



Renewable Renaissance in Poland

The impact of the offshore wind on the Polish power market and the neighbouring regions

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ICIS is a world-leading price reporting agency and analytics powerhouse for commodity markets

The diagram consists of two horizontal bars on a dark blue background. The top bar contains three circles: a light blue circle labeled 'Petro-chemical', an orange circle labeled 'Energy', and a light green circle labeled 'Fertilizers'. The bottom bar, which is shifted to the right, contains four circles: a light blue circle labeled 'Prices', an orange circle labeled 'News', a light green circle labeled 'Analytics', and a grey circle labeled 'Data'.

Petro-chemical

Energy

Fertilizers

Prices

News

Analytics

Data



Agenda

- 1) *Status quo* in Poland
- 2) U-turn in Polish renewables policies
- 3) Price impact: Polish and regional
- 4) Things to look out for
- 5) Conclusions

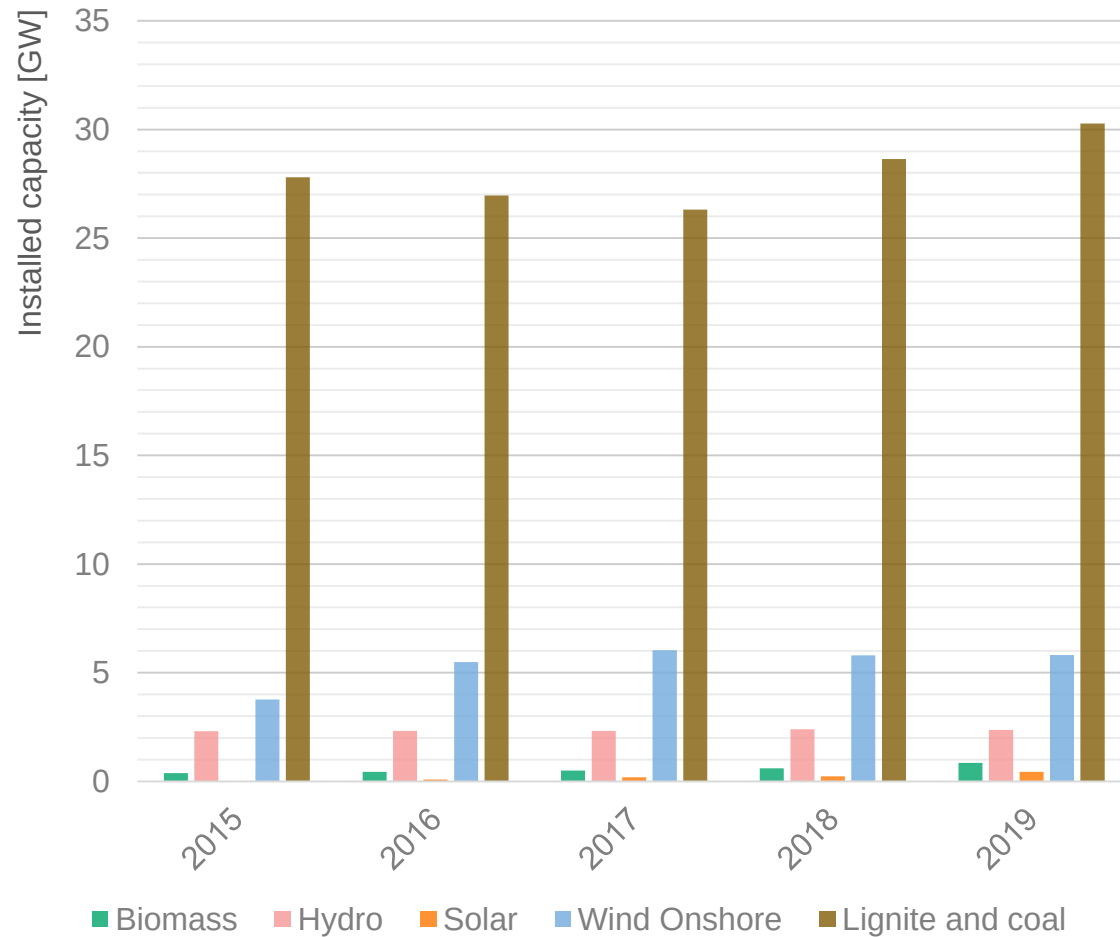


Regulatory environment

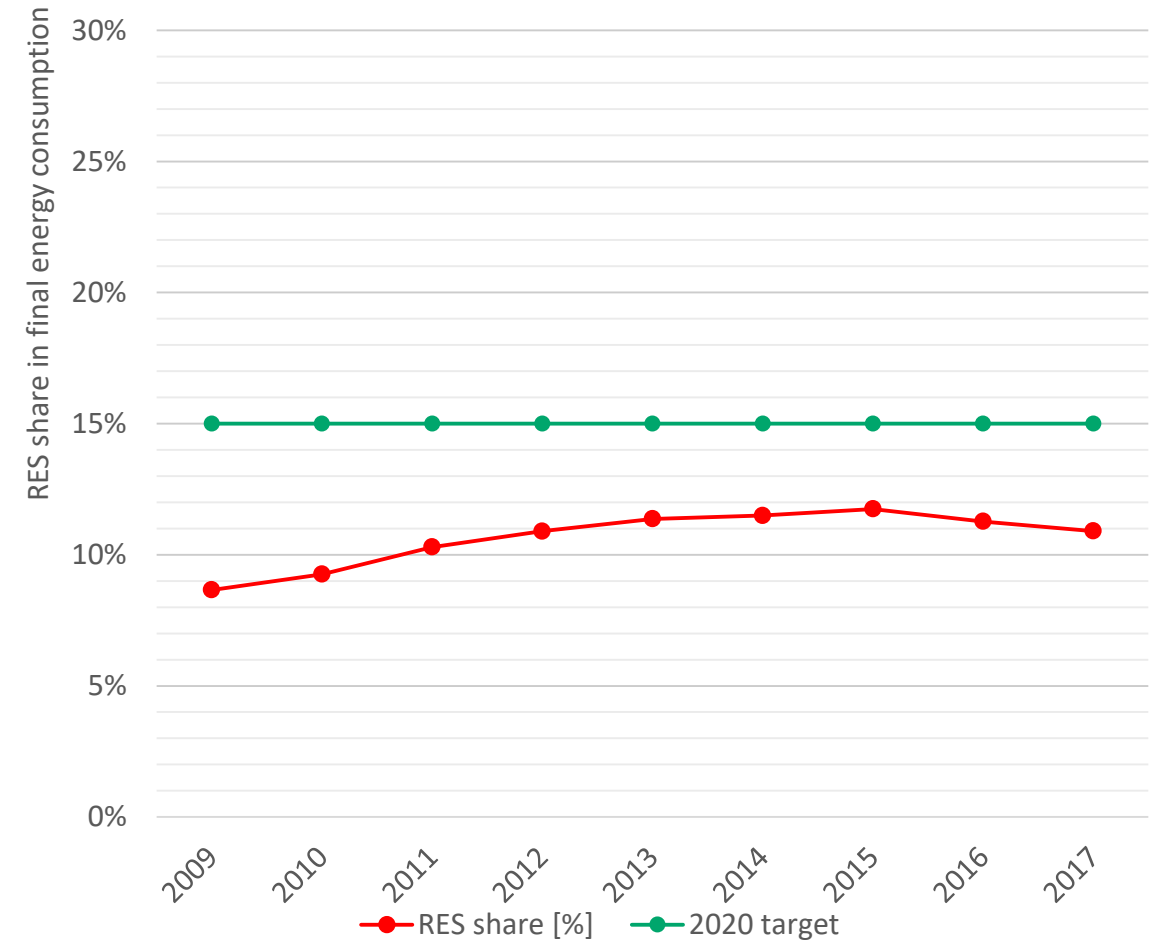
- ▶ National energy strategy
 - ▶ Last adopted 2030 energy strategy – a decade old
 - ▶ One draft presented in 2015 under previous government
 - ▶ New draft through 2040 in December 2018
 - ▶ Draft NECP January 2019
- ▶ Capacity market mechanism
- ▶ Renewable Energy Law and RES auctions



Stagnation in RES electricity since 2015

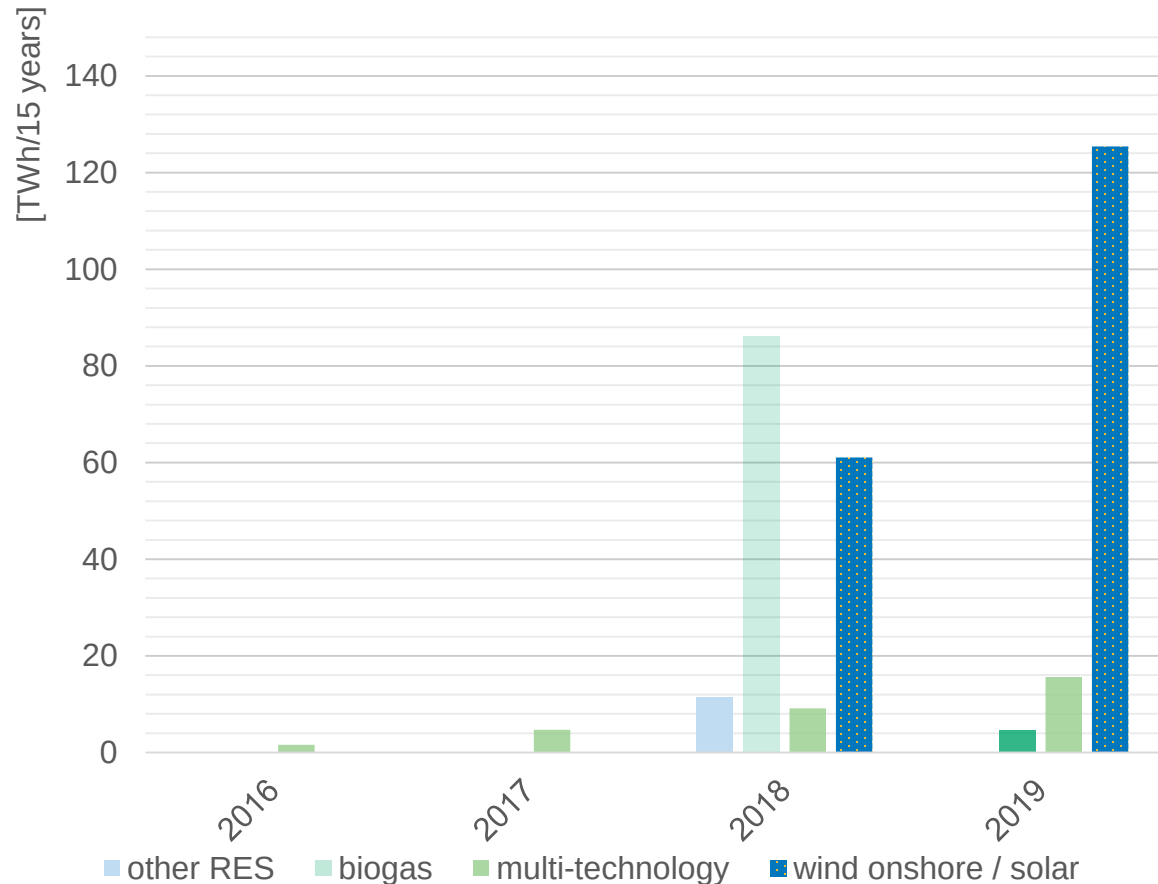


Source: ENTSO-E
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Source: Eurostat

RES auctions volumes for new installations: return in full force



- Polish Institute of Renewable Energy: up to 8GW of new renewable energy capacity might be added to the Polish grid in the next few years
- Most advanced projects took part in 2018 auctions (1GW wind, 0.5GW solar)
- 2019 auctions may bring 3GW of onshore wind only*

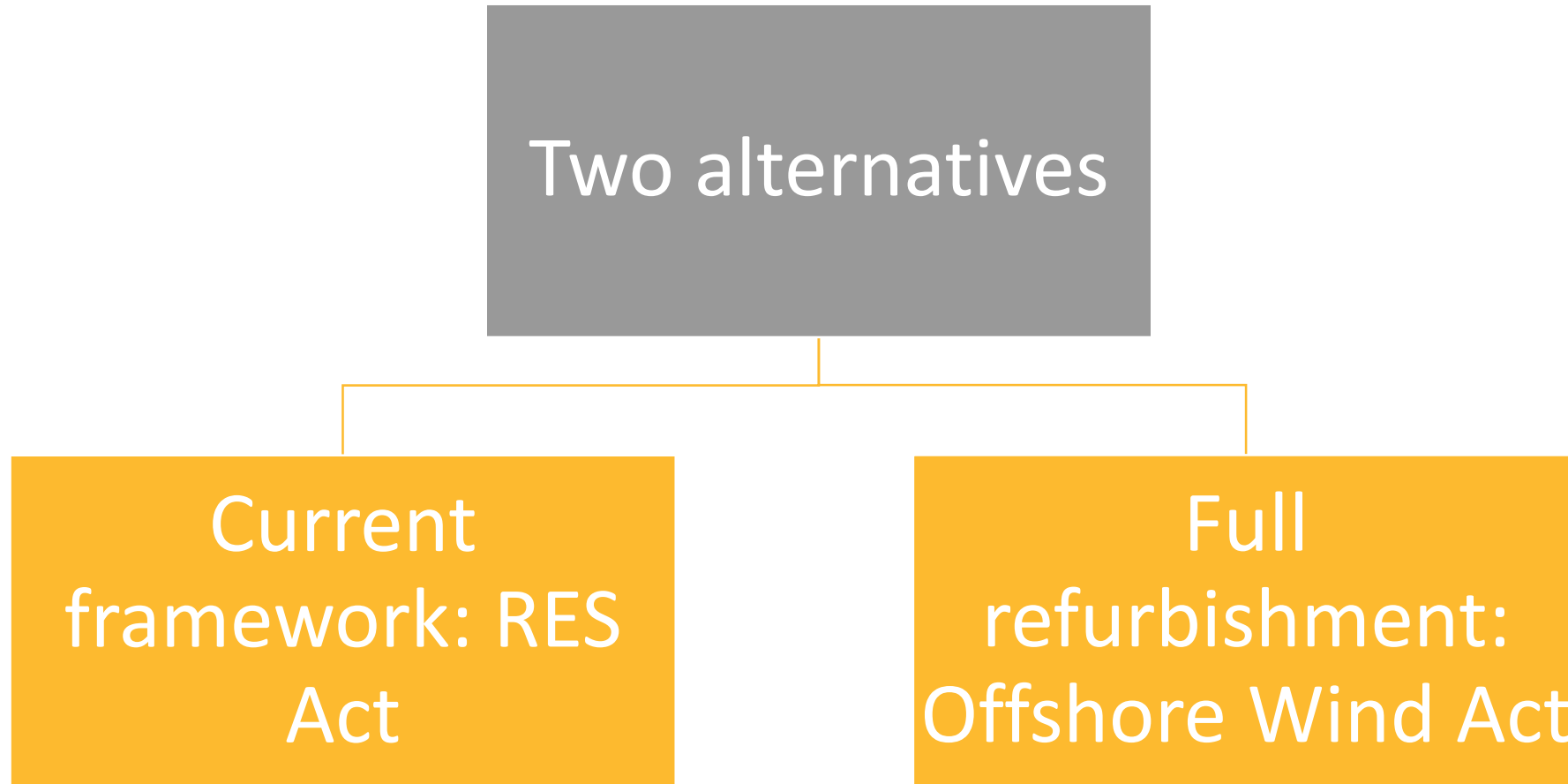
Offshore wind spring?

- ▶ Government: 8GW offshore wind by 2035
- ▶ A potential of 14GW
- ▶ 24 applications to the Ministry of Marine Economy and Inland Navigation by May 2019

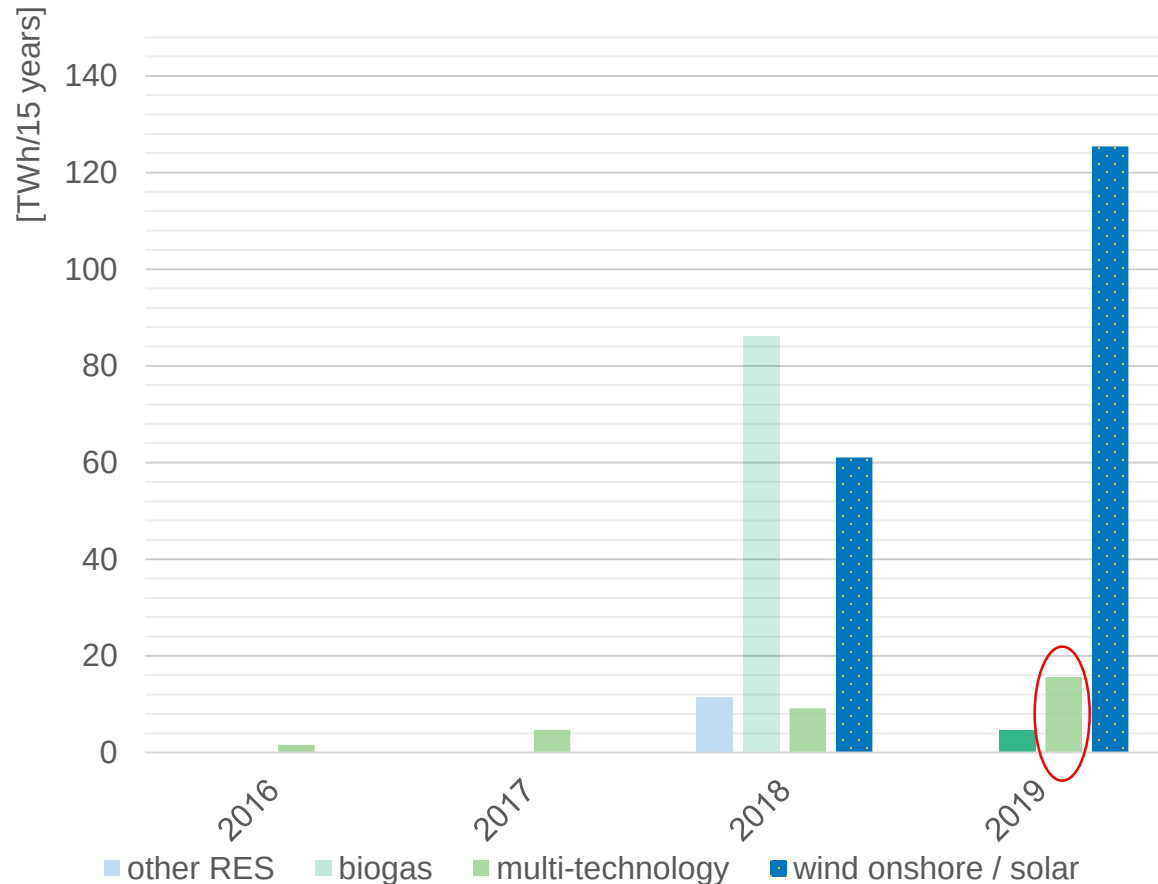


Photo: Pexels.com

Offshore Wind Act before the next elections – nearly impossible



Increase in RES auctions volumes for new installations



- Polish Institute of Renewable Energy: up to 8GW of new renewable energy capacity might be added to the Polish grid in the next few years
- Most advanced projects took part in 2018 auctions (1GW wind, 0.5GW solar)
- 2019 auctions may bring 3GW of onshore wind only*
- Offshore wind in theory can participate in the multi-technology basket

Market impact: ICIS Power Horizon



Long-term power forecasting: ICIS Power Horizon

Overall methodology

- ▶ Dispatch model – we are modelling the hourly dispatch mimicking how the market clearing works
- ▶ Global optimization model that minimizes all system costs subject to a number of constraints (or maximization of social welfare)
- ▶ Formulated as a linear programming model

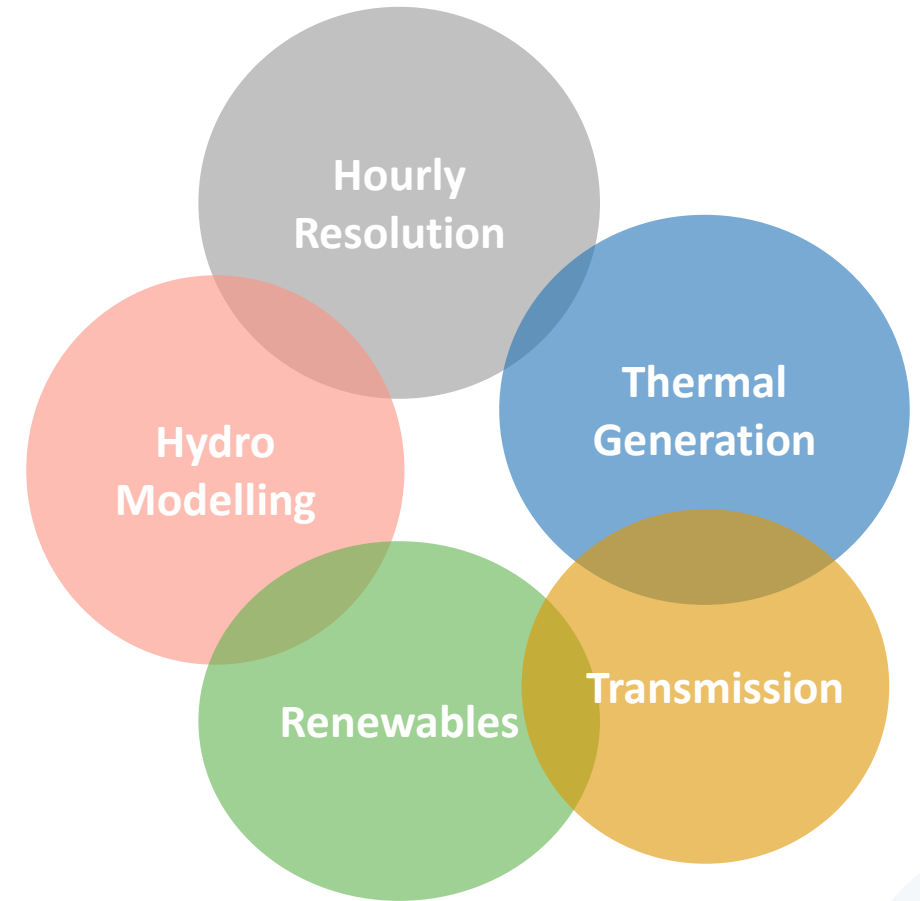
Features

- ▶ Optimal dispatch of generation including trade
- ▶ Incorporation of start-up costs
- ▶ Full EU integration: capacities of all major interconnectors
- ▶ Detailed hydro modelling
- ▶ Accurate cycling of thermal generation
- ▶ Taking into account technical restrictions: part-load efficiencies, reservoir levels, ramping restrictions

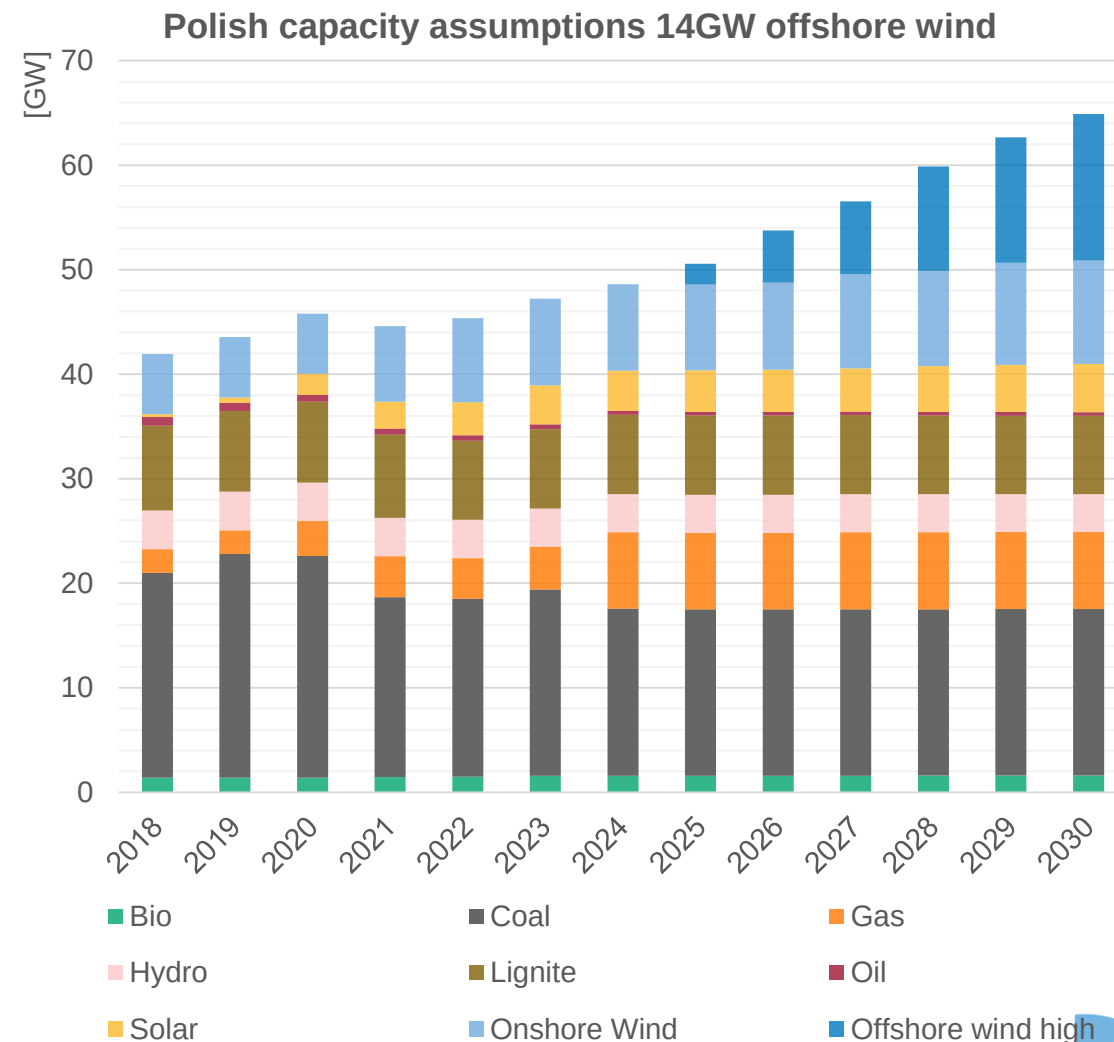
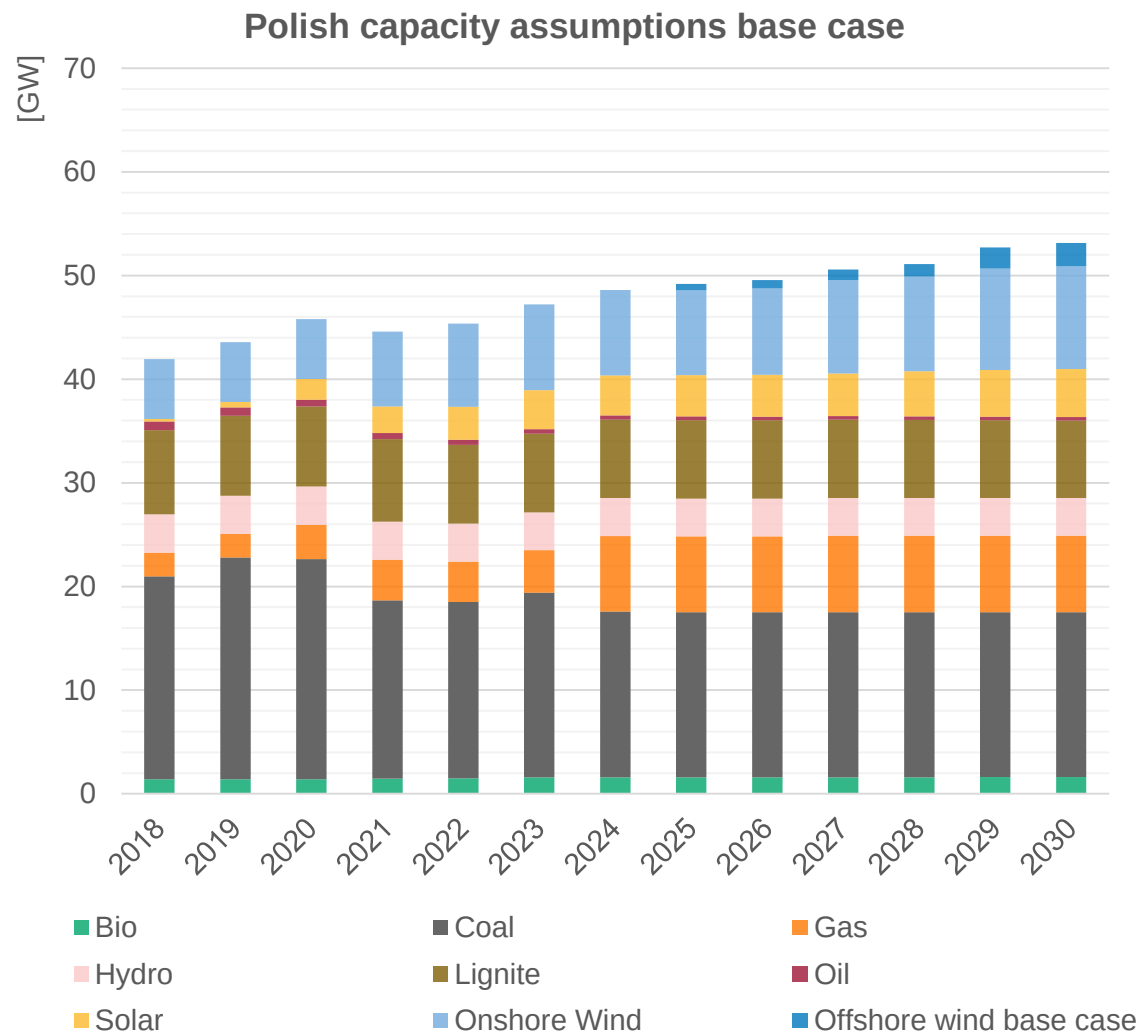


Features

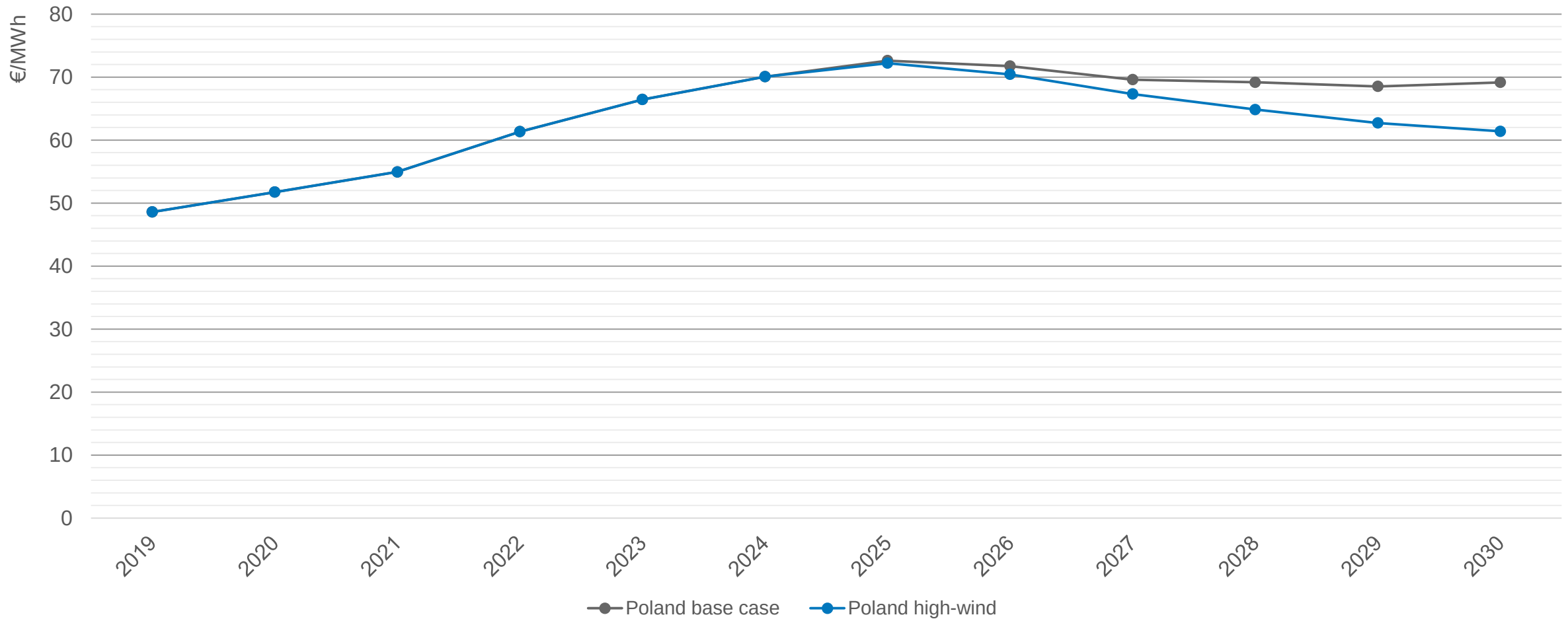
- ▶ Model simulates **all** hours of the year
- ▶ **Hydro**: RoR, Reservoirs, Pumped Storage
- ▶ **Thermal**: Start up costs (*linearization*), part-efficiencies and minimum stable load
- ▶ **Renewables**: Modelled with observed volatility
- ▶ **Transmission**: Losses, availability and ramping constrains



Poland price forecast base case vs high offshore wind scenarios

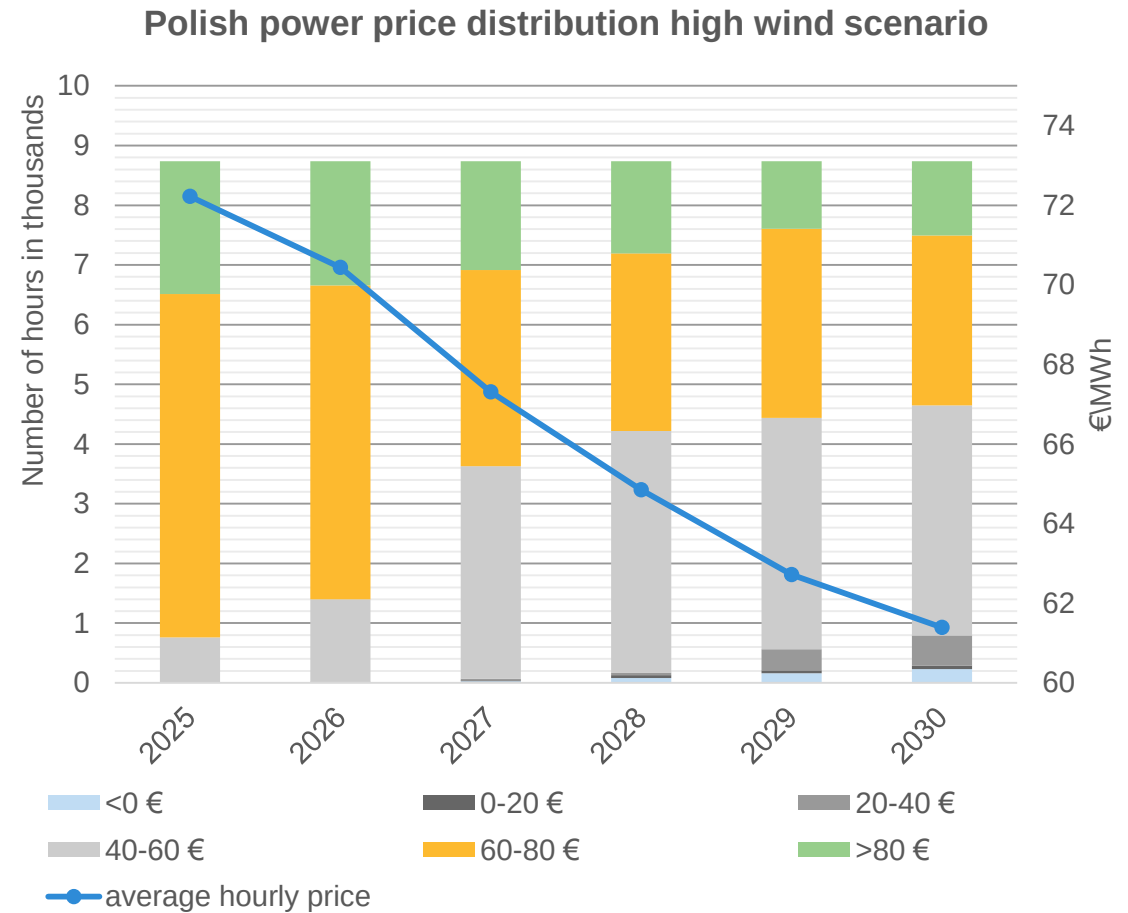
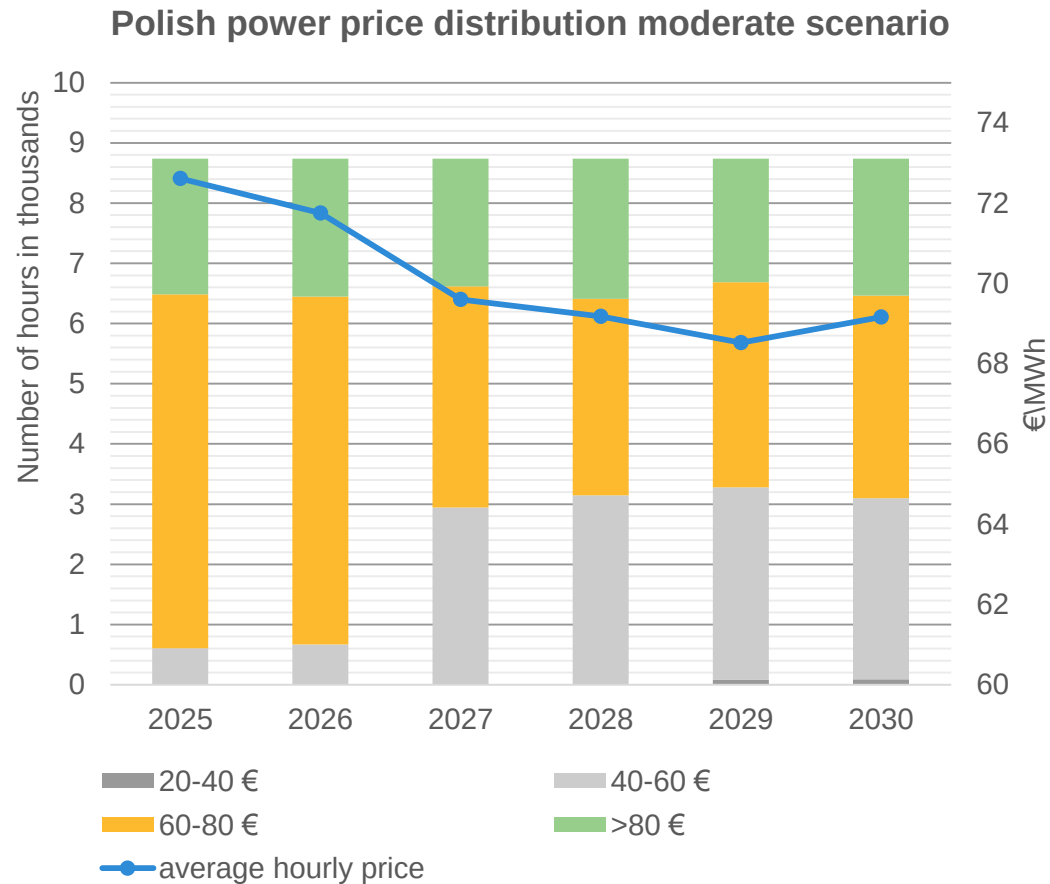


Price differential – around €8/MWh on average in 2030



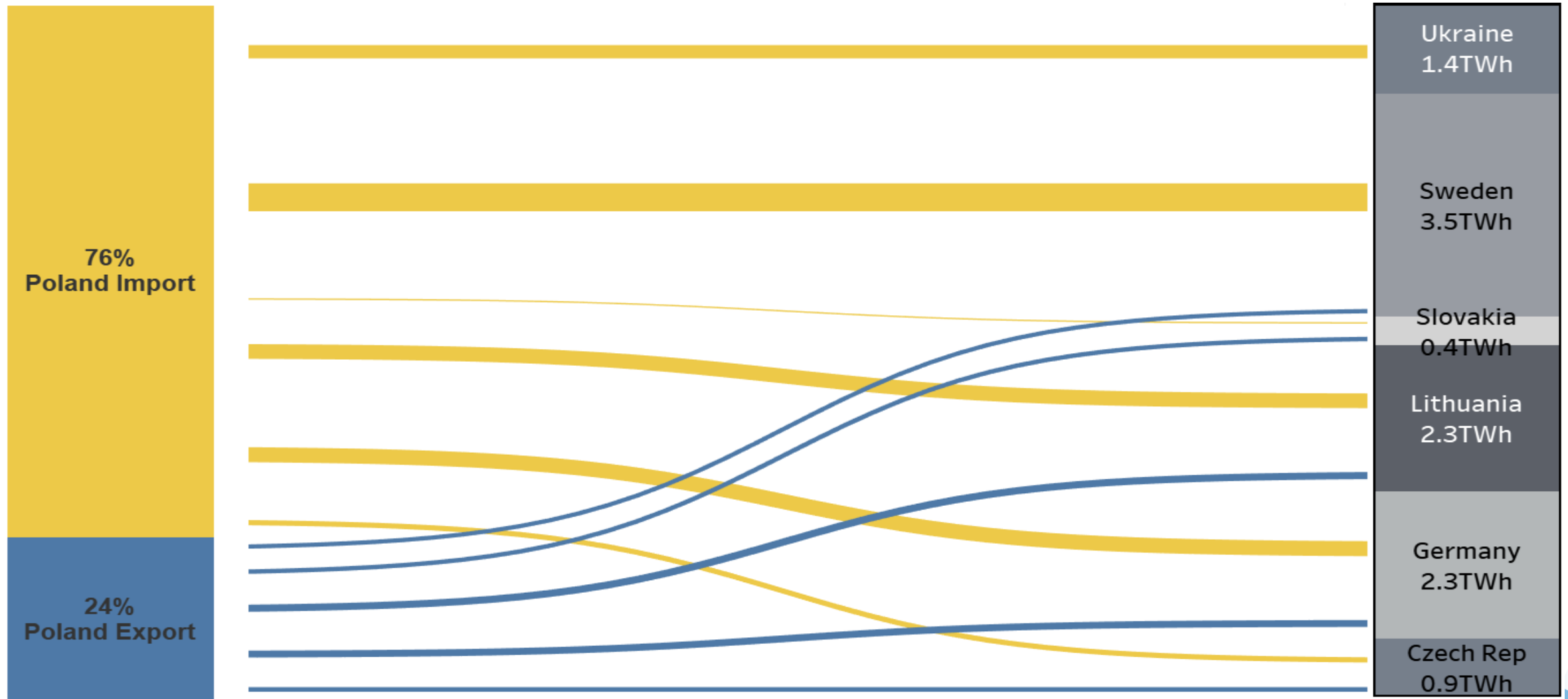
Source: ICIS Power Horizon

... higher offshore penetration means prices become lower and more volatile...



Source: ICIS Power Horizon

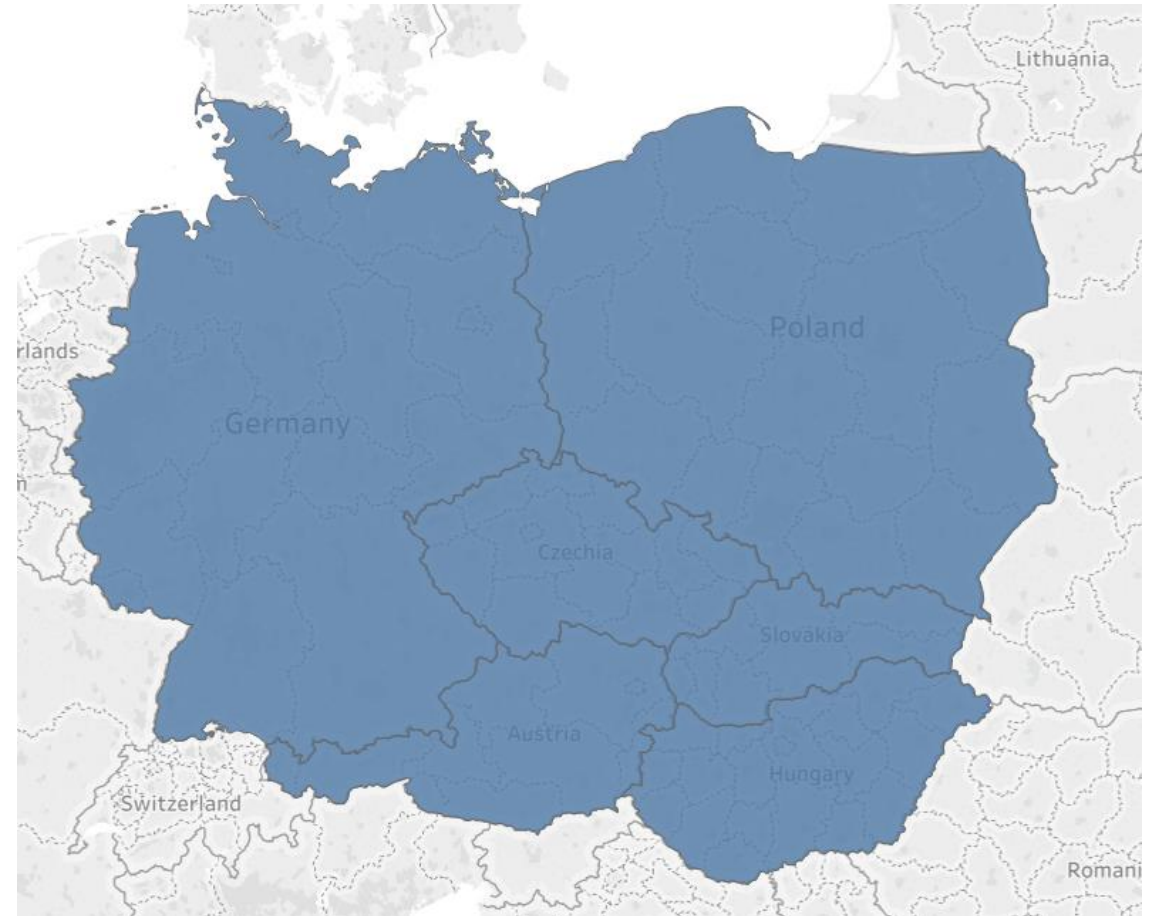
Net importer in 2018 – trade with other Visegrad countries low



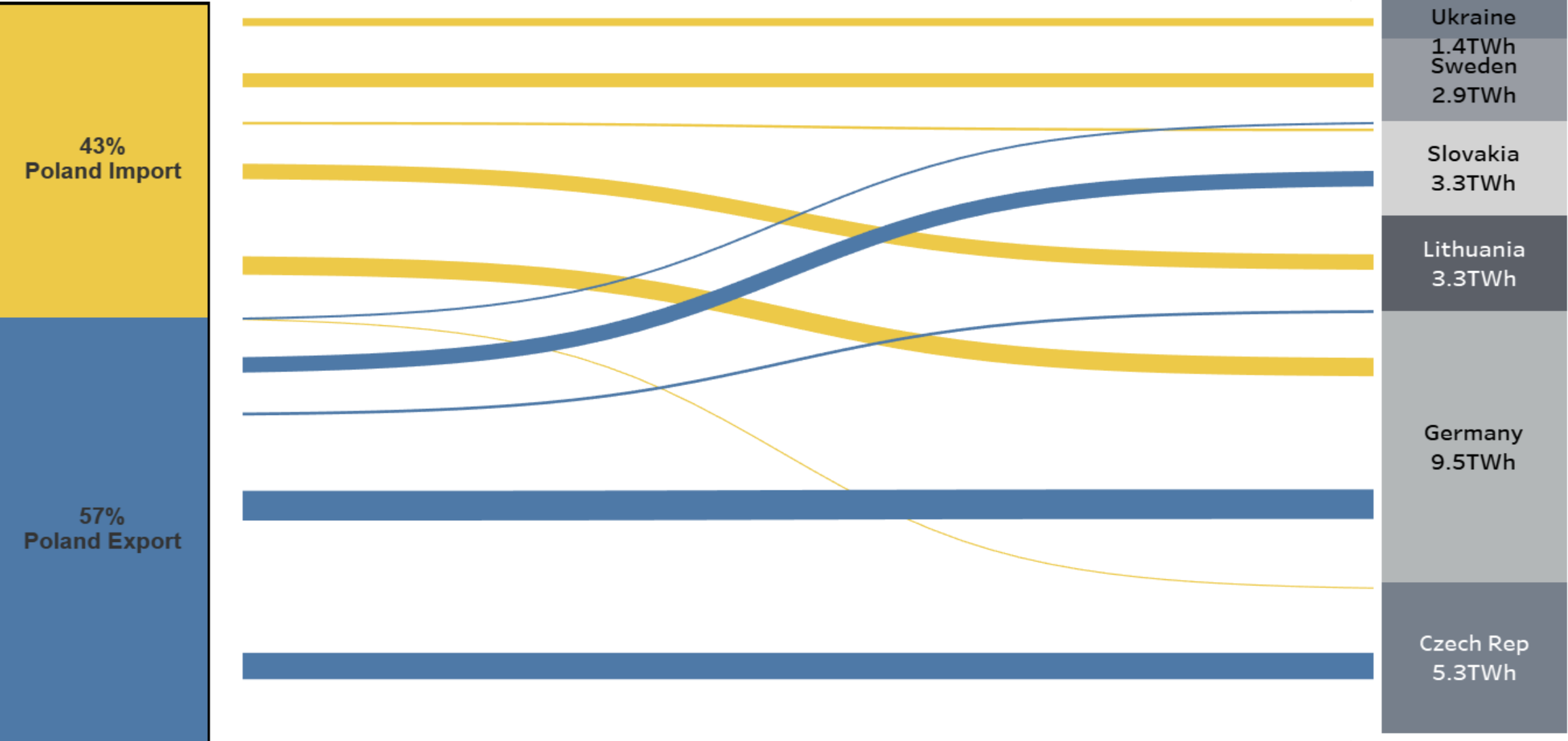
Source: Scheduled commercial flows, ENTSO-E
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But it will change with offshore wind and interconnectors

- ▶ Austria, Germany, Poland and the 4MMC countries (Czech Republic, Hungary, Romania, Slovakia) market coupling
- ▶ Increase of transfer capacities:
 - ▶ 2021 Increase in HU-SK transmission capacity
 - ▶ 2021-2022 increase in AT-DE transmission capacity
 - ▶ Improving grid in Germany and avoiding loop flows with PL/CZ

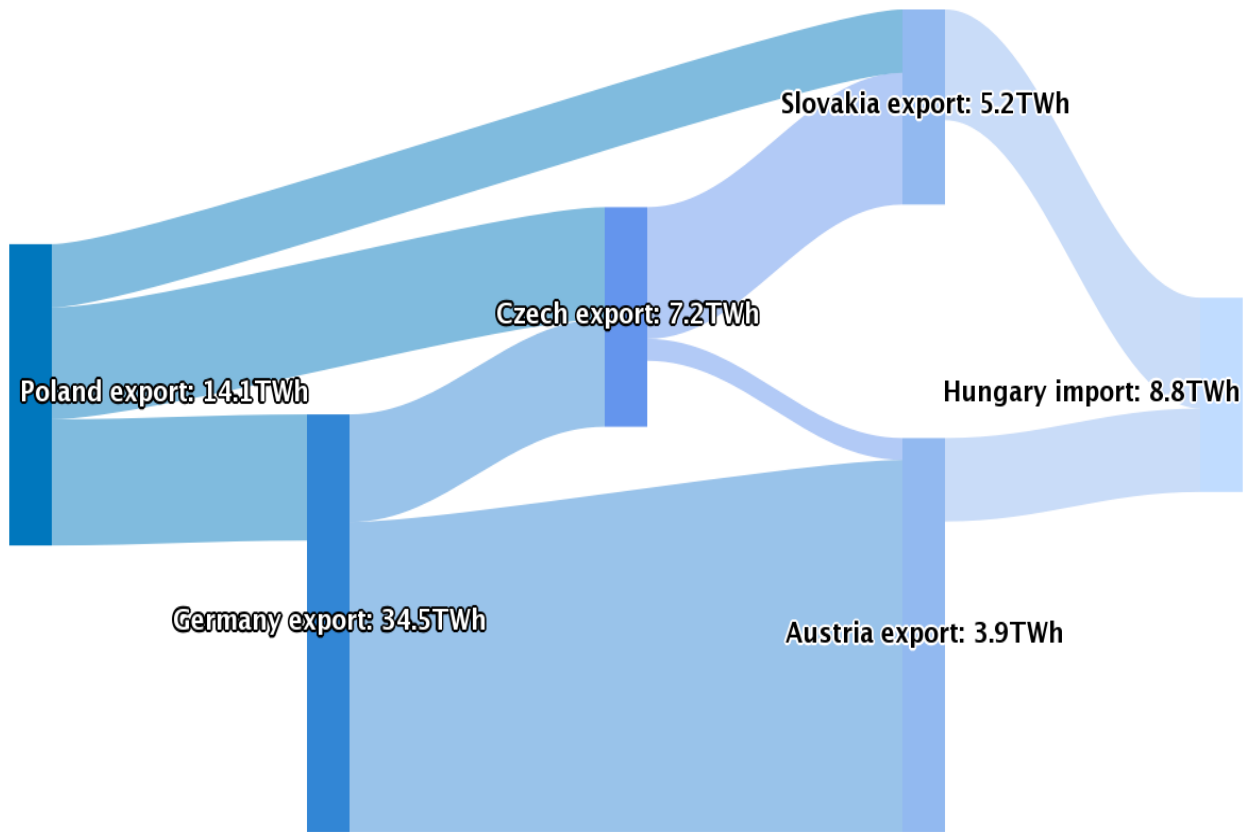


Offshore wind scenario: Poland becomes net exporter



Source: ICIS Power Horizon, high offshore wind scenario, year 2030

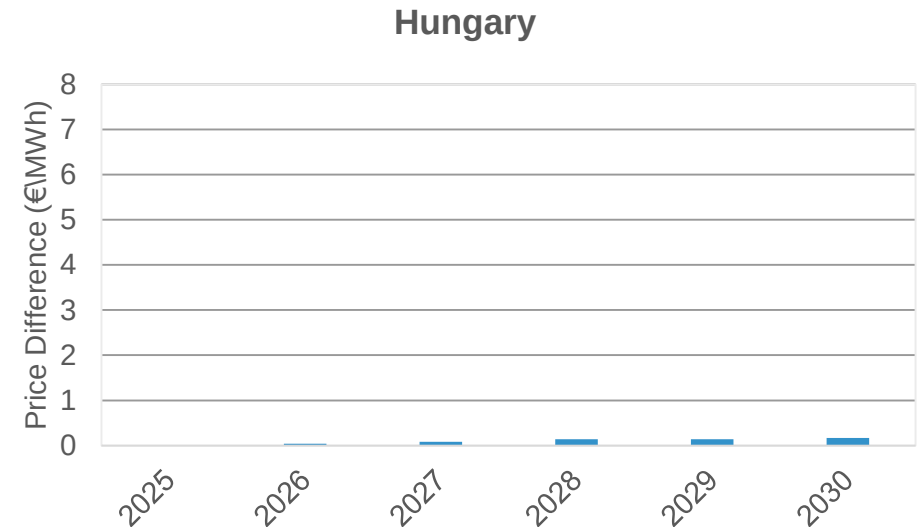
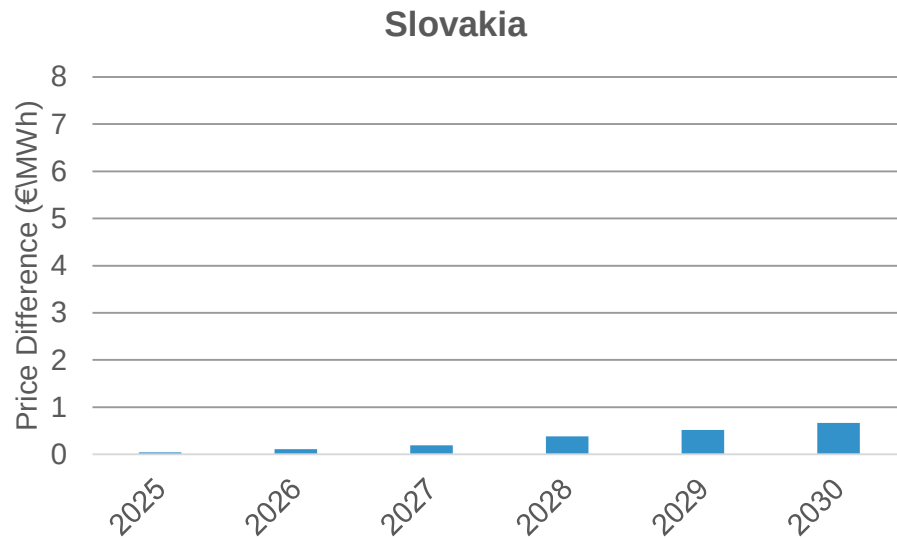
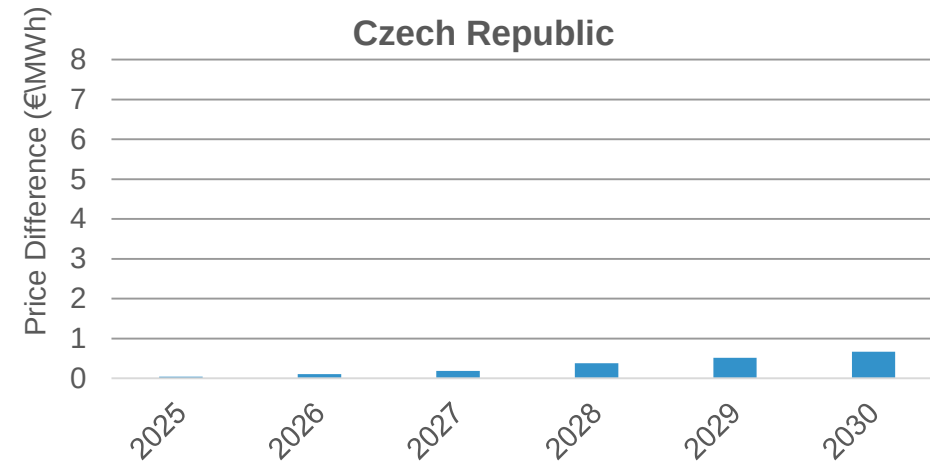
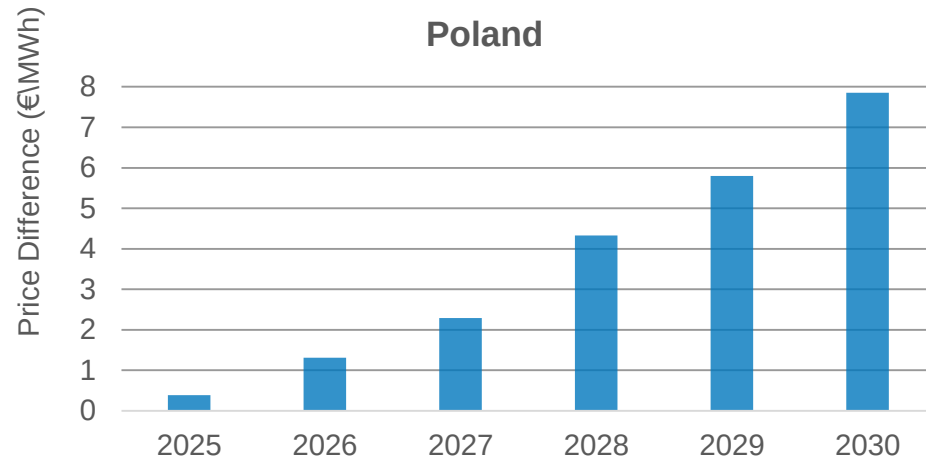
2030 power export flows from Poland to the region



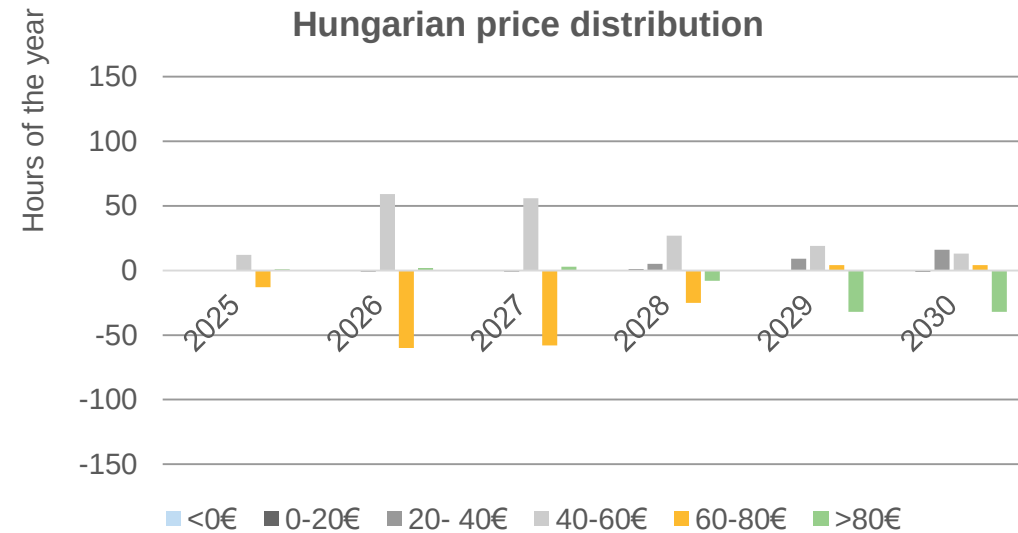
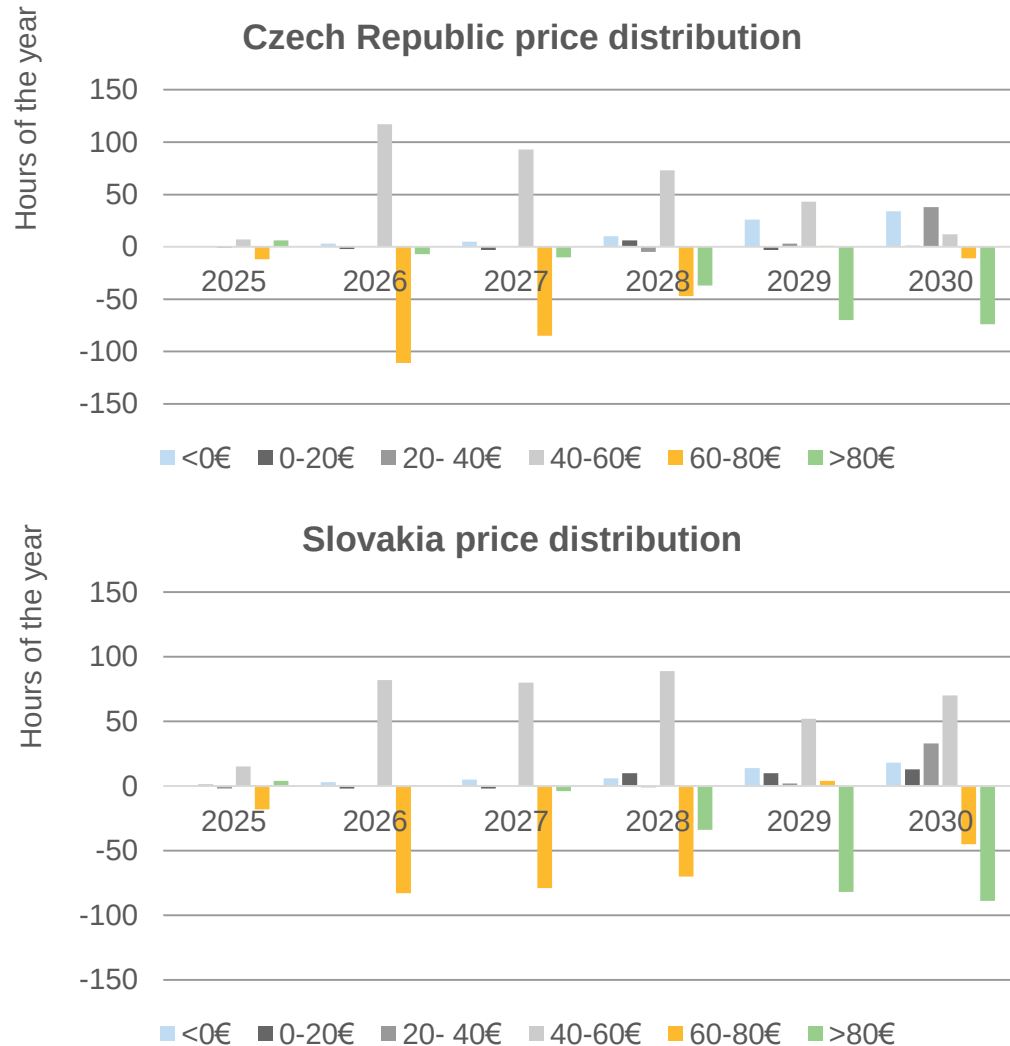
- The biggest correlation between flows Poland-Slovakia and Slovakia-Hungary:
 - 69% export correlation
 - 55% of the year hours interconnectors used at the same time
- Other directions less correlated

Source: ICIS Power Horizon, high offshore wind scenario, 2030

Average annual price effects on the Visegrad countries



Impact on the regional price structures



Things to look out for

- ▶ Renewable energy auctions 2019
- ▶ Reversal of the onshore wind Distance Act
- ▶ October 2019: Parliament elections
 - ▶ Policy continuity likely
 - ▶ Usual precursor to the Sejm elections – EP elections on 26 May 2019
 - ▶ PiS wins in European Parliament vote
- ▶ Decision on free carbon allowances to the coal&lignite sector (Art. 10c derogation)
- ▶ Offshore Wind Act
 - ▶ Adoption earliest in 2020
 - ▶ Local content requirements
- ▶ Austria, Germany, Poland and the 4MMC countries market coupling



Conclusions

- ➔ Poland at the cross-roads
 - ▶ Behind the 2020 RES target
 - ▶ Increasing onshore renewables and offshore wind ambition
- ➔ 14GW offshore wind scenario
 - ▶ Turns Poland from net importer into net exporter
 - ▶ Average power price falls but volatility increases
- ➔ Regional impact
 - ▶ More exports to the neighboring countries and less imports
 - ▶ Average price effects small with the current cross-border transmission capacities
 - ▶ Fewer hours with very high prices and more with very low

ICIS Power and Carbon analytics

The background of the slide features a photograph of several wind turbines silhouetted against a vibrant orange and yellow sunset sky. The turbines are positioned on the right side of the frame, with their blades slightly blurred to suggest motion. The overall aesthetic is clean and professional, with a blue gradient overlay on the left side where the text is placed.

Translating market developments and regulatory changes into their price impact

- ▶ Pan-European power and carbon price forecasts
- ▶ Ad-hoc scenario analysis whenever market conditions change

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