

HYDRO OPTIMIZATION TOOLS

- IMPLEMENTATION AND APPLICATION
- CHALLENGES FOR THE FUTURE

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Europe's largest generator of renewable energy



Statkraft in numbers

More than
350
power plants around
the world

Present in
15
countries

More than
3 million
energy related contracts traded per year

Statkraft at a glance

OWN CAPACITY

19 300 MW

62 TWh → 98% renewable

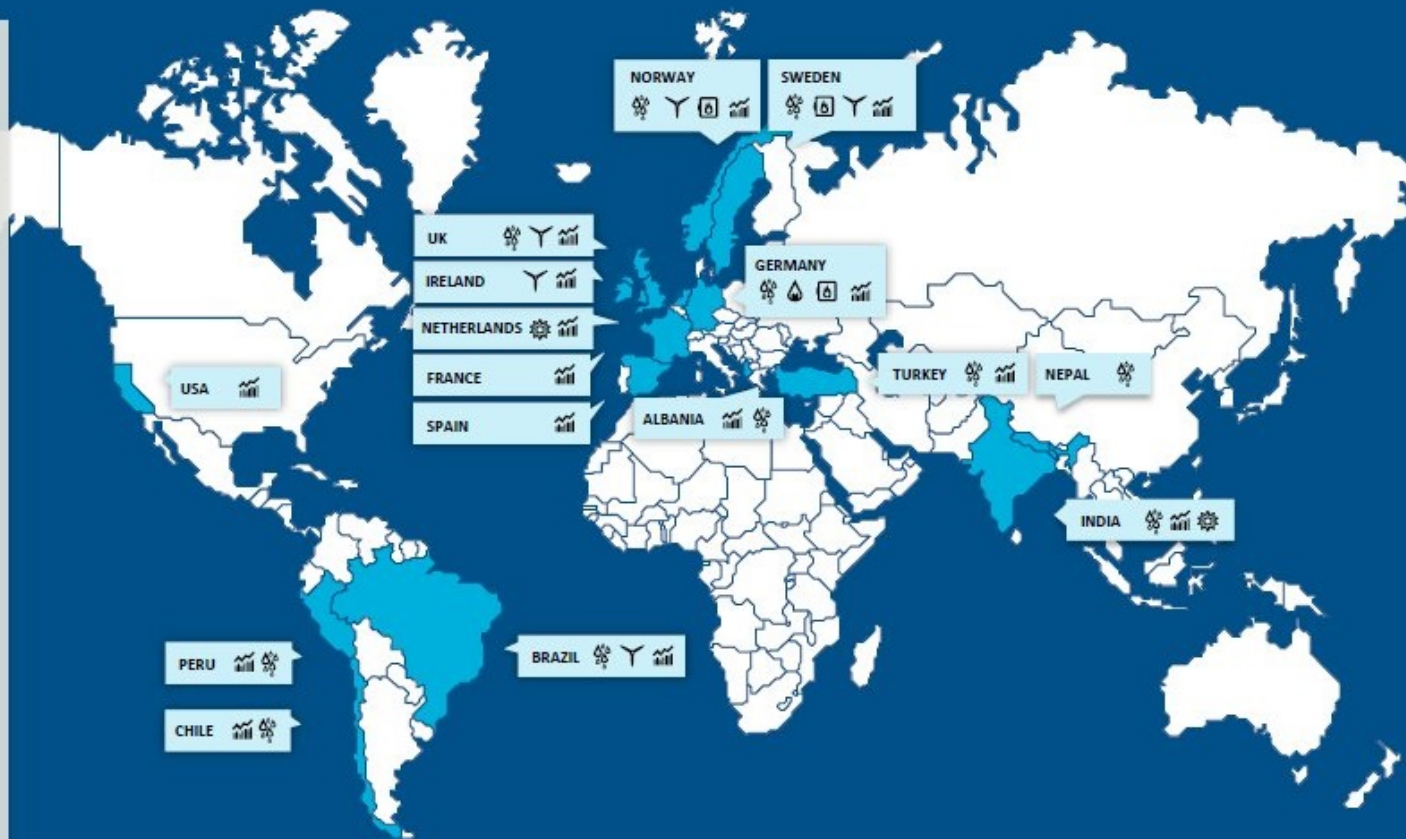
THIRD PARTY CAPACITY

22 000 MW

100% renewable

EMPLOYEES

3 600



Strategic priorities

MARKET CENTRIC APPROACH:

Finding the best opportunities in renewable energy within each country, across technologies.

OPTIMISE HYDRO- POWER PORTFOLIO



RAMP UP AS WIND AND SOLAR DEVELOPER



GROW THE CUSTOMER BUSINESS



DEVELOP NEW BUSINESS INITIATIVES



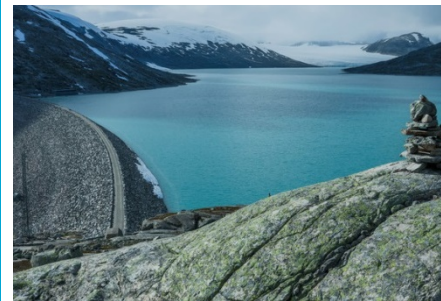
Optimize dispatch and nomination

- Statkraft has a strong belief in fundamental market modelling
- Significant added value, to our own portfolio and services to other market participants
- Optimal socio-economic benefit given reasonable reservoir strategy and constraints
- The task is highly complex and involves many people and a combination of models



Optimizing production
for small external
producers:

22 000 MW









1106,83 moh

Grasbotntjörni



1153,01 moh

Langvatn



Grasbotntjörni



1114,66 moh

Skruelsvatn



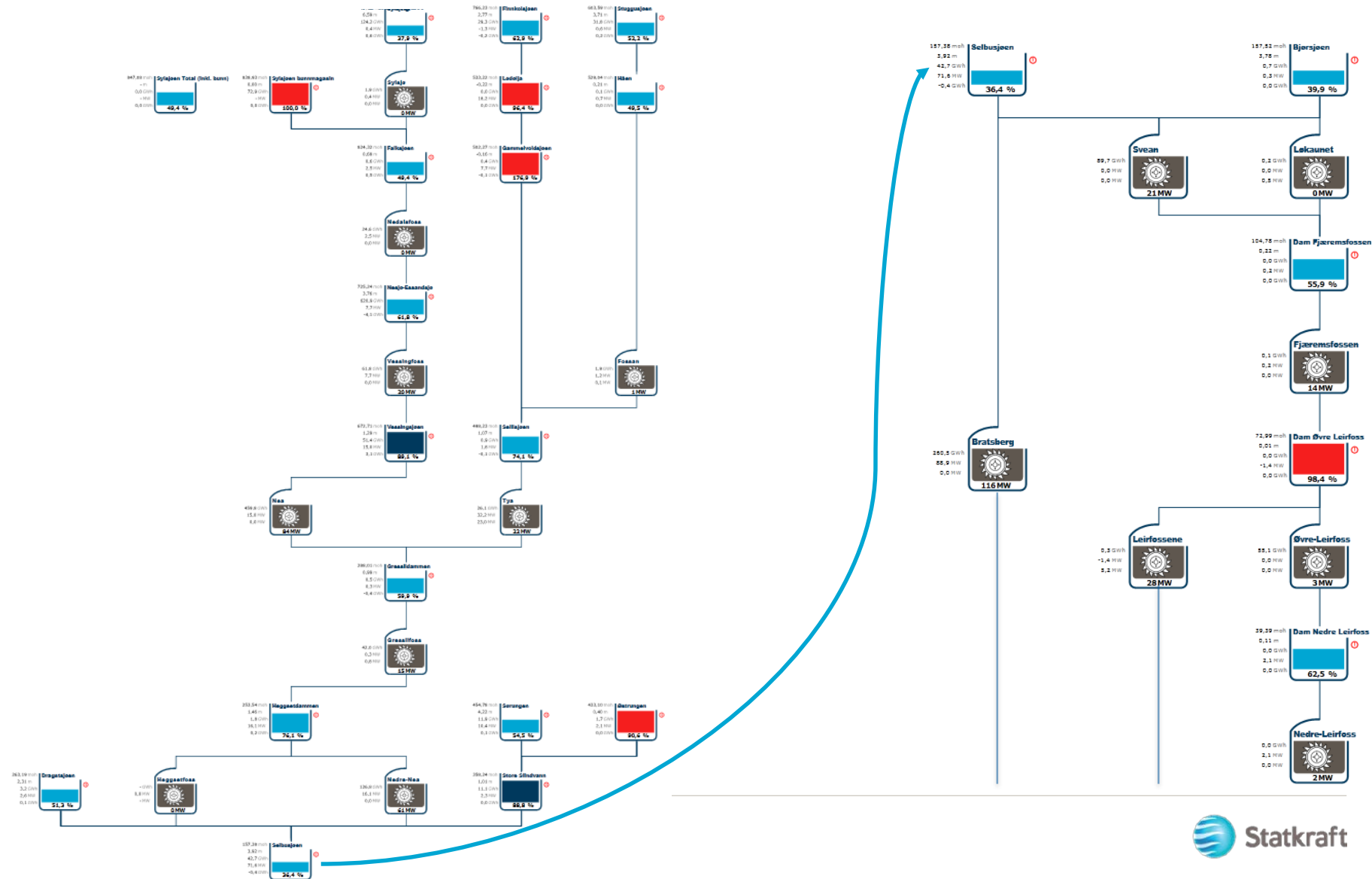
1037,85 moh

Rundavatn

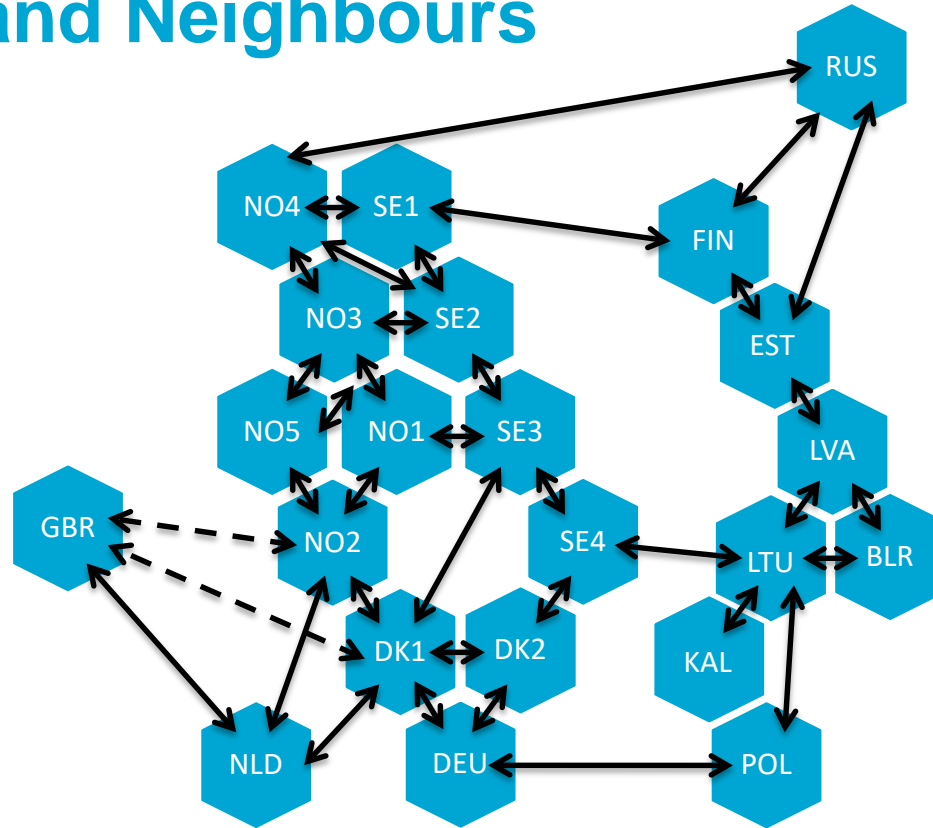


Lang-Sima

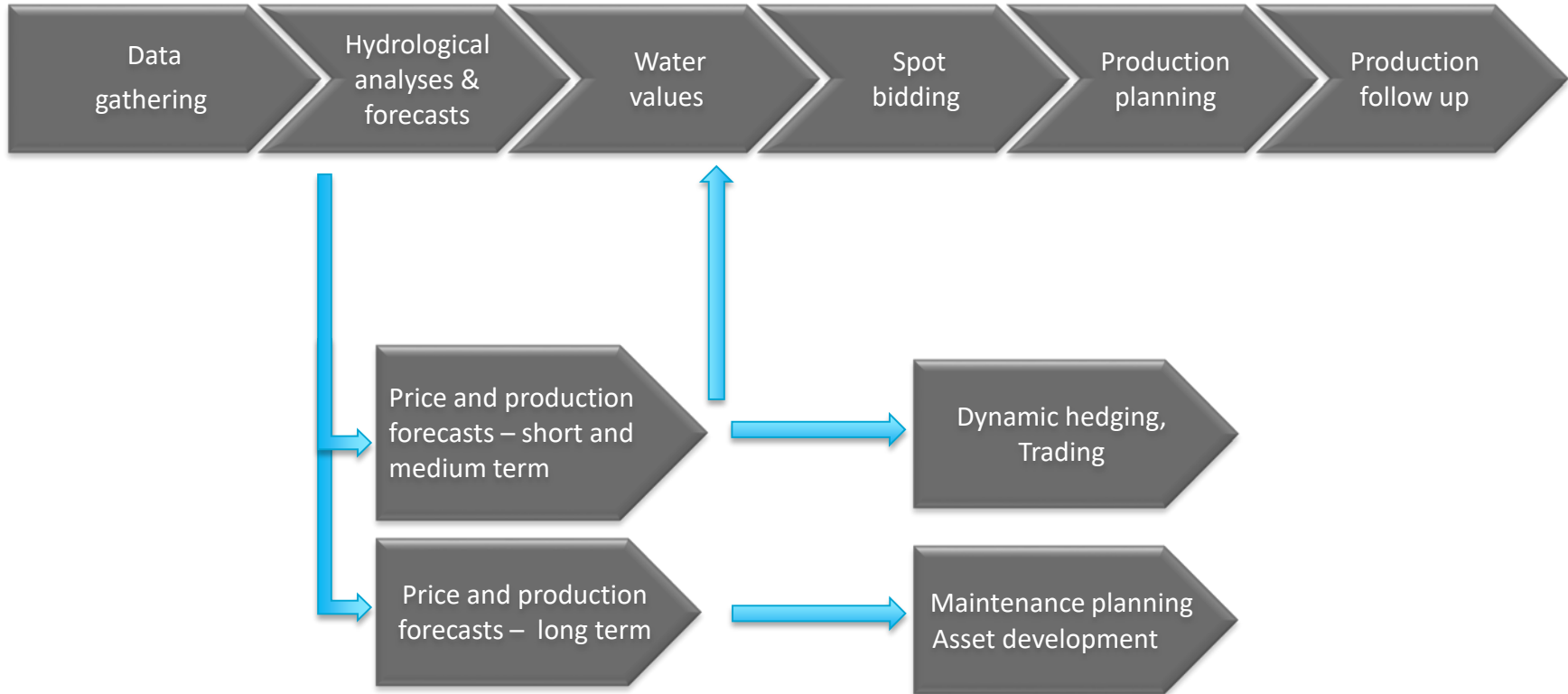




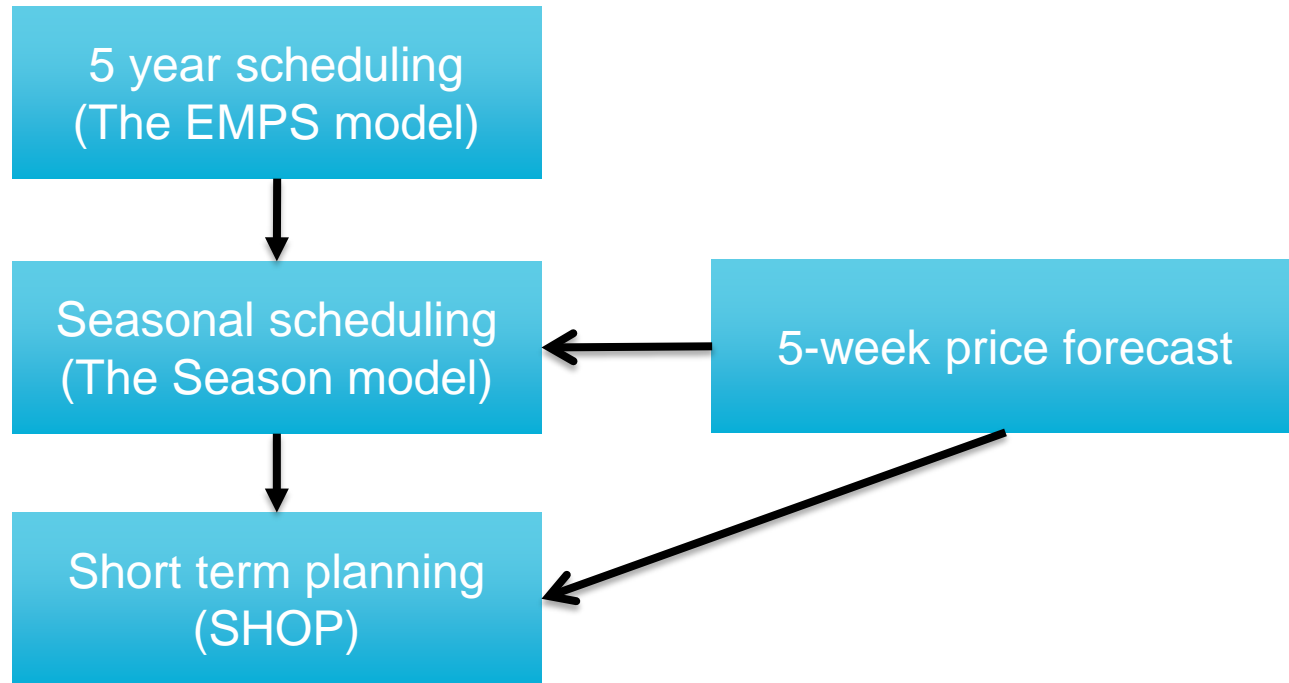
Nordic areas and Neighbours



The energy management process



Hydro optimization tools



Operational routine

Weekly: manual run



Work flow:

- Update all input
- New starting week
- Re-calibration if necessary
- Quality assessment

Daily: auto run



Updates:

- Hydrology from weather forecast
- Financial thermal market prices
- Short term price forecast
- Market availability – if significant

Short-term optimization : run several times every day

Challenges in future market design



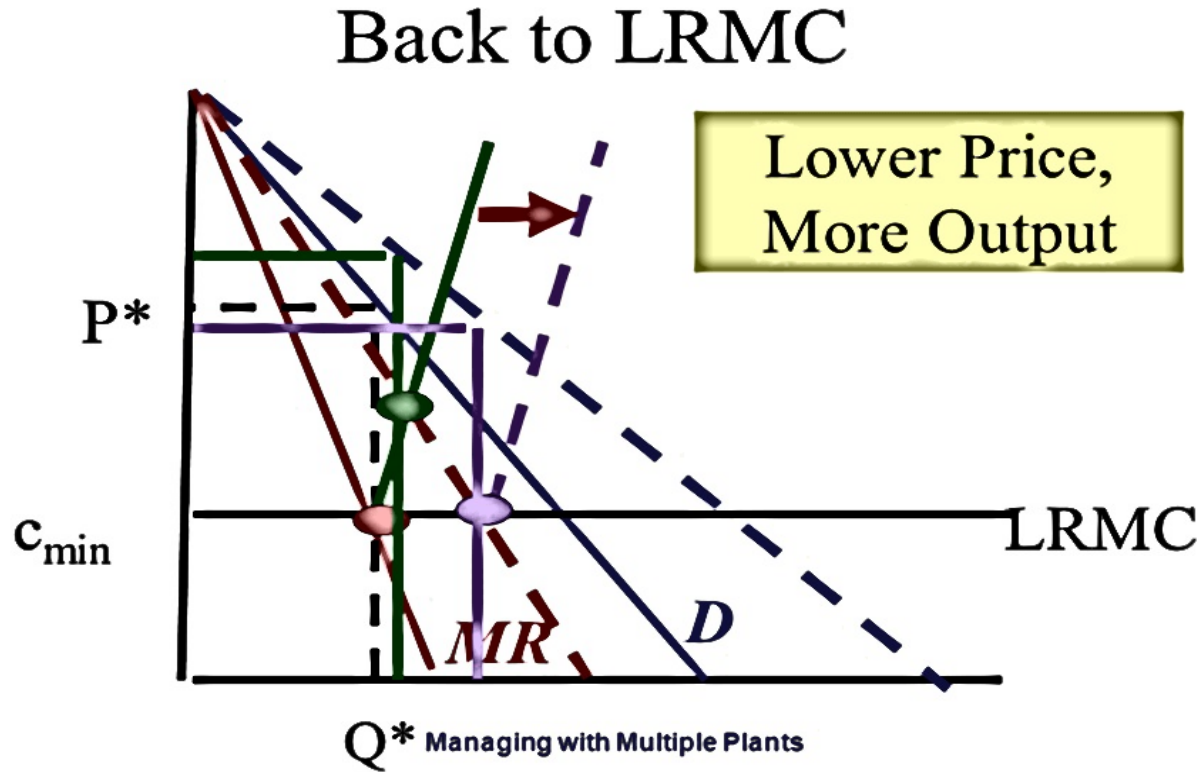
Coal / gas switching – and thermal phase out



Oversupply



Zero or negative SRMC



More extreme weather events



What kind of winter to prepare for?





THANK YOU

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PURE ENERGY

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