



Reconsidering Poland's energy mix

Joanna Maćkowiak Pandera PhD
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About us



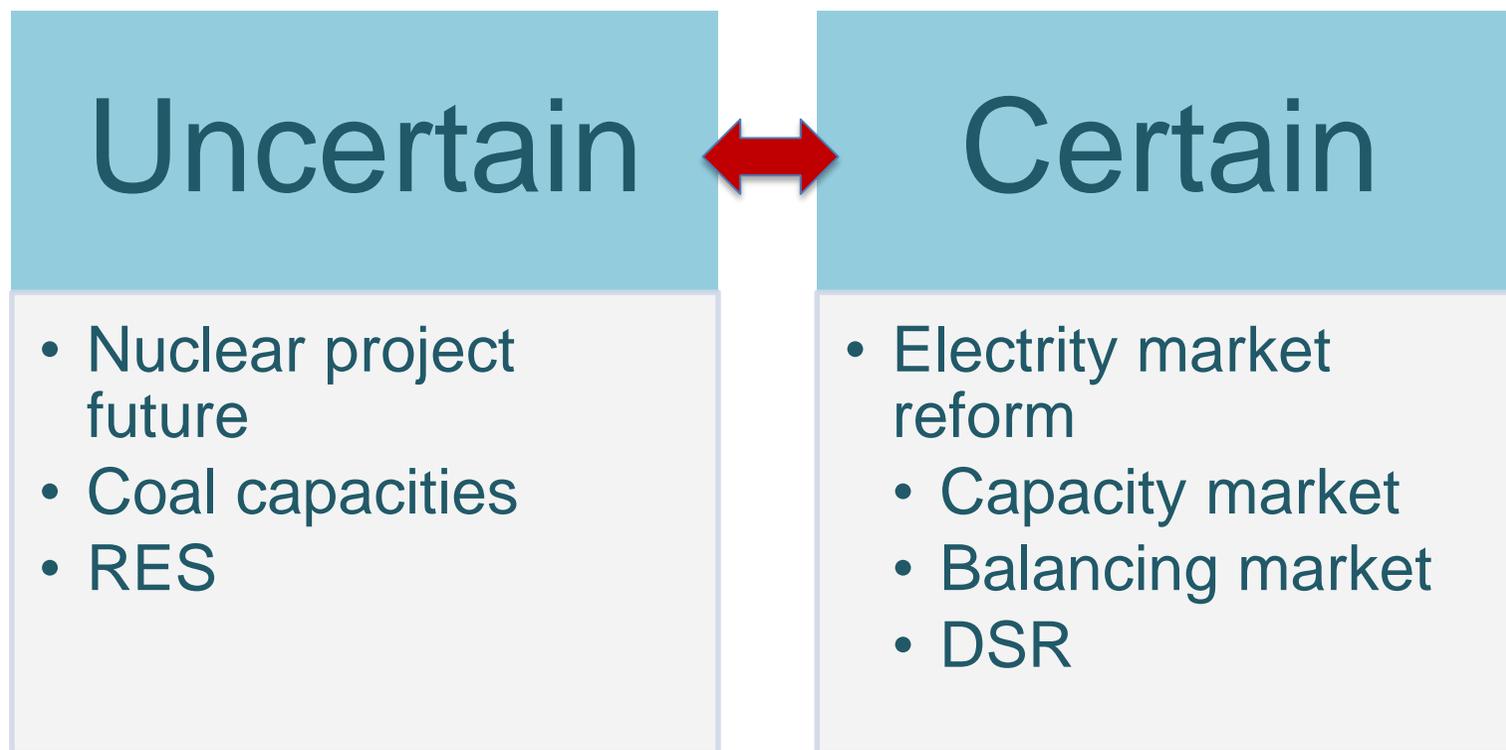
- Forum Energii is the independent and non-partisan, energy **think tank**.
- **Our mission** is forging the foundations of an efficient, secure, clean, and innovative energy sector.
- We support energy transition in Poland and in Europe.



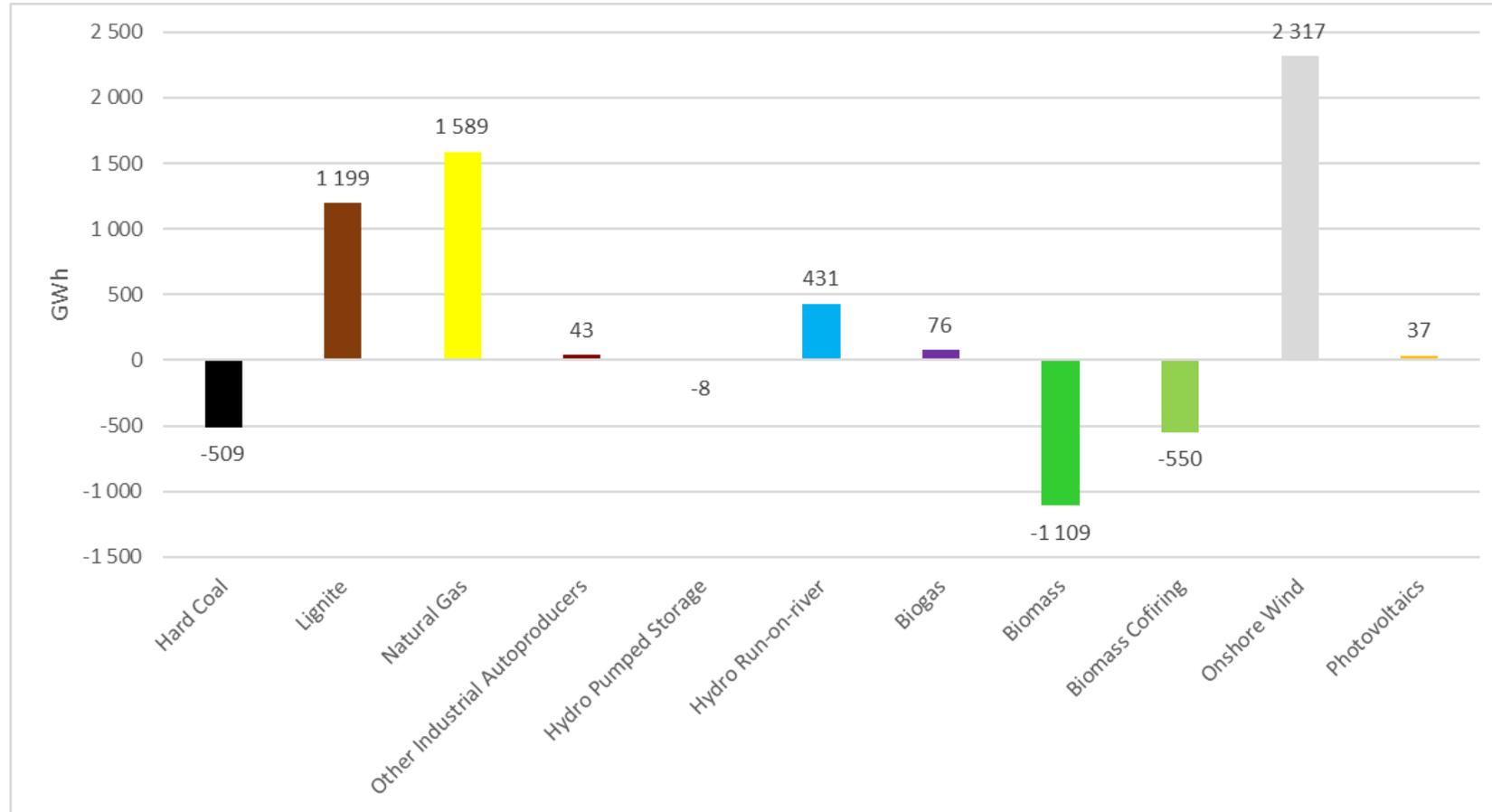
Topics

- What can we expect from the Polish government on the country's energy mix?
- New market design for Poland
- Prospects for new regulations

Where we are?



Changes in electricity production 2017 versus 2016

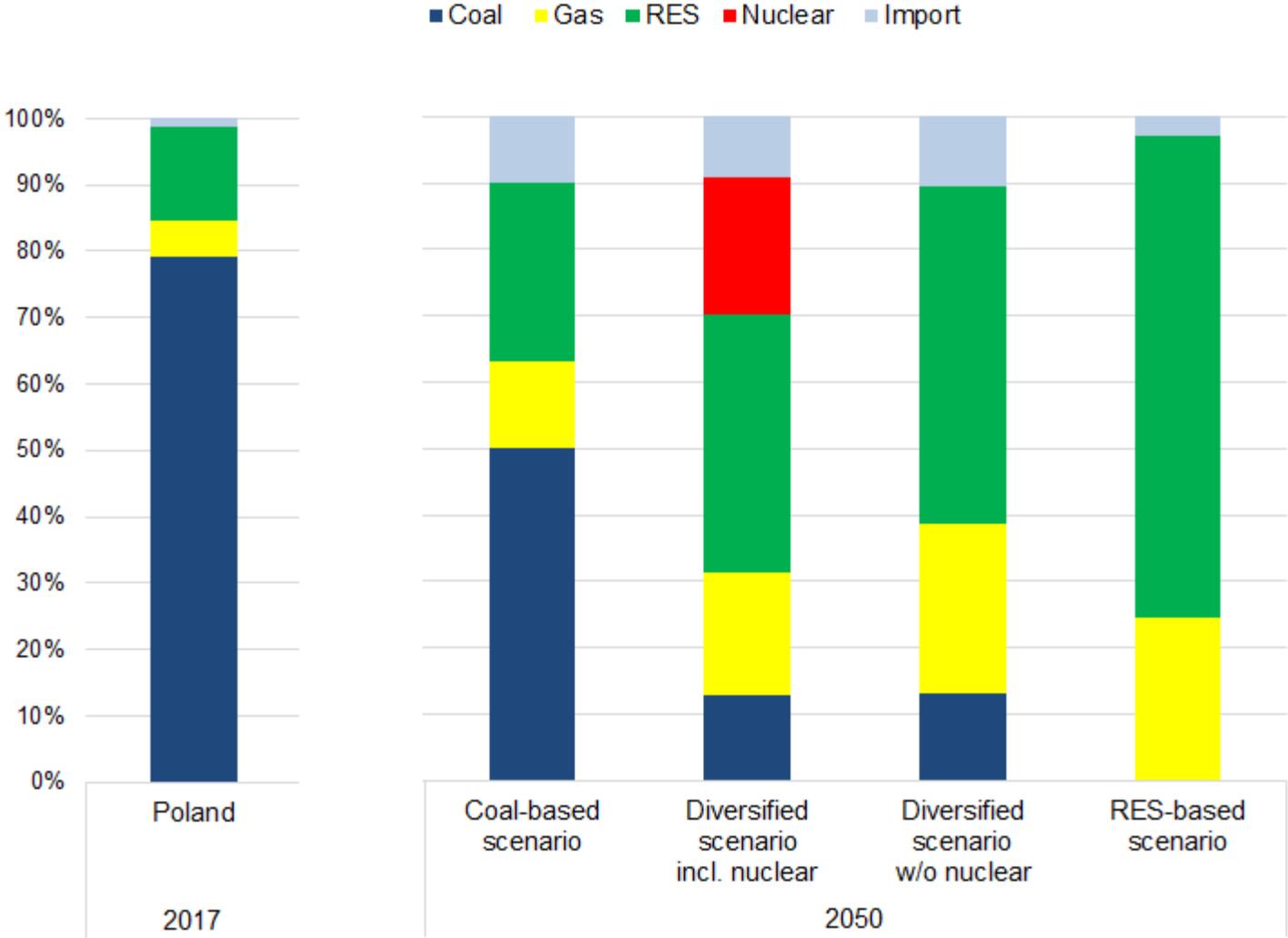


How the future power mix can look like?

Outcome of the Forum Energii project
4 scenarios of the power mix until 2050



4 scenarios of the Polish power mix until 2050



Source: Forum Energii 2017, enervis Energy Advisors

Assumptions



Demand in 2050

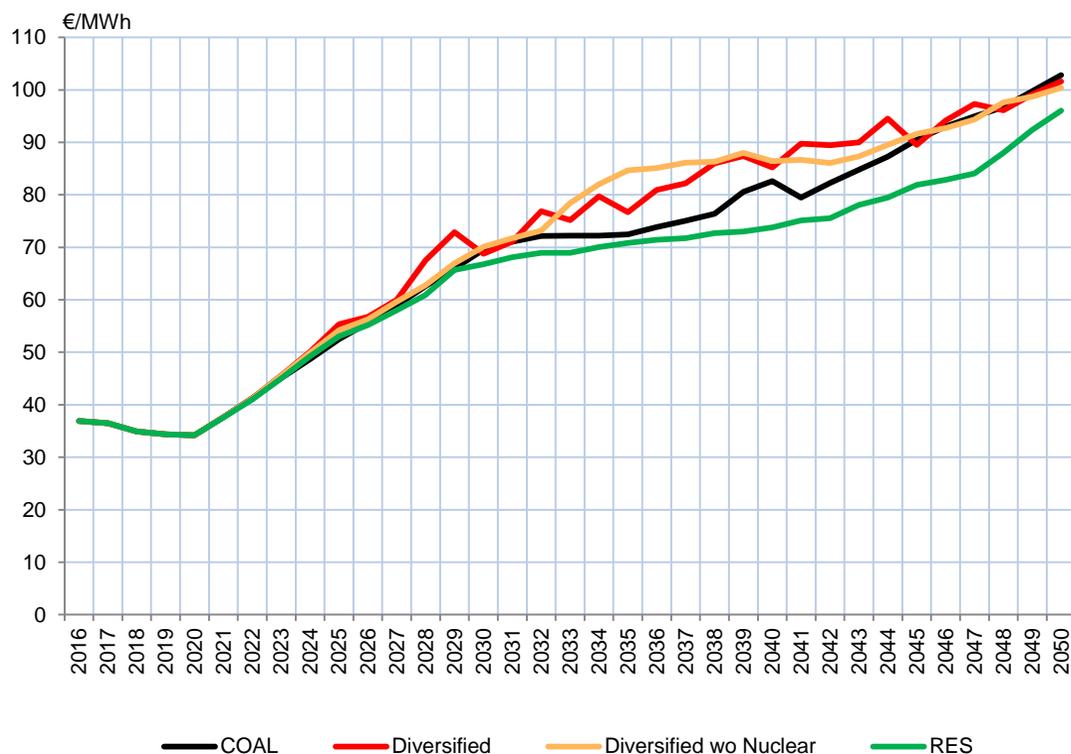
Increase by 1.4% annually up to **220 TWh**

Power reserve **9 %**

Prices forecast of fuels and CO₂ – **IEA** reference scenario and futures

Wholesale electricity price in 4 scenarios

Wholesale electricity price



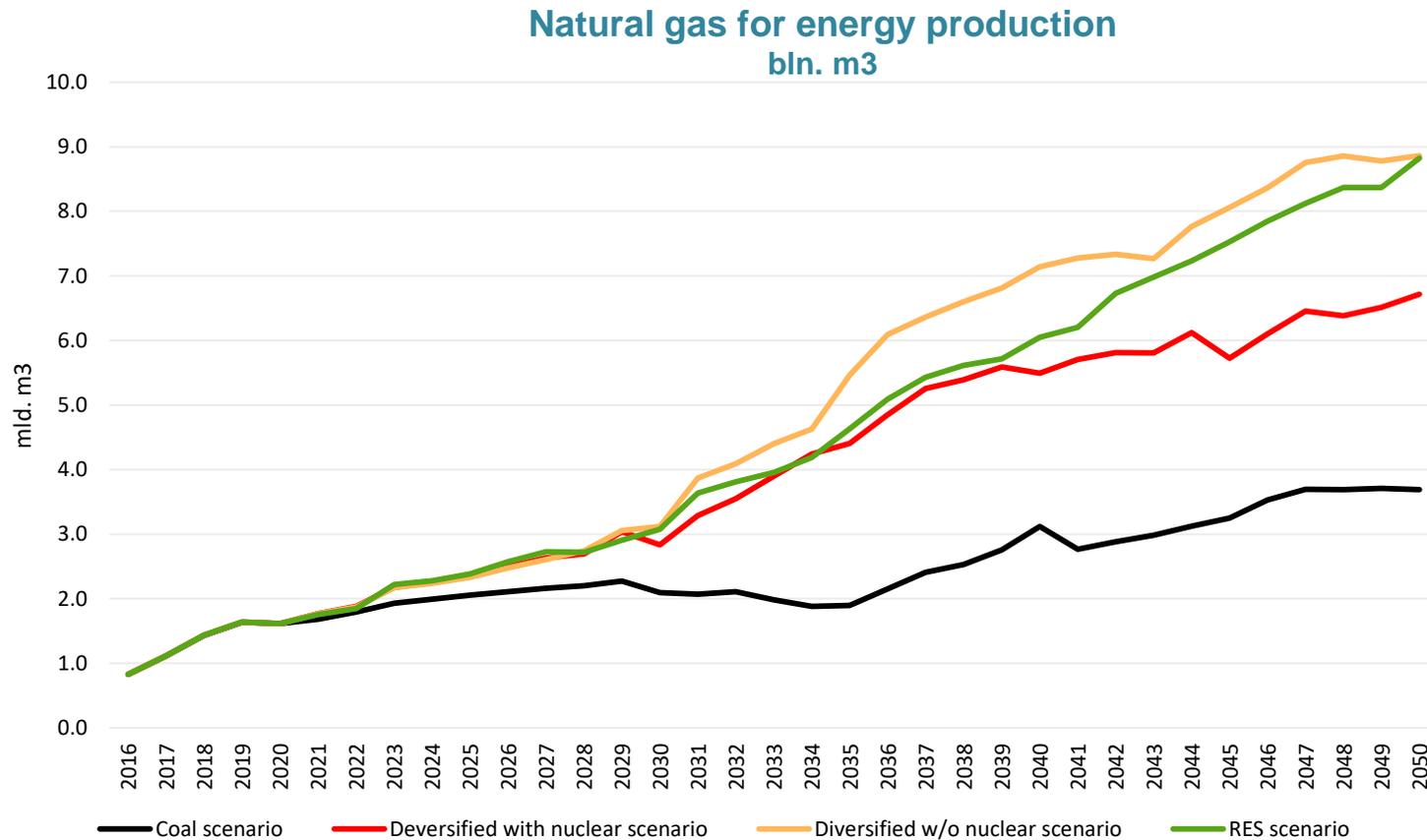
Wholesale prices will increase due to:

- increasing cost of fuels
- increasing cost of CO2 allowances

Possible limitation of prices and costs for the consumer:

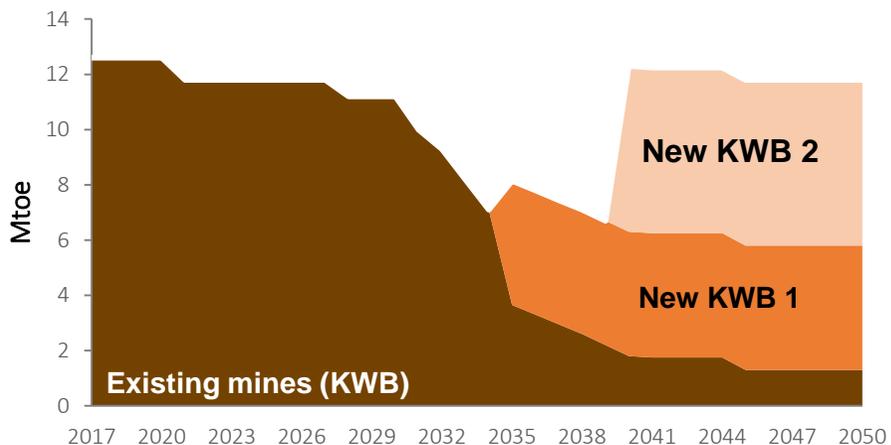
- greater share of low-emission technologies
- lesser share of units reliant on high-cost fuels
- better use of interconnections with external energy systems
- efficient energy use

Natural gas consumption in 4 scenarios



Source: Forum Energii 2017, enervis Energy Advisors

Lignite production
In coal-based scenario



Source: WiseEuropa

Lignite supply:

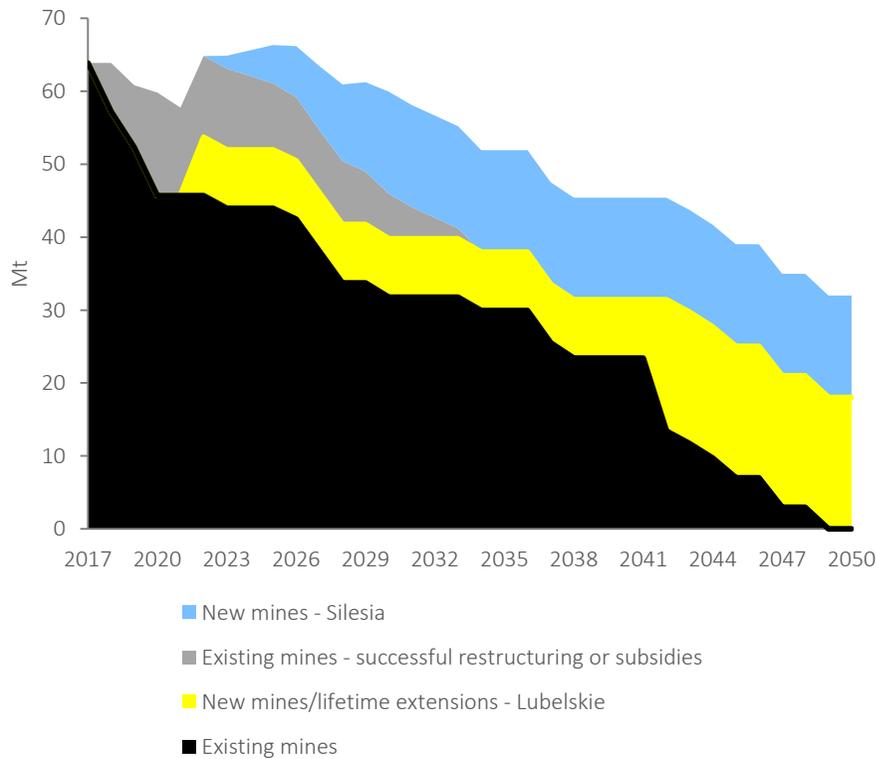
- Depleting lignite deposits after 2030 will require construction of new mines and power plants
- Coal scenario assumes opening of 2 new lignite mines and power plants **3 GW** and **4 GW**.

Risks:

- Public resistance against new mining sites.
- High cost of lignite mine and power plant 3 GW – ca. **4 bn EUR**.
- Long construction time means start-up in time of unprofitability of coal units (after 2030)
- **Base load operation necessity** to gain return on invested capital

Projected hard coal production

Hard coal production
In coal-based scenario



Source: WiseEuropa

Domestic hard coal supply:

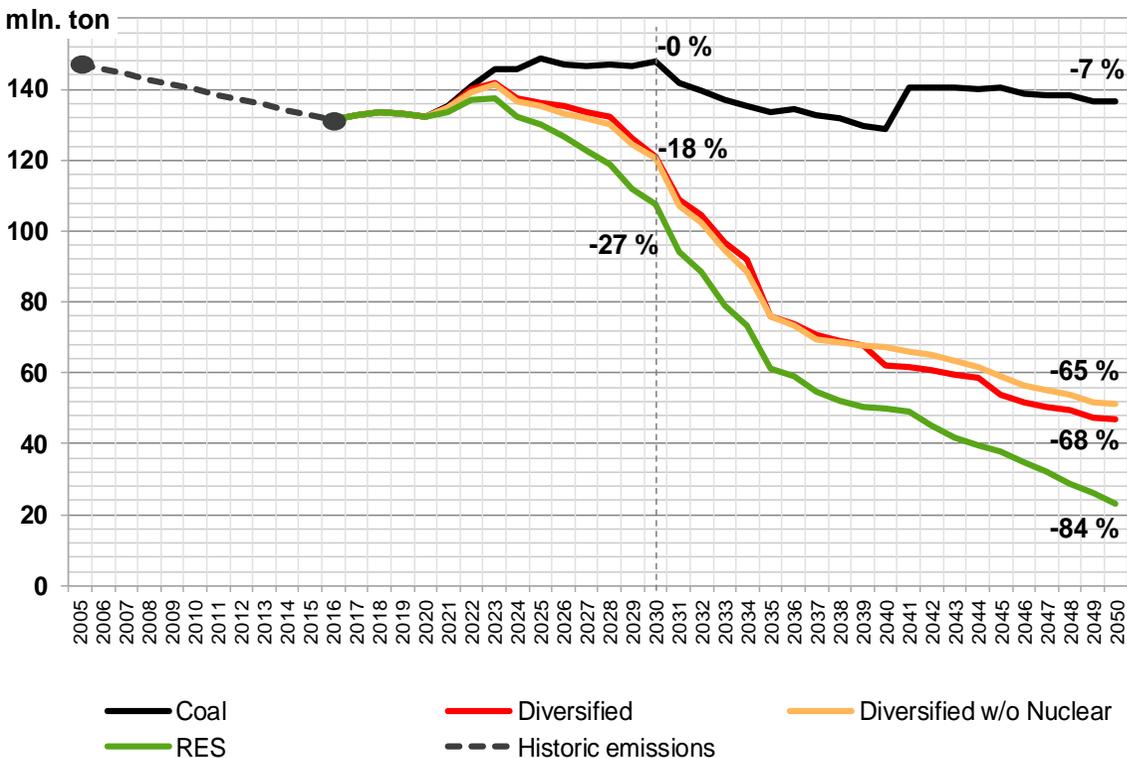
- Decrease of supply due to geological conditions and high extraction costs
- Coal scenario assumes hard coal supply in 2050 to be **32 mln t**

Risks

- Public resistance
- Lack of staff
- Increasing productivity per 1 employee from **700 tonne/year** up to ca. **2 000 tonne/year** (break-even point)
- Competition with imported fuel

CO2 emissions of domestic power sector

CO2 Emission
(% reduction vs 2005)

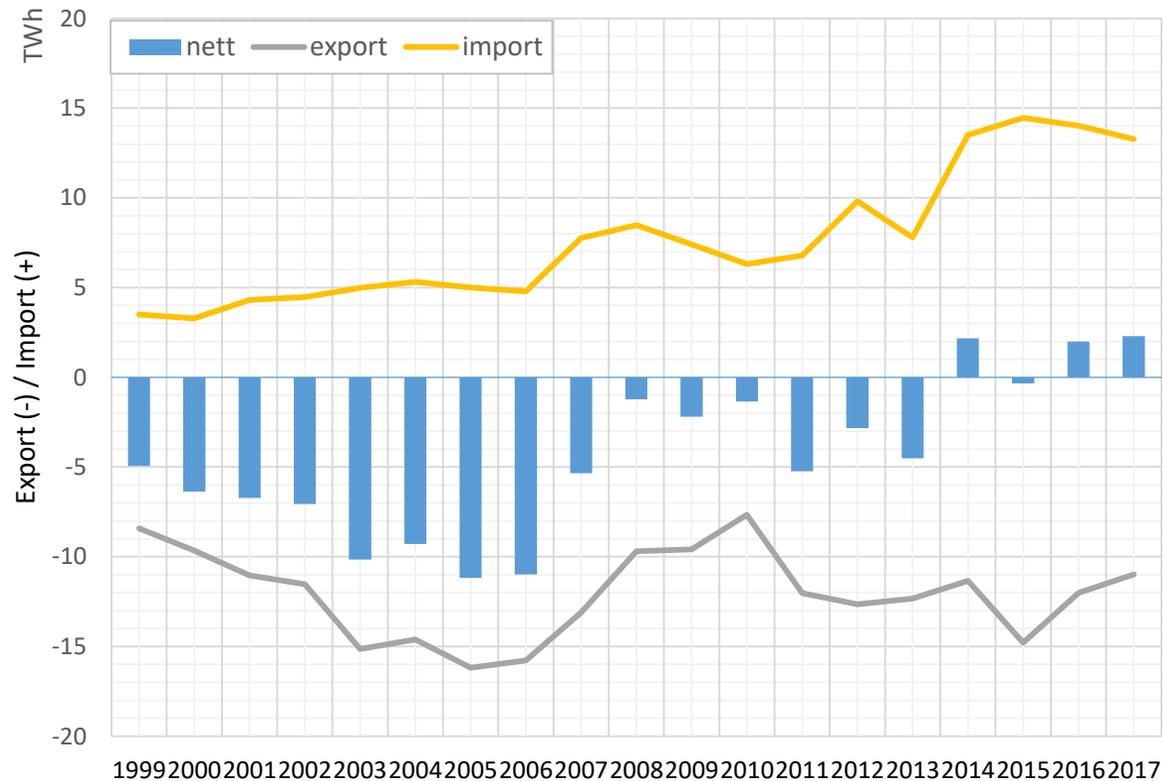


Source: enervis Energy Advisors

- RES scenario introduce CO2 emission limitation up to **84%** in 2050, coal-based only by **7%**
- Diversified and RES scenario allow to keep to 2030 targets.

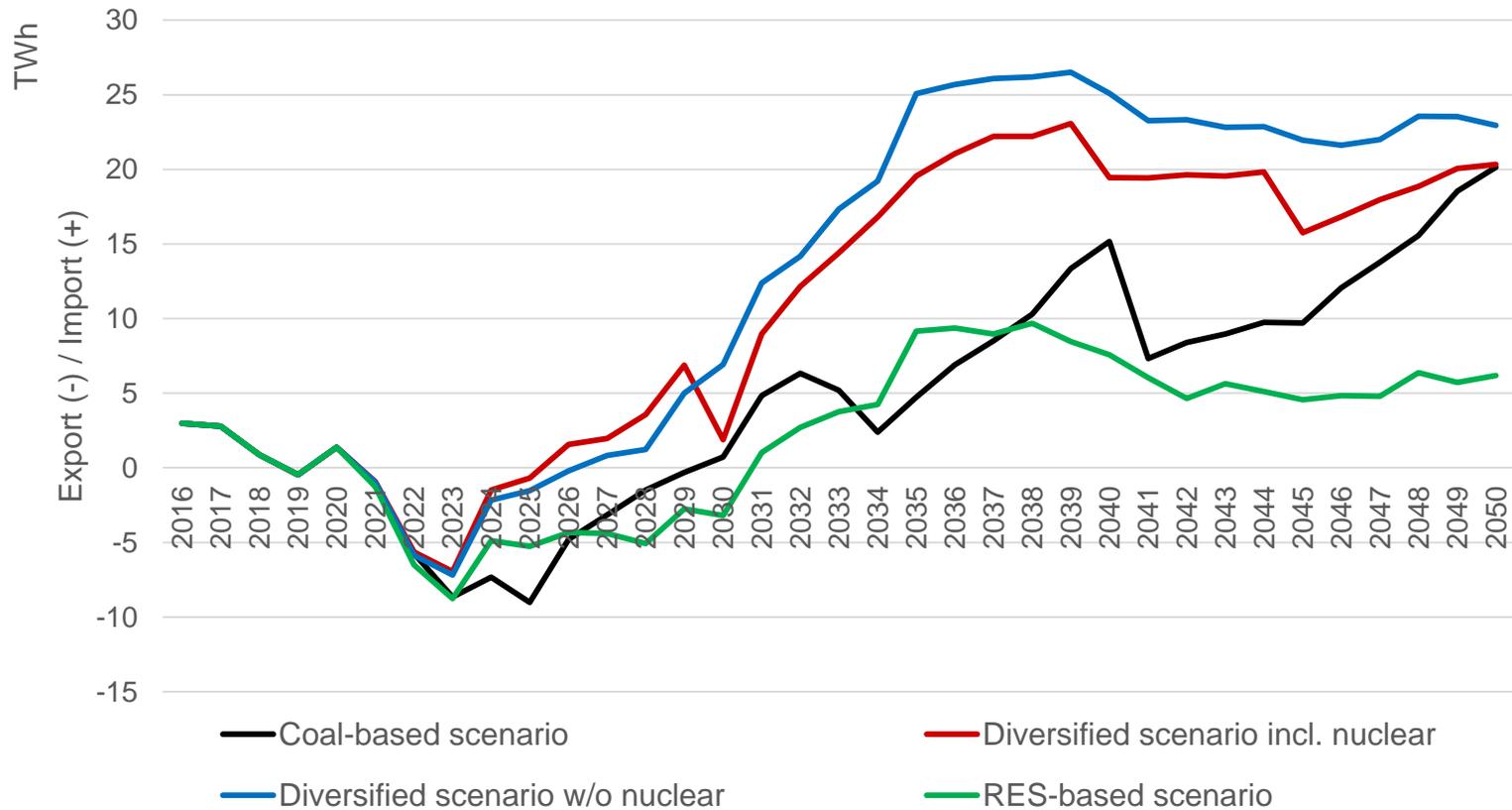
Historical electricity import trends

Cross-border electricity flows



- In the past Poland was electricity exporter
- Currently, as for 2017, Poland import about **2 TWh** electricity nett, it is due to neighbouring markets cheaper prices

Nett electricity import expected for each scenario



Source: Forum Energii 2017, enervis Energy Advisors

New electricity market design for Poland



Expected changes

based on EC state aid decision about capacity market

2018

Day Ahead and intraday –
removing restriction on bid
prices

2019

Balancing market cap on the
level of intraday and day
ahead

New market design for Poland based on EC state aid decision



2021

Balancing market prices based on marginal prices scheme with locational differentiation

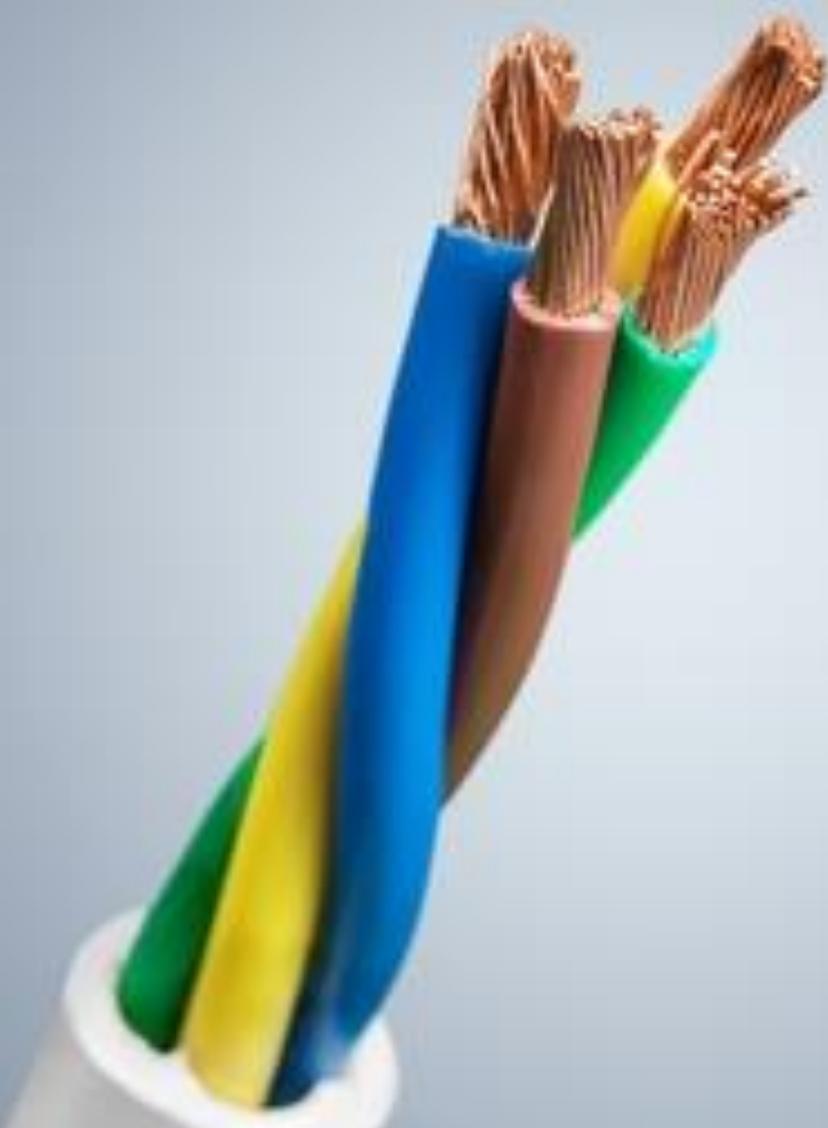
Balancing Service Providers allowed to update their integrated scheduling bids until the intraday cross-zonal gate closure time

All market participants able to bid or change their energy bids in the wholesale market at least until the intraday cross-zonal gate closure time.

Administrative scarcity pricing should be introduced

DSR eligible to participate in all markets

Current reserves mechanisms should be removed



Summary

1. Substantial uncertainties in the Polish energy sector
2. Flexibility of the power system is the no regret option
3. Perspectives for renewables
4. Ongoing electricity market reform

Thank you

Joanna Maćkowiak Pandera
Forum Energii

Joanna.Pandera@forum-energii.eu
www.forum-energii.eu