

FLEXGRID

A novel smart grid architecture that facilitates high-RES penetration through innovative markets towards efficient interaction between advanced electricity grid management and intelligent stakeholders

Electricity market situation in Europe



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**NORD
POOL**

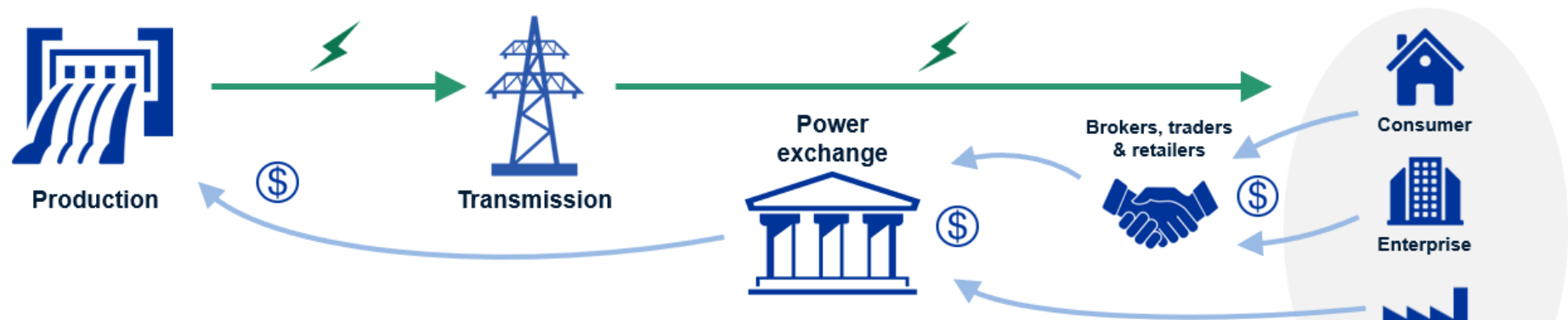
**NORD
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FLEXGRID

September 26, 2022, Halden, Norway

FLEXGRID

Nord Pool's role in the electricity value chain



- Power production
- Mostly hydropower in Norway
- Mix of wind, hydro, nuclear and thermal in the other Nordic and European countries

- Transmission system operators (TSOs) build and operate the national high voltage grids
- Distribution system operators (DSOs) build and operate the local distribution networks

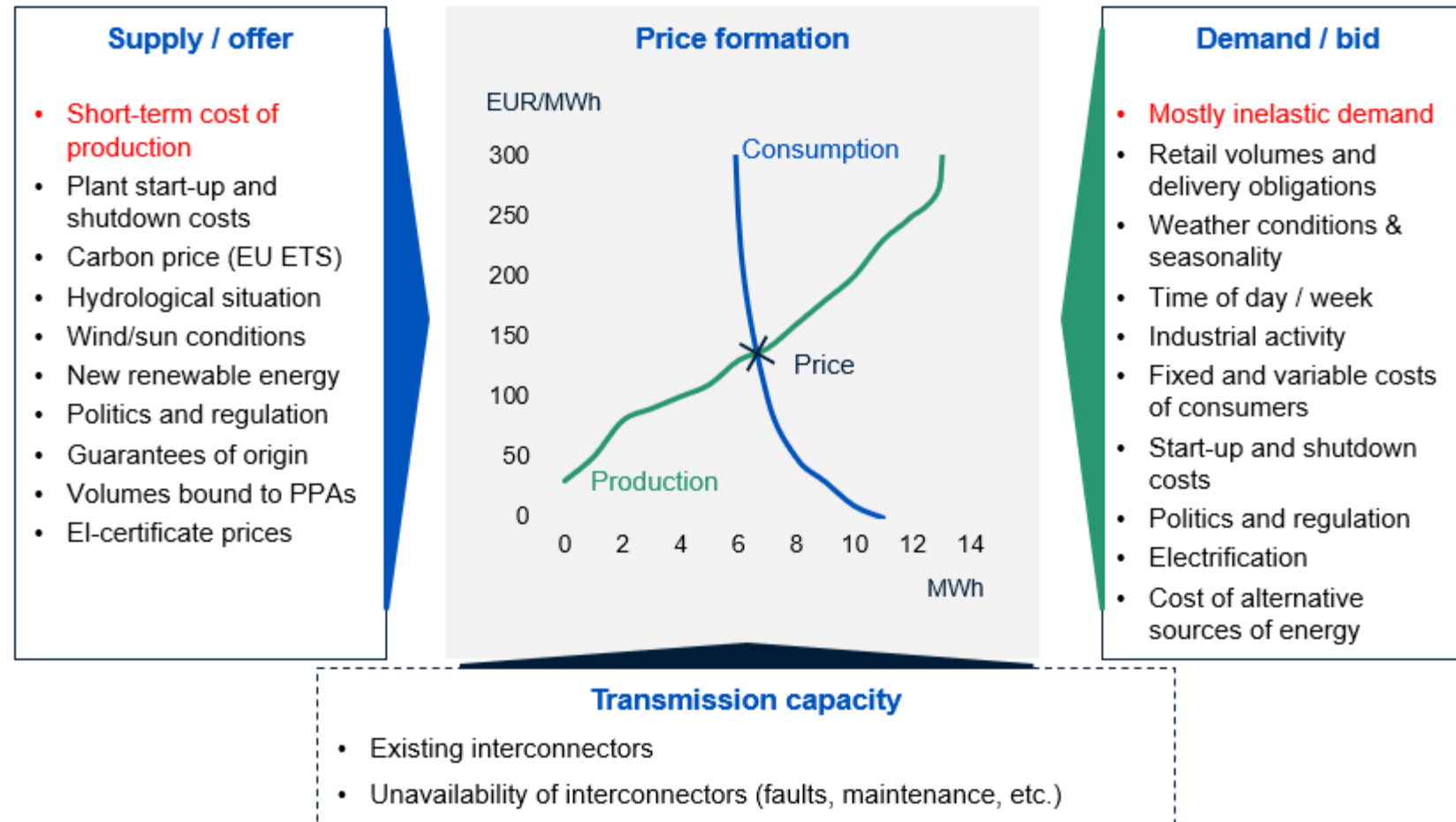
- Exchange for trading of electricity with physical delivery
- Services usually include trading, clearing and settlement
- Large consumers often buy directly from exchanges

- Resell power to retail and commercial end-customers
- Own the customer relationship
- Both independent sellers and integrated companies exist

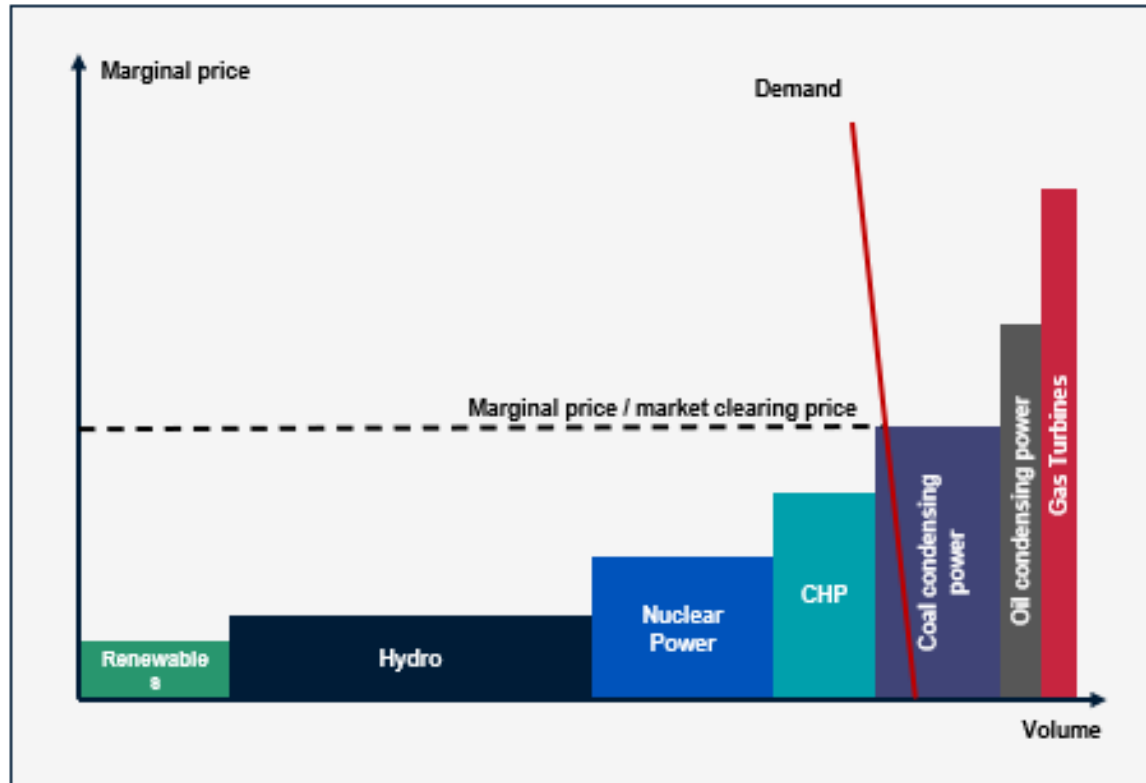


Nord Pool determines market prices

Key factors affecting the day-ahead price formation



Current energy situation



Merit order of generation technologies

- ▶ *High gas prices due to shortage in supply*
- ▶ *Diminished baseload supply (nuclear & coal)*
- ▶ *Low hydro levels in the Nordics*
- ▶ *At times low wind production*

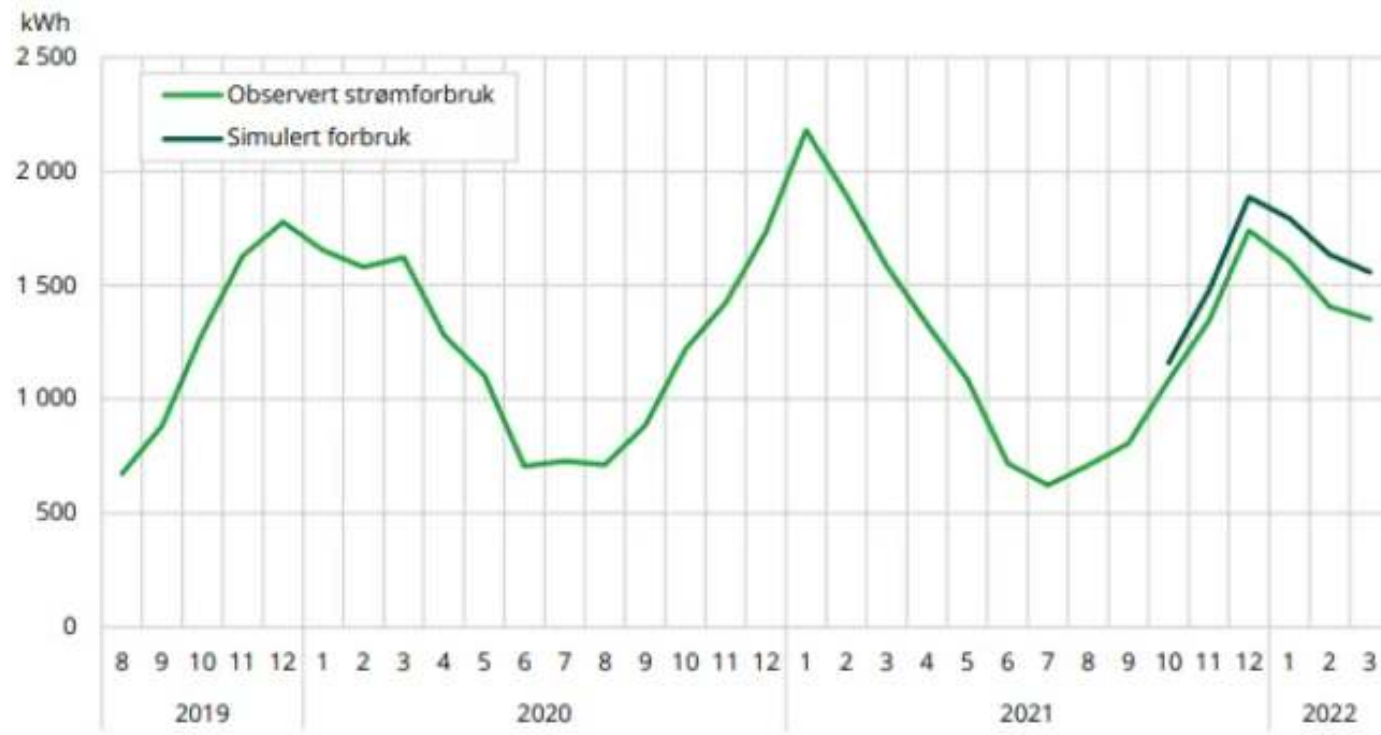
Solutions

- ▶ *Demand-side flexibility (load reduction/shift)*
- ▶ *Generation capacity increase*
- ▶ *Transmission capacity increase*
- ▶ *Flexibility at distribution grids:*
Local flexibility markets can solve various problems through new services

Demand side flexibility - reduction/shift

Existing wholesale markets already provide good solution through price signals

Figur 6.1 Gjennomsnittlig strømforbruk, observert og simulert, august 2019 - mars 2022, Sør-Norge. kWh



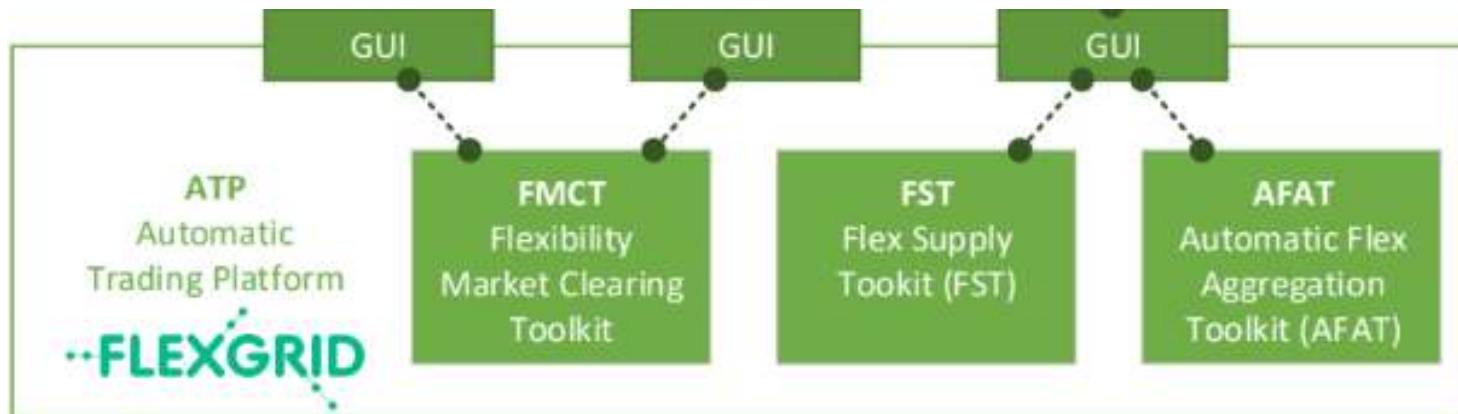
Kilde: Boforholdsregisteret, Elhub, Nord Pool og egne beregninger

Source: SSB

Demand side flexibility - new services

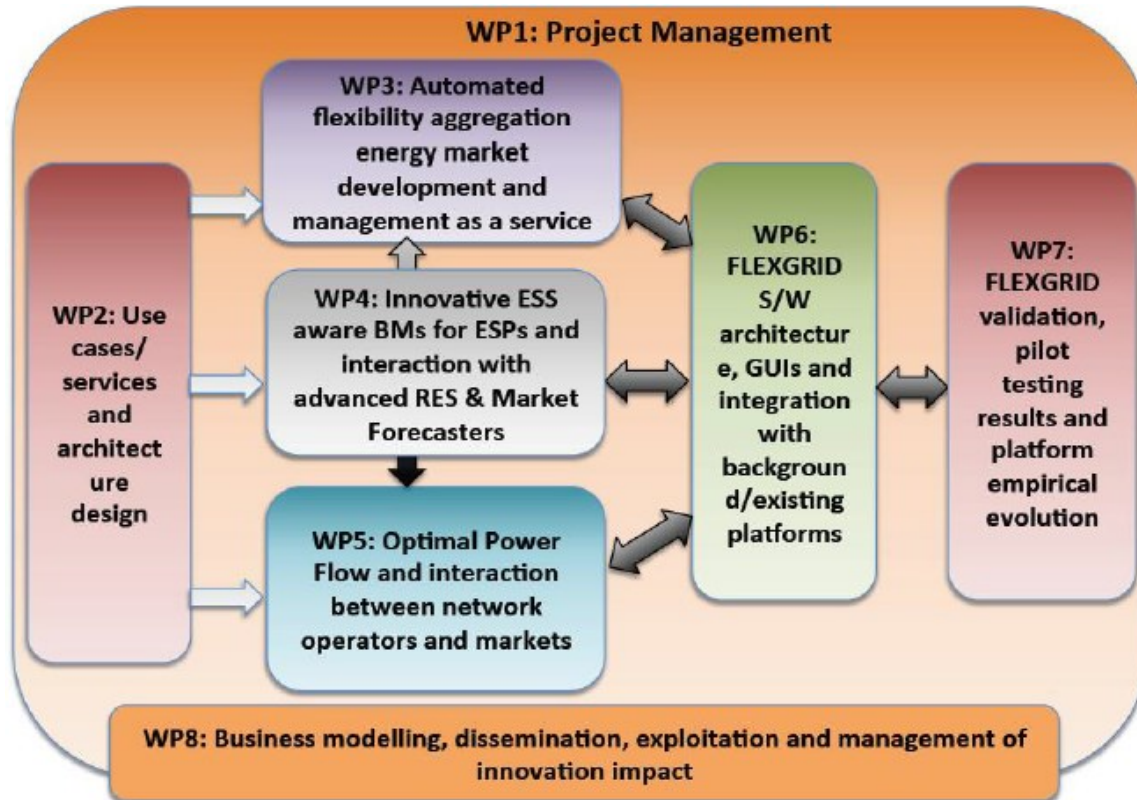
Flexgrid provides novel and innovative solutions for flexibility markets

- ▶ *Integrated modular platform (Flexgrid ATP)*
- ▶ *Provides modules for market operators, flex supply and demand*
- ▶ *Easy connectivity via GUIs and APIs*



Nord Pool (Consulting's) role in Flexgrid

Nord Pool led WP2 work on Use cases/services and architecture design

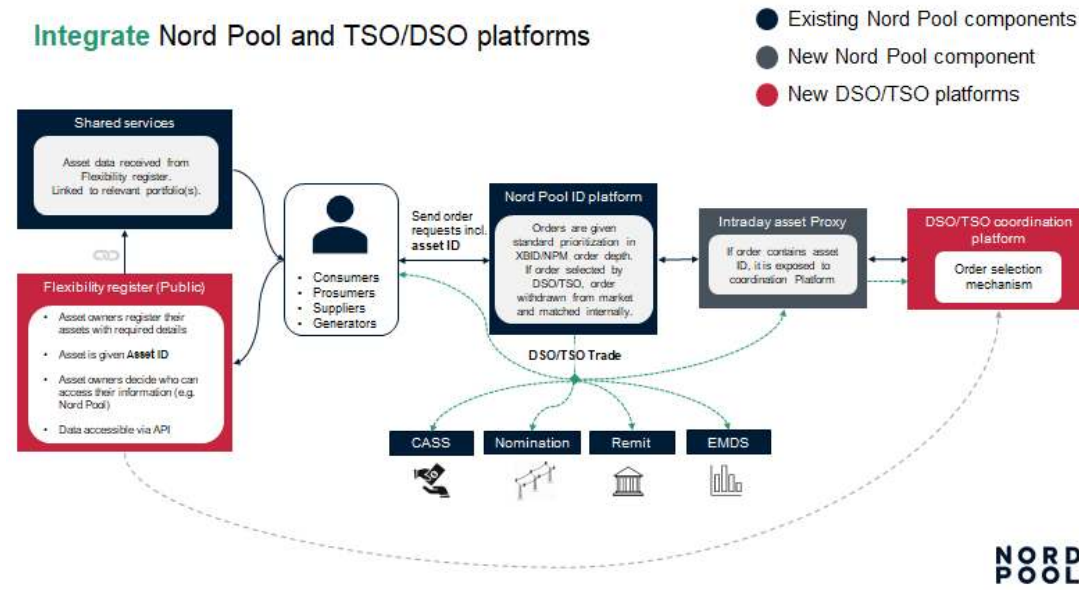


- Exploiting knowledge from other relevant EU projects and commercial flexmarket activities
- Ensure compatibility of proposed solutions with **existing market design** and new regulation (CEP), e.g. enhanced role of markets in DSO grids
- Definition of reference Use Cases and Use Case Scenarios
- Requirements analysis for functional architecture

Nord Pool's exploitation pathway

- ▶ *Flexibility is one of Nord Pool's strategic pillars*
- ▶ *Flexgrid research outcomes are actively used by Nord Pool Consulting in project work both in Europe and internationally*
- ▶ *Project results are also used in internal business development to determine new opportunities for market operators*
- ▶ *Nord Pool is active in other flexibility projects, e.g. OneNet which integrates Nord Pool systems with TSO/DSO platforms*

Integrate Nord Pool and TSO/DSO platforms





Q&A

Thank you for your
attention

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