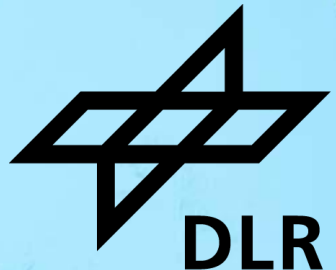


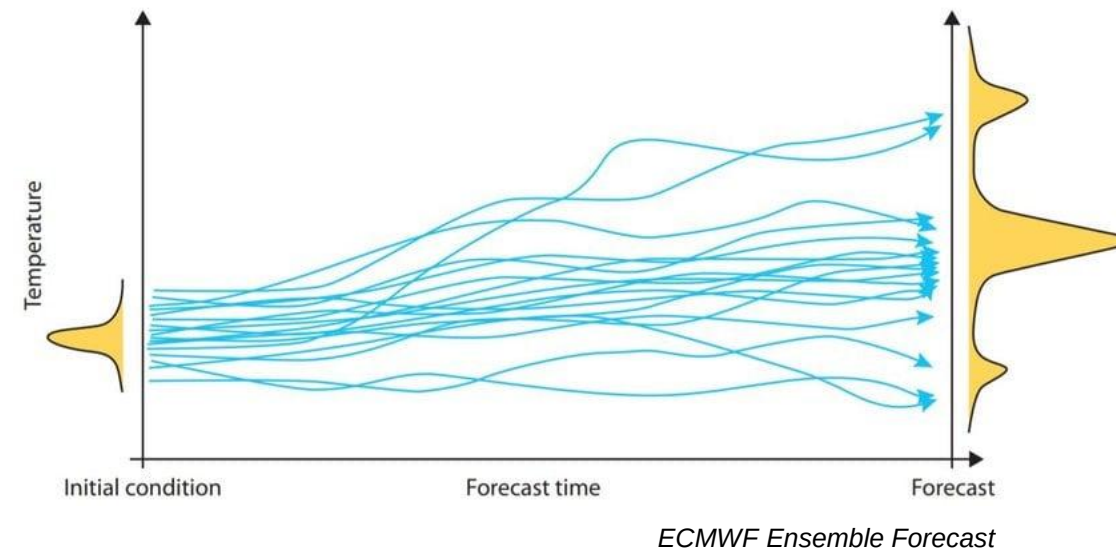
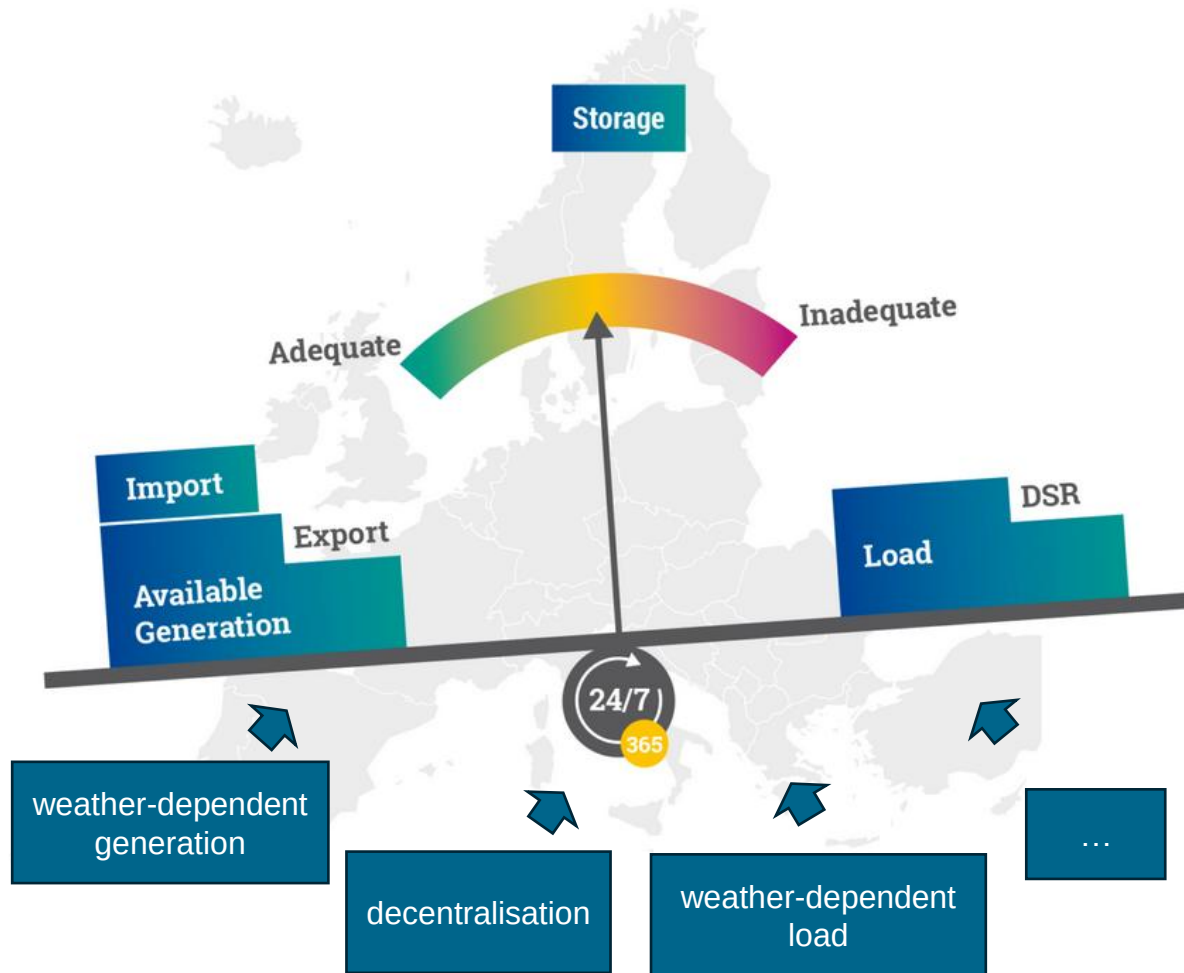
LOCAL IMPACT OF SHORT TERM LIDAR OFFSHORE POWER FORECASTS ON GRID INTEGRATION

EMS ANNUAL MEETING 2026 OSA2.1

Arne Goerlitz, Lueder von Bremen, Matthias Zech, Bruno Schyska



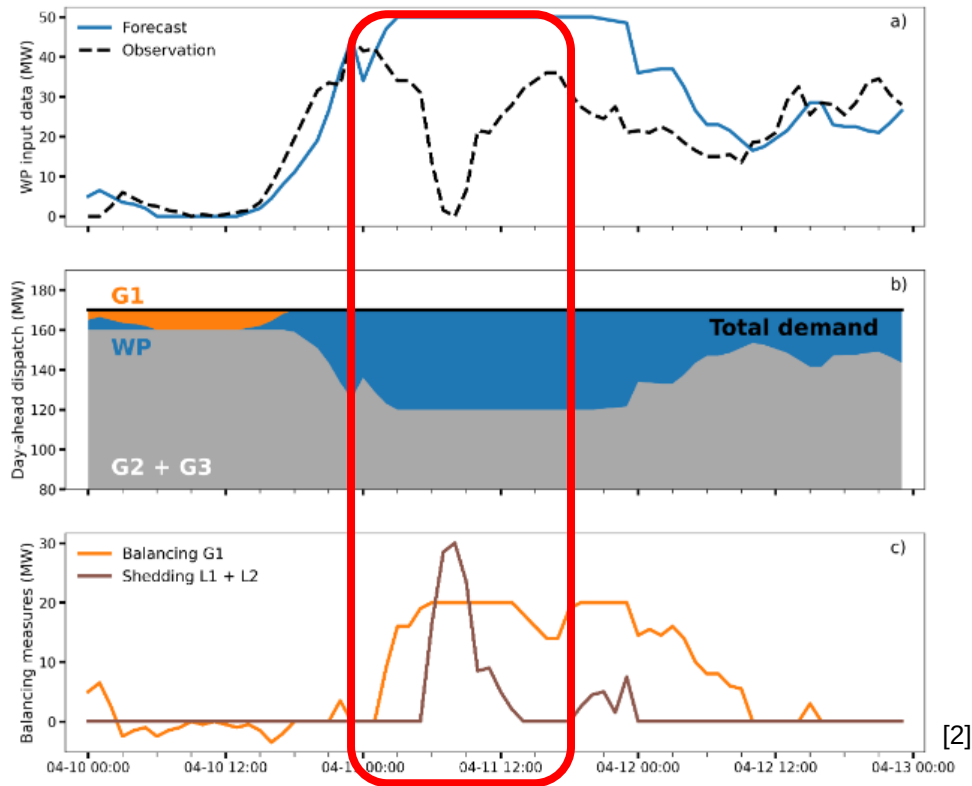
Nodal balance in the power system



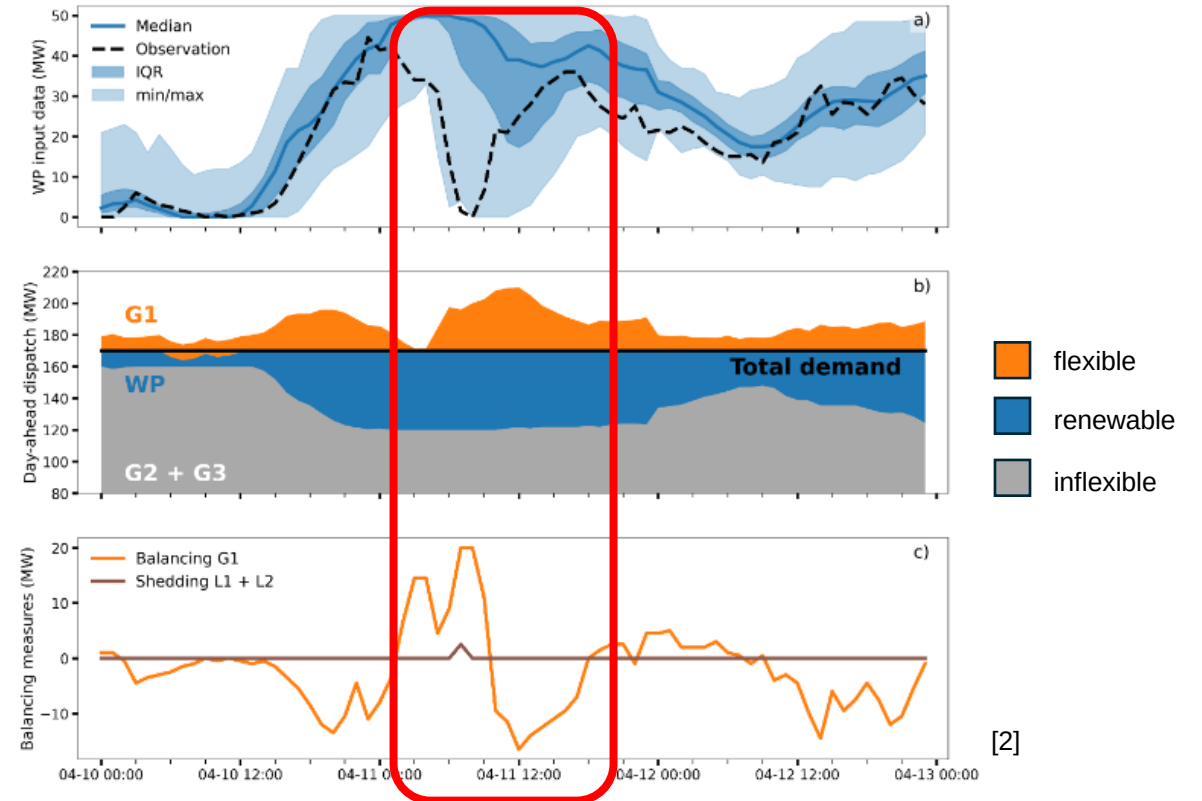
- (1) ENTSO-E Annual Report (2020) <https://annualreport2020.entsoe.eu/system-development/>
- (2) Grönquist et al. (2019) *Predicting Weather Uncertainty with Deep Convnets*

ProPower - Probabilistic Power Forecasts Evaluation with python

deterministic



stochastic



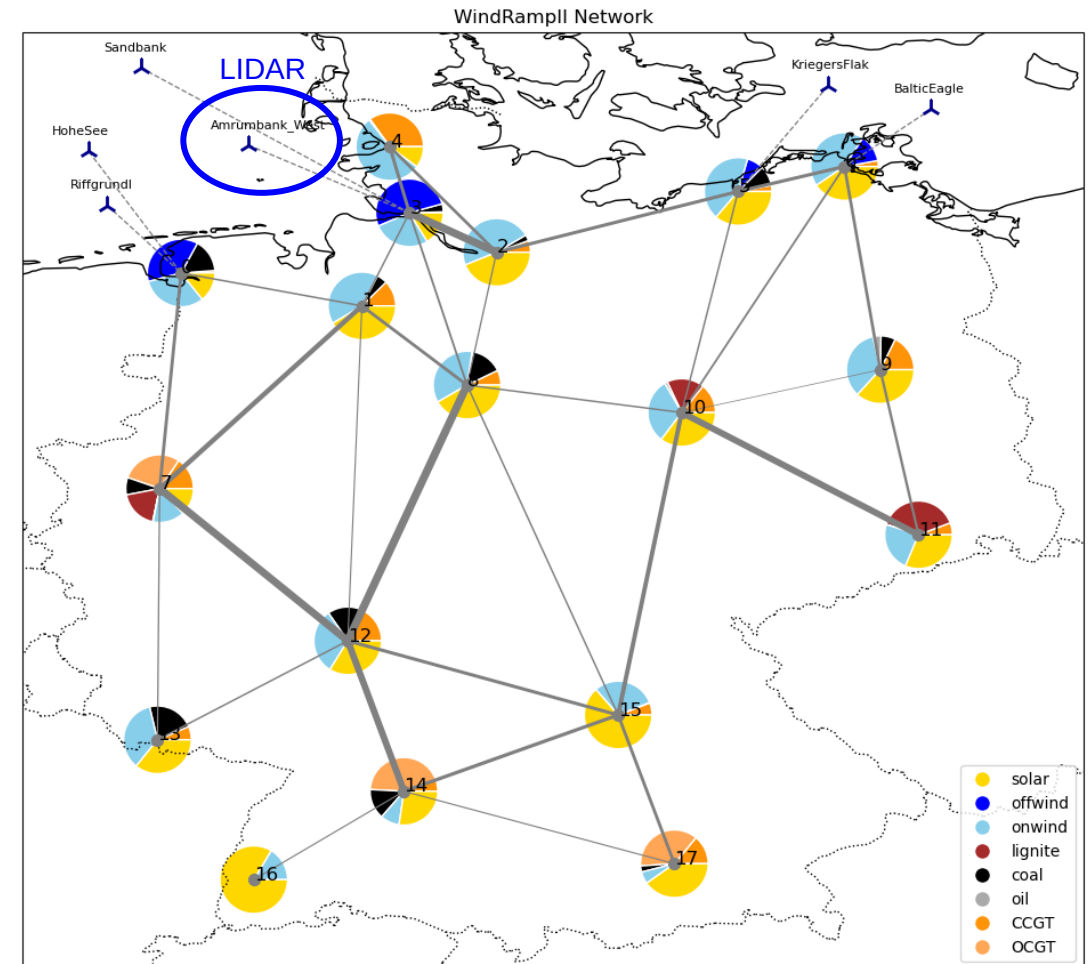
min initial-clearing costs

→ + expected balancing costs

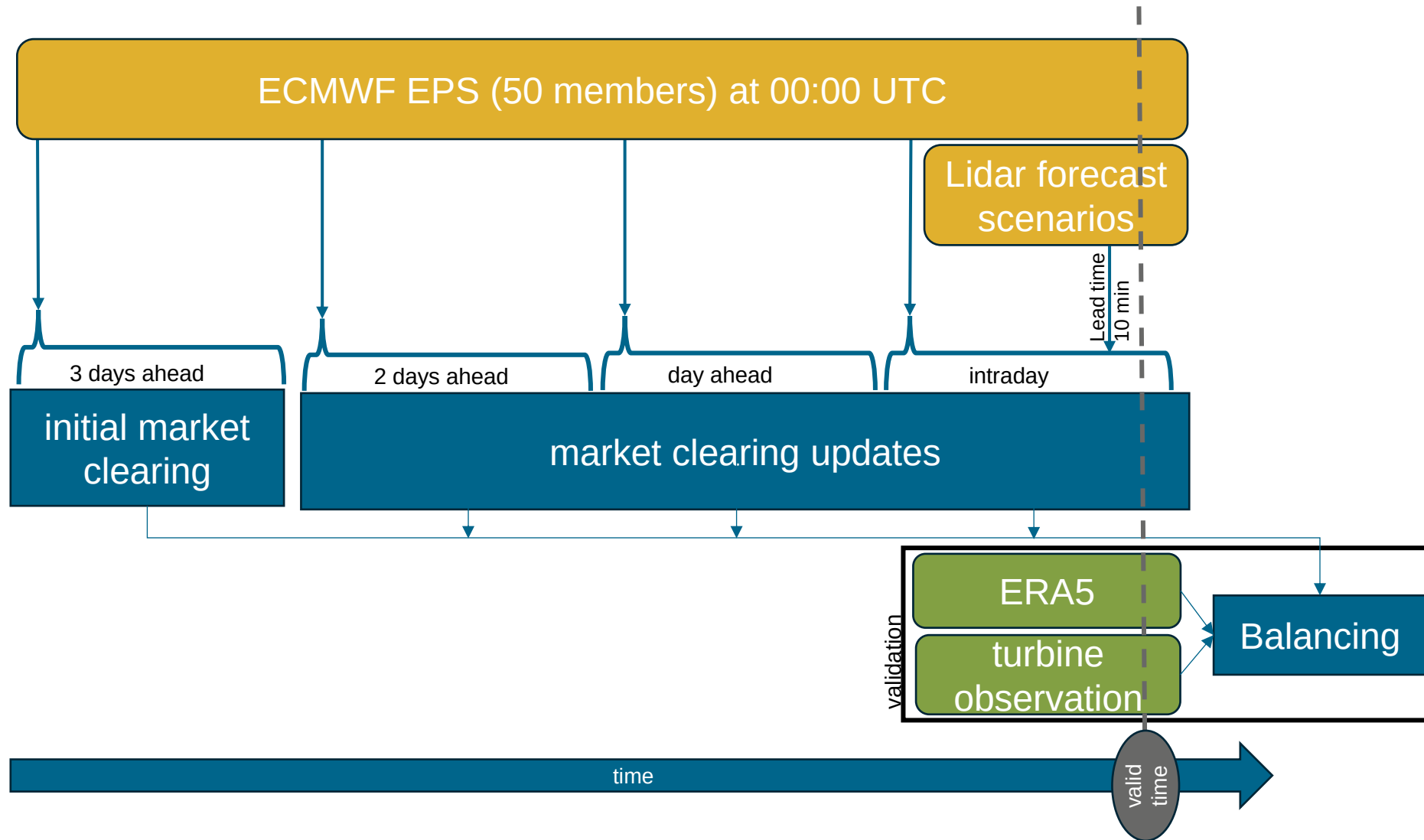
Windramp II Network

- Network topology with 18 busses and 85 generators
- incl. 6 windfarms (1 with Lidar data)

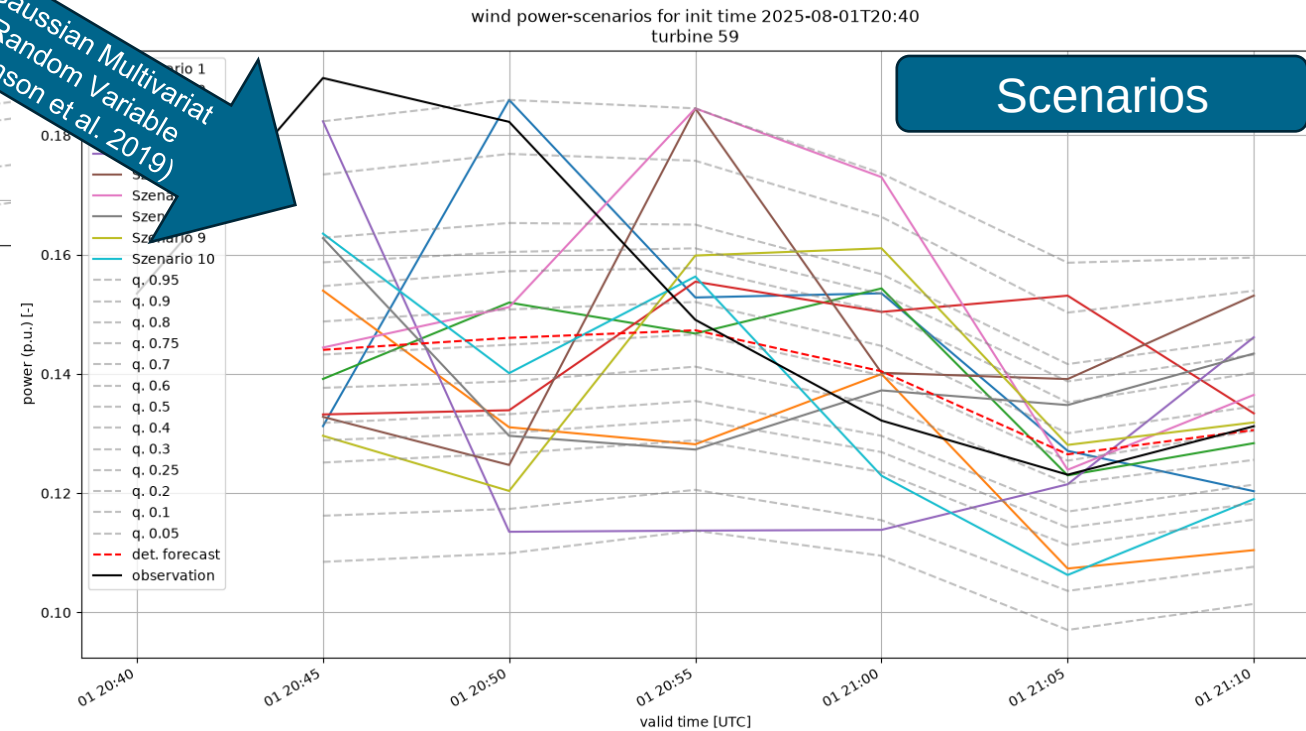
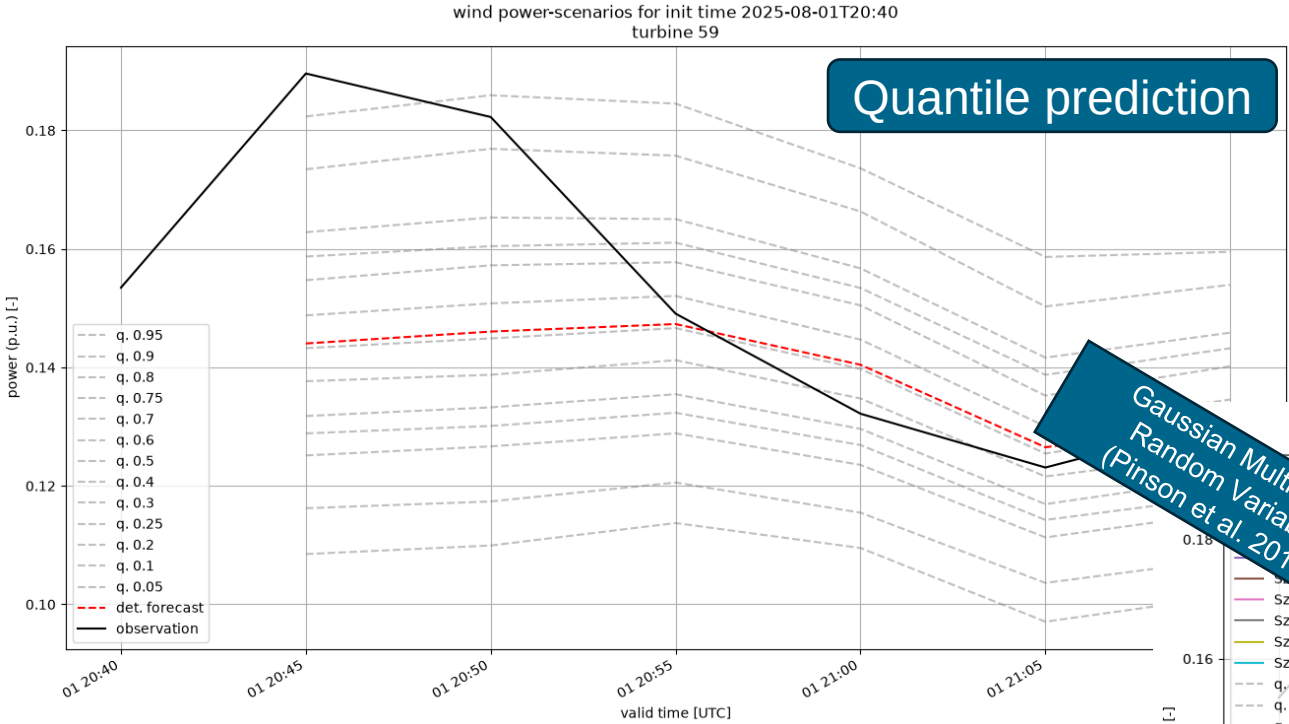
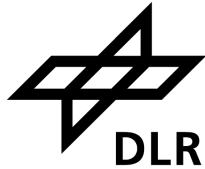
Carrier	Nominal power [MW]
solar	78389
offshore wind	8406
onshore wind	67419
coal	19624
oil	750
lignite	21167
CC gas turbine (flexible)	32734
OC gas turbine (flexible)	39199



Windramp II workflow



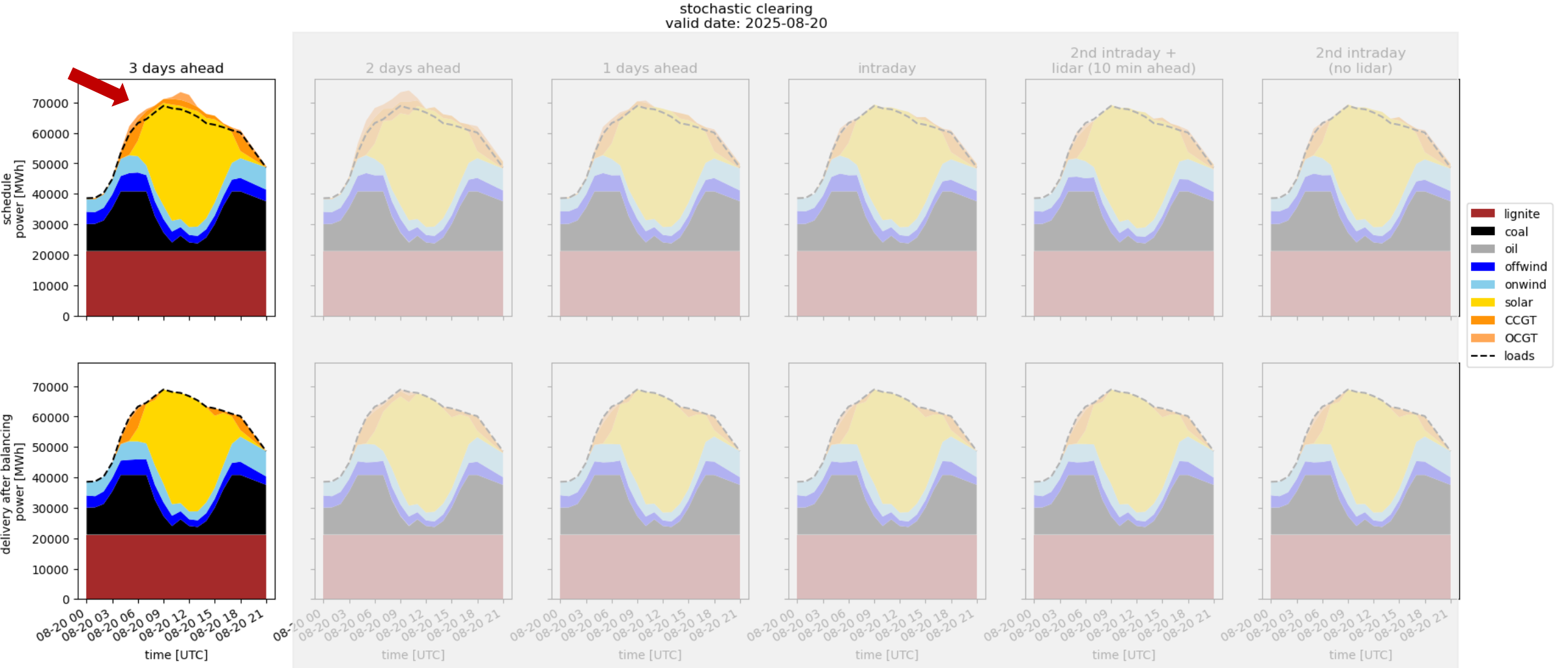
Scenario generation of short term lidar forecasts



see [7]

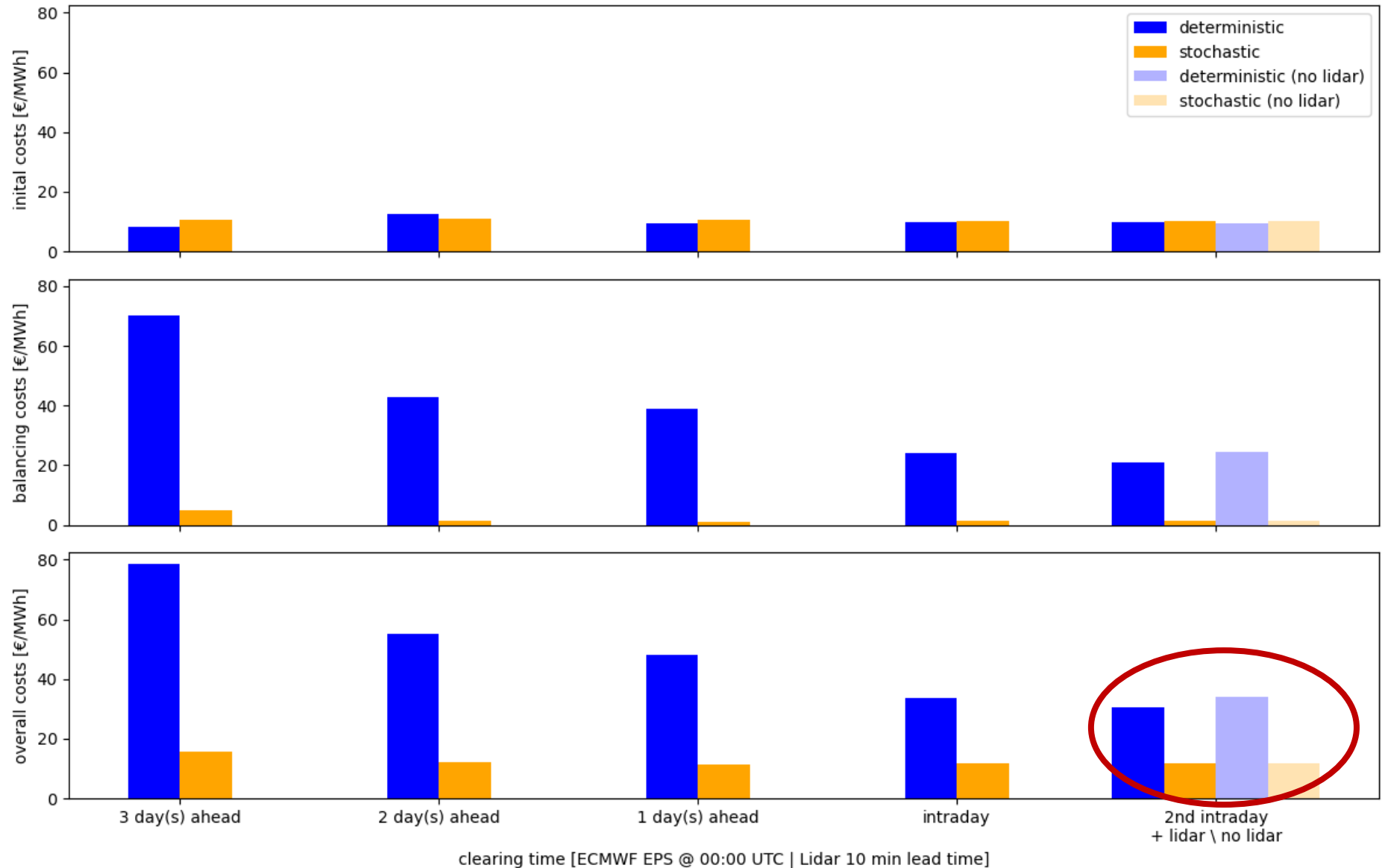


stochastic clearing example



Cost comparison (one month)

August 2025 mean costs



- Taking the uncertainty information of ensemble forecasts can reduce the system costs also for forecasts with high lead times
- More frequent market clearings can reduce system costs in deterministic setting
- Inclusion of lidar forecasts can reduce system cost for deterministic clearing

→Future work:

- Full year analysis (more Lidar data)
- Analysis of grid congestion situations
- Storage integration
- Integration of load predictions

Acknowledgement



■ Project

- WindRamp II
- Duration: May 2024 – April 2027
- Lidar forecasts provided by ForWind – Center for Wind Energy Research of the Universities of Oldenburg, Hannover and Bremen.
- Link: <https://www.dlr.de/en/ve/research-and-transfer/projects/project-windramp-ii>

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2. Bents, H.M. (2023) *Integrating Weather Forecast Uncertainty into Power Systems Management using the Probabilistic Power Forecast Evaluation Tool (ProPower)*. Masterarbeit, Carl von Ossietzky Universität Oldenburg.
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Topic: **Local impact of short term lidar offshore power forecasts on grid integration**

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Authors: Arne Goerlitz, Lueder von Bremen, Matthias Zech, Bruno Schyska

Institute: Institute of Networked Energy Systems

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