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Six months of flowbased market coupling

How has it impacted the market and operation?

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What is flowbased market coupling?

- New method for calculating capacities in the day-ahead and intraday timeframe
- Provides more information about the network elements in the nordic grid to the market
- A tool to manage the power system of the future

Why flowbased?

- Increased utilization of the grid
- More similar prices between bidding areas
- Increased socio-economic welfare for Norway, the Nordics and Europe

But...

- The welfare is not equally distributed
- The complexity makes it less intuitive to understand the flows and prices
- Higher utilization in day-ahead provides less capacity in intraday and balancing

Main takeaways from flowbased so far

- Higher utilization of the grid
- More secure operation
- Forecasting and precise parameters are difficult
- Challenges in intraday and balancing

Changes in flows

Flow-based enabled more flows through the Nordic system after go-live

North Cut:
Average southbound flow is in increased by 8%

Central Cut:
Average flow is increased by 22%
Maximum flow increased by 9% 7.994 → 8.692 MWh

South Cut:
Average flow is increased by 22%
Maximum flow increased by 7% 5.336 → 5.694 MWh

South Norway:
Average flow is increased by 173%
Maximum flow increased by 23% 2.565 → 3.156 MWh

Note: data comparison in slide 7 – 9: First two months post go-live (Nov and Dec 2024) vs. winter periods (Nov-Feb) of the two years prior to go-live (2022-2023 and 2023-2024).

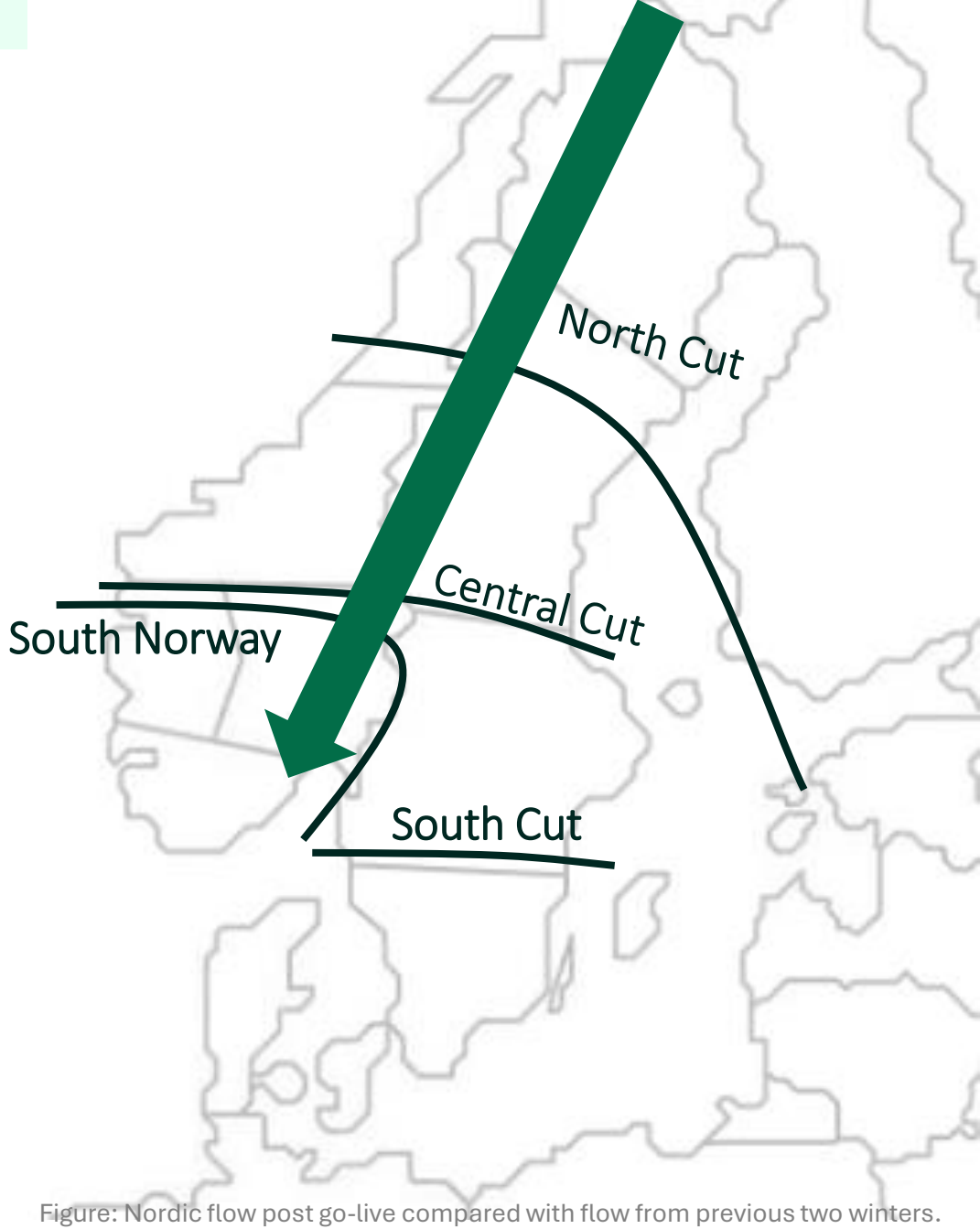
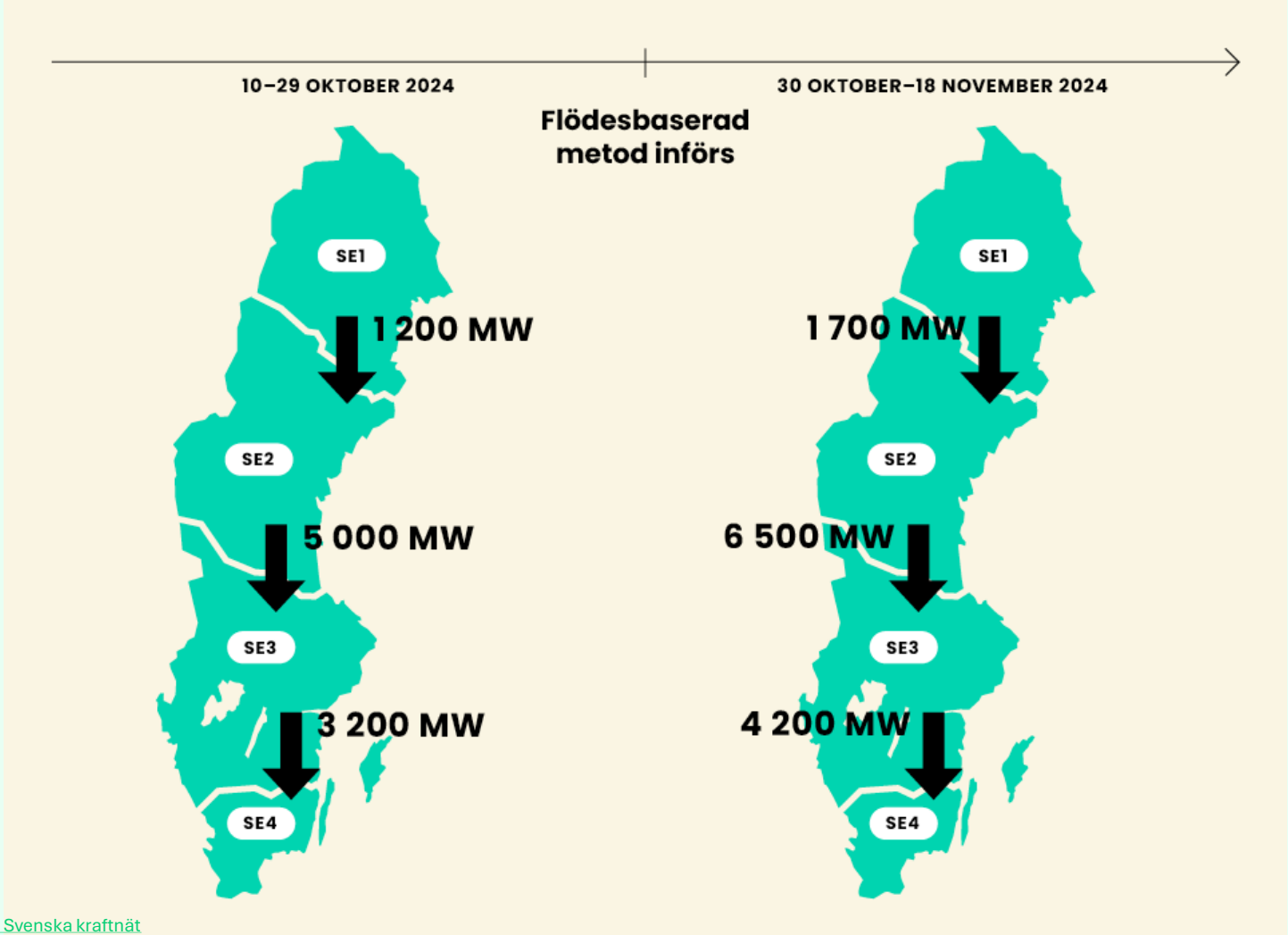


Figure: Nordic flow post go-live compared with flow from previous two winters.

Experience from the Swedish grid



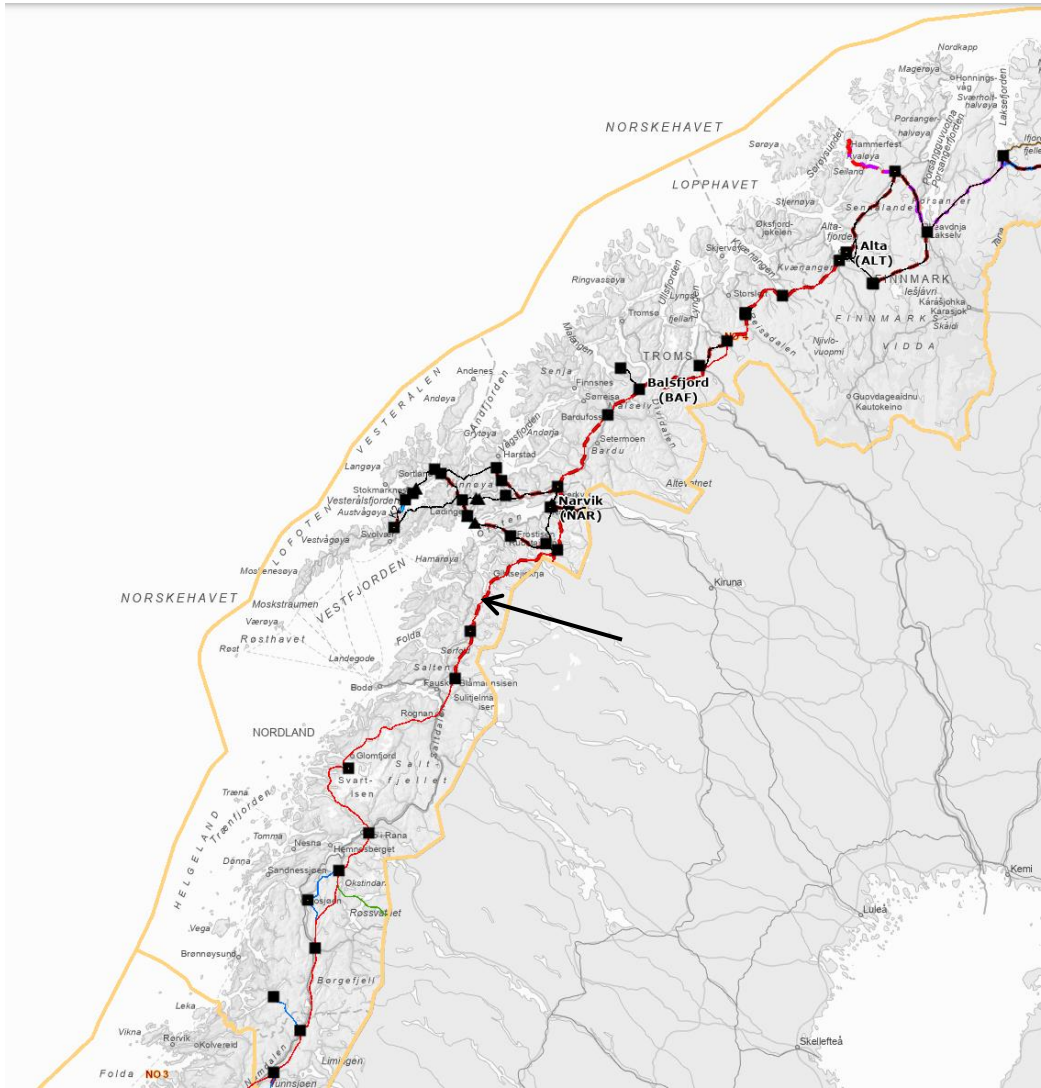
Kilde: Kraftigt ökat handelsutbyte med nya metoden | Svenska kraftnät

Challenges after go-live so far

- NO4 grid split
- High reservoir filling and import into NO3
- North Sea Link (NSL)
- Intraday and balancing market

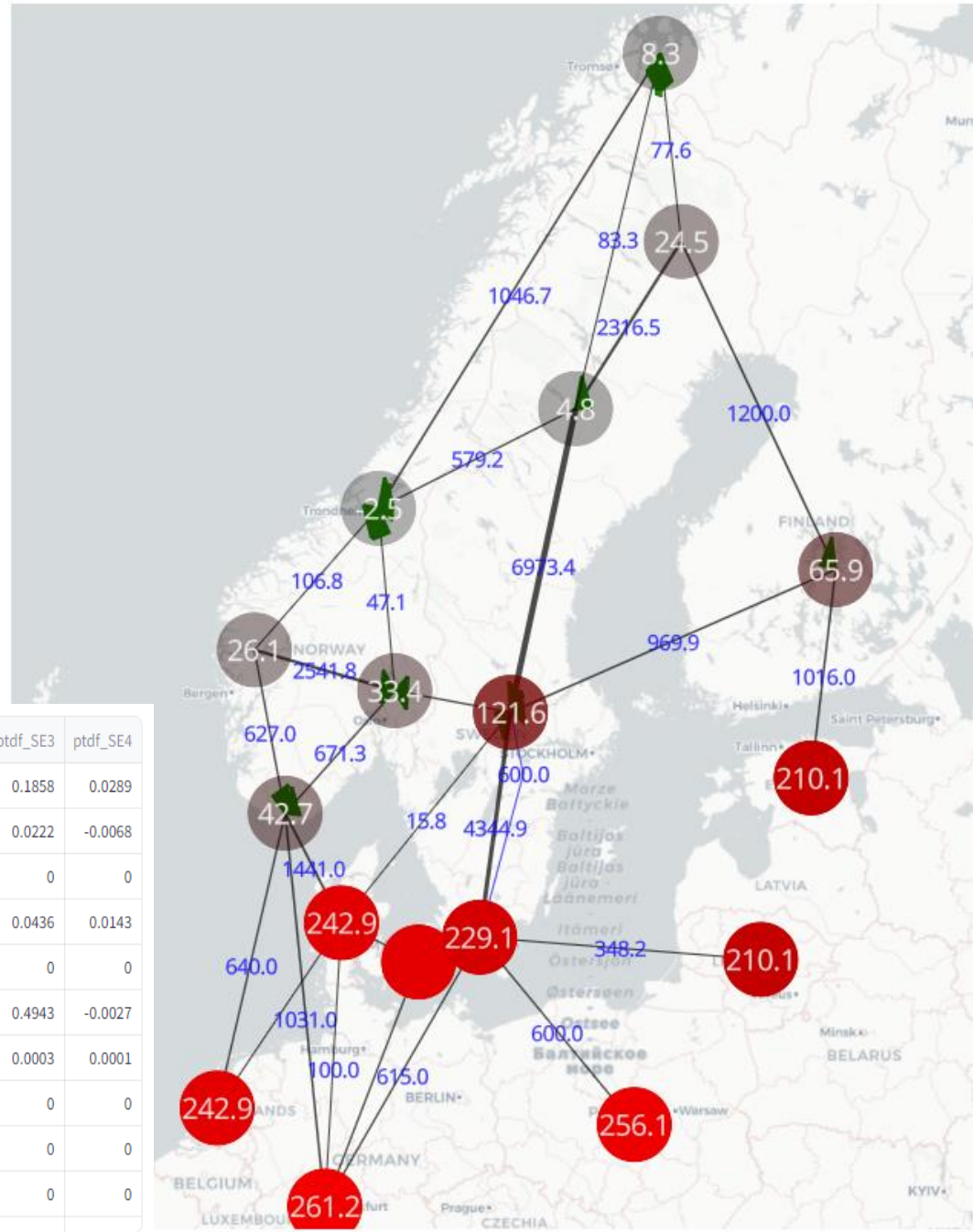
NO4 grid-split

- A planned maintenance on Ofoten-Kobbvatnet from 19 March to 9 May split NO4 in two
- Generation shift key (GSK) values are defined per bidding area
- Due to the difference in production units north and south of this split, the PTDFs will likely not be very precise
- Makes it difficult to send in correct information to the market and has required high levels of redispatch



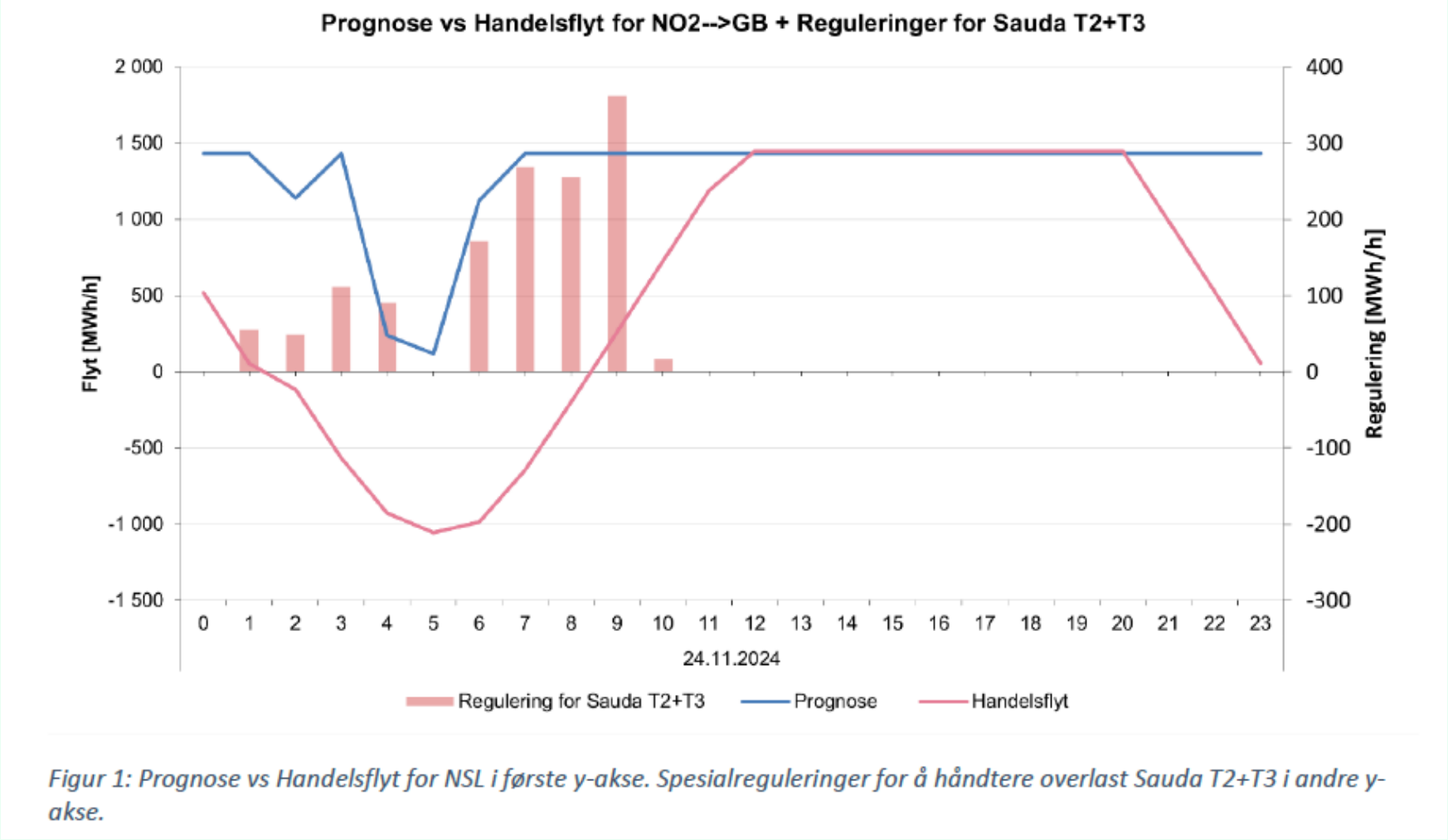
Production in NO3 late 2024

- High prices on the Continent
- High reservoir filling in NO3
- Still import into NO3 to relieve CNECs and allow for higher flows in SE2-SE3 etc.
- FB does not really consider issues in individual bidding areas
  - Can cause overflow in reservoirs
- Net position in NO3 is now much higher than the same last year



cnecName	Faaf	flowFb	ram	shadowPrice	ptdf_DK1	ptdf_DK2	ptdf_FI	ptdf_NO1	ptdf_NO2	ptdf_NO3	ptdf_NO4	ptdf_NO5	ptdf_SE1	ptdf_SE2	ptdf_SE3	ptdf_SE4
a1910e221e1c4a50bad52283ea3d913c	885	557	885	421.8183	0	0.0004	0.231	0.4304	0.436	0.3049	0.2566	0.4311	0.2306	0.2388	0.1858	0.0289
304988780f5f40459770c28f31c7d4e4	1,088	1,257	1,088	286.4288	0	-0.0001	0.1476	0.1555	0.1526	0.219	0.1826	0.1552	0.1465	0.1843	0.0222	-0.0068
AC_Minimum_NO2_SK	1,441	1,441	1,441	194.2398	0	0	0	0	0	0	0	0	0	0	0	0
b0965ab03d18429995c787d1ac5b9c72	1,133	1,170	1,133	187.7169	0	0.0002	0.134	-0.1434	-0.159	0.0749	0.1209	-0.1501	0.1337	0.1591	0.0436	0.0143
AC_Minimum_FI_EL	1,016	1,016	1,016	144.2083	0	0	0	0	0	0	0	0	0	0	0	0
20e1a74d41374affb999f9ce5424de44	6,615	6,080	6,615	55.0844	0	0	0.9589	0.1883	0.1525	0.7539	0.9018	0.1754	0.9588	0.9708	0.4943	-0.0027
13792_457 300 Mauranger-Blåfalli	641	627	641	52.6289	0	0	0.0012	0.0181	-0.0948	0.0074	0.003	0.1908	0.0012	0.0009	0.0003	0.0001
FI_PTC_RAC_SE1-FI	1,200	1,200	1,200	41.9382	0	0	-1	0	0	0	0	0	0	0	0	0
f988d0ded124494ab5825f6dd3c48933	600	600	600	36.6385	0	0	0	0	0	0	0	0	0	0	0	0
c1e9852e22f3437d98f43d3d8fb4f3f4	615	615	615	22.4167	0	0	0	0	0	0	0	0	0	0	0	0

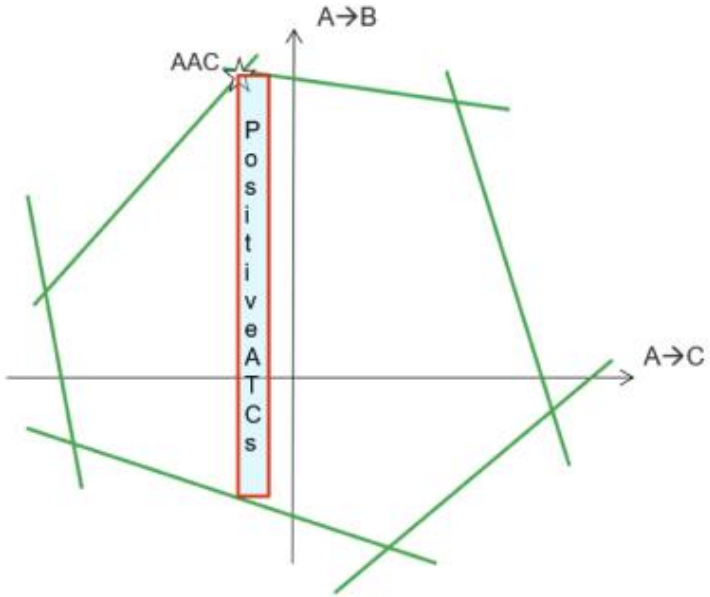
North Sea Link forecast

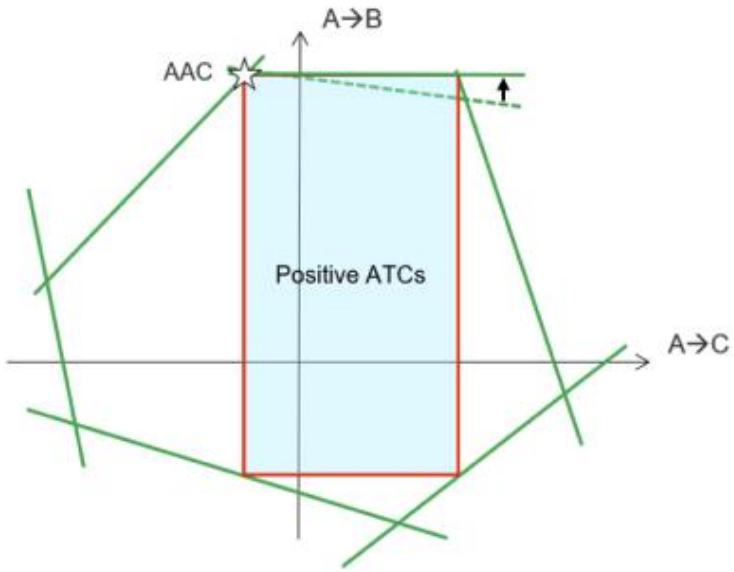


Figur 1: Prognose vs Handelsflyt for NSL i første y-akse. Spesialreguleringer for å håndtere overlast Sauda T2+T3 i andre y-akse.

Intraday and balancing

- The Intraday and balancing markets still requires capacities on NTC-format
- Translating from a flowbased-domain to NTC-domain can often lead to very small capacities
- Consequences: more difficult for market participants to trade themselves into balance, reservation of capacity to ensure balancing
  → Less effective market and potentially higher balancing prices





What are we working on to provide better information to the market?

- Looking into publishing D-2 domain earlier (before mFRR CM gate closure)
- FB parameter forecast to improve price forecasts (W-1, D-10 etc.)
- How to better represent effects of planned outages through NUCS/UMM

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Thank you!

Questions?