

Welcome to the Nordic Electricity Market Forum



Nordic Council
of Ministers

Nordic Electricity Market Forum
February 4, 2021, 09.00-12.00 CET

Program Nordic Electricity Market Forum Session 1

- 09.00 Welcome and Introduction**
Electricity Market Group chair Tatu Pahkala and forum moderator
- 09.15 The vision for the Nordic Electricity Market – Our way of working and how we are progressing**
Electricity Market Group chair Tatu Pahkala
- 09.30 European regulatory developments promoting flexibility**
Ms. Catharina Sikow-Magny, Director, European Commission
- 10.00 Break**
- 10.10 Analysis and outlook Future Flexibility Needs**
Geir Brønmo and Oliver Pearce, AFRY shares outlooks for the energy sector focusing on economic aspects of flexibility.
- 10.40 Breakout session: Opportunities, challenges and the role of Nordic cooperation in meeting future flexibility needs**
Dialogue and reflections on future flexibility needs.
- 11.15 Break**
- 11.25 Learning from each other**
We share and review the output from group dialogues
- 11.50 Concluding the forum**
Electricity Market Group chair Tatu Pahkala and forum moderator
- 12.00 End**



Introduction by Electricity Market Group chair Tatu Pahkala

Purpose of the online forum sessions 2021

Main theme: Future Flexibility Needs

- **Strengthen** our commitment to the vision for the Nordic Electricity Market 2030 and enable common understanding of progress made, our different roles and the way forward.
- **Inspire** further Nordic stakeholder dialogue and action contributing to moving towards the vision for the Nordic Electricity Market.
- **Explore and mobilise** around key topics and focus areas from the roadmap relevant for achieving the vision.



Who is participating today?



Emilie Popp, Peter Falstaff



Peter Olsen, Jonas Katz, Martin Hansen, Lars Nielsen, Ulrich Lopdrup



Nina Detlefsen



Eva Centeno López, Turid Tersmeden, Bengt Toresson, Fredrik Norlund



Rickard Nilsson



Sara Emanuelsson, Anton Steen, Johanna Lakso, Magnus Thorstensson



Pasi Kuokkanen



Trygve Tomren-Berg



Niclas Damsgaard & Tomas Söderlund



Caroline Törnqvist, Karin Tvingsjö & Mattias Johansson



Tapio Tuomi, Tuukka Vainio, Berndt Schalin



Conny Rosenberg



Ane Hammer Langhelle, Kjell Grotmol



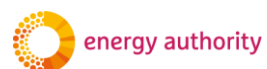
Johnny Lindström



Johan Bruce



Petteri Haveri, Samuli Honkapuro, Reima Neva, Simon-Erik Ollus, Merja Paavola



Veli-Pekka Saajo & Antti Paananen



Alexander Kellerer, Hege Holte Nielsen, Ove Flataker



Stein Øvstebø



Marie Knutsen-Öy Conny Johansson



Asta Sihvonen-Punkka, Tuomas Rauhala, Juha Hiekkala



Maiken Thomsen, Michael Arentsen



Johannes Bruun, Jeannette Møller Jørgensen & Signe Rosted



Thor Erik Grammeltvedt, Anne Risnes



Tatu Pahkala



Jari Nykänen & Toivo Hurme



Birgitte Jourdan-Andersen, Toini Løvseth & Vivi Mathiesen



Davide Orifici & Henrike Sommer



We will be guiding you through the session



Tatu Pahkala

Senior Adviser, Ministry of
Economic Affairs and
Employment &
EMG Chair and Host for
forum



Andrea Stengel

Senior Adviser Nordic
Energy Research &
EMG Secretariat



Julia Karner

Forum moderator,
Odd Agency



Mikkel Seiling

Forum moderator,
Odd Agency



Johan Bjerkreim

Technical host,
Start Up Norway



Guidelines for our session

- Please keep your camera on if you are able to do so.
- Please ensure your name and organization is visible in Zoom
- We will inform you about breaks and how to access group rooms.
- We will record the plenum session for forum stakeholders not able to participate today
- If you have questions or comments, please use the chat function.



Forum process

Session 1

February 4,
CET 09.00-12.00

- We learn, become
inspired and engage in
cross-stakeholder
dialogue

Alignment and
dialogue within
stakeholder
organizations

Input from session 1 and
from stakeholder dialogues
will form and influence the
agenda for online session
part 2.

Session 2

March 19
09.00-12.00 CET

- We mobilize,
conclude and plan for
action



Warm-up question

What are you looking forward to most with our session today?

Please type your answer in the chat .



The vision for the Nordic Electricity Market

Our way of
working and how
we are progressing

2030 Vision for the Nordic Electricity Market

Core Purpose

To provide secure, affordable and sustainable electricity to the Nordic society, through competitive markets

Core Values

Productive and trust-based cooperation across the Nordic countries and between stakeholder groups

Reliable and cost-efficient electricity supply

Transparent and market-based solutions

Constant improvements to low-carbon solutions, a driving force behind innovation and leading the way.

Emphasis on consumer-oriented solutions

2030 Goal

In 2030, the Nordics have the world's most competitive, innovative, and consumer-oriented electricity market, that contributes to reaching the ambitious Nordic climate goals.

The Nordic Electricity Market in 2030

A society characterised by digitalisation, automatization and electrification is backed by a highly reliable electricity supply

The electricity market brings increasing benefits to the society as it enables consumers and new market players to contribute to the energy transition with innovative solutions.

The grid infrastructure is smartly operated, cost-efficient, robust and without undue constraints, being optimised from a regional perspective

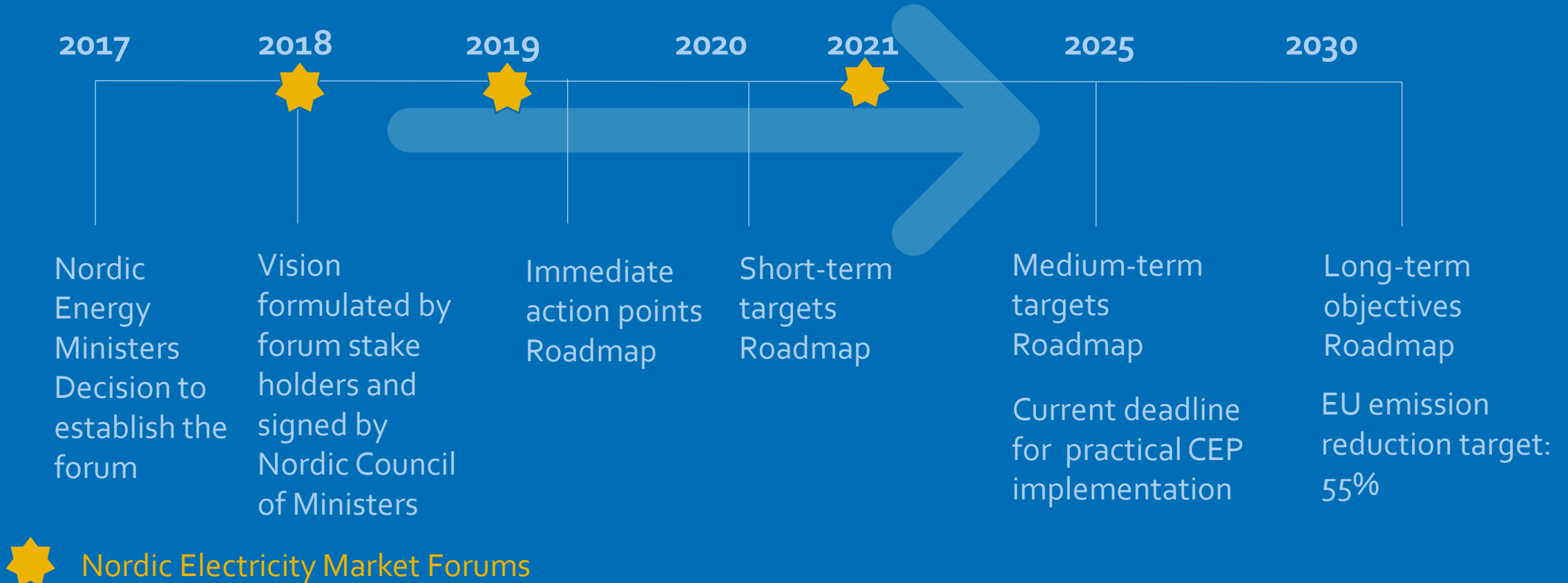
The Nordic electricity market is a positive driving force in the European electricity market integration, market development and in the effort towards reaching ambitious climate goals

Key Element: Flexibility



Nordic Council
of Ministers

Roadmap for reaching the 2030 Nordic Electricity Market Vision



The Forum Way of Work (2021)

Q4

Take stock of the virtual years and celebrate the success stories.

Find out how we continue to work on the Roadmap and the Vision

Get the new Roadmap confirmed

Get a new subject for the physical Forum in December

Q3

Q1

Until 4. March: internal work on questions for the stakeholder

After 4. March: NEF and EMG collect input and work on session 2, with help of the NEMF coordination group

EMG

Update of Roadmap for the Nordic Electricity Market, work towards the Nordic Council meeting

Coordination Group/WGs

Contribute to new Roadmap Based on new roadmap discuss and find topics for the physical forum. Collect input from all stakeholders

Q2

Nordic Electricity Market Forum: IN REAL LIFE

Coordination Group and Working group(s) meetings

EMG meetings

September: Nordic Council Energy Ministers meeting

Nordic Electricity Market Forum Online Session 1

Nordic Electricity Market Forum Online Session 2

Virtual Meetings: Coordination Group Working group(s)?

Virtual EMG meetings



Implementation of immediate actions

EMG- tasks

- | | |
|--|---|
| • Coordinate CEP implementation | Nordic workshops for the ministries, coordination done, implementation slightly delayed |
| • Deliver inputs on cybersecurity to NordBer | Pending |
| • Nordic vision for sector coupling | National visions exists, no Nordic vision |

NRA - tasks

- | | |
|---|---------------------------|
| • Coordinate CEP implementation | Ongoing, deadline 2025 |
| • Coordinate sharing of best practices TSO/DSO/flex | Ongoing |
| • Status report on Nordic retail market integration | Expected delivery Q2 2021 |



Implementation of immediate actions 2019-2020

TSO- tasks

Status

Implementation of market reforms

- | | |
|--|---|
| <ul style="list-style-type: none">• Early involvement of stakeholders in regulatory work:<ul style="list-style-type: none">• Implementation of Flowbased Capacity Calculation• Implementation of 15 min. Market Time Unit in Day Ahead and Intraday• Development and implementation of Intraday Auctions• Coordinate CEP implementation | <p>Various workshops/hearings
Delayed, Common Grid Model missing
Delayed, challenges within the NEMOs, the algorithm
Delayed, less of a priority
Ongoing, deadline 2025</p> |
|--|---|

Nordic Balancing Model

- | | |
|--|--|
| <ul style="list-style-type: none">• Next steps balancing market/follow up solutions report | <p>Ongoing, progress on the various projects</p> |
| <ul style="list-style-type: none">• Activate consumers in Nordic balancing markets | <p>Various national pilot projects ongoing</p> |
| <ul style="list-style-type: none">• Design market for flexibility/system services | <p>Various national pilot projects ongoing</p> |

Resource adequacy & grid planning

- | | |
|---|---|
| <ul style="list-style-type: none">• Nordic grid planning and Nordic welfare | <p>Regional grid modelling within ENTSO-E</p> |
| <ul style="list-style-type: none">• Regional analysis on resource adequacy | <p>Regional adequacy modelling within ENTSO-E</p> |

DataHubs/retail market

- | | |
|---|----------|
| <ul style="list-style-type: none">• Nordic stakeholder group on Data hubs | <p>?</p> |
|---|----------|





European regulatory developments promoting flexibility

Ms. Catharina Sikow-Magny,
Director, European
Commission



Future flexibility needs in the Nordic energy system

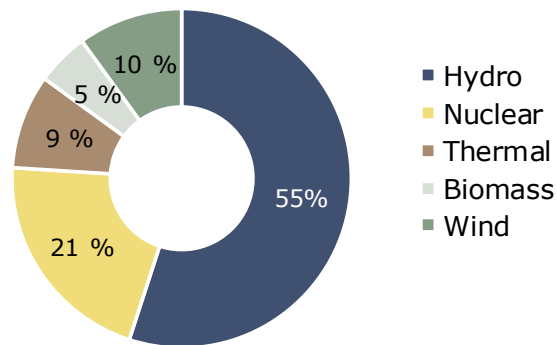
Nordic Electricity Market Forum

GEIR BRØNMO

THE NORDIC POWER MARKET IS ALREADY FLEXIBLE

Flexibility comes from the combination of reservoir hydro power with baseload capacity and an extensive interconnection

GENERATION



- Nuclear power provides baseload and stability
- Hydro power provides flexibility in season and peak
- Hydro power also balances renewables

NORDIC INTERCONNECTION



- High degree of internal interconnections
- Low level of price differences, historically

LINKS TO EUROPE



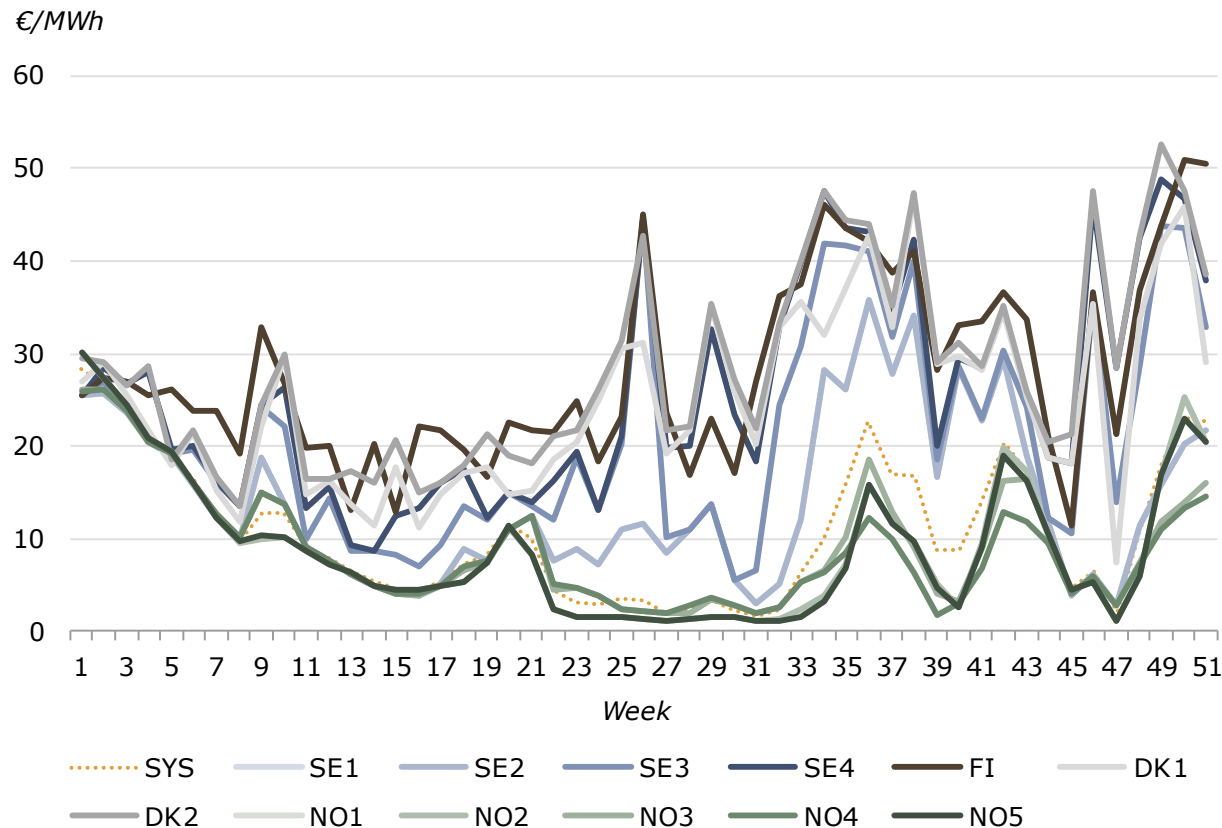
- Links to Europe provide security of supply in dry years
- And export capacity in wet years

Source: ENSTO-E (left), Svenska Kraftnät (middle), AFRY Management Consulting (right).

2020 SHOWS CRACKS IN THE SHINY SURFACE?

But record low prices, locational issues and increasing price differences signal a growing need for flexibility

2020 WEEKLY AVERAGE POWER PRICE, NORDIC PRICE AREAS



Source: Nord Pool (left), Montel (right).

Nordic utilities suffer as prices fall to 20-year low

MONTTEL NEWS

15 Jun 2020
15:12 CET

Earnings prospects for Nordic power producers have turned ever more gloomy this year due to an extraordinarily mild and wet winter, with the coronavirus adding uncertainty as to how soon prices will recover.

Nordic spot set to double in August but will linger at lows

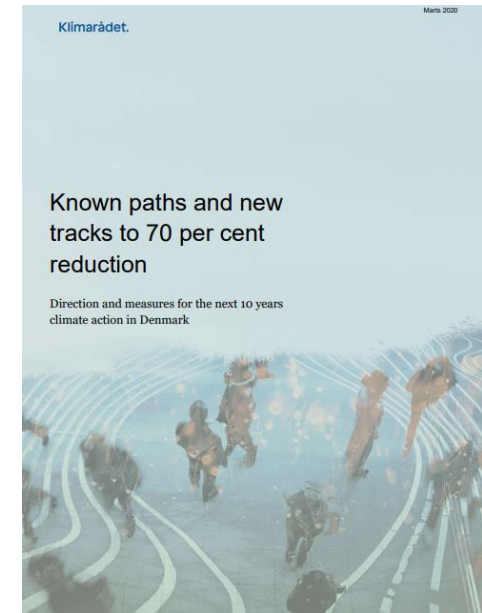
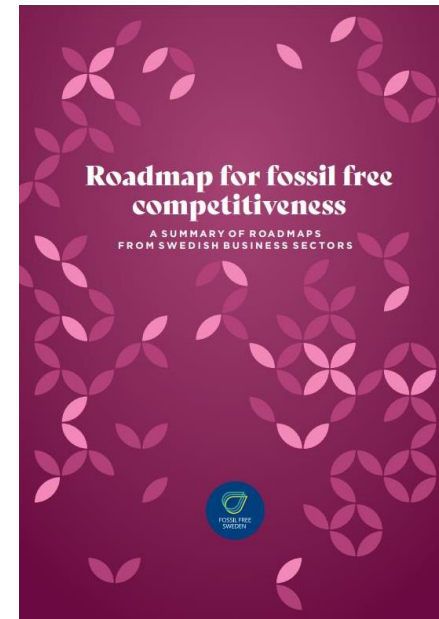
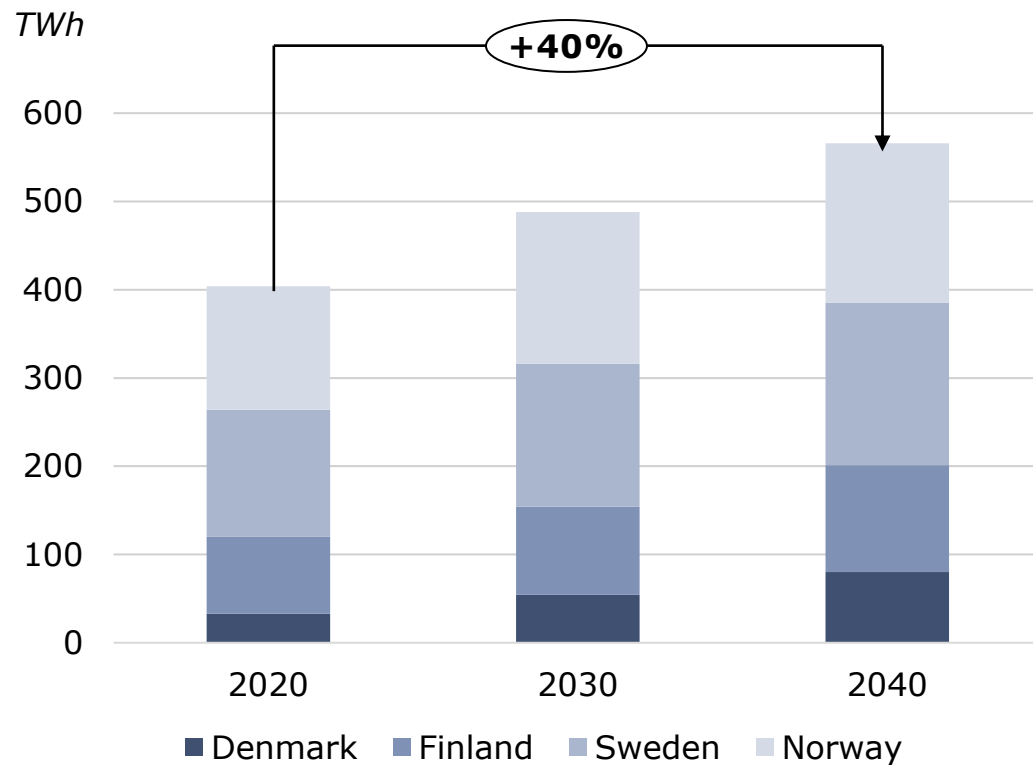
(Montel) Nordic power spot prices are set to rise next month but will still likely linger around record low levels amid strong hydropower supply, market participants said on Friday.

Nordic spot power drops below EUR 1 for first time

(Montel) The Nordic system price hit a fresh record low of EUR 0.72/MWh on Sunday due to sustained hydropower inflows and high wind output, the first time the price has fallen below EUR 1.

Nordic power demand can increase by 40% to 2040, driven by electrification from decarbonisation targets

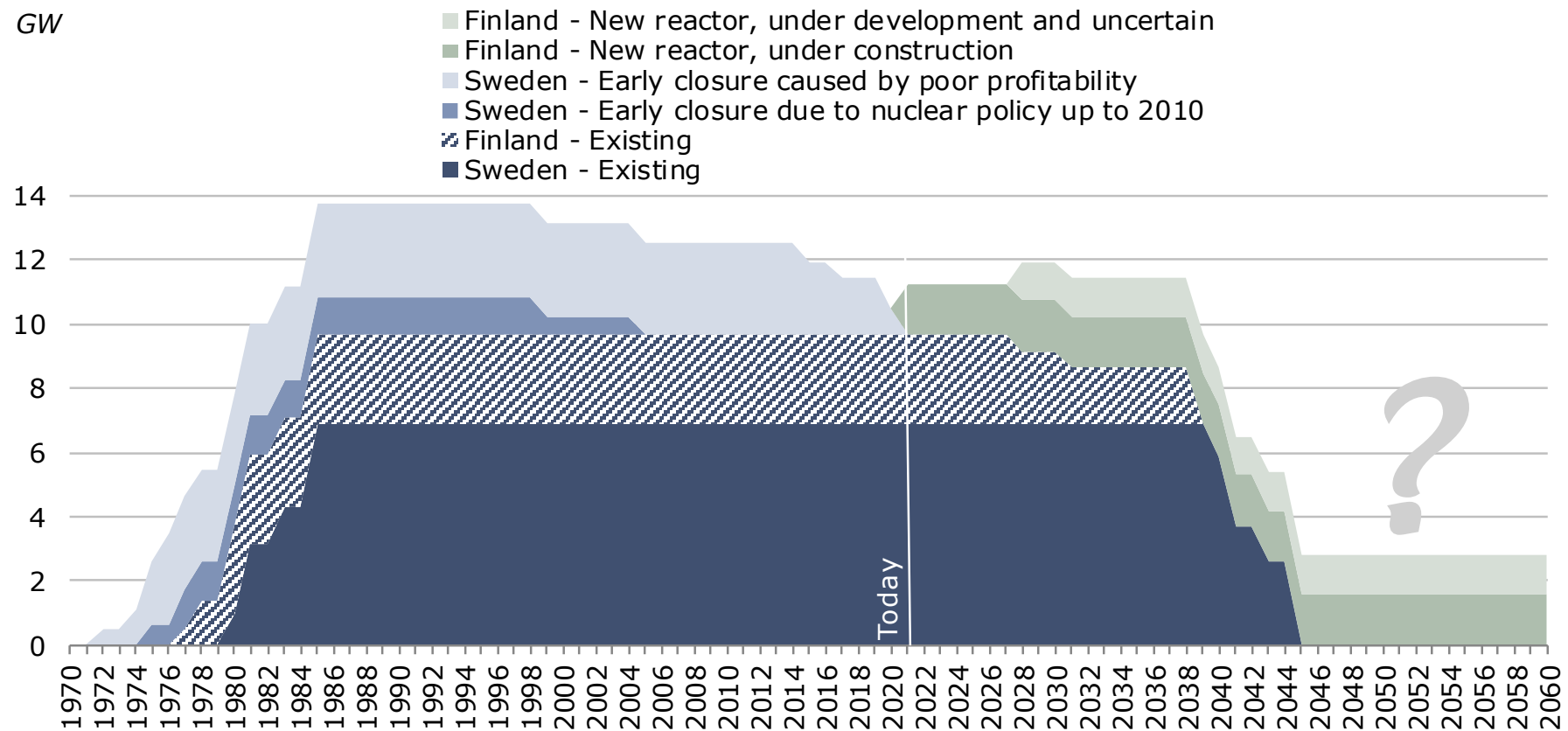
POTENTIAL FUTURE POWER DEMAND IN THE NORDIC REGION



Source: Energinet analyseforudsæninger 2020 (DK), AFRY - Impact of the carbon neutrality target on the Finnish power system – 2021 (FI), Energiföretagen/North European Power Perspectives (SE), Statnett LMA 2020 (NO).

Most of the Nordic nuclear plants should reach end of their lifetime in the 2040s

NORDIC NUCLEAR INSTALLED CAPACITY, 1970-2060



Source: Public information and World Nuclear Association, assuming no lifetime extensions.

WIND POWER IS BOOMING

Onshore wind power is set to be the main source of production to meet new demand and replace nuclear capacity



Evwind, News Menu, Uncategorized, Wind Energy, wind energy

Enlight buys Swedish wind farm

October 12, 2020 reve

The Björnberget wind power project, which Enlight is buying, is one of the largest wind energy projects in Europe located in central Sweden, and has a total capacity of 372 megawatts.

Enlight Renewable Energy announced it has completed the transaction to acquire control in a huge wind power generation project in Sweden. Enlight will invest €435 – 445 million in building the project, which has a total capacity of 372 megawatts, and has obtained the main required permits for its construction, which will begin immediately.

The Björnberget project, which Enlight is buying, is one of the largest wind farm in Europe located in central Sweden, with 60 planned wind turbines based on Siemens Gamesa new 5.X technology.

Nordic developer Cloudberry enters offshore wind

11 September 2020 by Craig Richard

Renewables firm Cloudberry Clean Energy has been given the green light to acquire 100% of the holding company developing a 100MW wind farm in Sweden's largest lake.

IKEA Finland completes acquisition of three new wind farms, to support its renewable energy generation



MON, SEP 28, 2020 17:14 CET

Enercon sells Markbygden II to investment fund in major transaction

Published: 04.06.20 at 15:47

Credit Suisse Energy Infrastructure Partners has acquired 85 percent of the 252.7 MW Markbygden II project for EUR 200 million. It's the second time in six months that the Swiss fund invests heavily in Nordic wind.

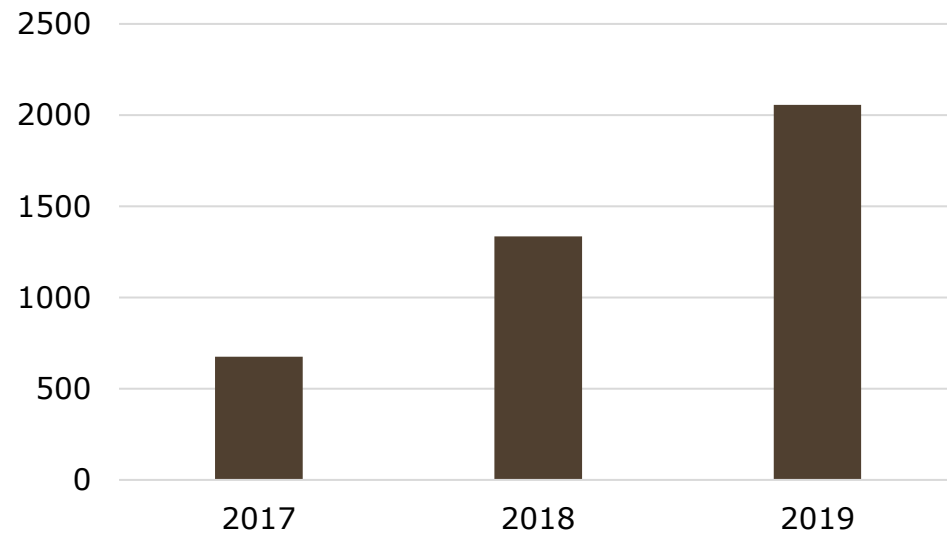
Cloudberry announces acquisition of an ownership interest in a Norwegian hydro power portfolio

Oslo, 24 June 2020

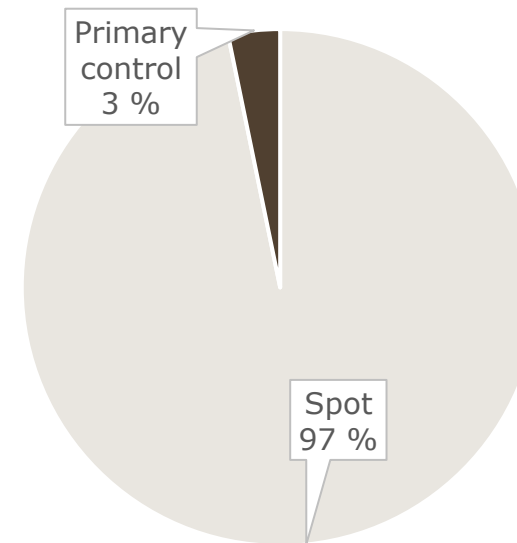
Source: Evwind (left), Wind power monthly, INGKA, Energy Watch, Cloudberry (right, from top to bottom).

Short term markets will change with the mix – primary control value is on the rise

VALUE OF PRIMARY CONTROL MARKET (MSEK/YEAR)



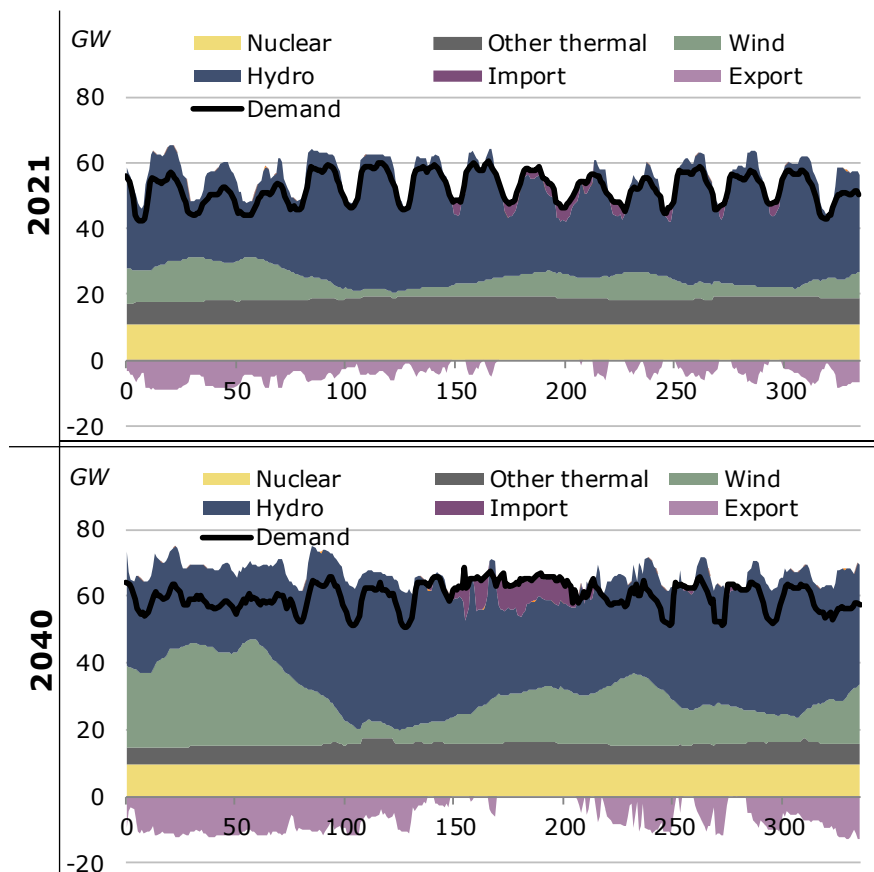
SHARE OF OVERALL MARKET VALUE (2018)



THESE FACTORS WILL CHALLENGE THE NORDIC POWER SYSTEM

The nature of the long-term challenges and need for flexibility will vary over timeframes

NORDIC HOURLY GENERATION AND DEMAND, 2 WINTER WEEKS



Source: AFRY Management Consulting, Norway/Sweden/Finland, Central scenario 2020 Q2.



- Energy balance year on year, seasonal balance



- Weekly and hourly balances
 - Cold winter week with no wind increases the risks for loss of load
 - Summer nights with high winds could create massive oversupplies



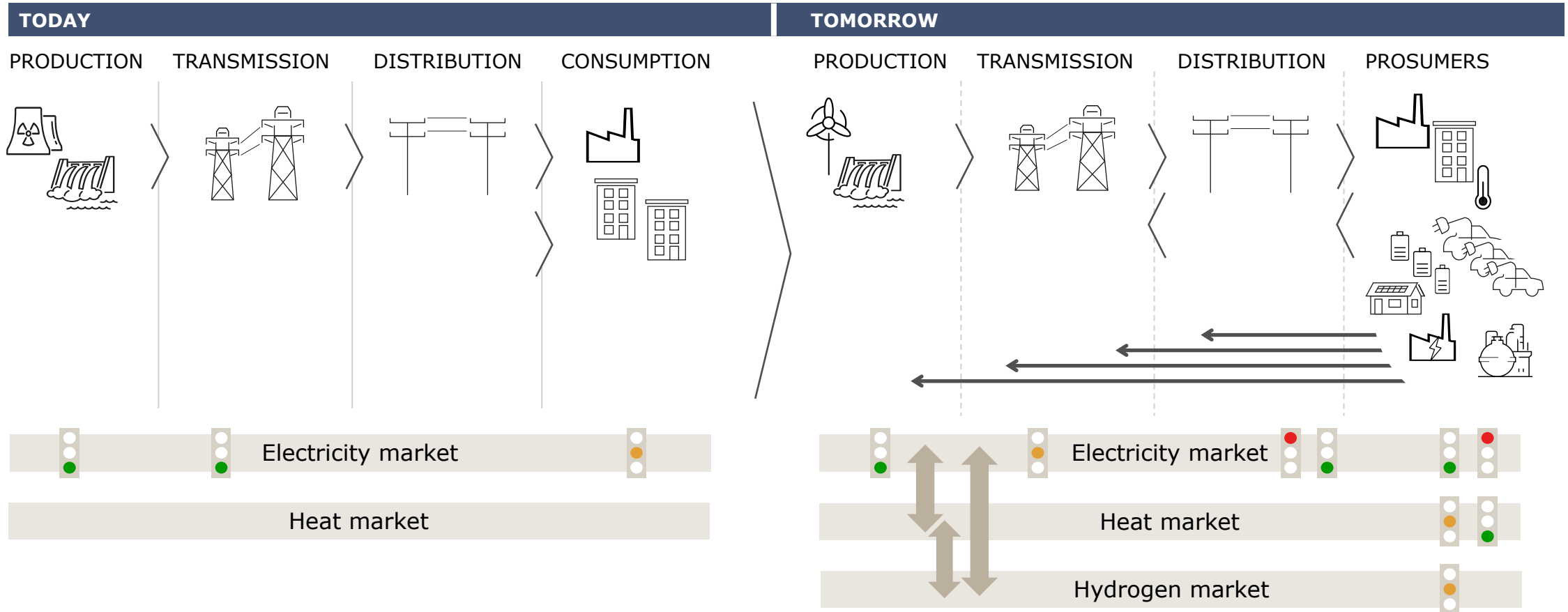
- Outages and large forecast errors, system stability
 - In high wind situations there will be a need to ensure stability
 - A range of energy source could be used to ensure balance



- Lack of grid investments can add to the challenge

A RANGE OF CROSS-MARKETS SOLUTIONS CAN BE DEPLOYED

We are moving towards a more complex, multi-directional and integrated energy system with new sources of flexibility

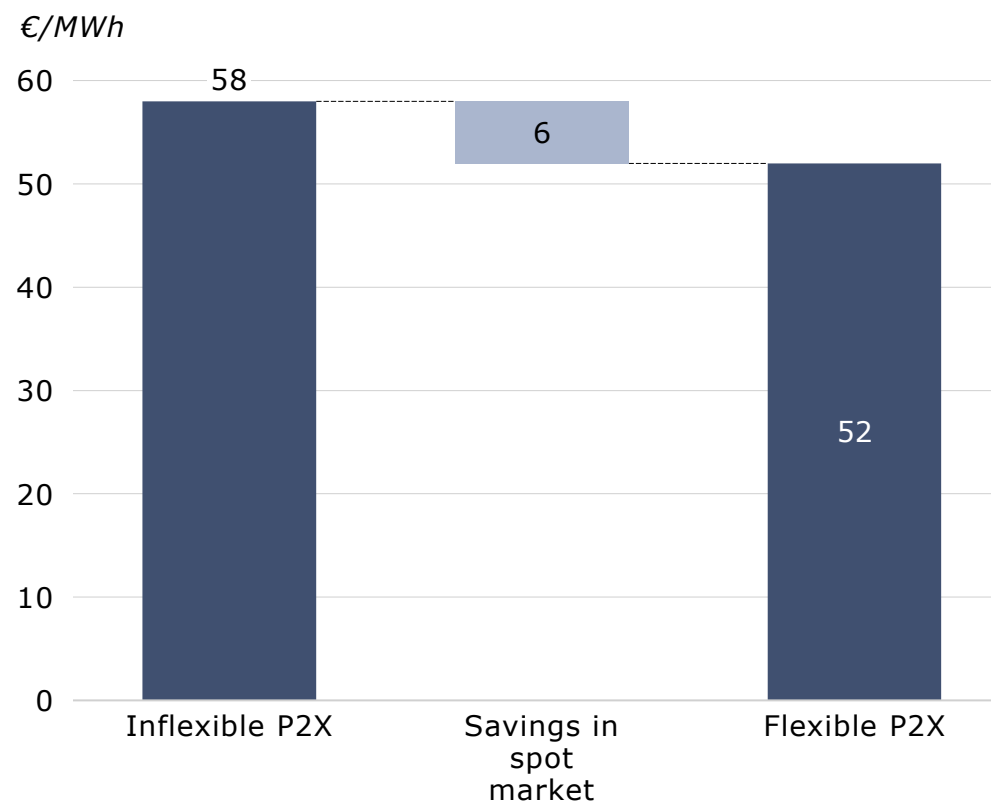


BUT IS THIS SIMPLER SAID THAT DONE?

Flexibility capabilities depend on process design; decisions need to be made soon due to long investment cycles but are current incentives sufficient?
















- For new demand, what are the economic benefits and incentives to become flexible?
- What are the practical and pragmatic changes that can be made in the existing market design to facilitate the emergence of new forms of flexibility?
- How can we make flexibility provision investable?
- How will the power prices look like – here and elsewhere?
- Are decision-makers truly supporting the Nordic vision?

ILLUSTRATION OF LIMITED FLEXIBILITY INCENTIVE, ACHIEVED ELECTRICITY PRICE FOR FINNISH INDUSTRY IN 2040

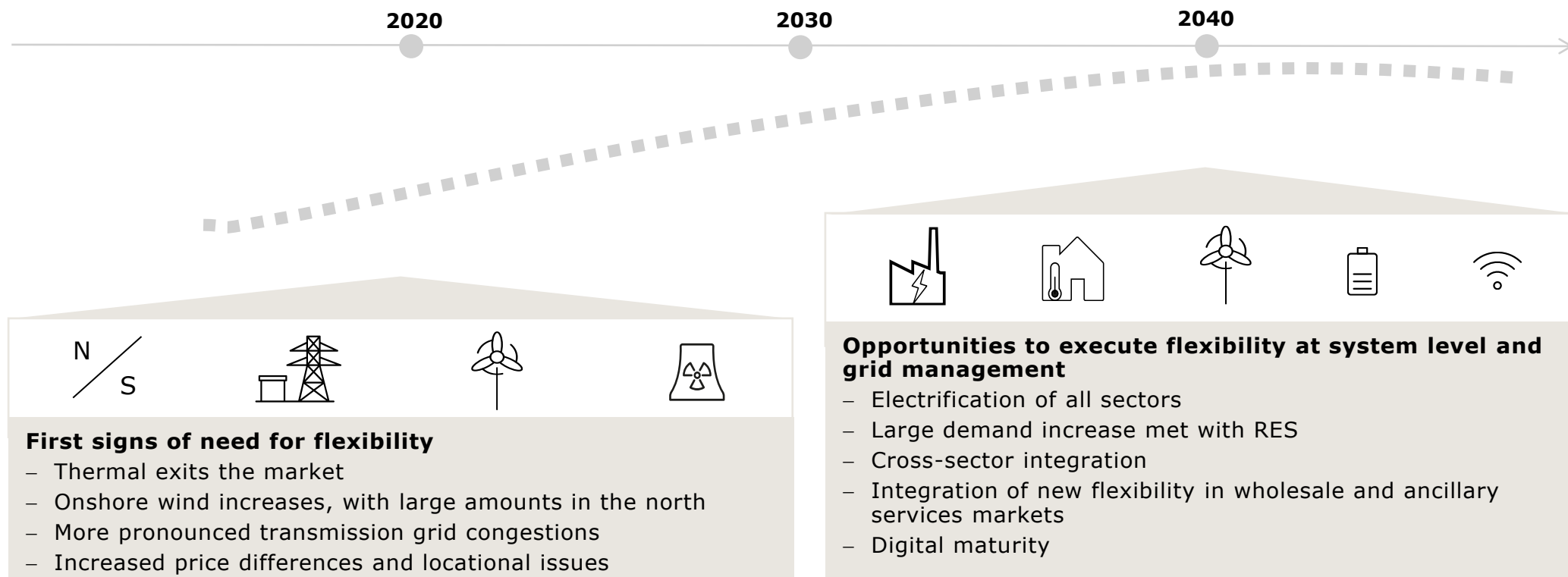


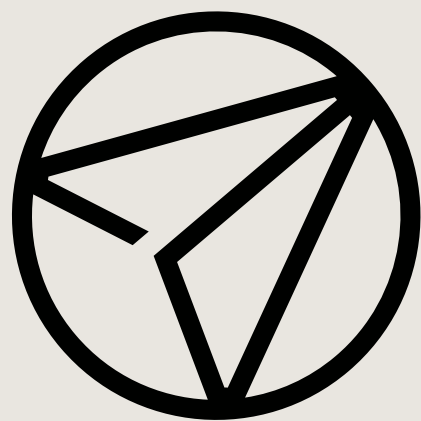
Source: AFRY - Impacts of carbon neutrality target to the power system – 2021. Smart electrification scenario, assumptions applying.

Many potential flexibility providers do not have a route-to-market in today's market design; need to change to untap potential and enable value creation

STAKEHOLDER	TODAY	TOMORROW
 RES PRODUCERS	 High barrier to entry in ancillary services markets, little incentives to become flexible	 Technology neutral market rules allow RES participation in system balancing
 END CUSTOMERS, ENERGY COMMUNITIES AND AGGREGATORS	 High barrier to entry to wholesale and ancillary services markets due to demanding requirements	 Prosumers can access to all markets, including peer-to-peer, allowing stacking of multiple revenue streams
 DSOs	 Few tools to manage electrification and increasingly fluctuating load and production profiles	 Innovative solutions are actively applied in grid management, including flexibility services and dynamic tariffs
 INDUSTRIAL CONSUMERS AND HYDROGEN PRODUCERS	 Little incentives to invest in storages and flexible processes	 Hydrogen storages and P2X fuels balance the power system across various timescales
 HEAT MARKET ACTORS	 Interaction of heat and electricity is mainly based on decreasing CHP production while waste heat is underutilised	 Heat storages and waste heat is fully utilized to maximise energy efficiency and flexibility between the energy systems

The need for flexibility to balance the system and manage network constraints is inevitably increasing in the Nordic region; but so are the opportunities to provide flexibility if companies are willing to invest





AFRY

ÅF PÖYRY

Q&A



Opportunities, challenges and the role of Nordic cooperation in meeting future flexibility needs

Breakout session

Purpose of breakout session

- Reflect and explore potential activities on the Nordic level to achieve more flexibility.
- You do not need to reach consensus – this is a starting point.
- In groups, your task is to summarise a few key challenges but focus on listing ideas for **solutions** related to future flexibility needs
- The groups have been assigned to focus on different perspectives on flexibility.



Perspectives on flexibility:

A) Flexibility & sector integration

Power to gas, hydrogen, heating, cooling and transportation, electrification of industry

B) Flexibility & local challenges

DSO, local grid, prosumers, small scale, smart grid, new local marketplaces

C) Flexibility & markets

Day ahead, intraday, balancing, system services: how can you get flexibility into the system using these markets?

Forwards and hedging: how do you allow market participants to hedge their price risk while keeping their incentive to remain flexible and react to price signals?

Questions to focus on:

On a Nordic level, which main **challenges** do you see in getting more flexibility to the market?

What should be done on the Nordic level to address those challenges? Which **solutions** do you see?



Plenum reflection

If you have comments
during this reflection
session, feel free to share it
in the chat.



Concluding the forum...

Forum process

Session 1

February 4,
CET 09.00-12.00

- We learn, become
inspired and engage in
cross-stakeholder
dialogue

Alignment and
dialogue within
stakeholder
organizations

Input from session 1 and
from stakeholder dialogues
will form and influence the
agenda for online session
part 2.

Session 2

March 19
09.00-12.00 CET

- We mobilise,
conclude and plan for
action



Until next time:

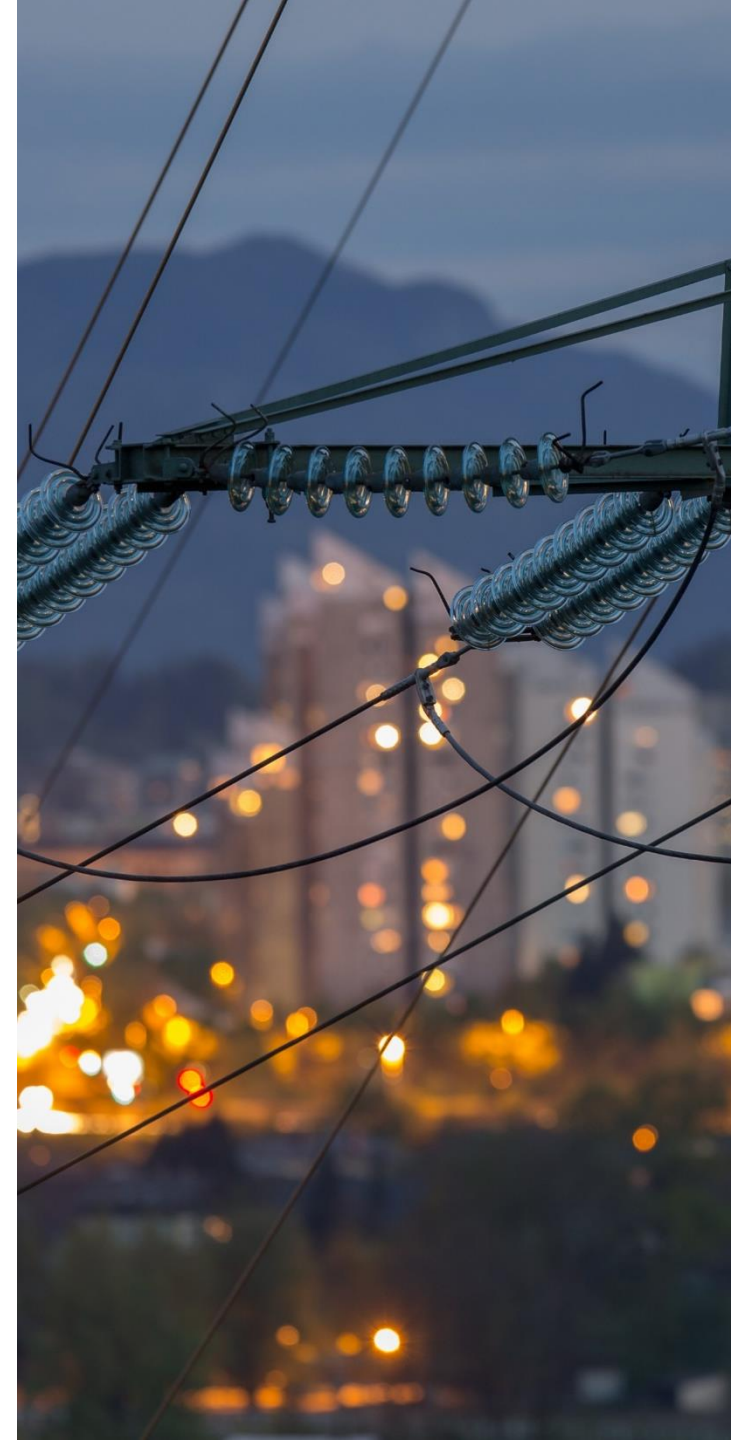
1) On the theme of Future Flexibility Needs:

- a) What could be a concrete proposal from your stakeholder perspective to get more flexibility into the system?
 - i. What are the main obstacles to bring existing flexibility into the system?
 - ii. What can we do on the national and Nordic level to address these obstacles?
- b) What would be a prioritised area of work for your stakeholder organisation to participate in?

2) On working towards the vision for the Nordic Electricity Market 2030:

- a) In what way do you see that your organisation can contribute the progress towards the vision?
- b) Are there other areas, outside of flexibility, you would like to contribute to?

You will receive these instructions and a template directly after this first online session. Your input shall be submitted in writing no later than March 4.



Check-out

What is your key take away from today?

Please share your answer in the chat.





Thank you.

See you again
in March!



Nordic Council
of Ministers

Nordic Electricity Market Forum
February 4, 2021, 09.00-12.00 CET