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Supply of electricity in central Europe: current situation and forecast

DRAFT

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Engelberg, 18th October 2017

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Agenda

1. Current market challenges in power sector
2. Modelling basics
3. Scenarios in Mid-term Adequacy Forecast (MAF) 2017
4. Adequacy in Europe in 2020 and 2025
5. Questions

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Electricity supply in Europe is in transformation

Current market situation in Europe is very challenging:

Low electricity prices as a result of:

» high share of susidized renewable generation, and

» overcapacity due to low demand since the financial crisis 2008

… endanger investments in existing and planned power plants.

BUT increasing volatility of generation requires thermal generation as a backup!

► How can electricity demand be covered in the future?

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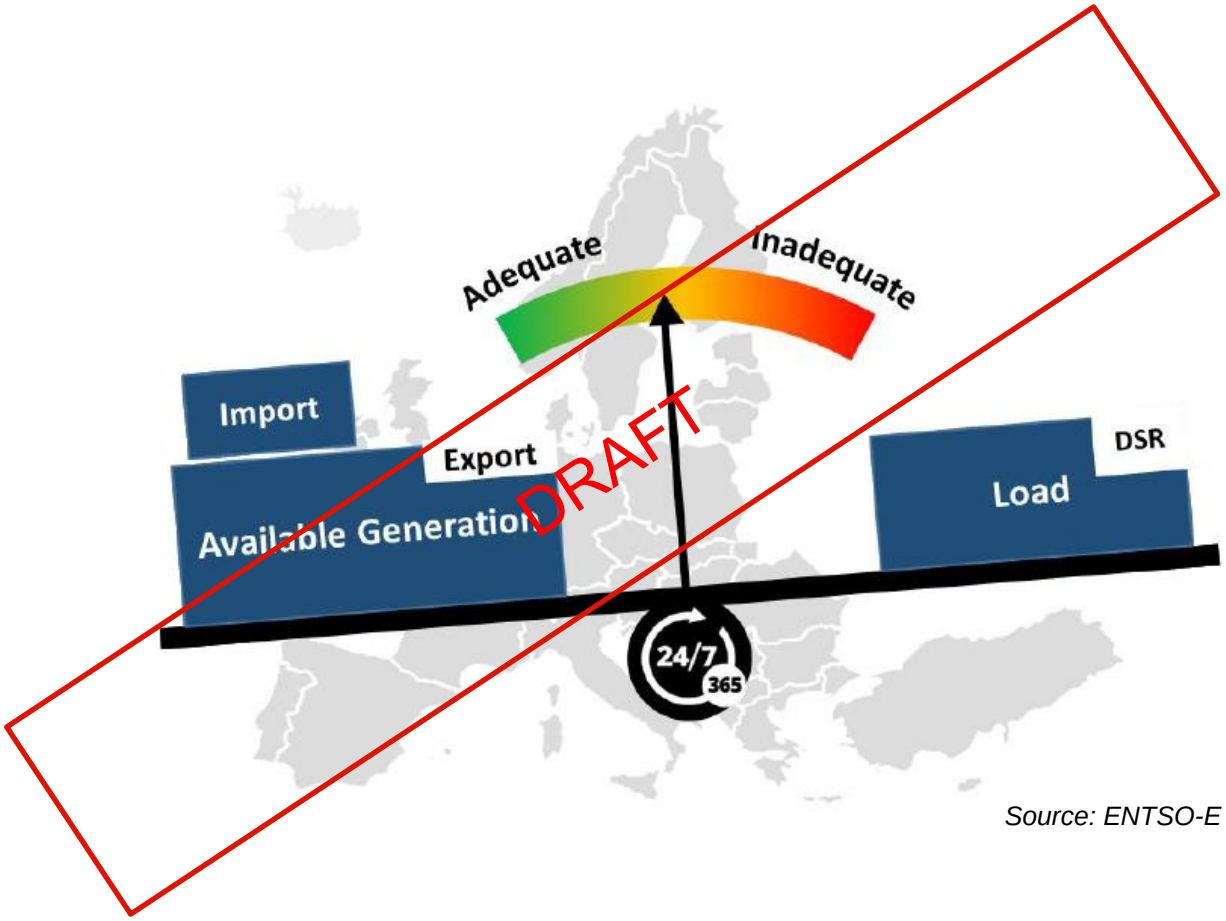
Resource adequacy: balance between net available generation and net load



Source: ENTSO-E

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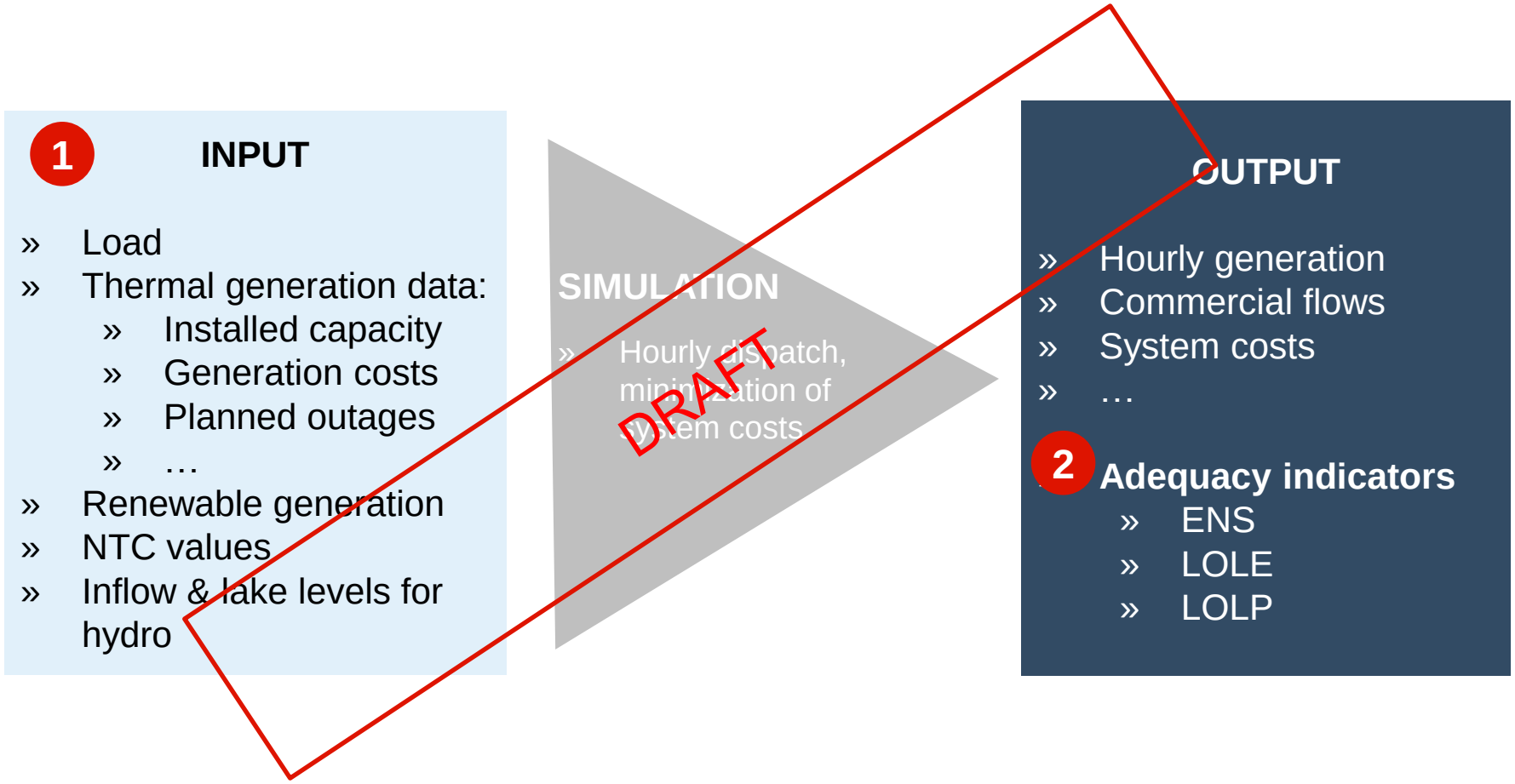
Input and output data of the market modelling



Source: Swissgrid illustration based on ELIA (2016)

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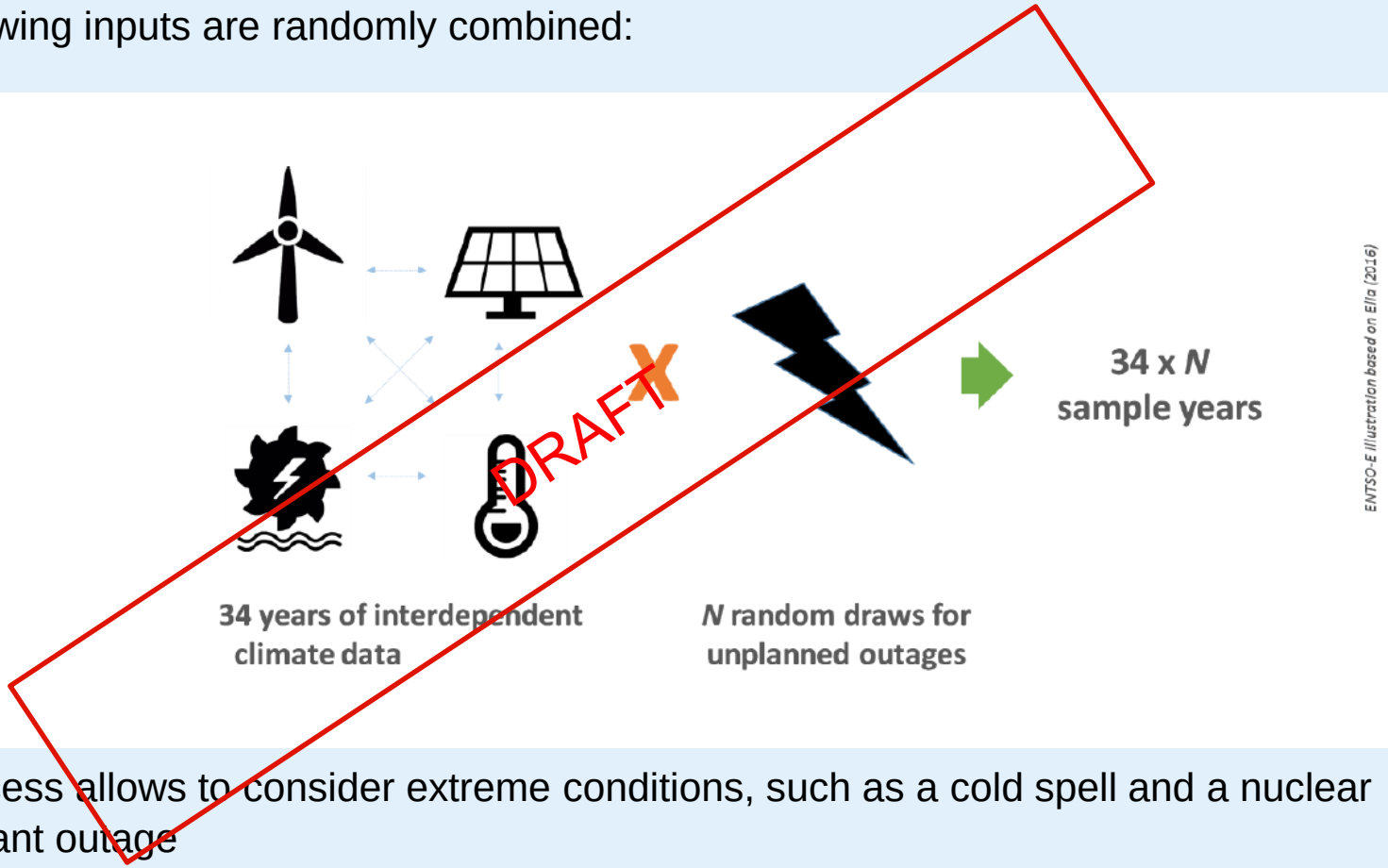
1 For adequacy analysis multiple simulations are necessary

» The following inputs are randomly combined:



» This process allows to consider extreme conditions, such as a cold spell and a nuclear power plant outage

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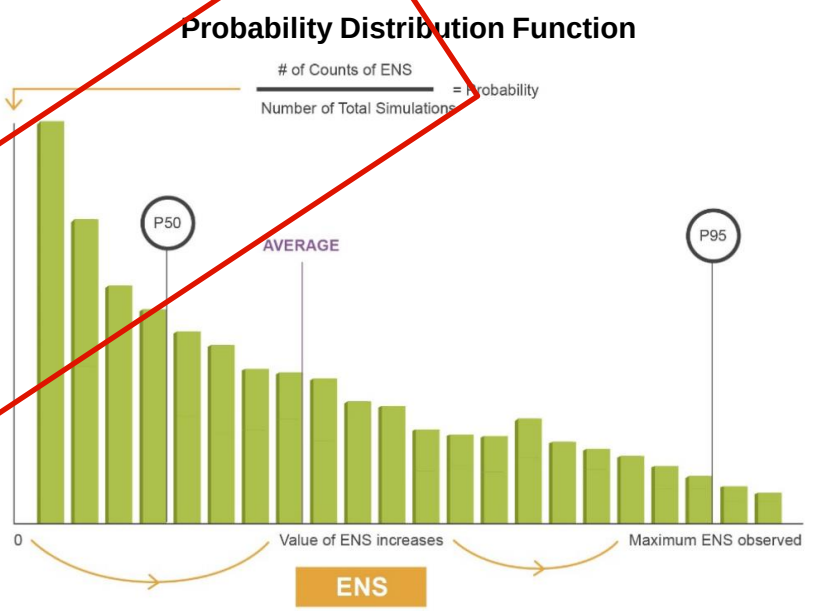
2 Adequacy indicators

- **Energy Not Supplied (ENS):** the average value of ENS found among all the situations (MWh)
- **Loss of Load Expectation (LOLE):** the number of hours in a given period (year) in which the load cannot be covered (h)
- **Loss of Load Probability (LOLP):** is the probability that the load will exceed the available generation at a given time (%)
- **Interpretation of the ENS distribution:**
  - Average: the average value of ENS found in all the simulationss
  - Median (P50): in the half of the simulations the indicator ist smaller/larger
  - "1-in-20 years" (P95): in 95% of all simulations the indicator is smaller, and in 5% larger



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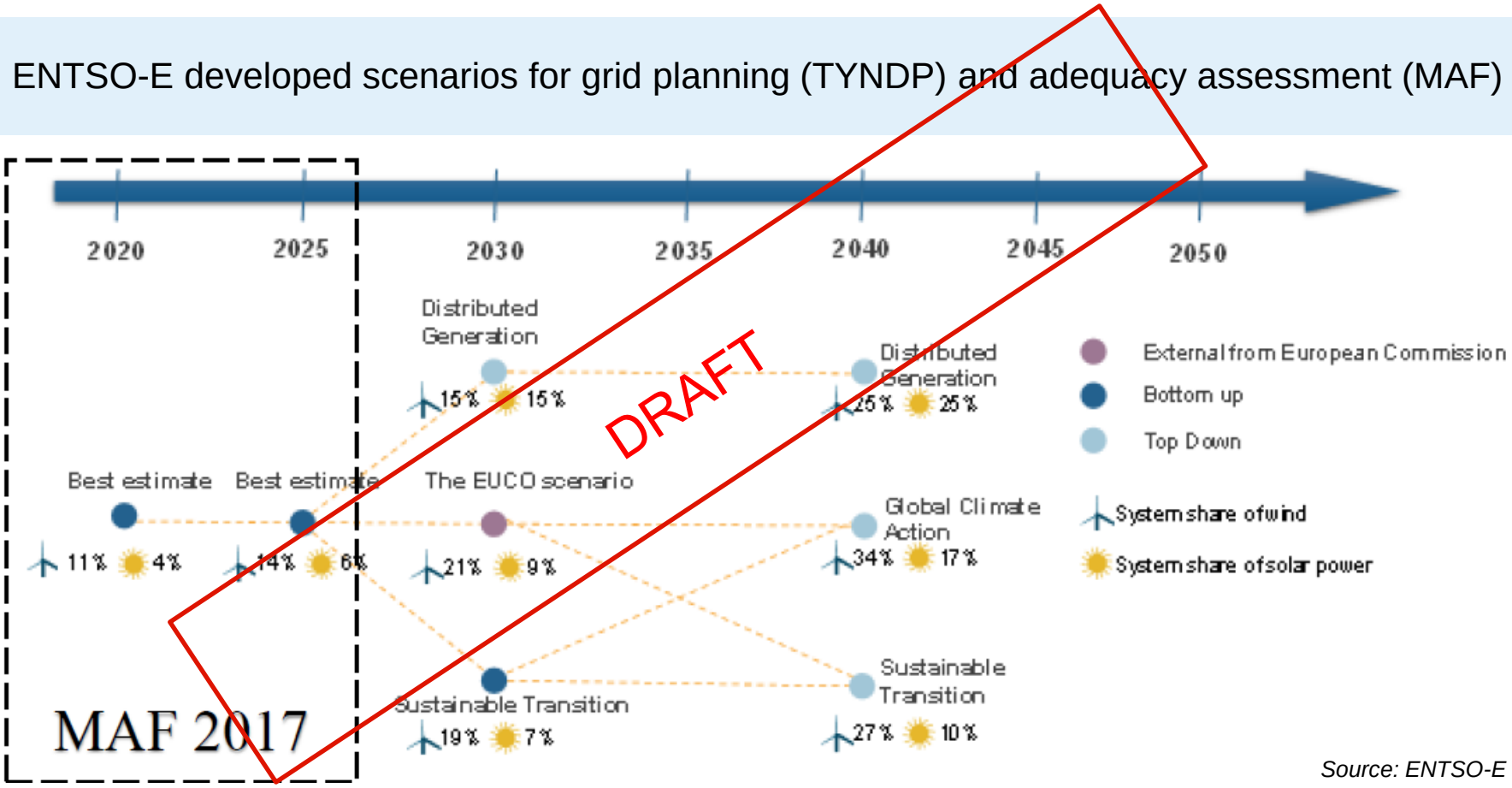
Adequacy assessment is performed for the years 2020 and 2025

» ENTSO-E developed scenarios for grid planning (TYNDP) and adequacy assessment (MAF)



Source: ENTSO-E

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The share of thermal generation in Europe decreases to appr. one third in 2025

- Scenario characteristics:
  - Renewable share of demand: 41% - 45 %
  - EU28 percentage reduction of CO_2 emissions for the power sector: ca. 60 %
  - Average marginal price: 38 €/MWh – 66 €/MWh
- Additional scenario parameters are:
  - Demand growth
  - Demand-Side Response
  - Balancing Reserves
  - Exchanges with non ENTSO-E countries

Generation capacity in the ENTSO-E Perimeter

		2020		2025	
		GW	%	GW	%
Thermal		489.2	40.8%	446.9	35.1%
	Nuclear	120.7		100.5	
	Hard Coal	91.4		74.1	
	Lignite	60.2		58.3	
	Gas	203.5		204.7	
	Light Oil	7.9		6.1	
	Heavy Oil	3.4		2.4	
	Oil Shale	2.1		0.8	
Wind Onshore		183.8	15.3%	220.0	17.3%
Wind Offshore		24.4	2.0%	44.6	3.5%
Solar PV		138.5	11.6%	189.6	14.9%
Solar Thermal		2.6	0.2%	2.8	0.2%
Hydro		265.6	22.2%	271.8	21.3%
Other RES		39.0	3.3%	41.3	3.2%
Other Non-RES		55.5	4.6%	56.7	4.5%
TOTAL		1198.7	100.00%	1273.7	100.00%

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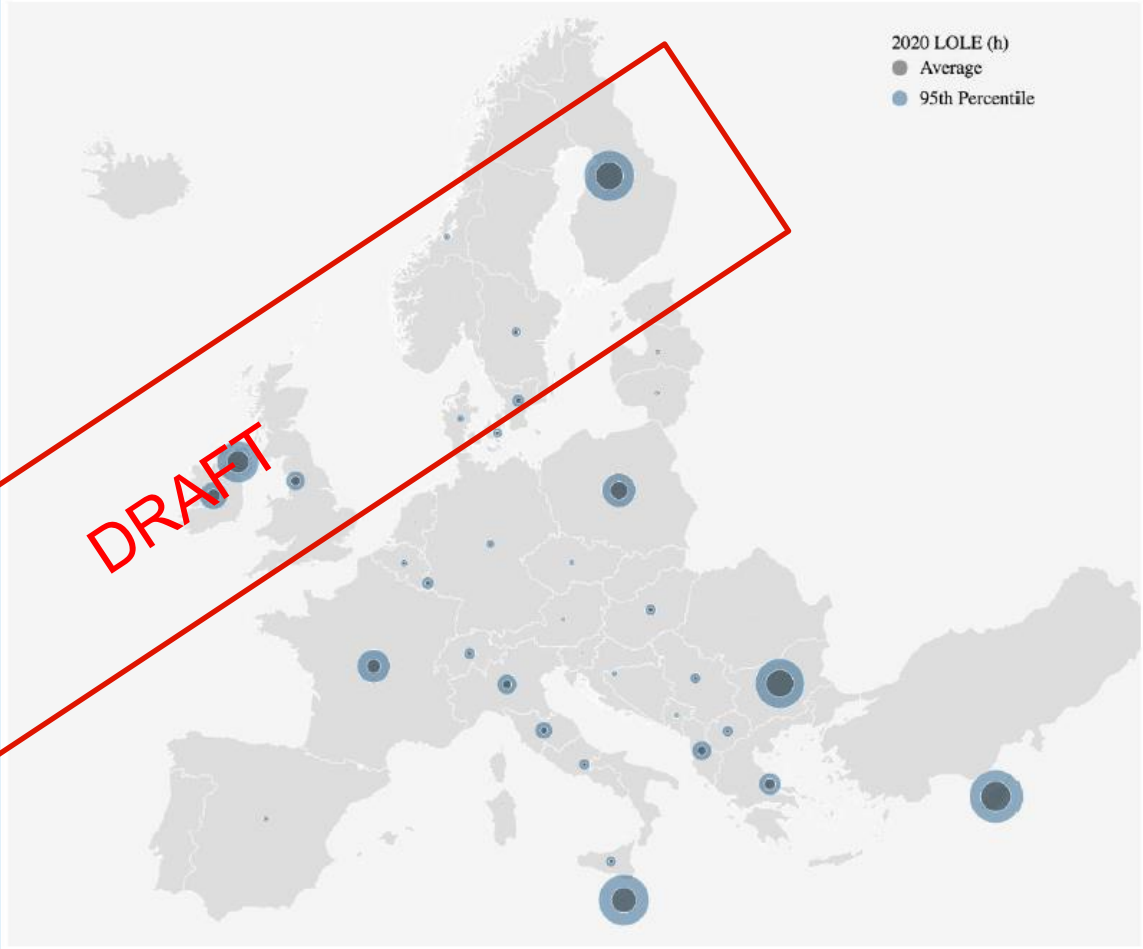
Resource adequacy in 2020 remains high in most countries

- Severe risk of resource scarcity has been identified (av. LOLE ≥ 10 hours/year):
  - mainly for islands (Cyprus, Malta, Ireland and Northern Ireland)
  - and at the periphery of the perimeter (e.g. Albania, Bulgaria, Greece and Finland)
- LOLE 95th percentile value is high (appr. 35 h) in France, Poland, Italy North and Italy Central-North.



Source: ENTSO-E

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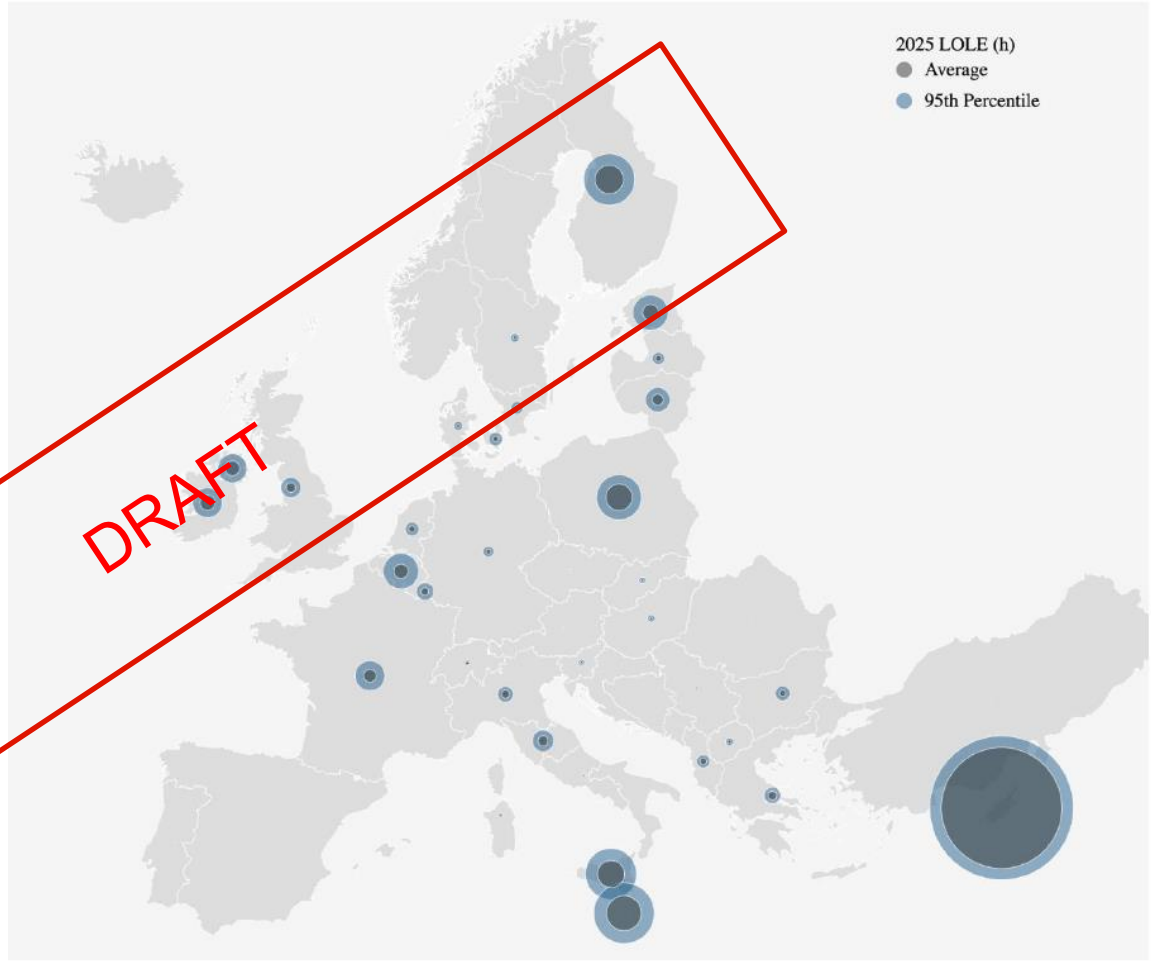
The adequacy situation in 2025 is broadly in line with the one in the 2020

- Higher adequacy risk compared to 2020:
  - in the Baltic area due to decommissioning of several old power plants,
  - in Poland due to high demand growth does,
  - in Belgium due to various changes on the supply side.
- Lower adequacy risk compared to 2020:
  - in Bulgaria due to the new CCGT plants,
  - Northern Ireland due to the new interconnector



Source: ENTSO-E

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Mothball sensitivity: A significant risk of premature retirement of generation in the central European countries

» Generation capacity at risk of being mothballed, absolute and relative to the total thermal generation capacity due to economic or policy reasons:

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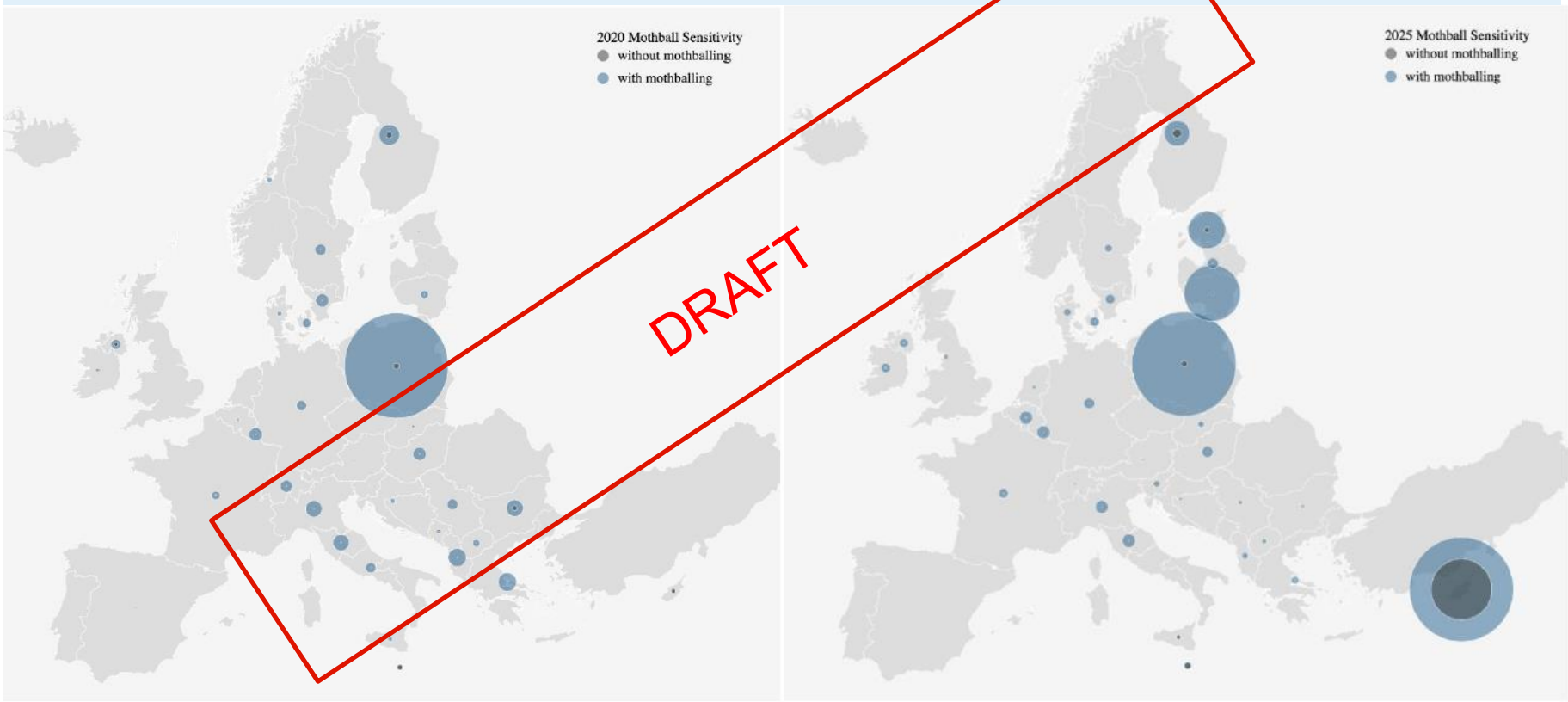
The mothball sensitivity is a more conservative view of the adequacy situation

» Due to crossborder exchange the mothballing of generation capacity in one country can influence the adequacy level in the others



Source: ENTSO-E

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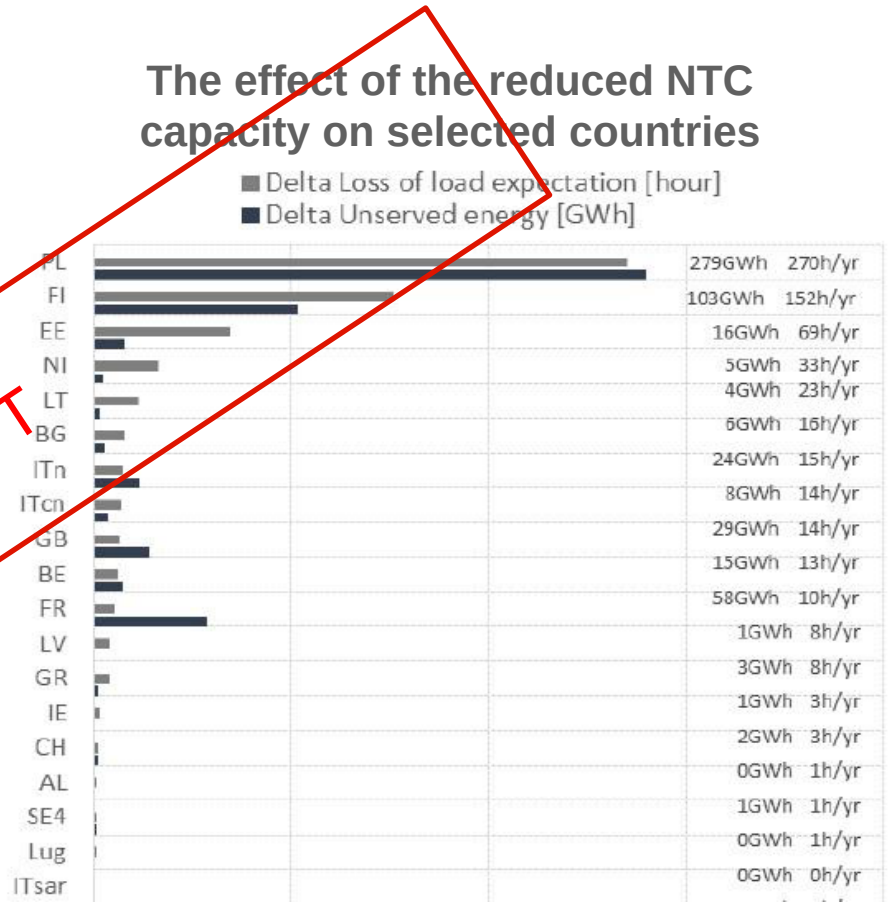
Interconnection sensitivity: interconnectors are crucial for supporting adequacy in large systems

- Sensitivity assumptions: base case 2025 scenario + NTC capacities from 2020, i.e. no NTC increase between 2020 and 2025.
- Reducing NTCs in 2025 scenario leads to more ENS in numerous countries.
- Interconnections can help to balance supply and demand on a broader geographical scope, thus allowing the deployment of benefits from statistical balancing effects in load and variable renewable generation.



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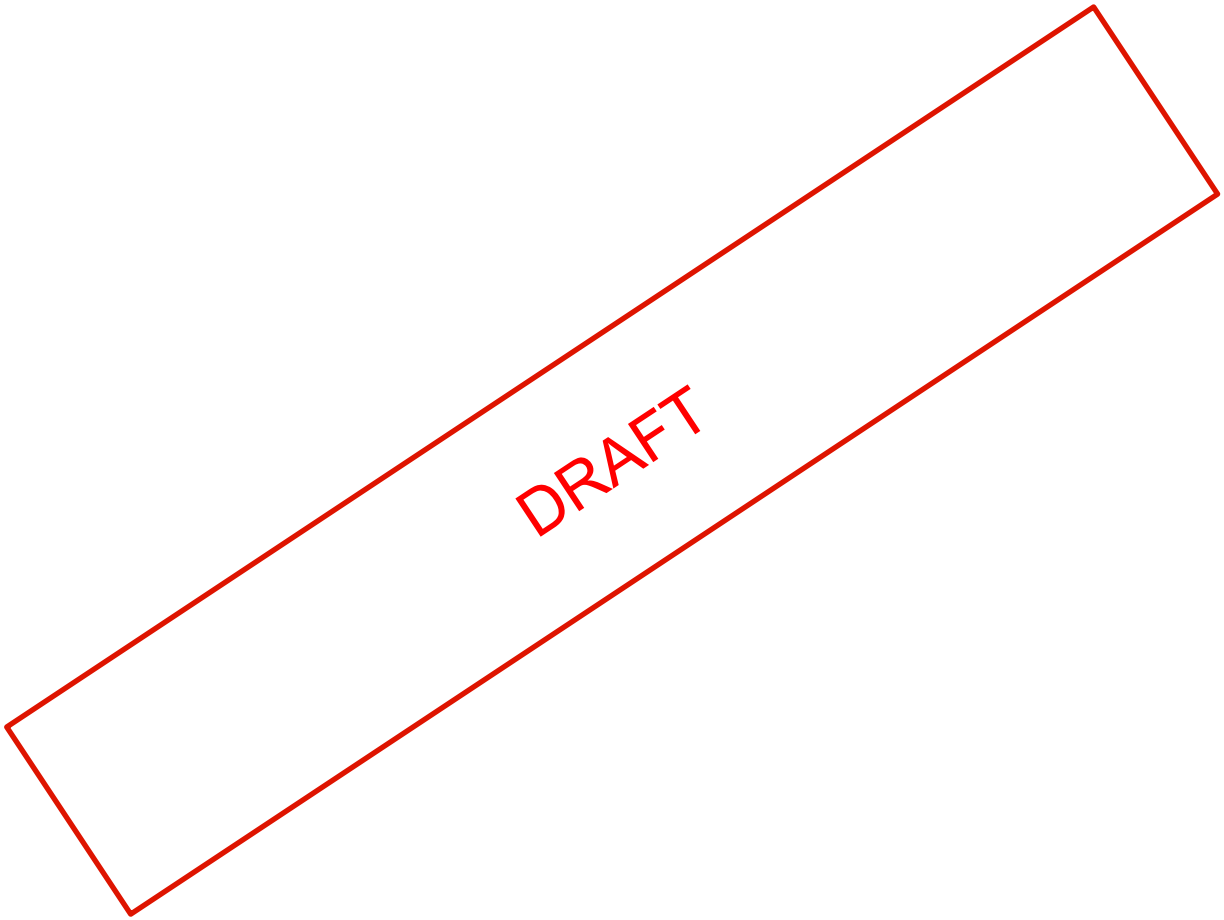
Questions?



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