European Workshops on Demand Response 2023

DR4EU
DEMAND RESPONSE FOR EUROPE

Demand Response in Sweden

State of play, evolutions and perspectives

Sabine CROME DG ENER European Commission	**Iolanda SAVIUC** JRC	**David FREED** Regeringskansliet	**Jennie NYBERG** Energimarknadsinspektionen Vi övervakar och utvecklar energimarknaderna	**Jenny LAGERKVIST** SVENSKA KRAFTNÄT	**Johanna LAKSO** POWER CIRCLE *Electricity for sustainable energy*	**Anders Tonhammar Lööf** **Filippa Kjaerboe** **Goranka Zoric** sympower VATTENFALL

When?

22nd June 2023

10:30 - 11:30 CET

On-line

55 min to be Fit for 55!

How to register?

by e-mail to

info@dr4eu.org

Agenda

- Sabine CROME, DGENER, EC
- Iolanda SAVIUC, JRC
- David FREED
- Jennie NYBERG
- Jenny LAGERKVIST
- Johanna LAKSO
- Anders Tohammar Lööf

Filippa Kjaerboe & Goranka Zoric

- Q&A + questions on-going => in the chat box please

Key steps to European framework on DR

- *15 Mar 2011: FERC order 745 to have DR in WM, based on net benefits for suppliers, backed by Supreme Court (2016)*
- 2012 (EED – art15-8): DR to participate alongside supply
- 2019: Dir&Reg on electricity markets

Article 17

Demand response through aggregation

- 2022: Council regulation (EU)2022/1854
- *2023 (Mar.14) prop. Reg. on (quick) market reform*

Now: Current crisis + Energy transition => a radical change: from GWs to daily TWhs

European workshops on DR

from EU framework….

… to national implementation

2021: analyse key features of CEP

- DR in all markets, incl. day ahead
- Aggregation, independent
- Balancing responsibilities
  - For DR aggregators
  - For impacted suppliers/BRPs
- Provisions for fair competition
- Technicalities: metering data, quality assurance, baseline…

2022: Examples of national rules

- Finland, Denmark, Italy
- First steps
  - Ancillary services to TSOs (BM/mFRR,…)
  - Principles and pilots
  - Legislation yet to come

2023: DR at large

- New initiatives, new laws/market rules
- Austria, Spain, Sweden,…

Demand response – EMD proposal and the implementation of the Clean Energy Package

Sabine Crome

European Commission – DG Energy
Internal Energy Market

22 June 2023

Energy

European Commission

COM proposal for a reform of the electricity market design - 14 March 2023

Provisions to enhance development of non-fossil flexibility sources, such as demand response and storage:

1. Flexibility needs assessment and requirement for MS to establish indicative objectives for DR and storage
2. Possibility of TSO peak shaving product and support schemes for non-fossil flexibility
3. Measures aiming at facilitating the use of DSF by SOs
4. Facilitating integration in ID market (such as shorter gate closure time)

European Commission

Key provisions of Electricity Directive 2019/944

- Non-discriminatory access of demand response to all electricity markets, either directly or through aggregation (Art. 17)
- Full recognition of (independent) aggregators as market participants (Art. 17)
- Customer entitlement to contract with independent aggregator of their choice, without need for consent or prior agreement of their supplier (Art. 13)
- Strict limits to compensation payments (Art 17(4))

Transposition of Electricity Directive 2019/944

- Key that Member States transpose these provisions into the national laws swiftly
- Deadline for transposition: 1 January 2020
- Transposition very uneven among Member States
- While progress has been made, significant number of important provisions have not been transposed in several Member States

Network Code on demand side flexibility

- Article 59(1)(e) Electricity Regulation

  The Commission is empowered to establish a **network code** on rules implementing Article 57 of the Regulation and Articles 17, 31, 32, 36, 40 and 54 of the Electricity Market Directive **in relation to demand response, including rules on aggregation, energy storage and demand curtailment**.

- Potential scope
  - Load, distributed storage, distributed generation
  - Products and services, in particular to solve physical congestions (and balancing)
  - Market and processes, SO coordination, market access and aggregation, information and data exchange

- COM request to EU DSO entity in cooperation with ENTSO-E on 9 March 2023 to submit proposal withing 12 months

Explicit Demand Response for small end-users and independent aggregators

Status, context, enablers and barriers in Sweden

A report by Saviuc, I., Zabala, C., Puskás-Tompos, A., Rollert, K. and Bertoldi, P.

Background

Sweden aims to become a net-zero carbon economy by 2045

Most of Sweden's electricity is generated by hydro and nuclear power

Electrification of industry and transportation + urbanization of large cities → higher electricity demand

Transmission and distribution infrastructure has not been modernized → capacity bottlenecks and power shortages

European Commission

Players and context

- 1 TSO : Affärsverket Svenska kraftnät.
- 170 DSOs
- 130 electricity suppliers
- 30 Balance Responsible Parties
- 5-10 aggregators that can provide DSF
- 4 bidding zones

Players and context

- Prosumers are primarily concerned with optimization and avoidance of electricity charges
- For homes and small businesses, 75% of Sweden's network charges are fixed components that depend on the size of the connection, discouraging most small and medium-sized prosumers from using flexibility to avoid network tariffs
- Prosumers with on-site generation can inject electricity into the grid and be rewarded for it
    - But NO feed-in tariff → prosumers consume as much power as possible and supply only the remaining power to the grid

Players and context

- Aggregators are recognized in Sweden, but no regulatory framework for independent aggregators
- 2 types of aggregators:
  - Normally, an operator needs a contract with the BRP associated with the end user's existing electricity company, OR arrange the delivery of electricity by itself, alongside the aggregation. There can only be one BRP in each connection.
  - Alternatively, ***uncorrected*** aggregators that act independently of the existing BRPs but take no financial responsibility for the imbalances they create → tolerated due to short and few activations which lead to low amount of activated energy → not scalable
- As part of NordREG, in 2020, Sweden has contributed to developing the Nordic Regulatory Framework for Independent Aggregation

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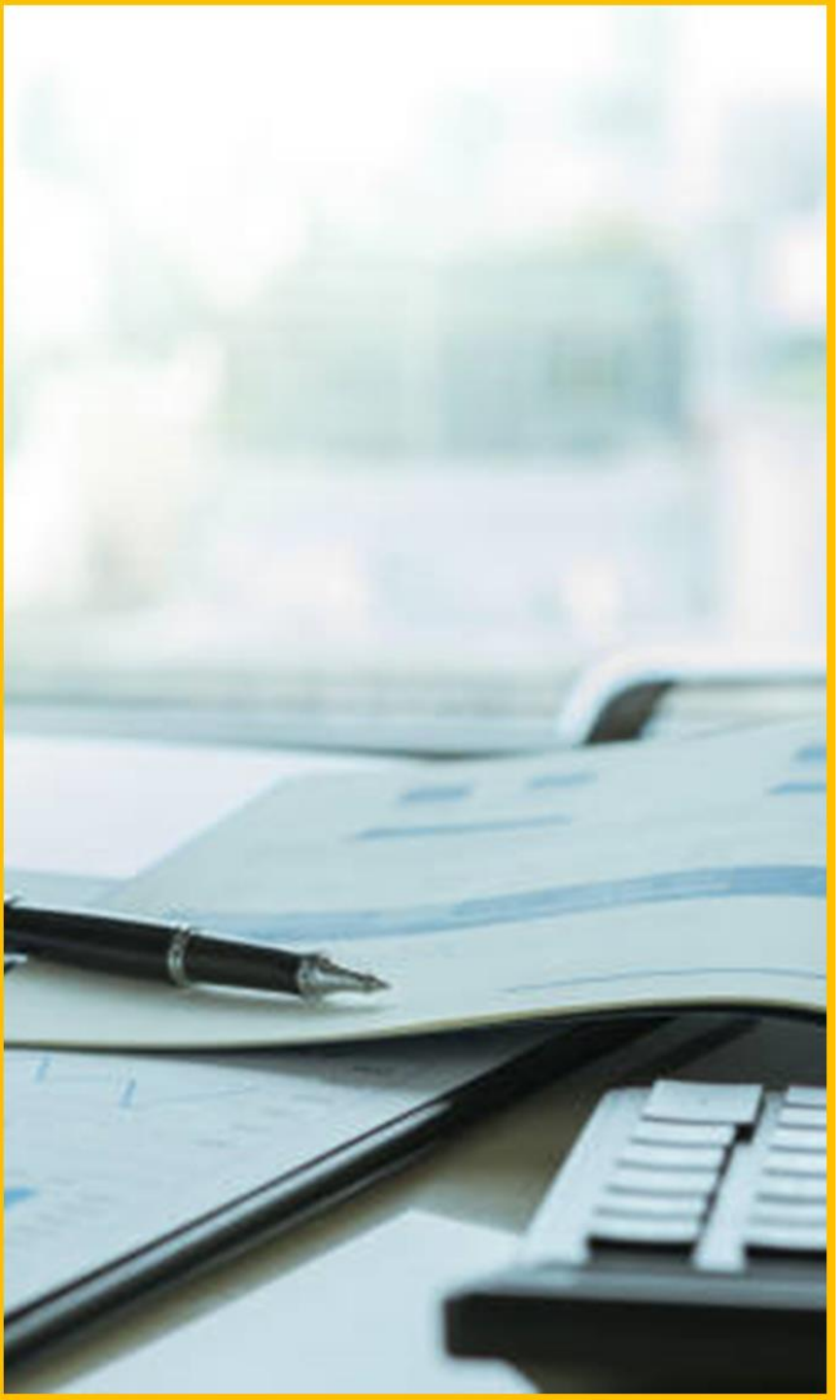


Demand response in the ancillary services market

TSO offers aggregated residential end-users access to the FCR market

One example of aggregation from residential end-users to DSO

No regulatory barrier against non-traditional resources to enter the TSO-market, but the prequalification process (set up by the TSO) is more suited for hydro resources.

European Commission

Enablers and Barriers for DR and Independent Aggregators

Barriers

- High initial investment cost for the technical system could be acting as a barrier for the smallest end-users, as the low revenue streams
- lack of harmonized baselines values and measurement-related issues that affect the validation
- Inability to pool consumers across bidding zones

Enablers

- Large share of EVs
- Mass roll-out of smart meters, completed
- Increasing share of intermittent RES in the grid → need for more flexibility

European Commission

Thank you

Full text of the report “Explicit Demand Response for small end-users and independent aggregators” at: https://publications.jrc.ec.europa.eu/repository/handle/JRC129745

European Commission

Demand Response Sweden

2023-06-22

Swedish Ministry for Climate and Enterprise
david.freed@gov.se

Government assignment

Summer 2022 – Government issued an assignment to 4 state authorities

1. Enabling flexibility in balancing/ancillary services – Swedish TSO **SvK**
2. Enabling implicit flexibility – **Energy Market Inspectorate**
3. Local flexibility markets – **Energy Market Inspectorate**
4. The technical requirements of enabling flexibility – **Energy Agency**

Clean Energy Package –> Independent Aggregators

- 1 BSP to volumes from several BRPs – 17 May 2024
- Electricity Law – compensation when economically motivated – Svk model (September 2024) then review by EI

Demand response from households in the Swedish markets

Remaining challenges and Ei:s role forward

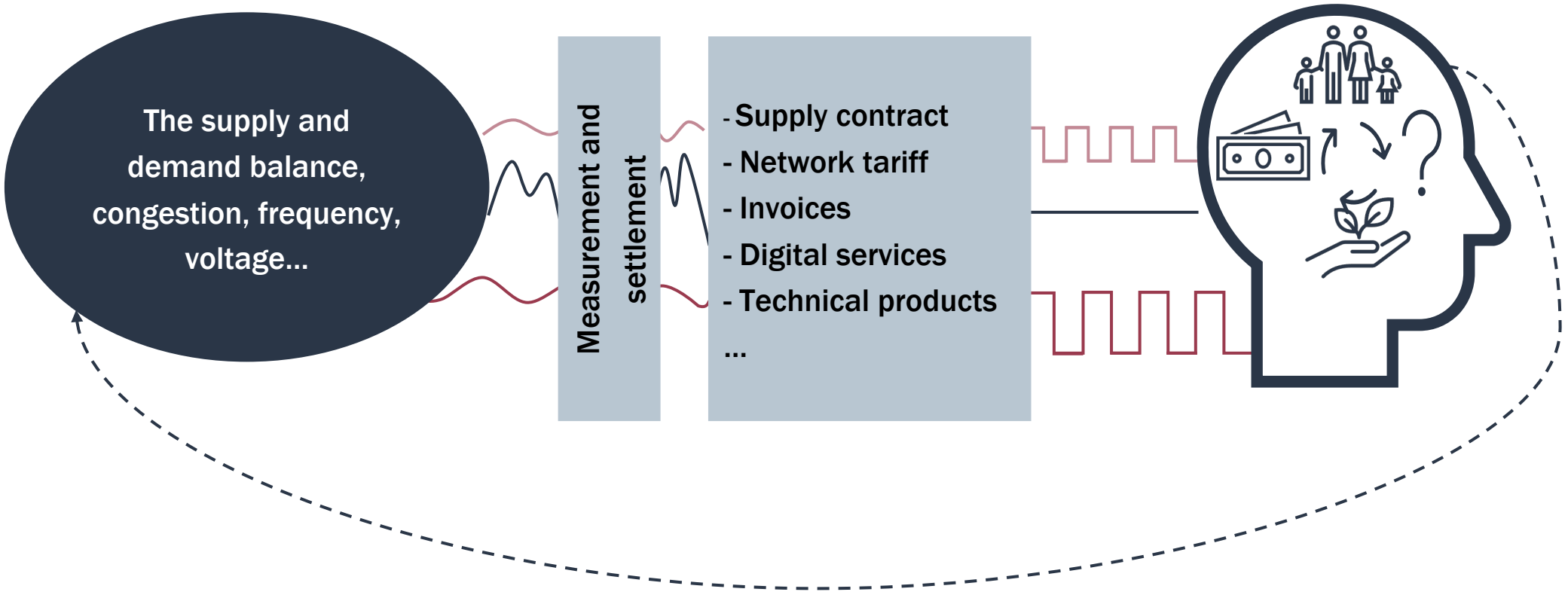
Jennie Nyberg

Energimarknadsinspektionen
Swedish Energy Markets Inspectorate

The consumers' perspective

- Welfare gains from realizing the potential for implicit DR based on spot price, network tariffs and explicit through aggregated services.
- Close the gap between what is legally and technically possible and what the households are ready to do.
- Efforts from most suppliers and DSOs to provide services that can encourage, inform and enable demand response are considered to be limited or non-existent.
- IA can make it easier for households to offer their flexibility to the markets without changing their main supplier.

The consumers relation to the markets



Demand for services, but supply is limited

- Households demand better digital services to gain knowledge about and control over their electricity use.
- Few offer this kinds of services.
- The steering services do not take network tariffs or network load into account.
- The information services often lack information that customers need to make informed decisions.
- Knowledge of how desirable behaviors can be encouraged is rarely applied.

Thank you!

Energimarknadsinspektionen
Swedish Energy Markets Inspectorate

Demand response in balancing markets

Svenska kraftnät, 2023-06-22

Jenny Lagerkvist,
Balancing markets

Demand response in balancing markets

Offered volumes (April 2023)

Type	FCR-N (MW)	FCR-D Up (MW)	FCR-D Down (MW)	aFRR Up (MW)	aFRR Down (MW)	mFRR Up (MW)	mFRR Down (MW)
Hydro	1 910	2 410	1 030	1800	1800	6110	5260
Thermal	40	40	20	50	50	280	260
Energy storage	<10	10	<10				
Demand response	<10 **< 0,5%**	180 **6,4%**	<10 **< 0,7%**			190 **2,8%**	160 **2,2%**
Solar			10				
Wind	150	170	320		250	20	1440
Combination hydro + battery	<10		10				
Gas turbines						160	90
Total	**2130**	**2810**	**1410**	**1850**	**2100**	**6760**	**7210**

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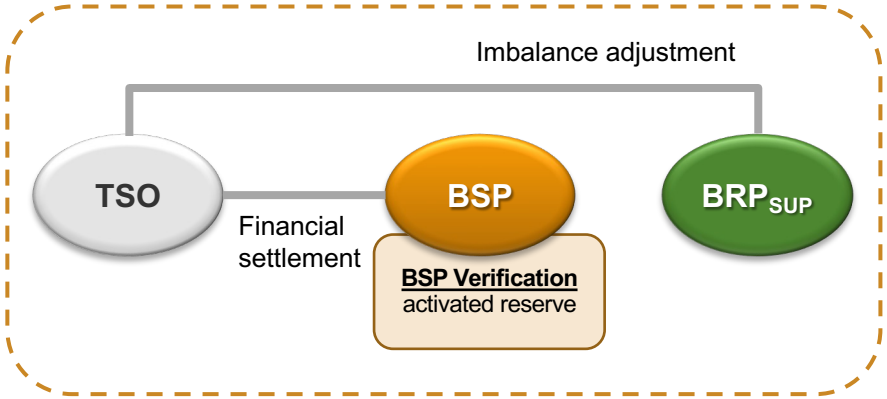
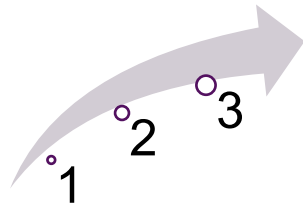
BSP/BRP model

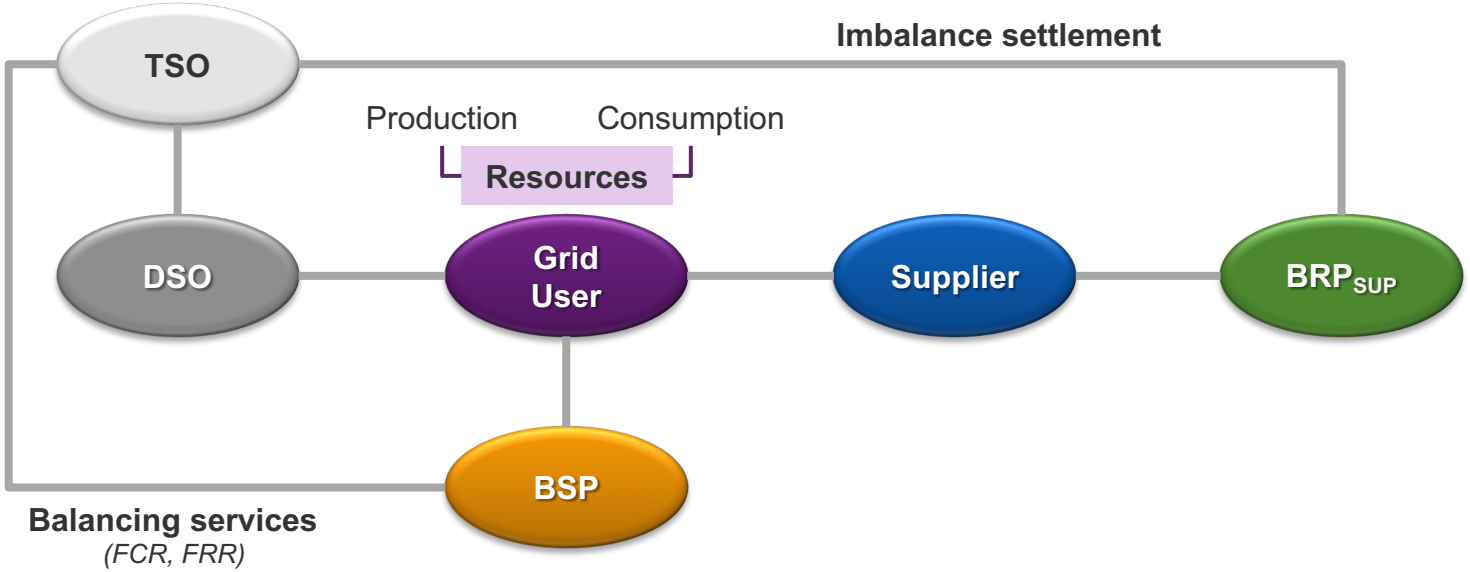
> Terms & conditions for BSP/BRP – approved may 2023

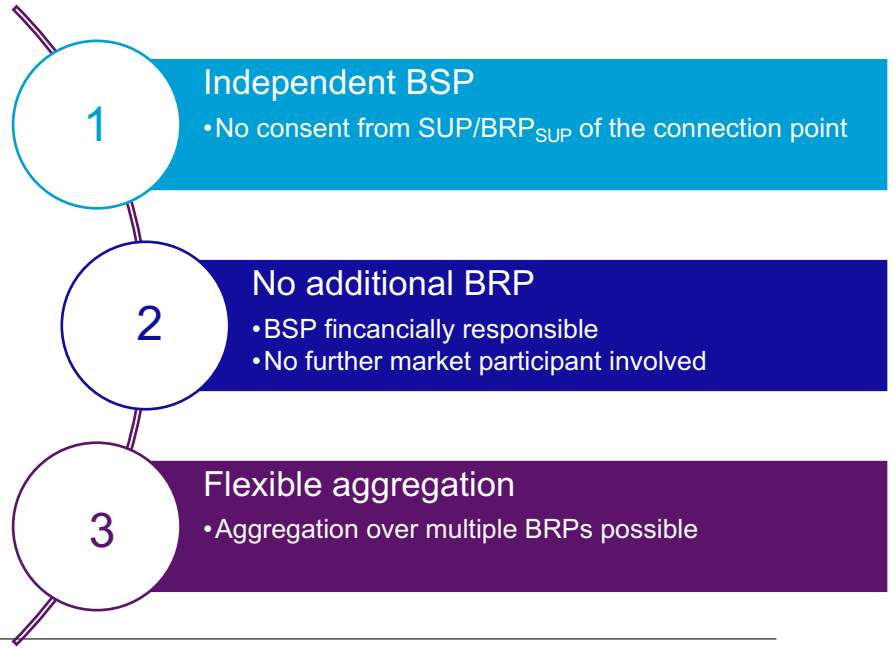
Key for enabling the model



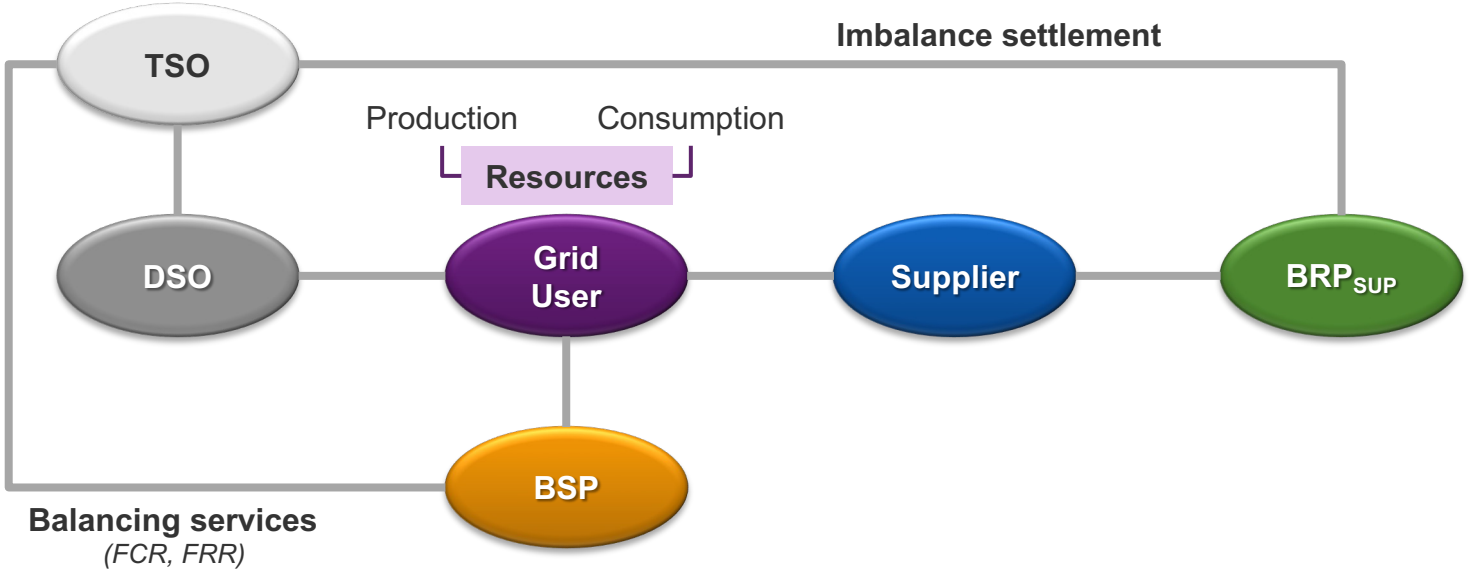


Expectation:
Increased volumes demand response





BSP/BRP model – next steps



> Implementation of the BSP/BRP model in the balancing markets

> Government assignment regarding a potential financial compensation mechanism

→ consider balancing markets

> BSP/BRP model does not include supplier role

SVENSKA KRAFTNÄT

Thank you.

bsp_brp@svk.se

Demand response through aggregation

2023-06-22

Johanna Lakso, CEO

POWER CIRCLE
Electricity for sustainable energy

We welcome the new laws and conditions

Day-ahead & Intraday
by Nordpool

An increase in DR could provide lower and more even prices, which will benefit everyone.

Balancing markets
by Swedish TSO

An increase in DR could improve liquidity and secure system stability in a cost efficient way.

Local flexibility markets
by DSO/private

An increase in DR could address bottlenecks in the grid and postpone the need to reinvest in the grid.

Who will pay the compensation?

How can a just compensation be design without being an obstacle?

Aggregator

The aggregator, or it will be unjust for other market players.

Society

The ones who benefit from DR in markets should pay.

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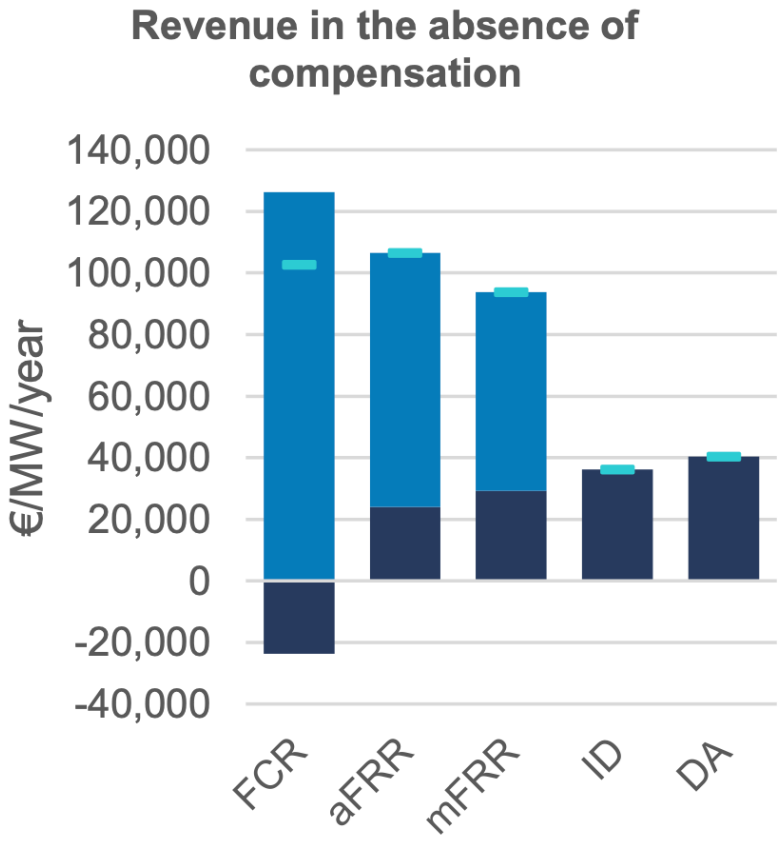
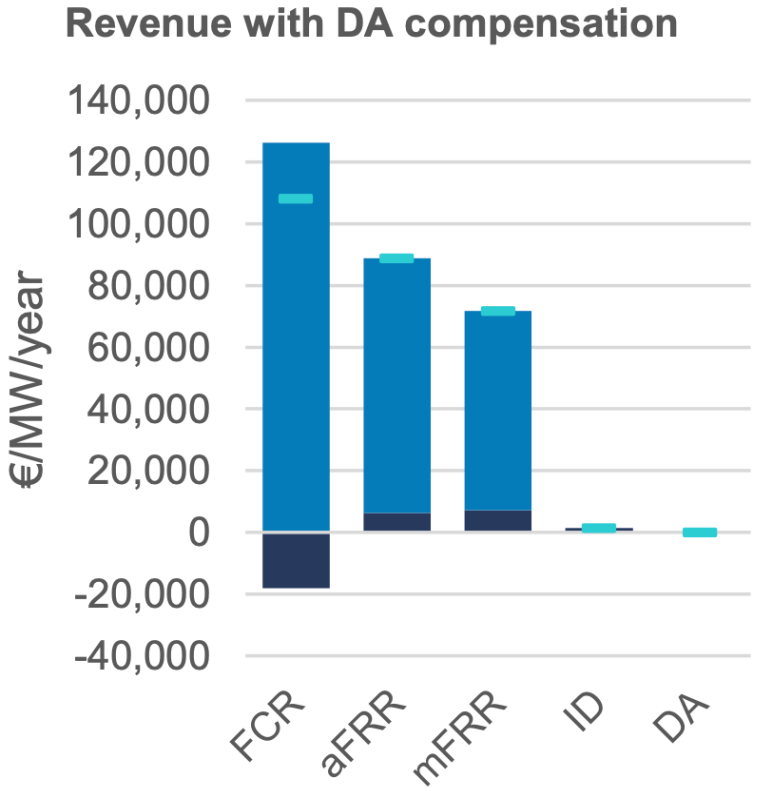
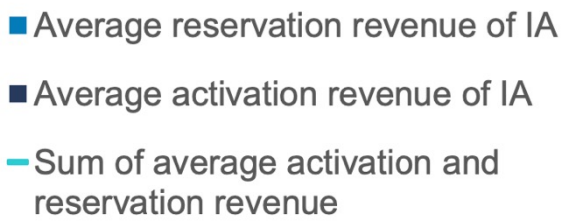
Impacts of different compensations







Report from NordReg

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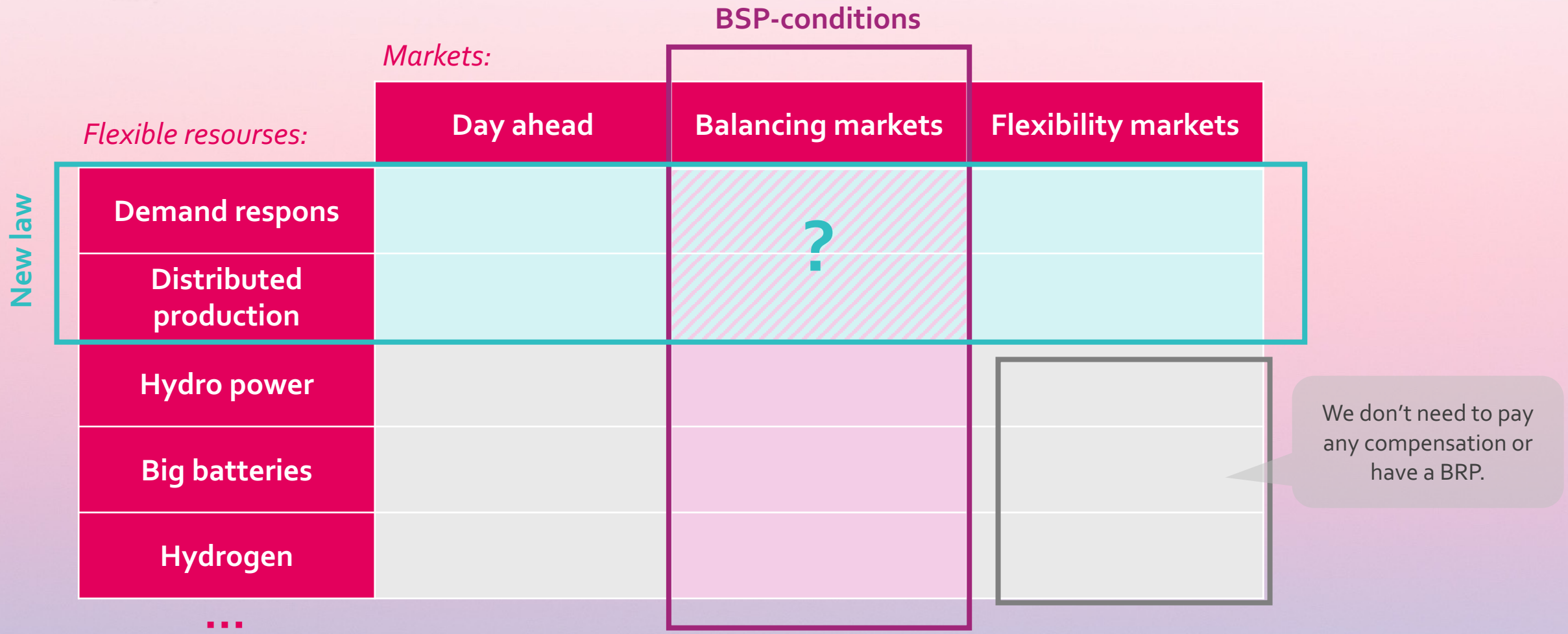
Electricity for sustainable energy

We lack a comprehensive view on flexibility



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Electricity for sustainable energy

Thanks!

Johanna Lakso, CEO
Johanna.lakso@powercircle.org

Demand Response in Sweden

22 June - DR4EU workshop

sympower

sympower.net

VATTENFALL

Involvement from Swedish industry, examples

Sawmill:
Fans

Metal industry:
Incinerators, Smelters

Datacenter:
Fans, Lighting, Servers, Mining Devices

Greenhouse:
Lamps, Heat pumps, Electric boilers

Paper mill:
Fans, Compressors, Pumps, Electric boilers

Process industry:
Electrolysis, Fans, Pumps, Heating

Heating systems

Batteries

Vattenfall together with Sympower

‘End-to-end’ solution for flexibility owners

sympower

VATTENFALL

Flexible Assets

Dispatching

Availability

Metering

Forecasting

Aggregation

Optimisation

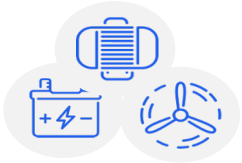
Monitoring

Bidding

Activation

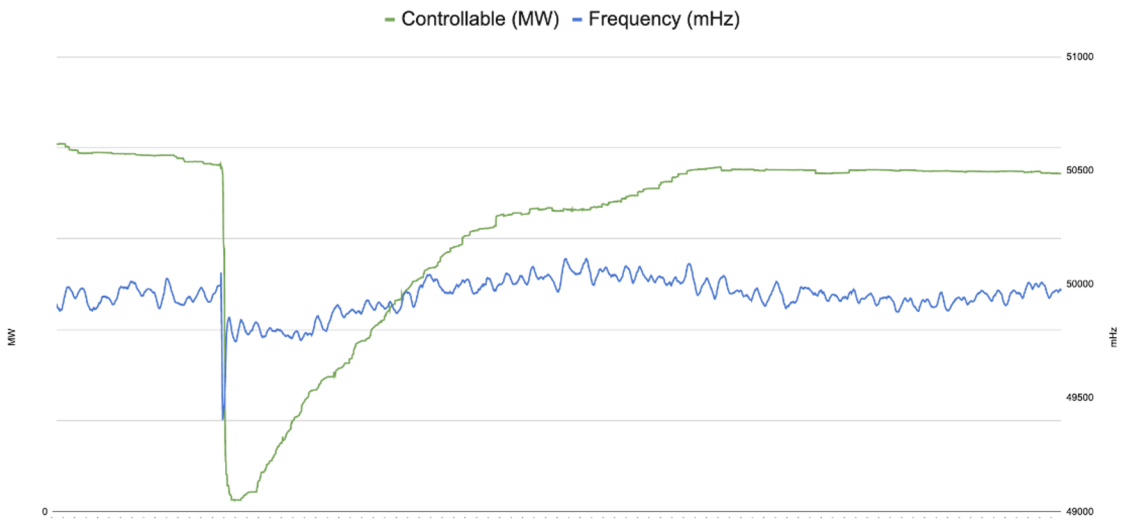
Reporting

Flexibility markets



Sympower’s and Vattenfall’s role is to ensure a maximum utilization of resource flexibility for the resource owner, market operator, network owner and power system.

On the 26th of April Demand Side Flexibility helped prevent a major grid failure in the Nordics



- Disturbance date: 26/04/2023 06:40 am CET
- Frequency dropped to 49.3 Hz
- Sympower responded with 100% of the available portfolio between Sweden and Finland
- **Sympower and Vattenfall made a significant contribution with Demand Side Flexibility**

"We had a sharp dip in voltage that affected production facilities which in turn led to a drop in frequency. But here our disruption reserve went into operation (as well as our connections with foreign countries). After ten minutes, the frequency returned back to normal levels."

Pontus de Maré
Senior Vice President Power System Operations at Svenska kraftnät

VATTENFALL

The regulatory landscape is evolving and it creates some uncertainty for flexibility service providers

FCR-D Up bidding limit

- Svk and Nordic TSOs want to introduce the FCR-D quota but timeline and volumes are still unclear
- Any bidding limit will create a barrier for DR reserve providers and industry involvement

NEW FCR requirements

- More stringent requirements that will limit participation from industrial assets
- Impact on the operation of the whole Nordic portfolio
- Increased process complexity

TSO being inventive

- Changing requirements on mFRR in order to get more assets online
- Winter peak shaving product valuable to bring DR to the market and help reduce consumer prices. Will it be renewed for winter ‘23/’24?

EI’s decision on BSP/BRP rules

- BSP terms and conditions are unclearly constructed and increases risks for the BRP and retailer
- The conditions risks reduce the competition on the electricity market among BRPs and retailers
- System changes demands time

Thank you for your interest in Sympower and Vattenfall

Want to know more?
Contact us!

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