



**NordREG**  
Nordic Energy Regulators



# THE USE OF FLEXIBILITY SERVICES IN THE LOCAL DISTRIBUTION SYSTEMS IN THE NORDIC COUNTRIES

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NVE

# Welcome and introduction

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## Trends

### Production

From traditional centralized

To intermittent decentralized

### Consumption

Improved energy efficiency

Increasing capacity demand

Self-production behind the meter

## Challenges

### Balancing

Frequency quality

### Grid stability

Voltage, quality of supply

### Grid congestions

Capacity expansions, poor utilization

## Solutions

### Digitalization

### Automation

Market design and regulations spurring new flexibility resources and solutions



# Flexibility in the power system

- Production resources
- Transmission of electricity
  - From surplus to scarcity areas
- Demand flexibility
  - Substitution - ex heating/cooling
  - Moving consumption to off-peak
- Storage
  - Power to gas
  - Batteries in the grid
  - Batteries behind the meter
  - Flywheel etc

	Generators and consumers adapt to price signals	Generators and consumers offer flexibility in (or close to) the operating hour
<b>Transmission &amp; Wholesale level</b>	Day ahead market, with bidding zones  Intra day market	Balancing market
<b>Distribution &amp; Retail level</b>	Suppliers offer spot based contracts  DSOs issue cost reflective grid tariffs	DSOs offer discounts to flex resources



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<b>Transmission &amp; Wholesale level</b>	Day ahead market, with bidding zones  Intra day market	Balancing market modernized, allowing aggregation of bids
<b>Distribution &amp; Retail level</b>	Suppliers offer spot based contracts  DSOs issue cost reflective grid tariffs	DSOs <del>offer discounts to flex resources</del> demand flex through market solutions  Suppliers / aggregators offer flexibility

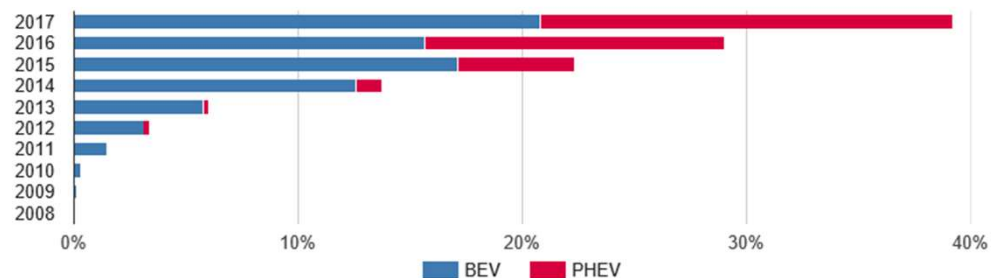


*«There is a risk that innovation on the consumer side outruns the DSOs, as well as the regulator. It will become crucial to be continuously updated and understand the available solutions in the market place, and also understand the impact on DSOs and the TSO»*

Eivind Reiten, Minister of Petroleum and Energy from 1989 to 1990, responsible for the deregulation of the electricity market in Norway.



THANK YOU FOR YOUR ATTENTION!



Charging station north of Oslo

Photo: Norwegian EV association