

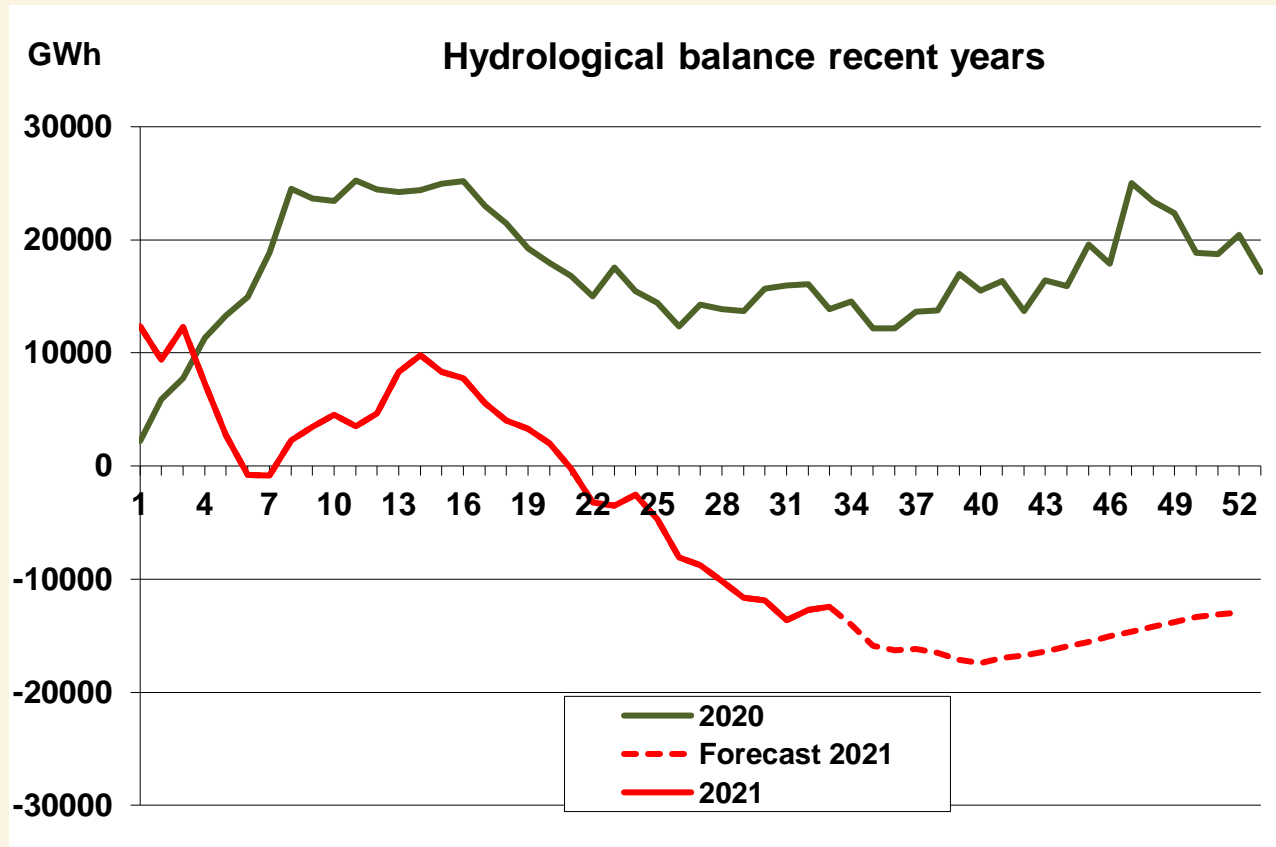
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# Implications for prices towards 2030

Focus on area price differences

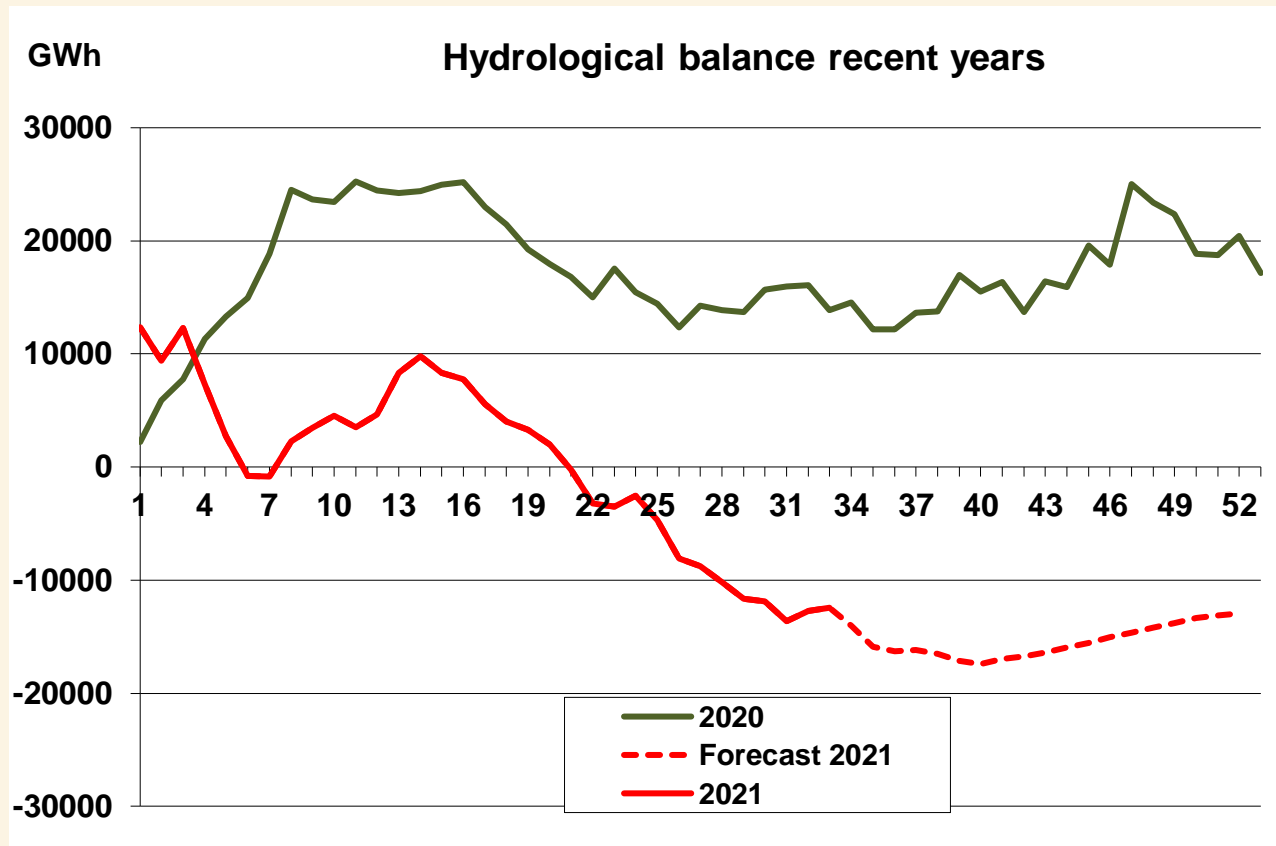
Senior Analyst Olav Johan Botnen, Volue Insight

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- Hydrological balance at 17 TWh negative. Lion's share of shortage related to weak reservoir levels in Norway

# Status in the Nordic power market now



- Hydrological balance at 17 TWh negative. Lion's share of shortage related to weak reservoir levels in Norway
- Low wind speeds
- Nuclear outages (R3 & R4, F2, Olkiluoto 3 delay)
- Extremely bullish gas and EUAs
- Nordic prices catching up with soaring neighbouring countries' spot prices (Q1: DE: 100 €, UK: 135 €)
- **Tighter connections to Europe**

## Our forwards/system price forecasts (as of 26/8-2021)

Product	Forecast Delivery period EUR			Gas SRMC
	Value M-Market Forecast	Market	Diff Market	
MSEP-21	70	67	3	115
Q4-21	67	62	5	117
Q1-22	73	59	14	117
Q2-22	55	34	21	82
Q3-22	47	24	22	82
Q4-22	54	33	21	93
YR-22	57	38	20	93
YR-23	48	31	18	72
YR-24	47	30	17	72
YR-25	48	31	17	72

- Weak upward signals for the rest of 2021
- Strong upward signals for 2022-2025
- Combination of negative hydrological balance and cable links to higher-priced countries: strong bullish potential
- Main uncertainties: weather performance, track for gas/EUAs after hitting all-time highs, outages

Notice: Latest observed market prices for fuel/EUAs and 30 years of weather spread going forward, are input to the price simulations.

## Our forwards/system price forecasts (as of 26/8-2021)

Product	5%	20%	50%	80%	95%	Average
<b>Q4-21</b>	53	57	<b>64</b>	70	77	<b>64</b>
<b>Q1-22</b>	50	60	<b>72</b>	86	99	<b>73</b>
<b>YR-22</b>	33	44	<b>57</b>	69	82	<b>57</b>

- Under dry/cold/non-windy conditions over autumn/winter, the Nordic Q1-22 may exceed 100€
- Under wet/mild/windy conditions over autumn/ winter, the Nordic Q1-22 may fall below 50€
- Additional uncertainties: track for gas/EUAs, outages

Notice: Latest observed market prices for fuel/EUAs and 30 years of weather spread going forward, are input to the price simulations.



# Grid bottlenecks and area price differences: when will it be better?

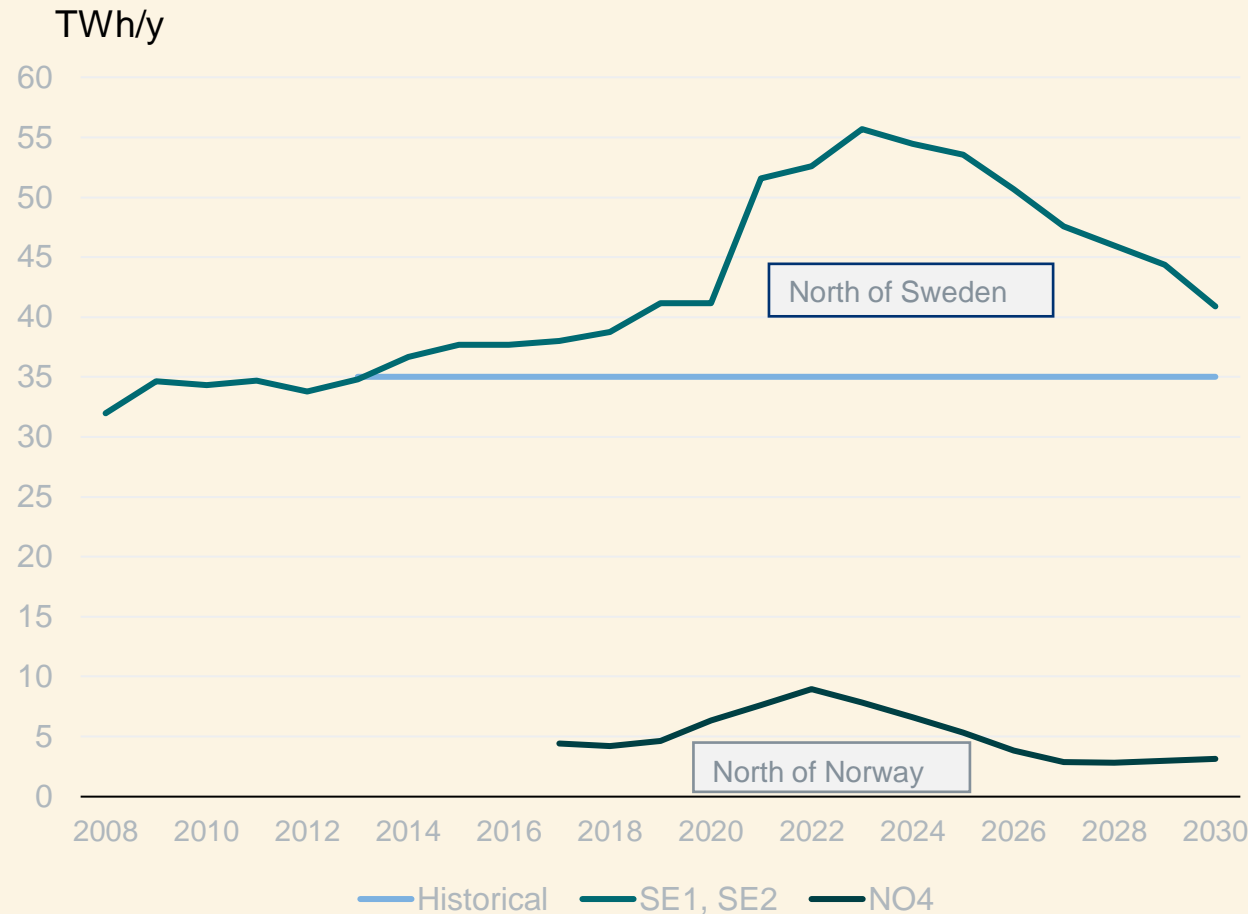
- Problem: Internal north-south grid bottlenecks
- Why? Strong development of wind power in SE1, SE2, NO4. New SE3 power flow patterns
- Consequence for market: Strong area price differences
- Consequence for price simulations: Modified modelling of internal/external transmission capacities

# Grid bottlenecks and area price differences: when will it be better?

- Problem: Internal north-south grid bottlenecks
- Why? Strong development of wind power in SE1, SE2, NO4. New SE3 power flow patterns
- Consequence for market: Strong area price differences
- Consequence for price simulations: Modified modelling of internal/external transmission capacities
- Solution: New industries in north, planned extensions of north-south grid capacities
- Uncertainties: 1) When SE3 grid problems are solved, 2) Any delays/changes in industrial or grid projects



# Grid bottlenecks caused by north: when will it be better?

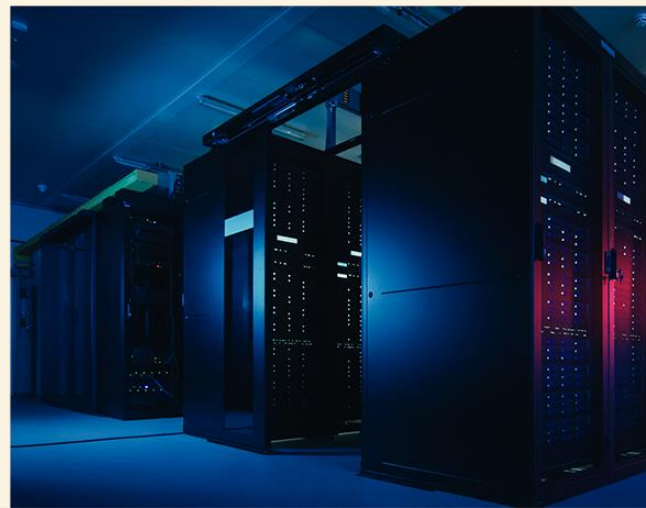


- North of Sweden: Large oversupply has developed over 2012-2023
- North of Norway: Some oversupply has developed also there
- In total: 25 TWh/y oversupply in northernmost price zones (compared to historical levels)
- Battery/hydrogen/green steel production will gradually remove the oversupply (2024-2030)
- Upgrades of grid will reduce the bottlenecks (2024, 2026, 2028, 2030)

# Grid bottlenecks Nordic-Europe: when will it be better?

- Problem: Grid bottlenecks and price differences Nordic vs. Continental European areas
- Why? Oversupply in the Nordic region, weak cable link capacities to higher-priced European areas
- Solutions: New industries/electrification to reduce Nordic oversupply, planned extensions of grid capacities

# Nordic power consumption: +100 TWh to 2030



- Datacenters: +21 TWh/y
- Transportation: +19 TWh/y
- Offshore oil & gas: +10 TWh/y
- Battery production: +13 TWh/y
- Heat pumps: +7 TWh/y
- Production of hydrogen: +32 TWh/y
- Pulp & paper industry: -5 TWh/y
- Other changes: +3 TWh/y
- Total growth: 100 TWh/y

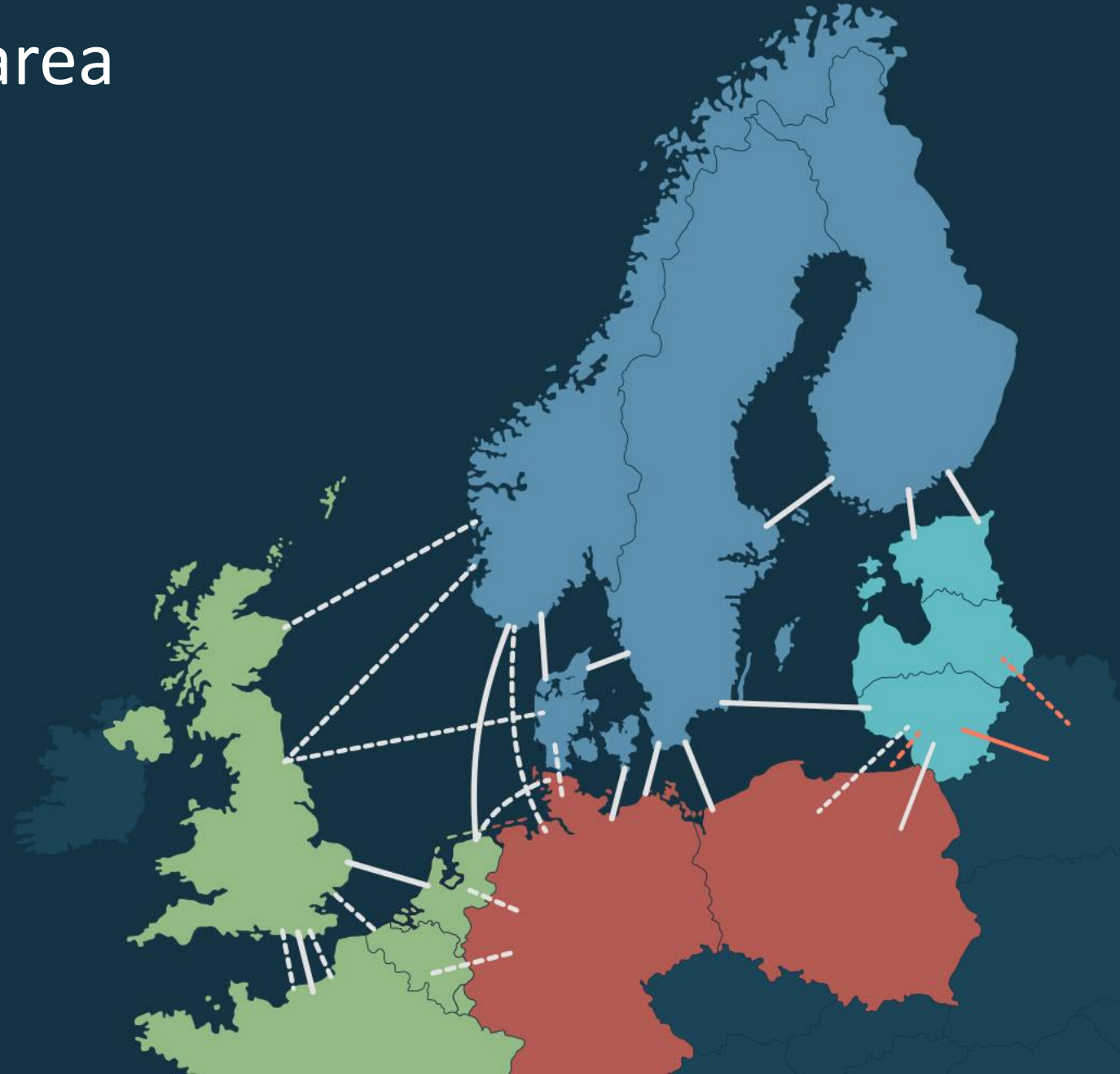
# New links from the Nordic area

Transmission capacities from Nordic area:

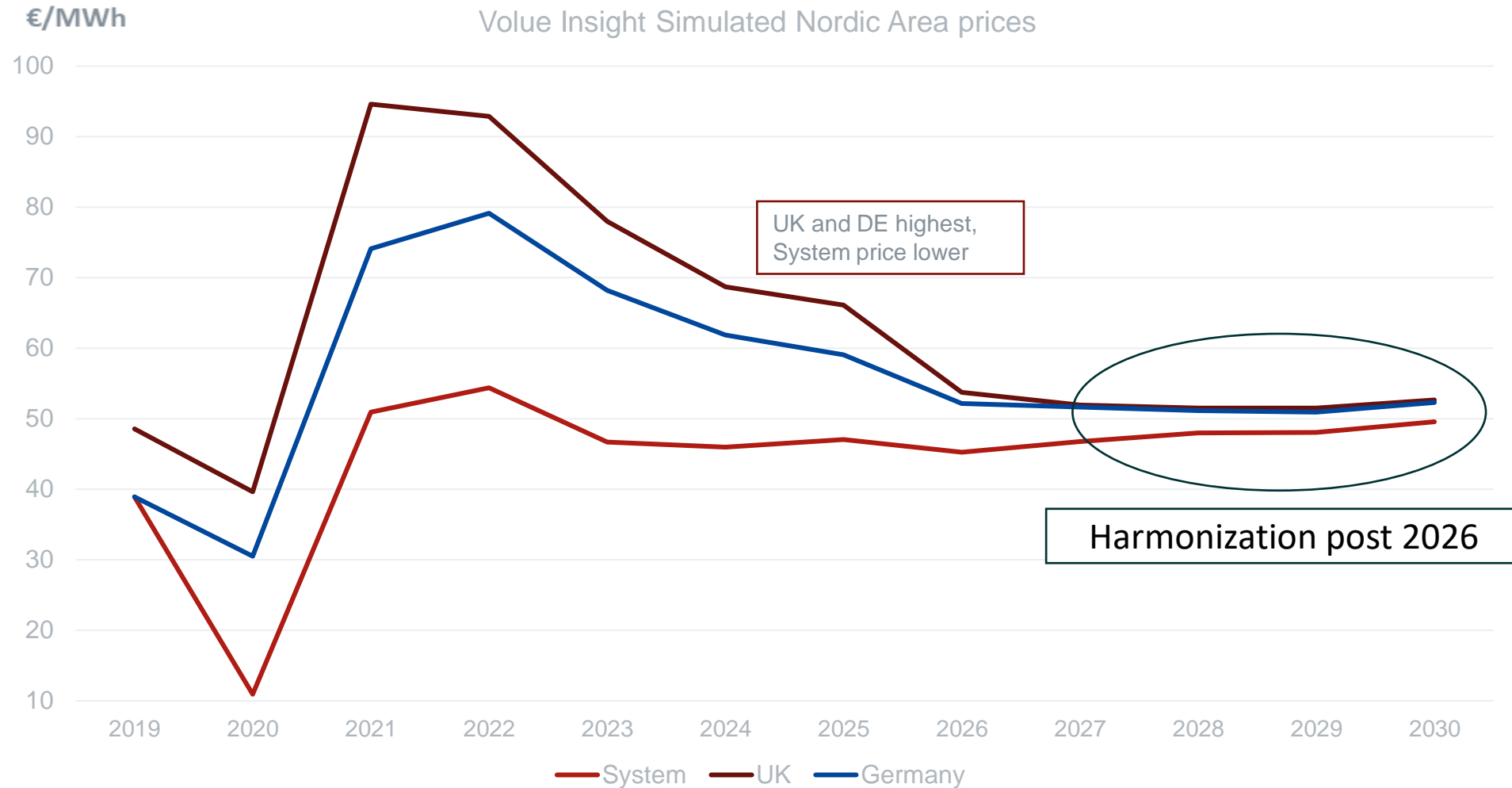
- Pr. 2019: 6 GW
- Pr 2022: 11 GW
- Pr 2025: 13 GW
- Pr 2030: 16 GW

NB:

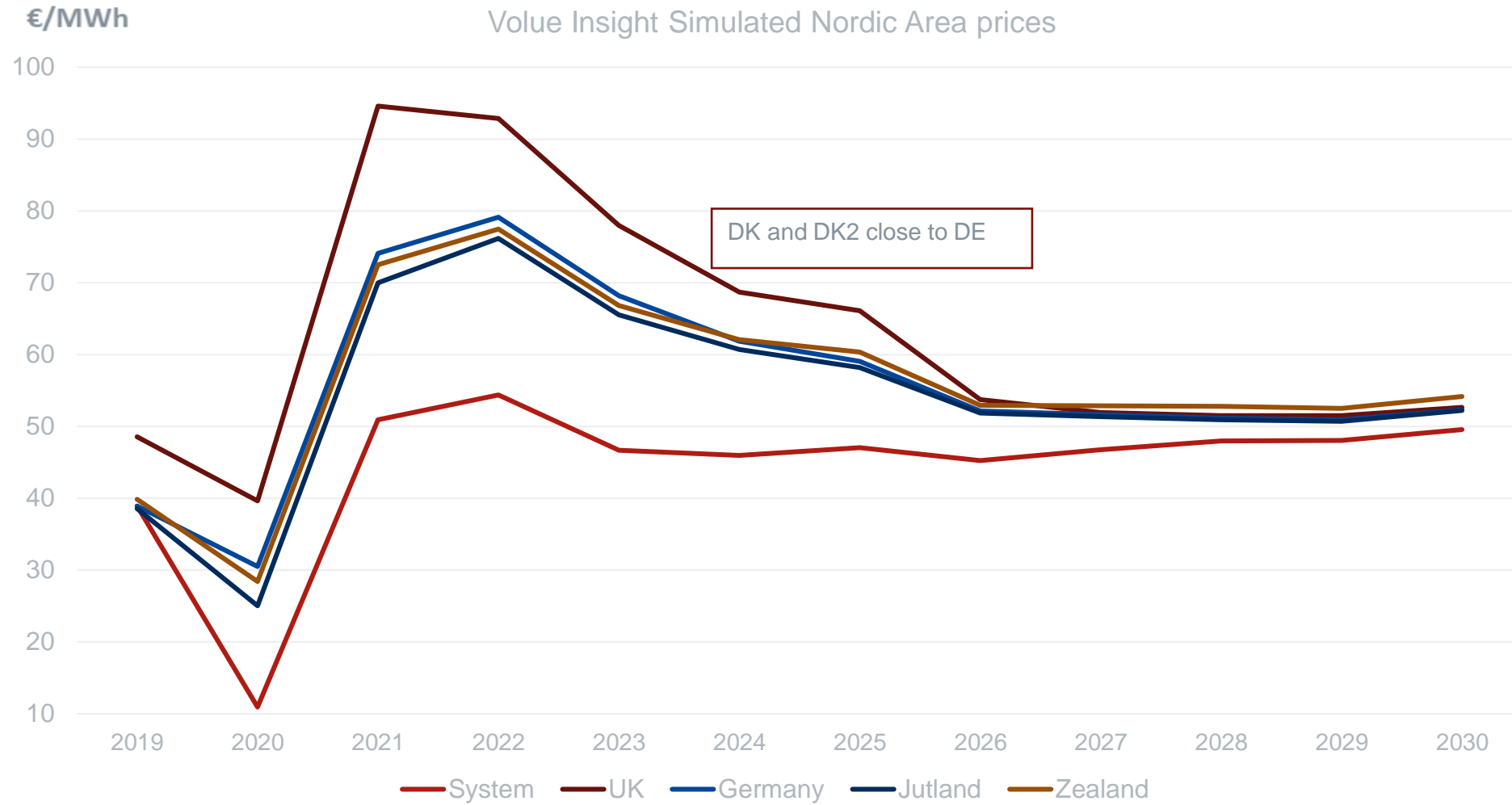
- Cap on NordLink (Nor-Ger) exports 2021-2028, 12-70% availability
- NorthConnect (Nor-UK) excluded in our modelling for now



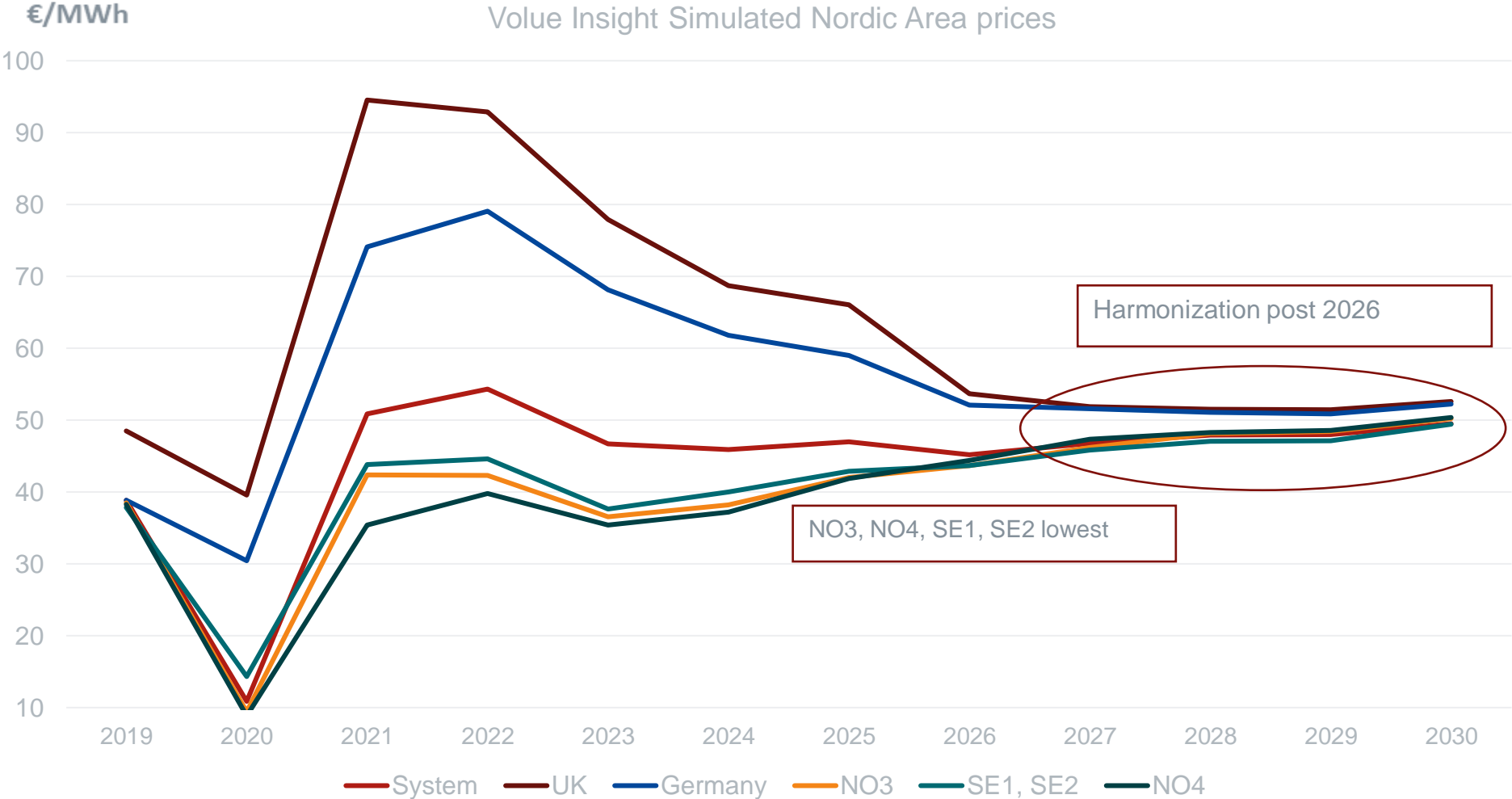
# Value Insight: Simulated Nordic Area prices



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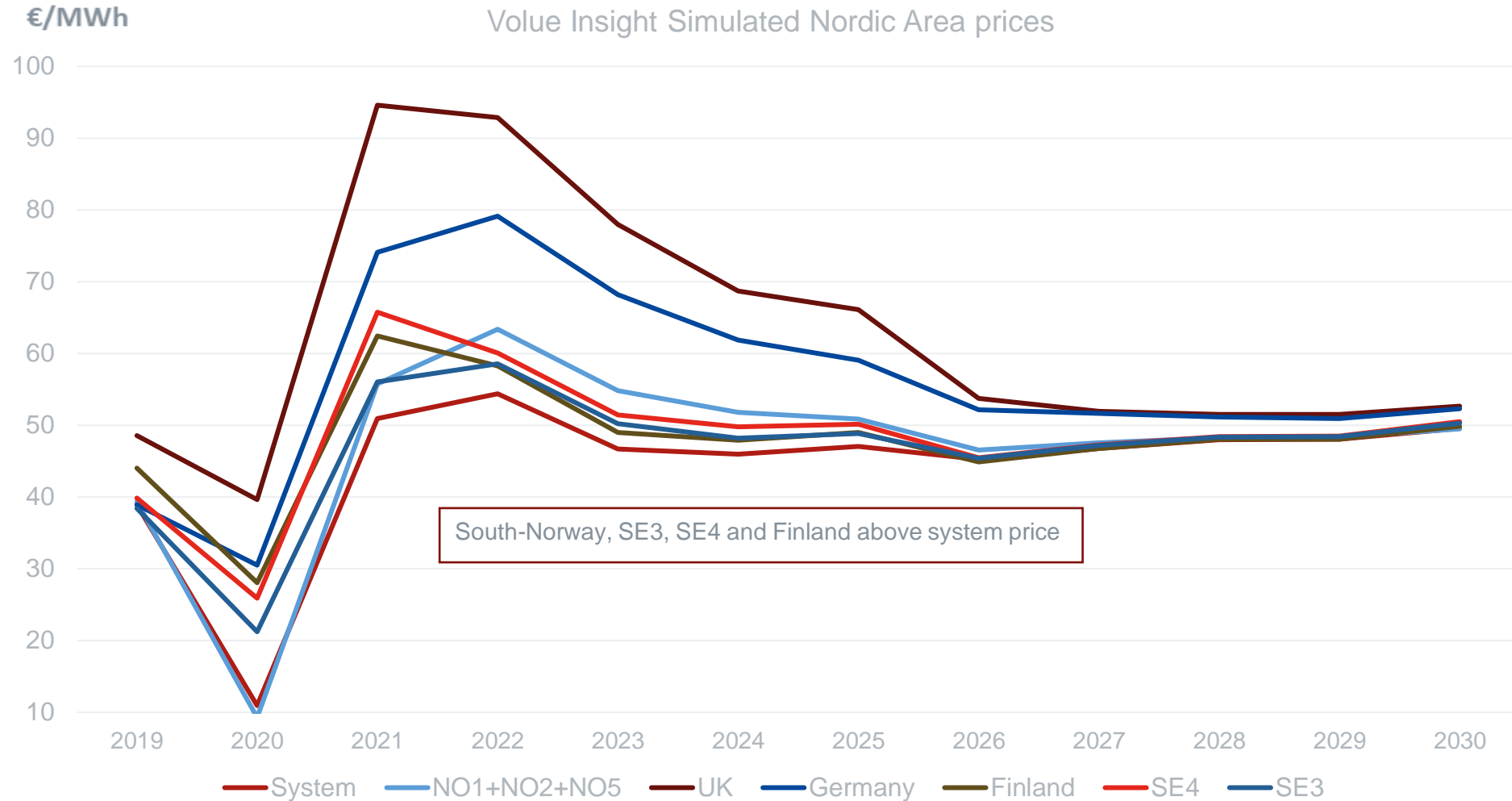


# Value Insight: Simulated Nordic Area prices





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# Area price differences: Conclusions

- Strong Nordic power consumption growth, and more grid capacity extensions, reduce all price differences over the 2020s (both internally and externally)
- Germany vs. system-price: Gradually reduced from 25 (2022) to 3 €/MWh (2028)
- UK vs. system-price: Gradually reduced from 40 (2022) to 4 €/MWh (2028) – driven by UK carbon prices/links
- System-price vs. NO3, NO4, SE1, SE2: Gradually reduced from 10-15 (2022) to 2 €/MWh (2026)
- South-Norway, SE3, SE4, Finland vs. system-price: Gradually reduced from 4-9 (2022) to 0-1 €/MWh (2026)
- Germany vs. DK1, DK2: Gradually reduced from 2-3 (2022) to 0 €/MWh (2026)
- BUT please observe: these figures are on average over 30 weather years! On hourly resolution the results can be completely different

# Thank you!

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