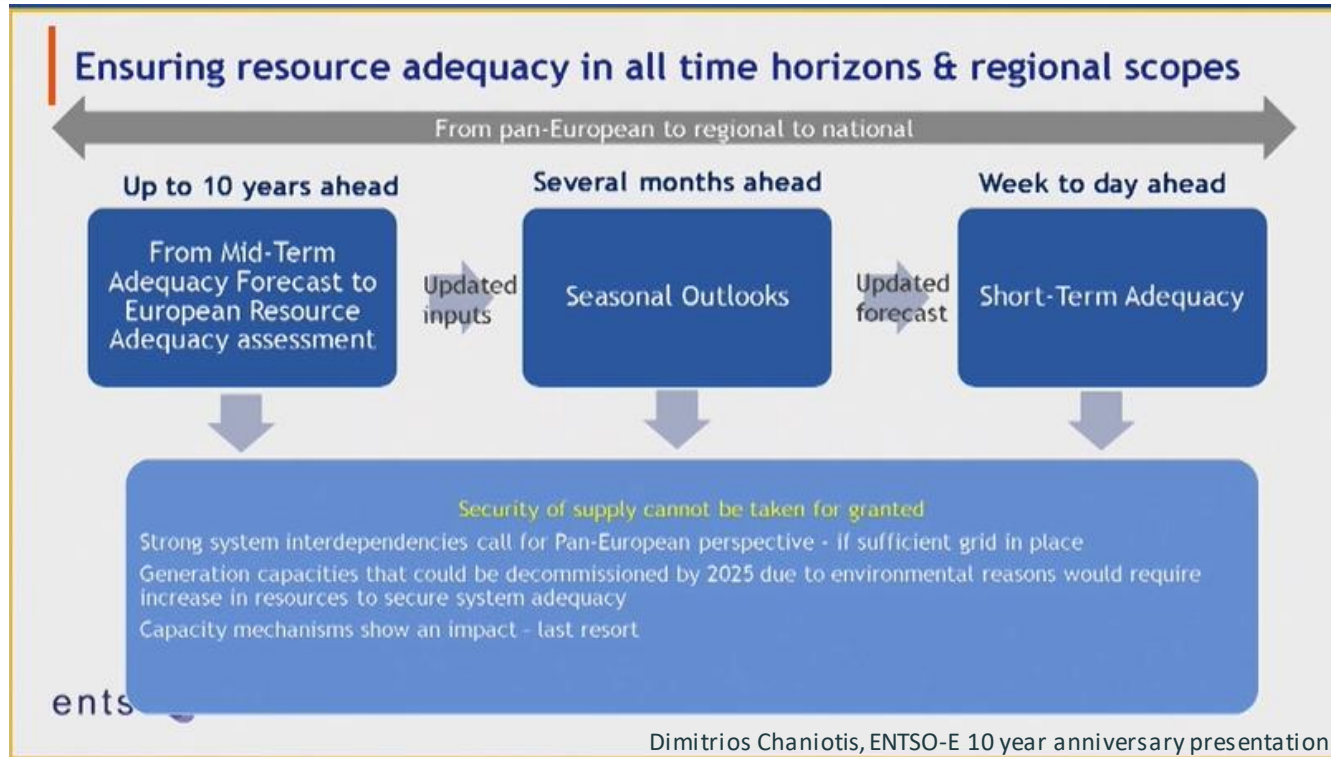

Nordic Electricity Market Forum

November 28, 2019

From national to Nordic Adequacy
by Nordic Planning Group



Adequacy assessments in different time horizons



Nordic winter power balance 2019-2020

With estimated power exchange [MW]
Cold winter day in 1 of 10 winters

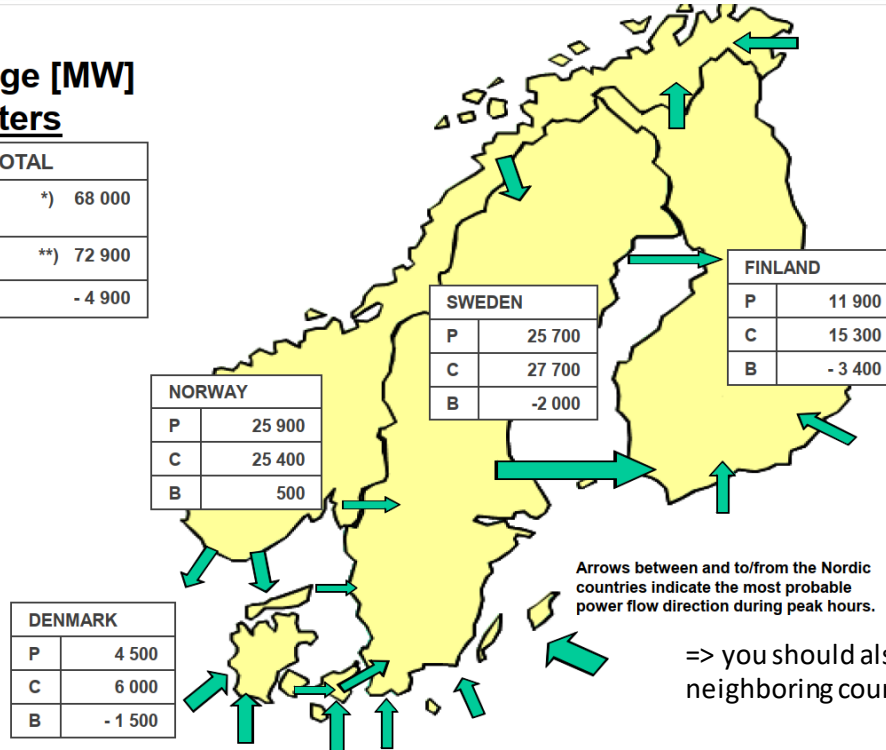
NORDIC MARKET	TOTAL
P = Available capacity for market, TSO reserves excluded	*) 68 000
C = Peak demand	**) 72 900
B = Balance without power exchange	- 4 900

Remarks :

*) Assumed availability in percentage
Nuclear power: 100 % in Finland, 90 % in Sweden
Wind power: 6 % in Finland, 9 % in Sweden,
9 % in Norway, 3 % in Denmark

**) Nordic peak demand 2 % lower than sum of national peaks.

TSOs' contracted reserves are excluded from this forecast.



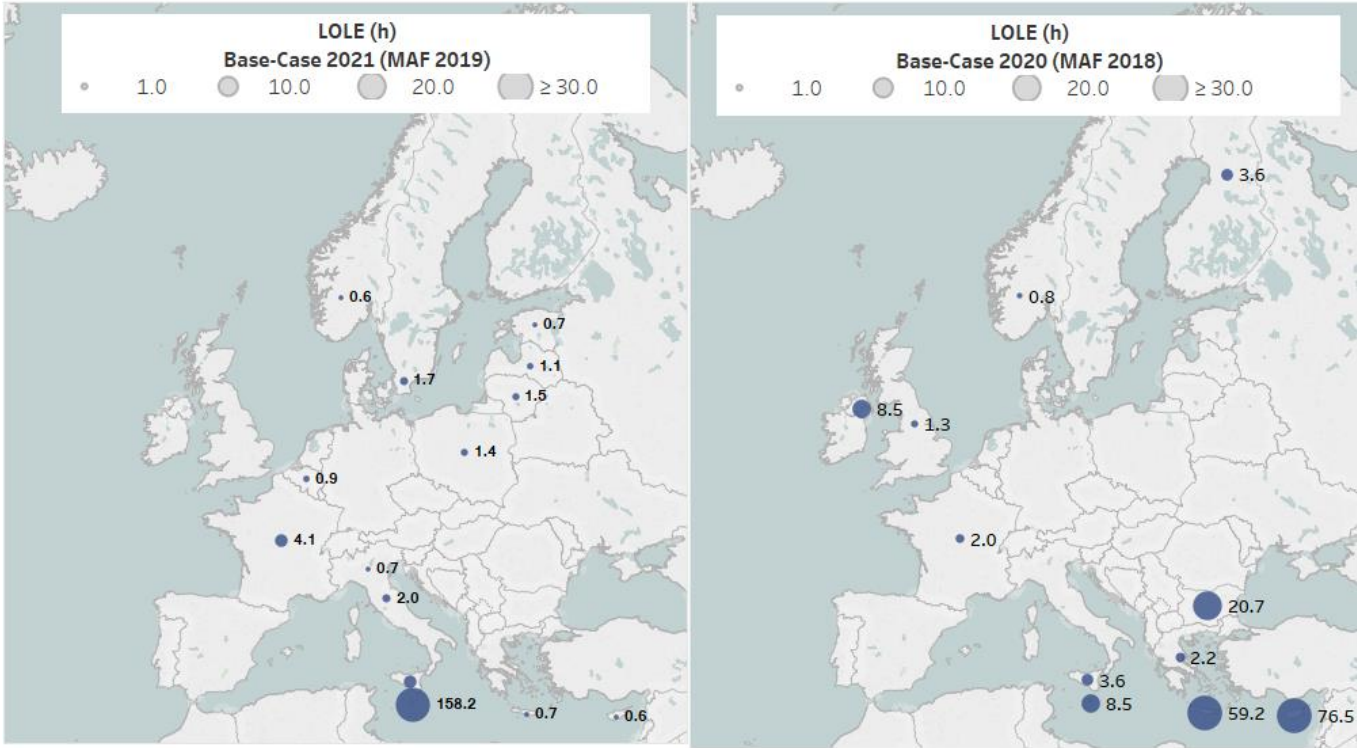
Longer term adequacy studies

- In longer term studies, the whole power system is modelled and simulated hour-by-hour with probabilistic approach
- Last year, Nordic TSOs published a Nordic adequacy forecast based on a European study (MAF, Mid-term Adequacy Forecast 2017) that was complemented with regional sensitivities:
 - Location of future wind power development
 - Weather patterns – extreme heat, extreme storm
 - No Russian cross-border exchange
 - Reduction in CHP capacity
 - Reduction in Nuclear capacity
 - Grid constraints in DK/Ger border
- A Pan-European study (MAF 2019) has just been published

Results from MAF 2019



Development: 2020 to 2021

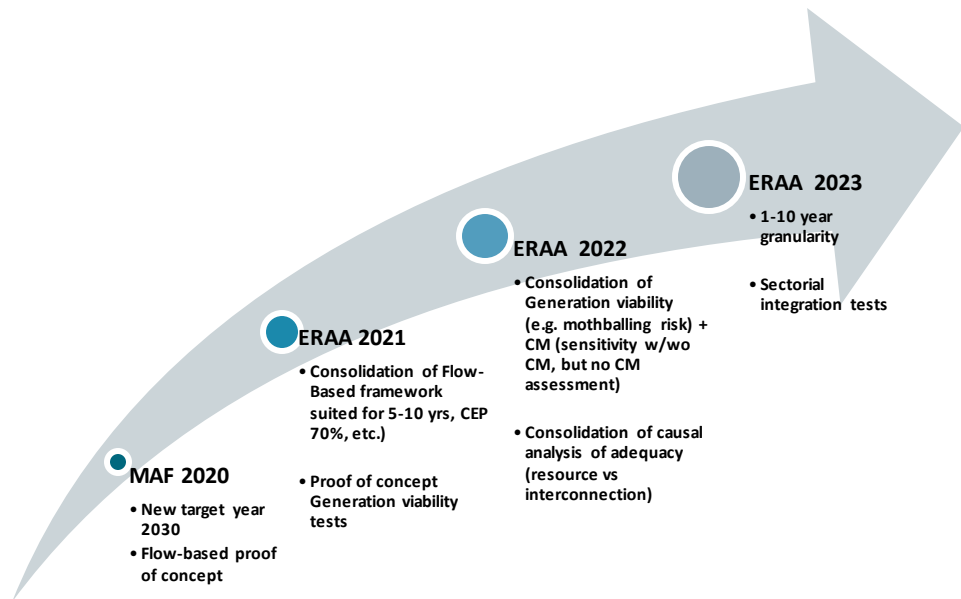


CEP impact on adequacy studies

Topic	MAF 2019	Target Methodology
Modelling approach	Probabilistic approach	Probabilistic approach
Communication	Annual publication	Annual publication
Network	NTC approach. Testing flow-based since 2018.	Compliance with FBMC
Time granularity	2 Target Years	10 Target Years
Available capacity	Bottom-up expectations: (de-)commissioning up to 7 years ahead	Economic viability of generation assets, integrated in the model (10 years ahead)
Capacity Mechanisms	No explicit CM considerations; Missing capacity investigation	Integrated consideration of CM
Sectorial coverage	No sectorial integration	Sectorial integration (P2X consideration)

To be developed

Gradual implementation towards 2023



This will also be the basis for Nordic adequacy assessment: any separate Nordic methodology or study is not planned

But we are still needed to interpret the results from the Nordic point of view!