The Role of Coal in Energy Policy of Poland

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Agenda

1. Characteristics and situation;
2. Trends and projections;
3. Challenges for energy sector;
4. Energy Policy directions;
Poland’s GDP growth comparing to the electricity consumption during last 25 years

(2005 = 100%)

Poland has made a great progress during last 25 years regarding GDP growth, whereas electricity consumption also increased but with less dynamics.
Primary energy demand - EC 2015 reference scenario

The chart illustrates the primary energy demand for the period from 2015 to 2050, with specific emphasis on the EC 2015 reference scenario. The data is categorized by energy sources, including Coal, Oil, Natural gas, Nuclear, Electricity, and RES (Renewable Energy Sources).

For each year, the chart shows the total energy demand in Mtoe, with the contributions from each energy source indicated by different colors. The key years are: 2015, 2020, 2025, 2030, 2035, 2040, 2045, and 2050.

- **2015**: Total demand is indicated by a bar, with the breakdown showing the contribution of each energy source.
- **2020**: Similar to 2015, with a focus on the projection for the future.
- **2025**: The chart continues to display the energy demand by source for this year.
- **2030**: The data for this year is also visualized, highlighting the trend in energy demand.
- **2035**: Projected demand for this year is shown, with a detailed breakdown of each energy source.
- **2040**: The trend continues into the next decade, with the energy demand by source.
- **2045**: The chart aims to project the energy demand for this year.
- **2050**: The final year is depicted, showing the projected energy demand for this horizon.

The chart provides a comprehensive view of the energy demand outlook, emphasizing the projection for the coming decades under the EC 2015 reference scenario.
Electricity generation by fuel sources in 2015

Structure of electricity generation by sources (2015) [%]

- Hard coal 47.1
- Lignite 32.0
- Renewable sources 13.7
- Natural gas 3.9
- Biogas and biomass 43.8
- Wind 8.1
- Hydro 47.9
- Photovoltaics 0.25
- Other 3.2
Age structure of Polish thermal power plants

- above 30 years: 62%
- 26-30 years: 13%
- 21-25 years: 4%
- 16-20 years: 6%
- 11-15 years: 6%
- 6-10 years: 3%
- up to 5 years: 6%
Electricity – capacity demand

Average domestic peak power demand (2006-2015)
Conclusions on examined various energy scenarios

- Increasing demand for primary energy and for electricity;
- Price of CO₂ emission allowances will be an important factor shaping the energy mix
- Price levels of CO₂ allowances will define in particular:
  - cost effectiveness of replacement of generation capacity for new high-efficient units
  - Share of gas and RES in the energy mix
  - competitiveness of nuclear energy
- Coal will remain the key component of Poland’s energy security.
- The role of RES will be growing but it will depend in particular on competitiveness and economic maturity
What are the challenges facing Polish energy sector?

- High energy demand for the developing economy
- Inadequate level of fuel and energy generation and transportation infrastructure development
- Significant dependence on the external supply of natural gas
- Obligations related to the natural environment protection, inclusive of those concerning the climate
- Almost full dependence on external supply of crude oil
Energy policy - main goals

Energy Security

Competitiveness
Sustainable development
Policy directions

- **Energy efficiency** will remain the priority of the energy policy;

- **Hard coal and lignite** will remain basic fuels for power generation—around 50% of electricity will be produced in 2050;

- **Supporting investments** in electricity generation (capacity market);

- **The role of RES** will increase according to EU policy but further development of RES will depend on achieving economic and technological maturity;
Policy directions

- **Nuclear Energy Program** will be implemented (1st power plant in 2030);

- Diversification of routes of **gas supply**: LNG, Norway, Denmark direction;

- Development of transmission and distribution grid (also using smart technologies);

- Reducing **CO₂ emissions** – EU 2030 goals

- Electrification of transport

- Development of energy clusters as a way to promote dispersed generation
Electricity generation by sources

- New gas-steam power plants
- New coal power plants
- New nuclear power plant
- Currently built gas-steam units (Płock, Żerań, Stalowa Wola, Włocławek)
- Existing & currently constructed lignite power plants (Turów)
- Currently constructed coal power plants (Jaworzno, Koźminiec, Opole) – without Ostrołęka C
- Existing coal power plants
- Biogas i biomass
- Photovoltaics
- Hydro

*) with the assumption of 20-year service life
Adapting to challenges in coal-based electricity production

SC and USC coal-fired power units to be operational in Poland in 2017, 2018 and 2019

Replacing old and less efficient coal-fired power units by new ones will result in 30% reduction of CO2 emissions.

Adapting to challenges in coal-based electricity production

Improving the efficiency of the power generation process in coal-fired power plants should be also classified as the clean coal approach.

New coal-fired power units that will be operational in Poland in the coming years will use supercritical and ultra supercritical technology.
CO2 reduction in power plants and CHP

[Graph showing % reduction from 2005 to 2040, with years on the x-axis and % reduction on the y-axis, showing a negative trend indicating CO2 reduction.]
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