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Norwegian energy landscape considering flexibility from building energy sector

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Teknologi for et bedre samfunn



Outline

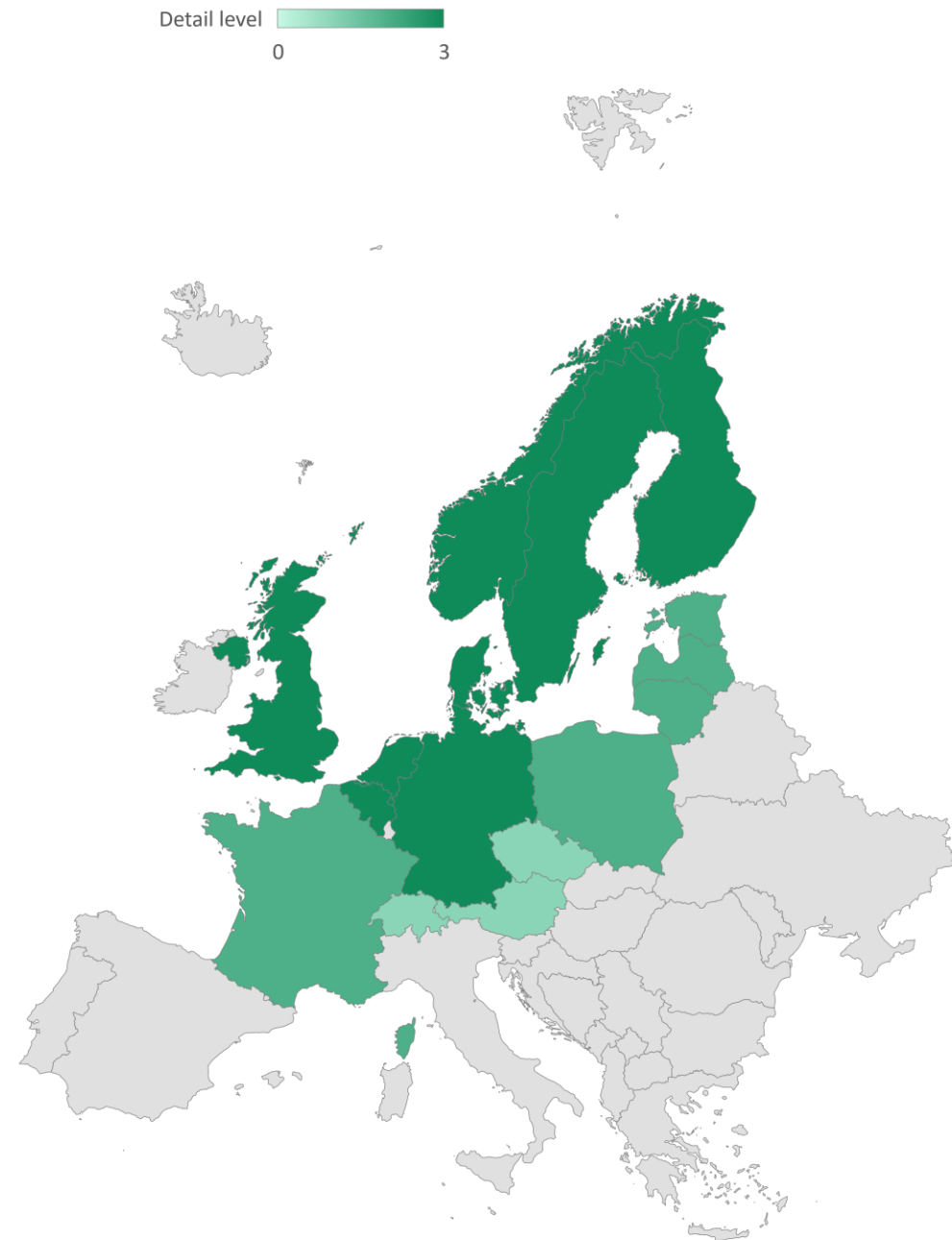
- Brief overview of the EMPS model
- Electricity demand
 - Changes in demand
- Electricity capacity and production
 - Installed capacities
 - Electricity production
- Electricity prices
 - Prices in Ostland (NO1)
 - Change in achieved prices
 - Zoom into Ostland area prices
- Summary notes



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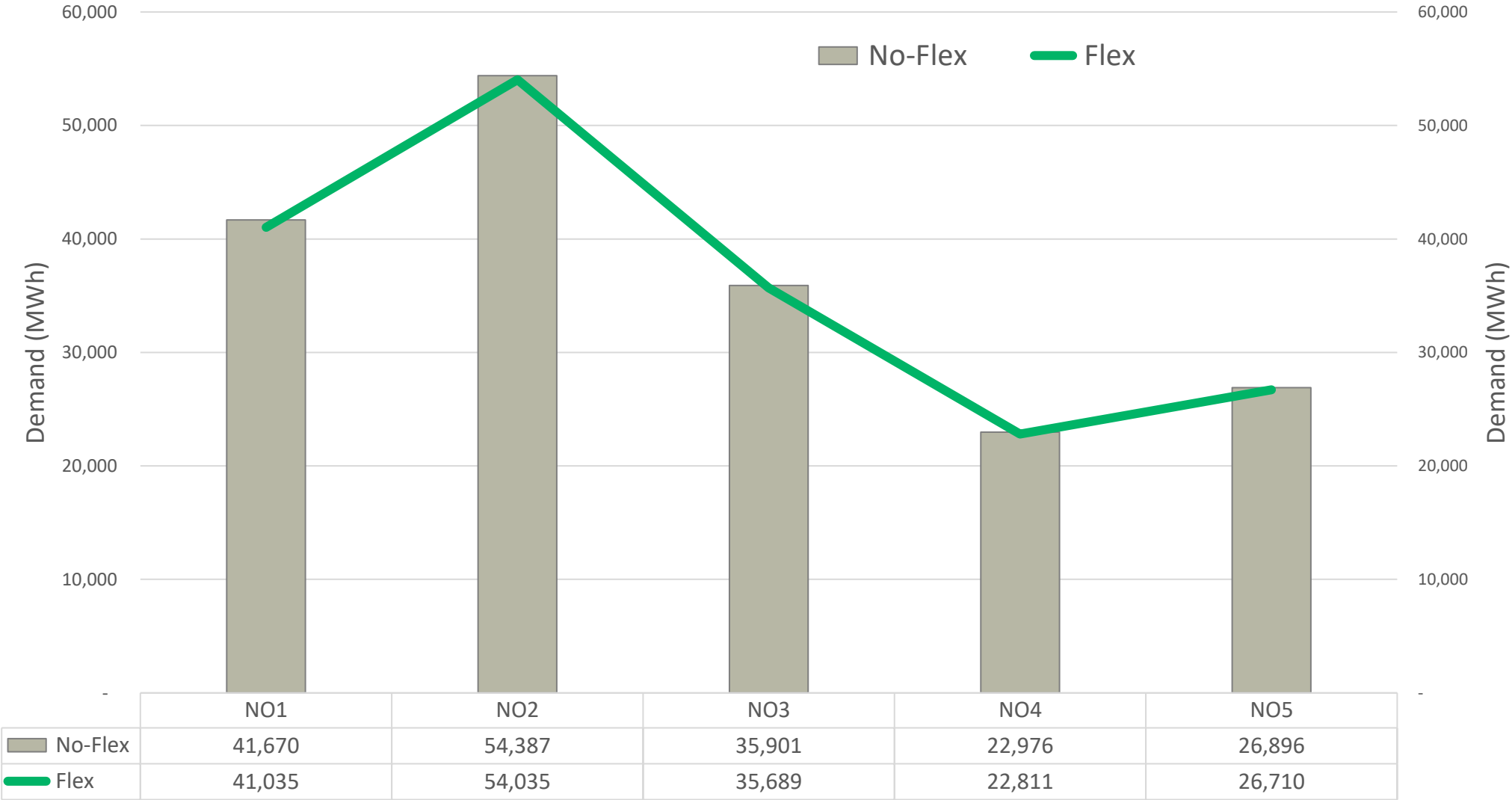
EMPS model

- 57 areas, including onshore and offshore
- 3 hours time steps (56 steps/week)
- 30 historical weather years (1980-2010)
- Detailed hydro for the Nordic region
- Hourly wind and solar characteristics
- Thermal power plant with startup-cost
- Transmission lines with line capacities
- Based on previous studies (NVE 2020, EUCO30)
- Production and consumption for Norway from TIMES-NORGE (Energy Nation scenario)
- Mapped dataset from TIMES-NO to EMPS
 - Demand and installed capacities in Norway





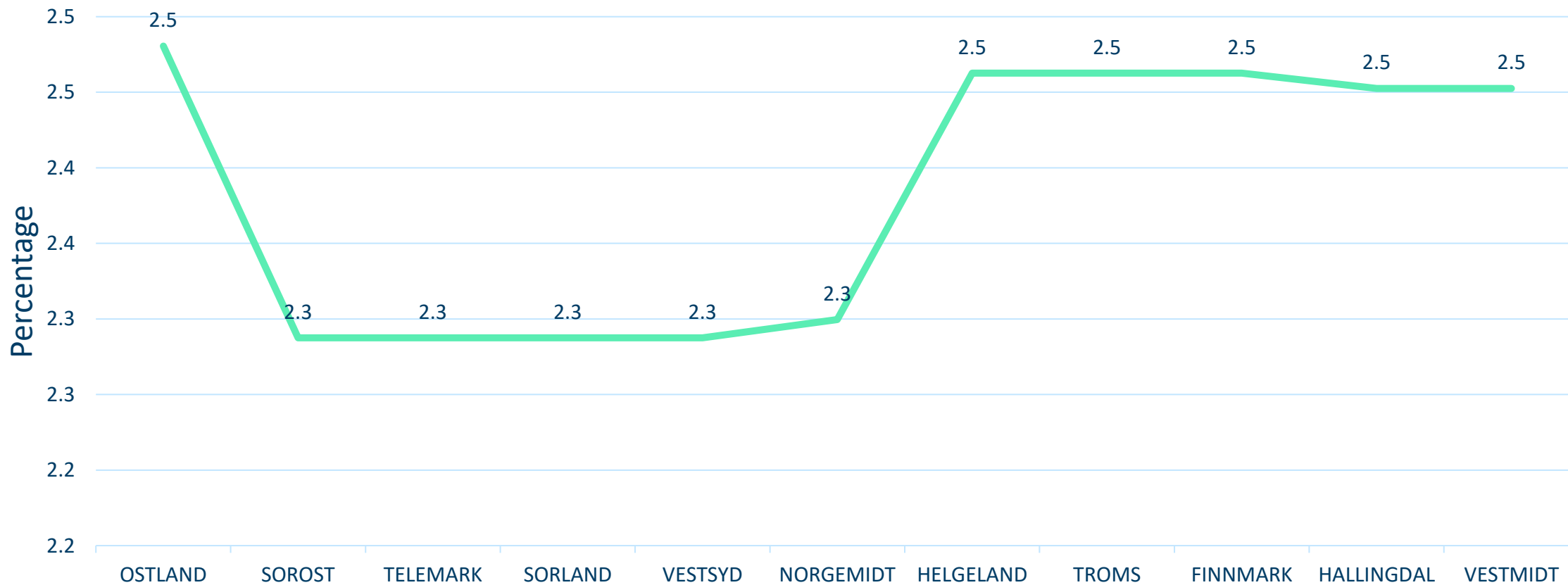
Electricity demand





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Percentage change in demand

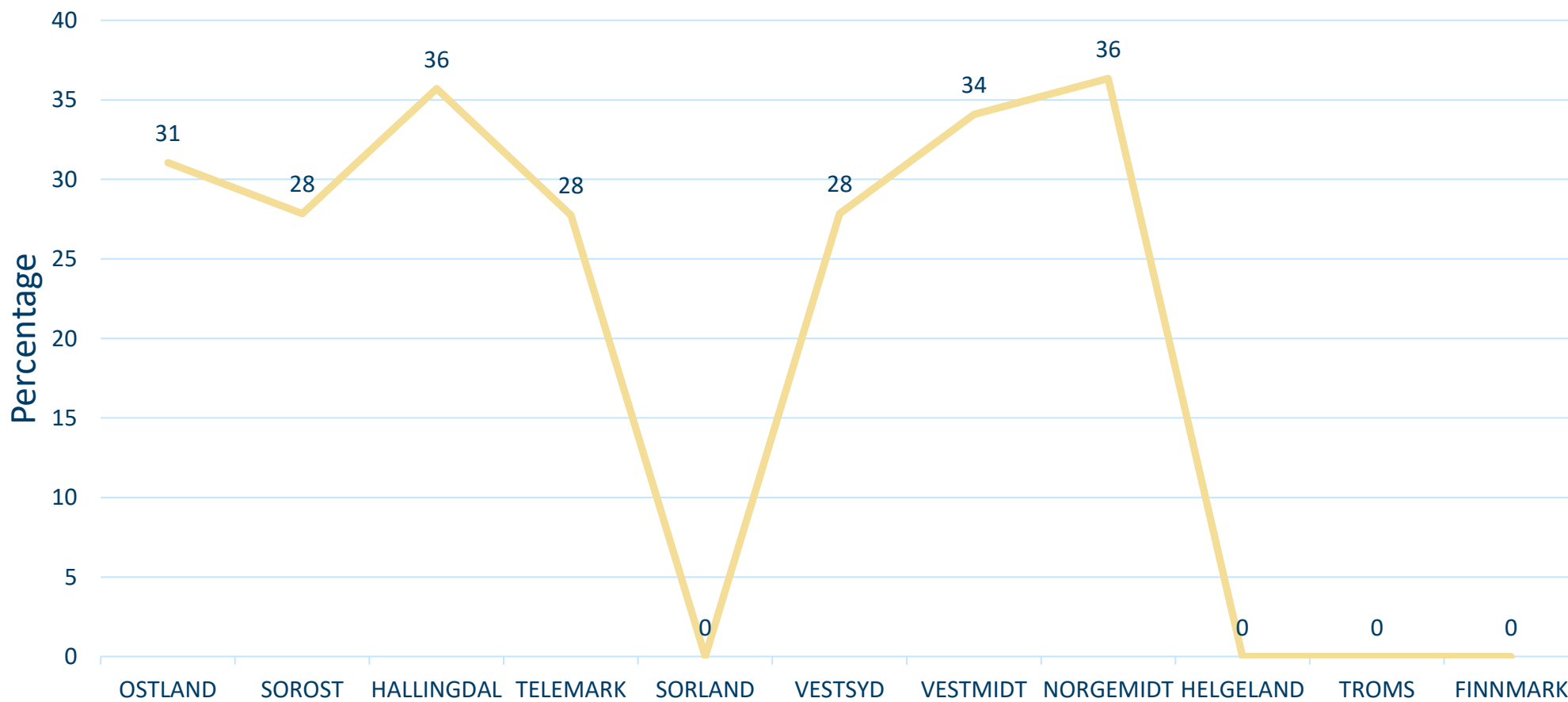




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Installed capacities

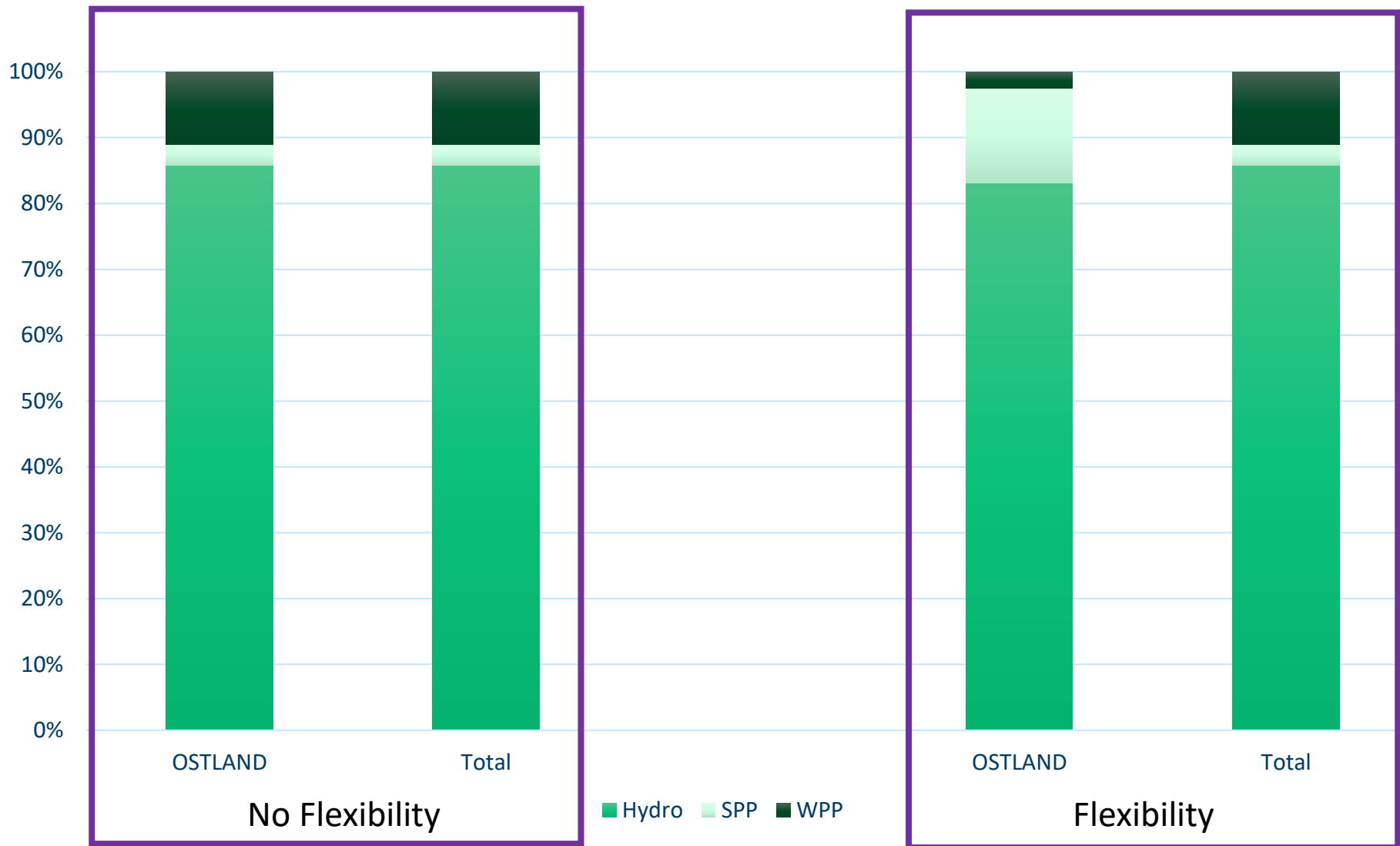
Solar power





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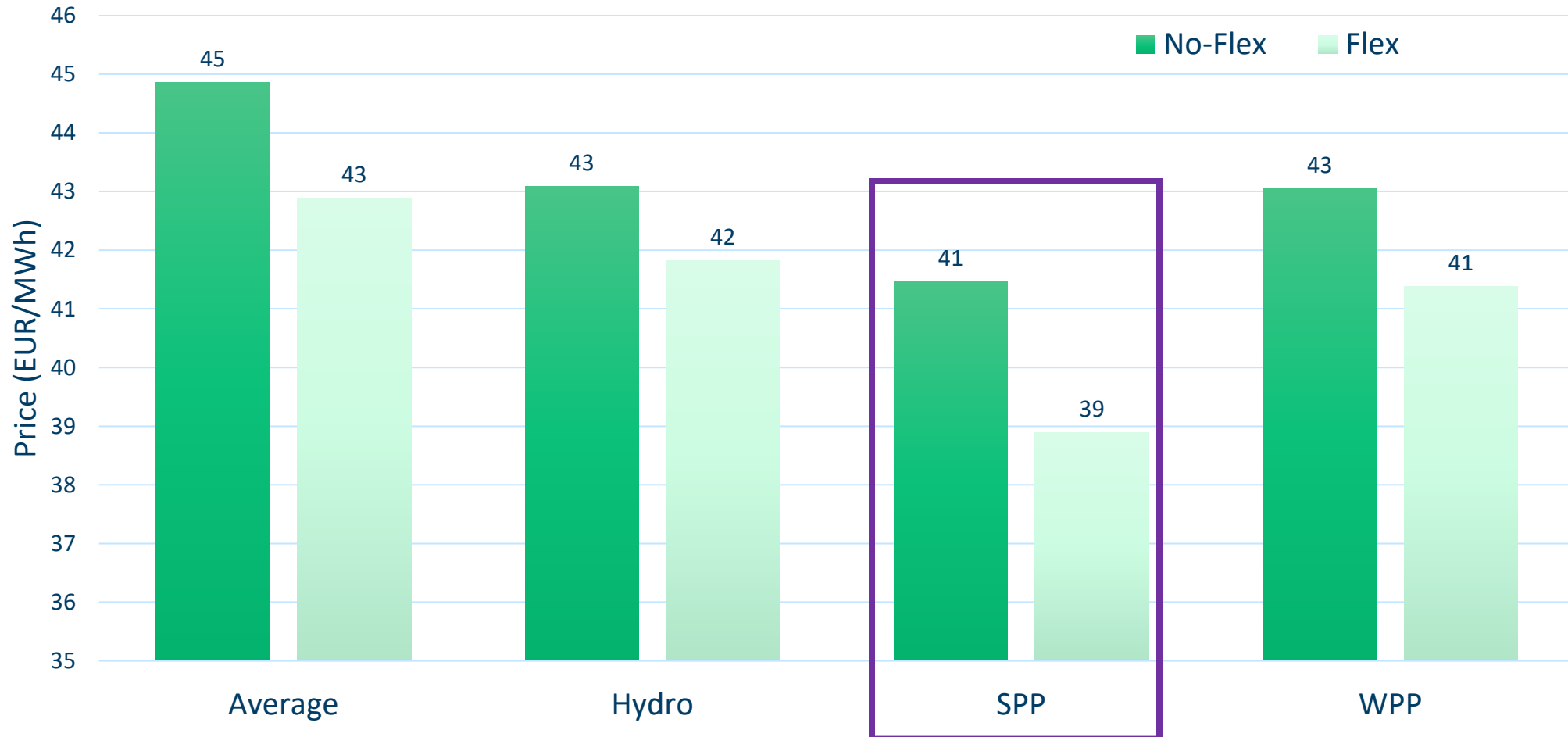
Electricity production





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Electricity prices in OSTLAND (NO1)

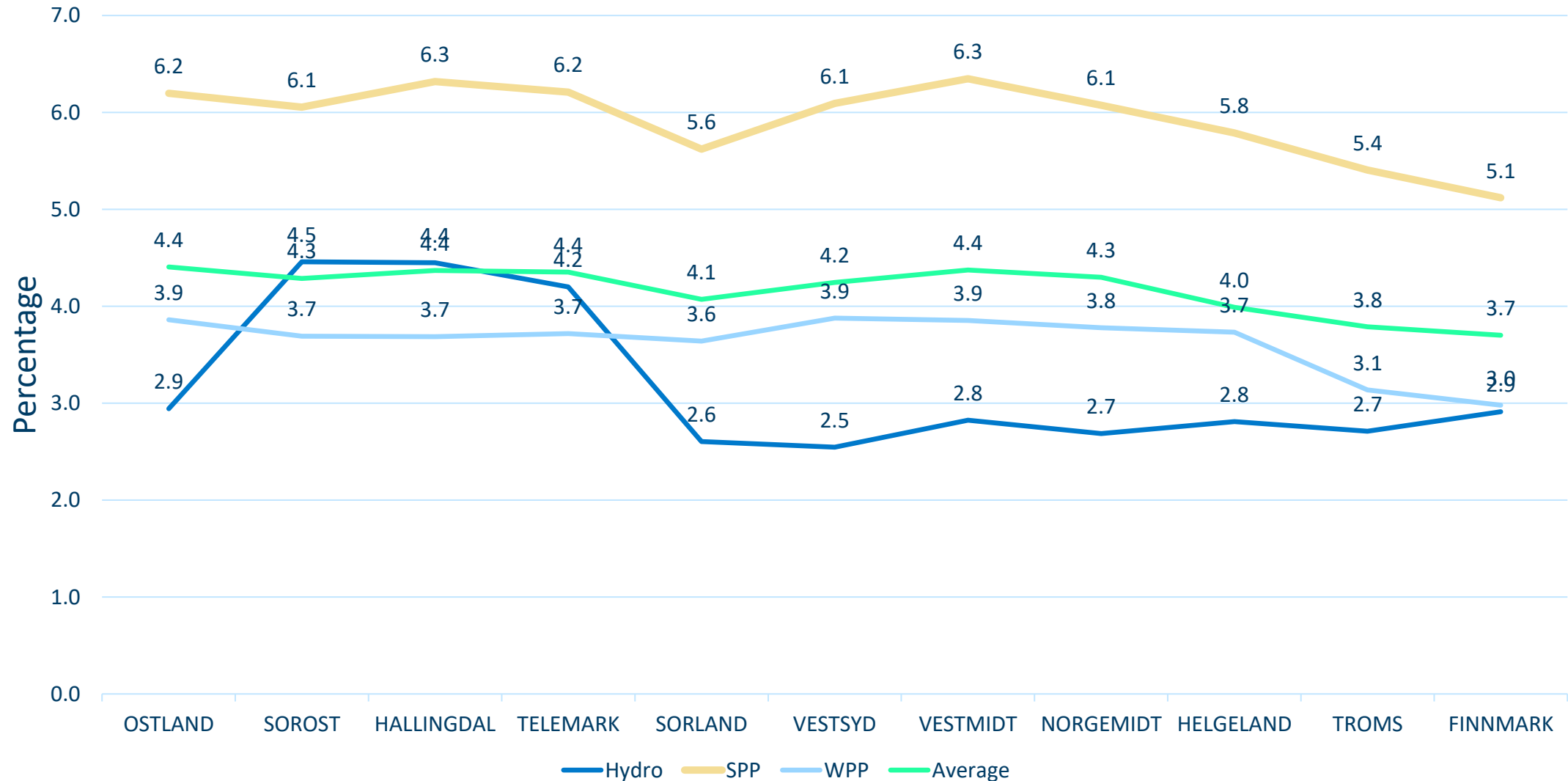


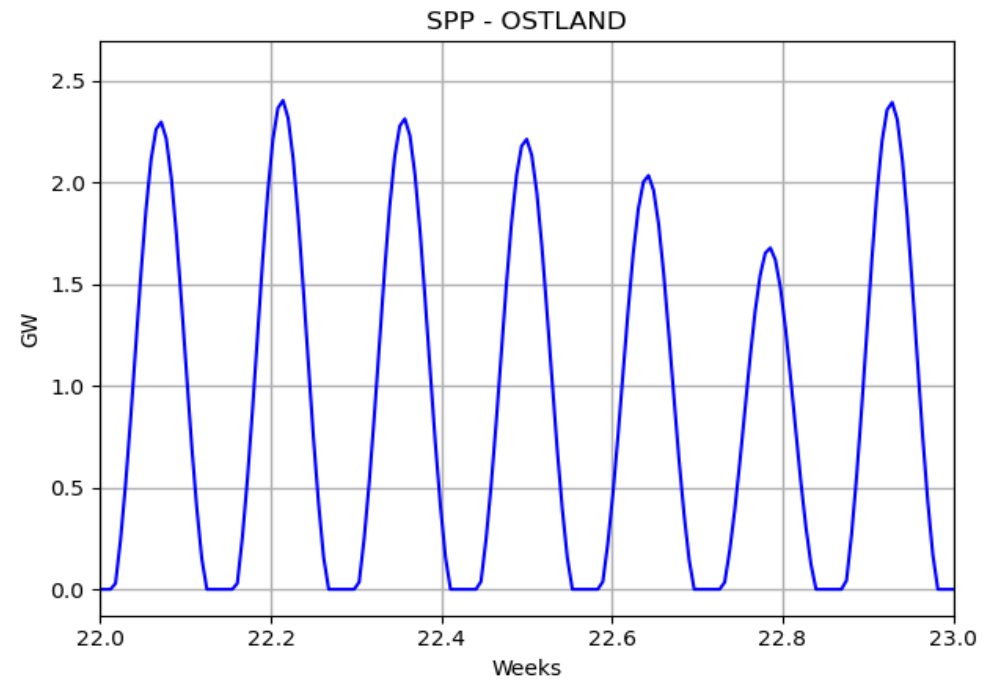
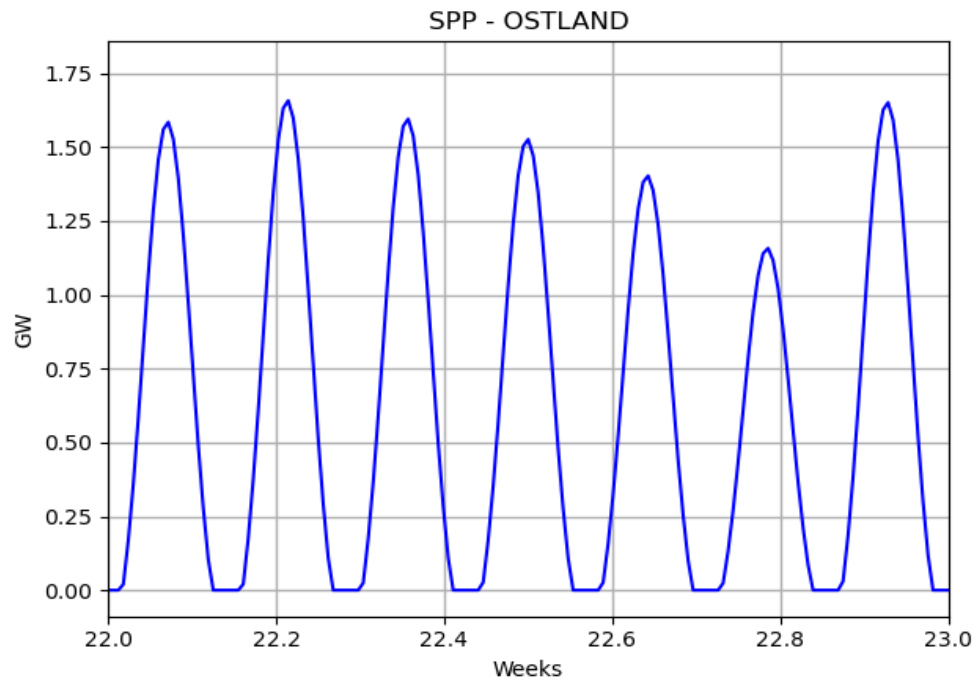
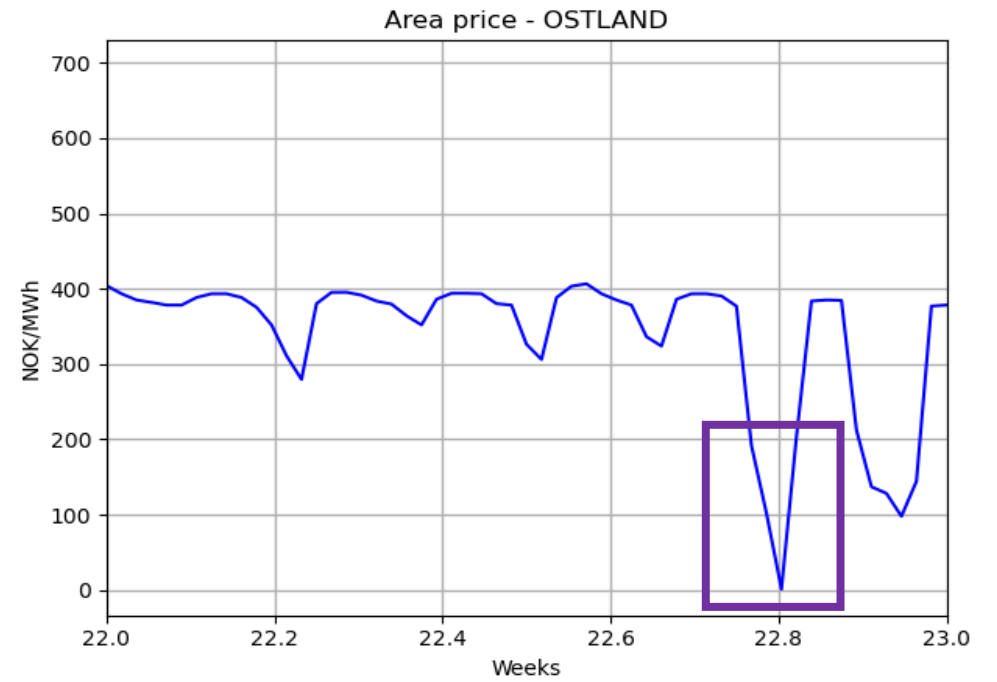
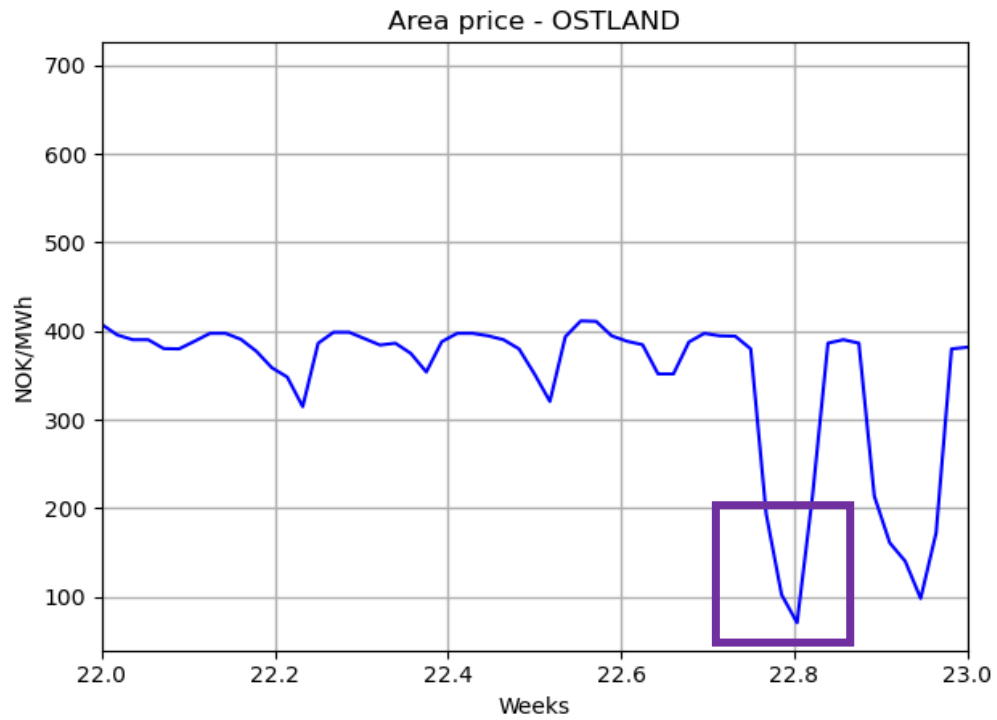
- Average prices – Average area price that is spot price over a year.
- Achieved prices- Average price a producer sells its power for over a year.



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Percentage change in achieved prices







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Summary

- Building energy sector can render flexibility through shifting the electricity and heating demand. While the net demand remains the same, the distribution flattens.
- Overall achieved price reduced by 4.5% mainly due to change in demand-supply balance.
- There is a 3.3 TWh rise in total generation from no-flexibility to flexibility scenario.
- Net production from Wind and hydro resources have no changes.
- Hydro power production acts as a counterbalance to solar production in meeting electricity demand.
- We observed a positive shift in solar power and its impact on the prices.
- We are yet to note a significant impact from the flexibility achieved through building energy sector on broader Norwegian electricity landscape.



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