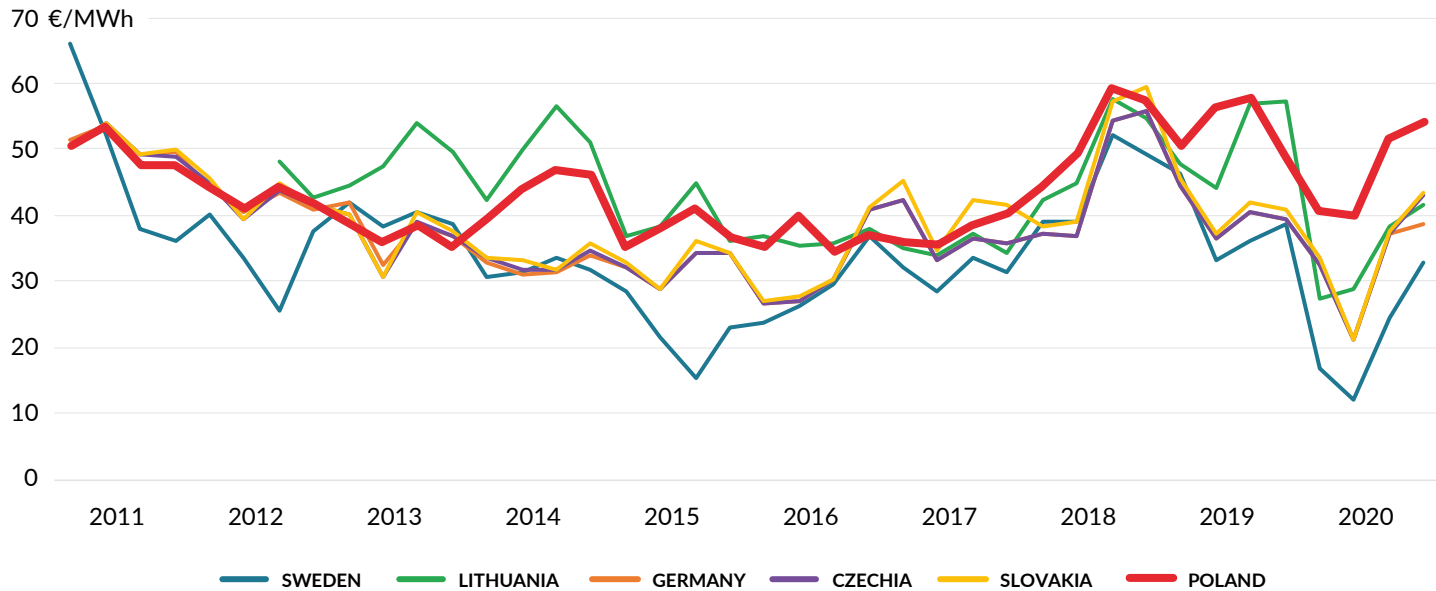


Source: based on data of EEA

Electricity prices

Comparison of SPOT prices of electricity on neighbouring countries' markets

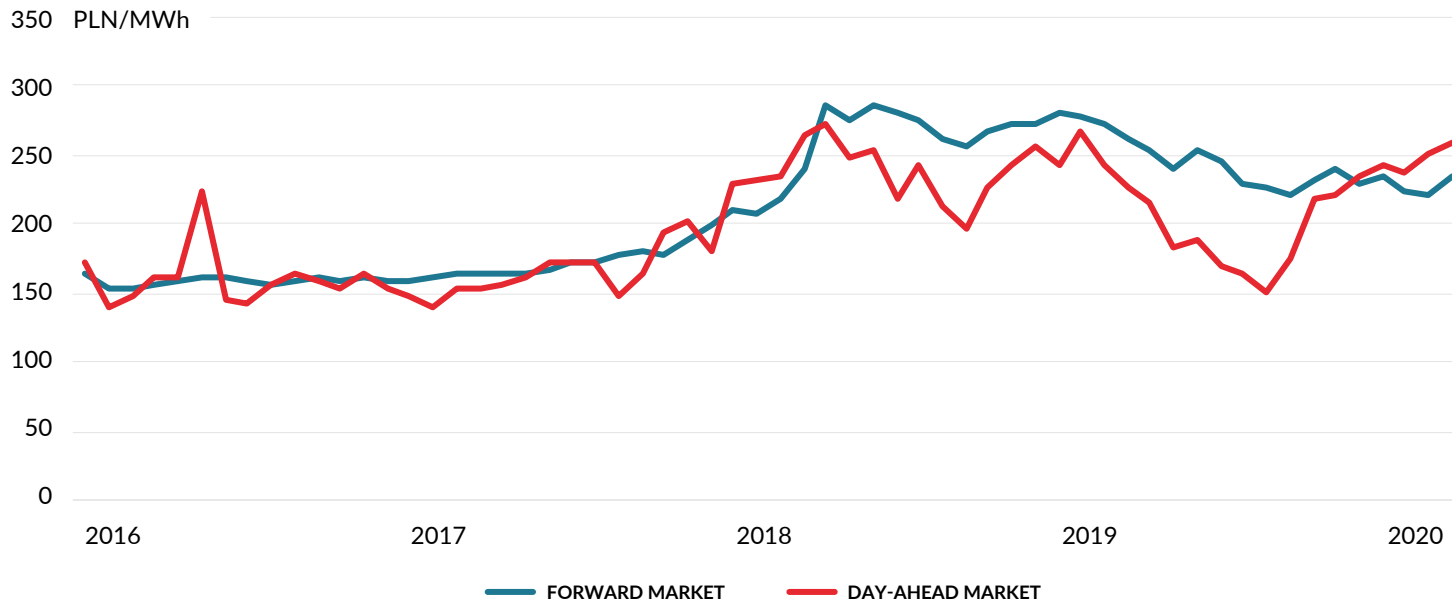
- Electricity prices in Poland have been the highest in the region for many years and not even the pandemic has changed that. .



Source: based on data of European Commission - Quarterly Report on Energy Markets, ENTSO-E

Wholesale electricity prices in Poland

- As of 2018, prices in the Day-Ahead Market and the Forward Market no longer closely follow each other. This is related to the growing importance of imports and the decline in the competitiveness of domestic generation resources.
- After declines in the second quarter of 2020, the increase in energy demand caused a significant increase in prices in the Day-Ahead Market.

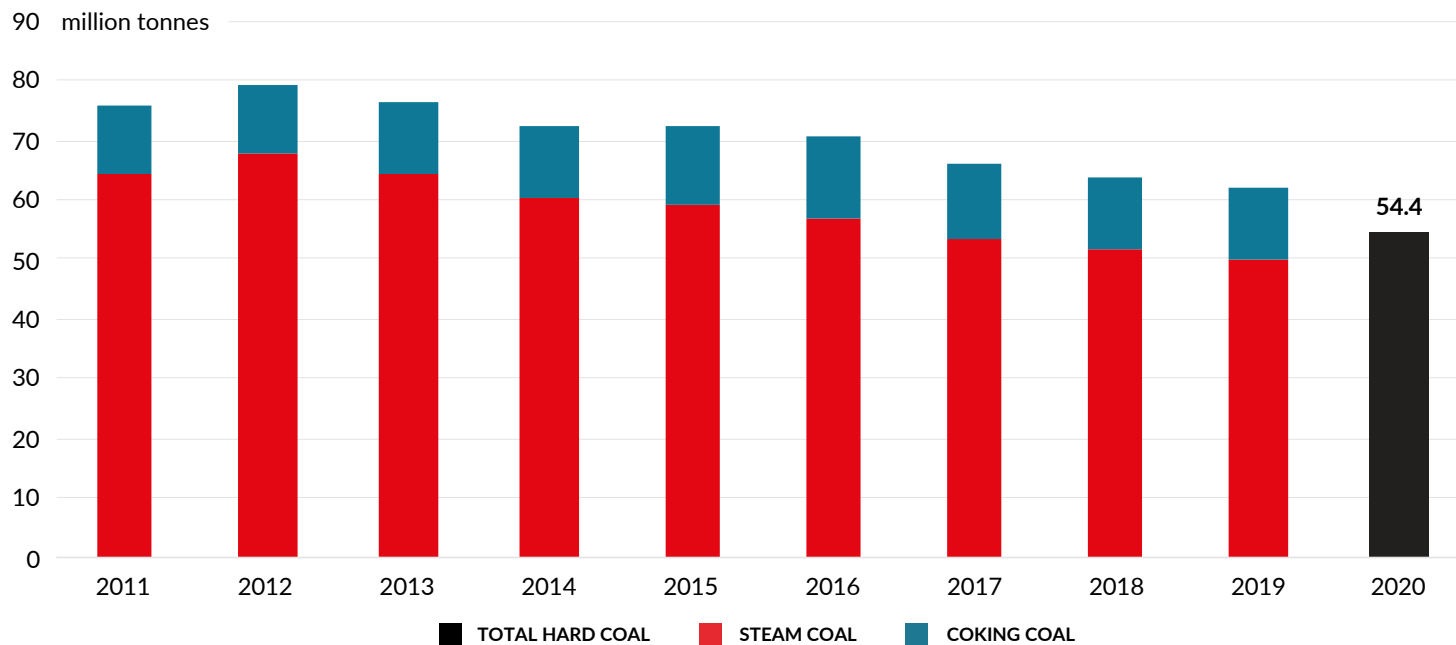


Source: based on data of Polish Power Exchange

Power sector fuels

Domestic hard-coal production

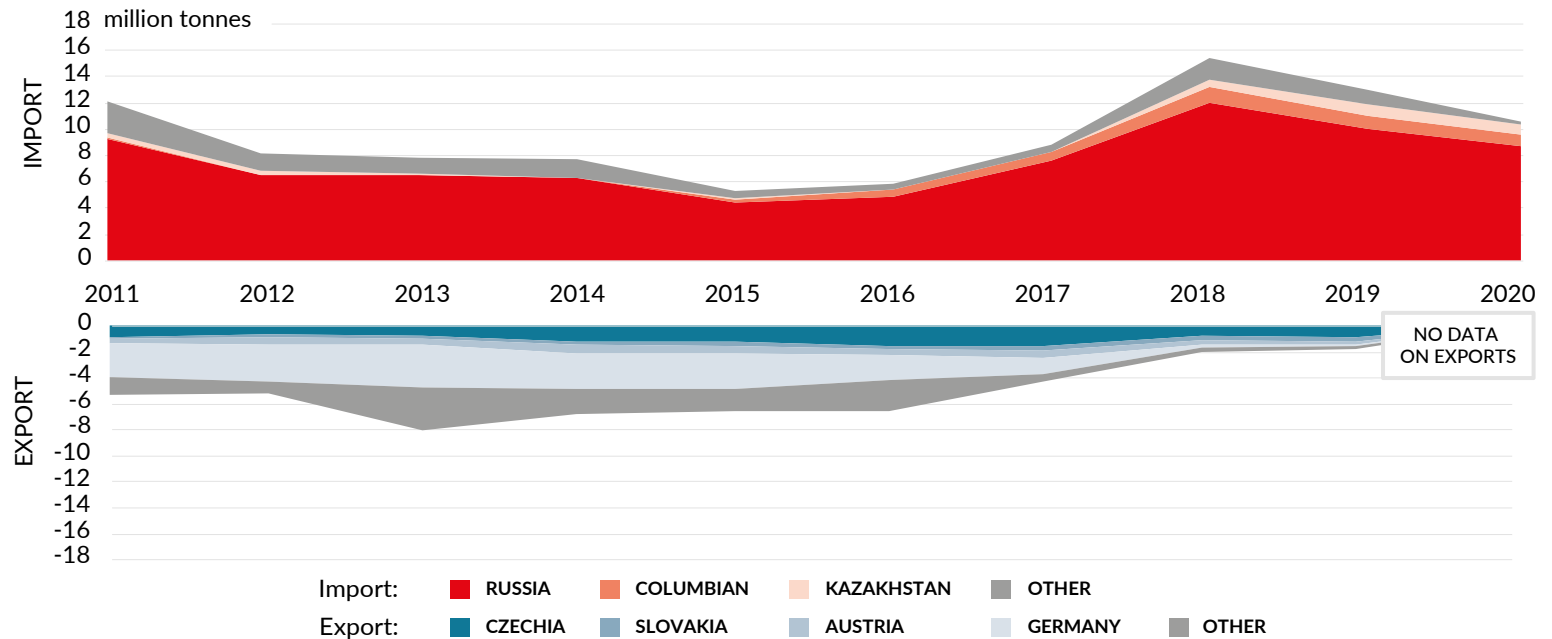
- In 2020, hard-coal production fell by about 7.7 million tonnes compared to 2019. This downward trend has continued for years. The reduction in power generation from conventional power plants is strongly affecting the demand for this fuel.



Source: based on data of GUS and Polski Rynek Węgla

Trade balance of steam coal

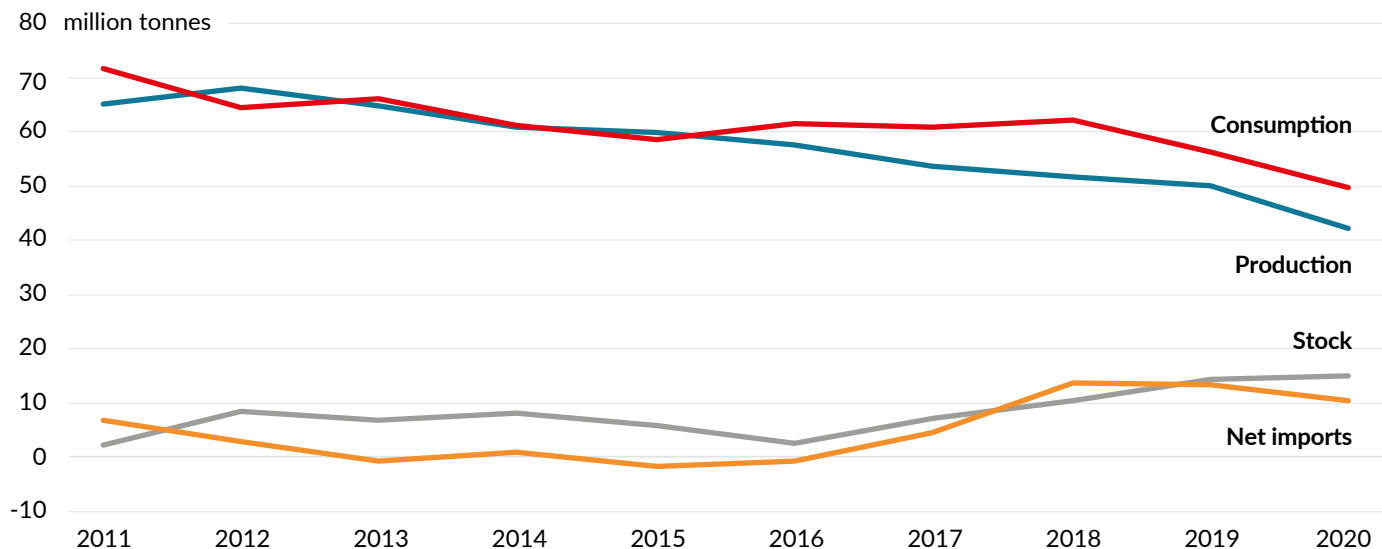
- In 2020, steam coal imports totalled about 10.5 million tonnes, about 2.4 million tonnes less than in 2019.
- More than 83% of the imported coal came from Russia, with the remainder mainly from Colombia and Kazakhstan.



Source: based on data of Eurostat

Coal production and consumption in Poland

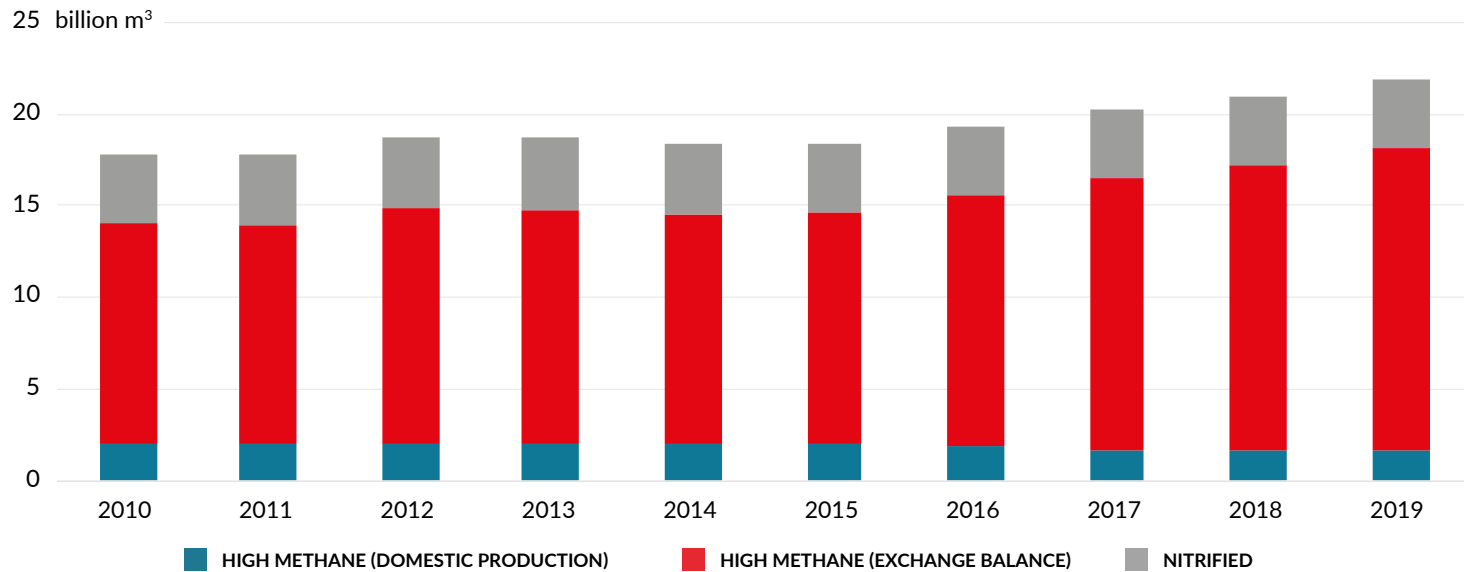
- The downward trend in both production and consumption of steam coal continued in 2020.
- The quality and price advantage of imported fuel makes it necessary to store unsold domestic coal; its reserves amounted to about 15 million tonnes.



Source: based on data of GUS and Polski Rynek Węgla

Domestic consumption of natural gas

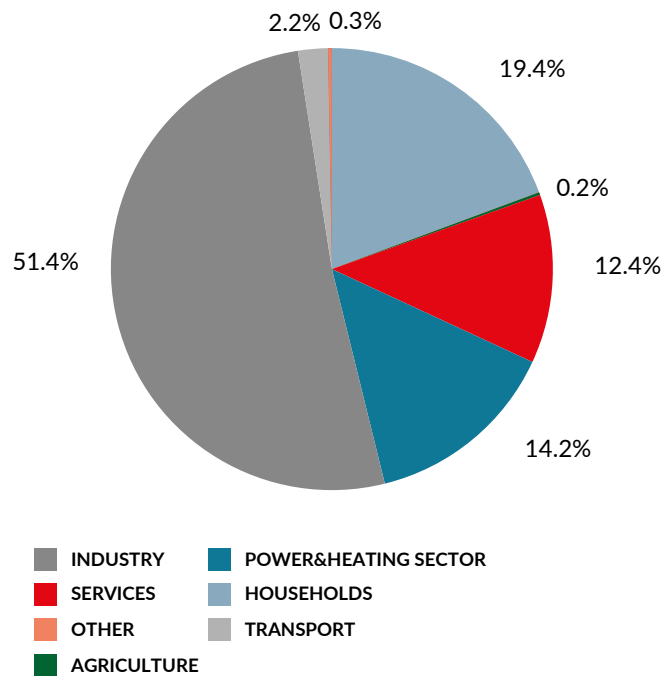
- High-methane gas consumption amounted to. 18.17 bcm—0.96 bcm more than a year earlier.
- The use of nitrogenous gas remained stable at around 3.7 bcm per year.



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

Gas consumption by various sectors of the economy in 2020

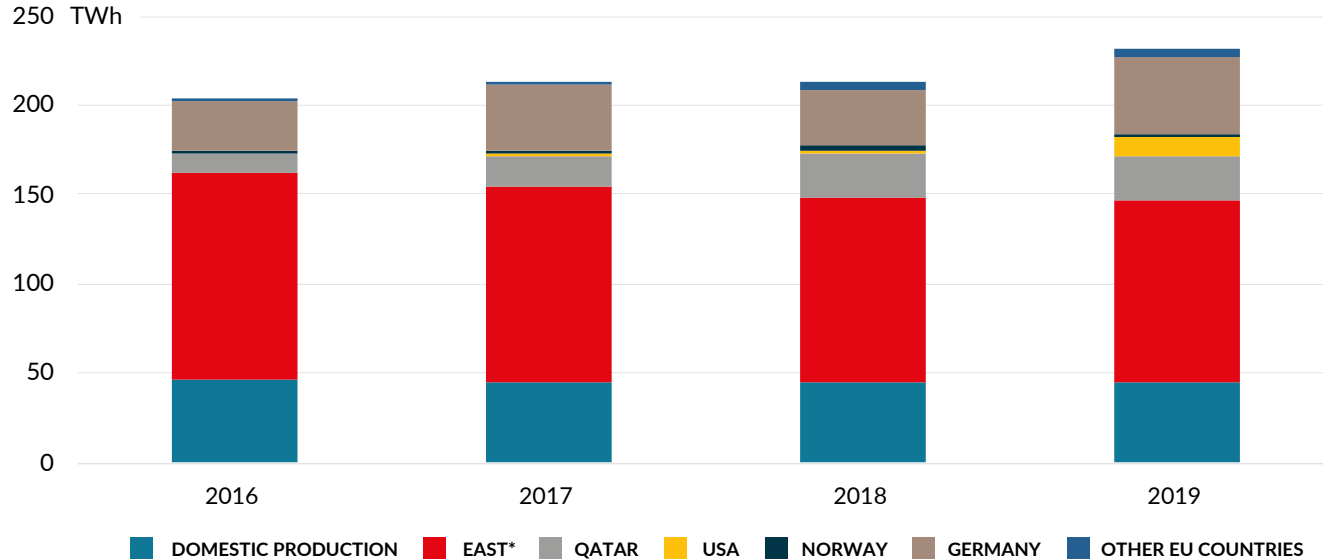
- The largest consumer of gas in Poland is industry, consuming 51.4%.
- The largest increase in demand for gas in 2020 was in transport and services.



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

Supply of high-methane natural gas

- 44% of gas imports come from the East and are steadily declining.
- In 2019, the importance of supplies from other directions has once again increased significantly, mainly thanks to contracts for the purchase of liquefied natural gas.
- Domestic production of high-methane natural gas, which covers about one-fifth of the demand for this fuel, is slowly decreasing year on year.

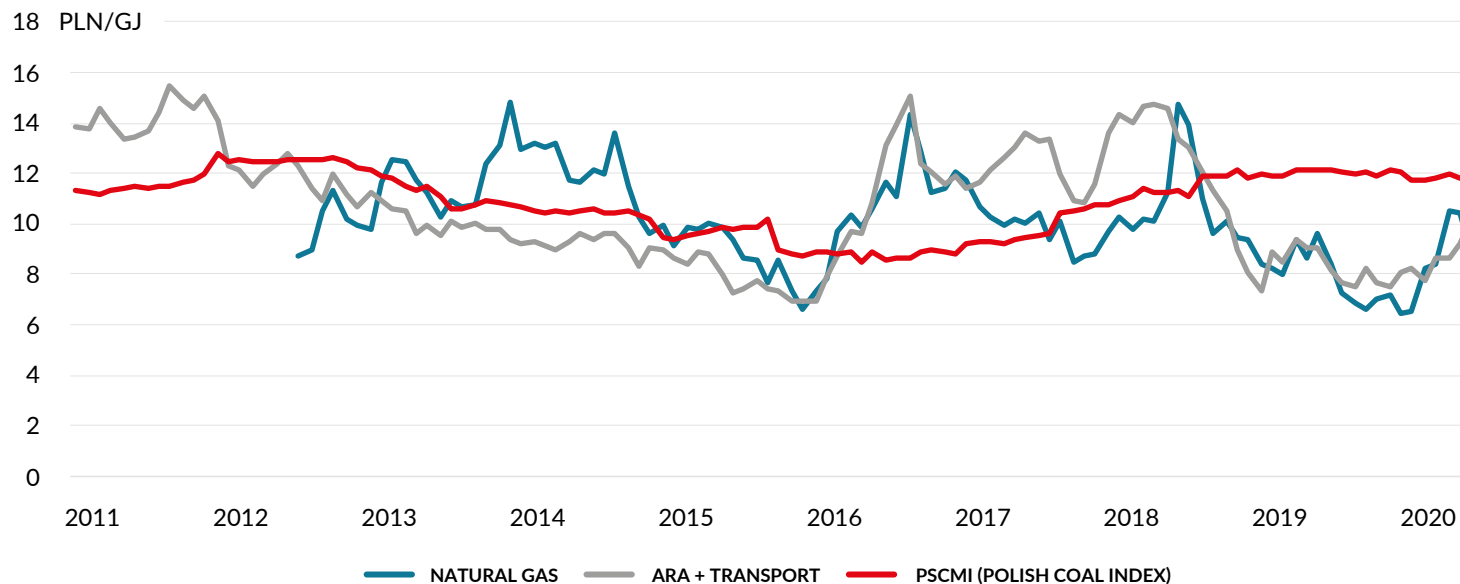


Source: based on data of Ministry of Climate and Environment

* category „East“ appears in the source data

Steam coal and natural gas prices

- The Polish steam coal price index (PSCMI) has been rising for years, reducing the competitiveness of domestic production.
- At the end of 2018, the domestic PSCMI index has surpassed the ARA API2 index..



Source: based on data of ARP, marketwatch.com, wnp.pl

Notatki

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