

# Information Meeting on mFRR through Local Flexibility Markets

2021-05-21



SVENSKA  
KRAFTNÄT



# Agenda

- > Welcome and Introduction
- > About the R&D projects CoordiNet and Sthlmflex
- > Ancillary Services and mFRR
- > Example of Compensation from mFRR
- > Experiences Winter 2020/2021
- > The Prequalification Process
- > Upcoming development and Summary
- > Questions



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## In the meeting

- > Maria Berg
- > Linda Thell
- > Linda Schumacher

# Svenska kraftnät

- > Owns and operates the national grid
- > System responsibility for electricity
  - > Balance between production and consumption of electricity



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# About the R&D projects CoordiNet and Sthlmflex

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# New opportunities from R&D-projects about local flexibility markets

> CoordiNet



> sthlmflex



ELLEVIO



VATTENFALL   
Vattenfall Eldistribution



# CoordiNet - the Swedish pilot

**Vattenfall Eldistribution** is leading the Swedish demonstration of flexibility markets in the EU-funded Horizon 2020 project CoordiNet, which is being carried out together with **E.ON Energidistribution** and **Svenska Kraftnät**.

E.ON Energidistribution is the supplier of the technical platform (flexmarket) for the market in the EU project.

Partners in the Swedish demonstration are also **Uppsala Municipality**, **Energiforsk**, **Expektra**, **GEAB** and **Upplands Energi**



## **Västra Norrland**

Enable the production of wind and hydropower during rebuilding



## **Uppland**

Unlock capacity in the electricity grid and more efficient use of the grid



## **Gotland**

Enable new wind power production and security of supply on Gotland



## **Skåne**

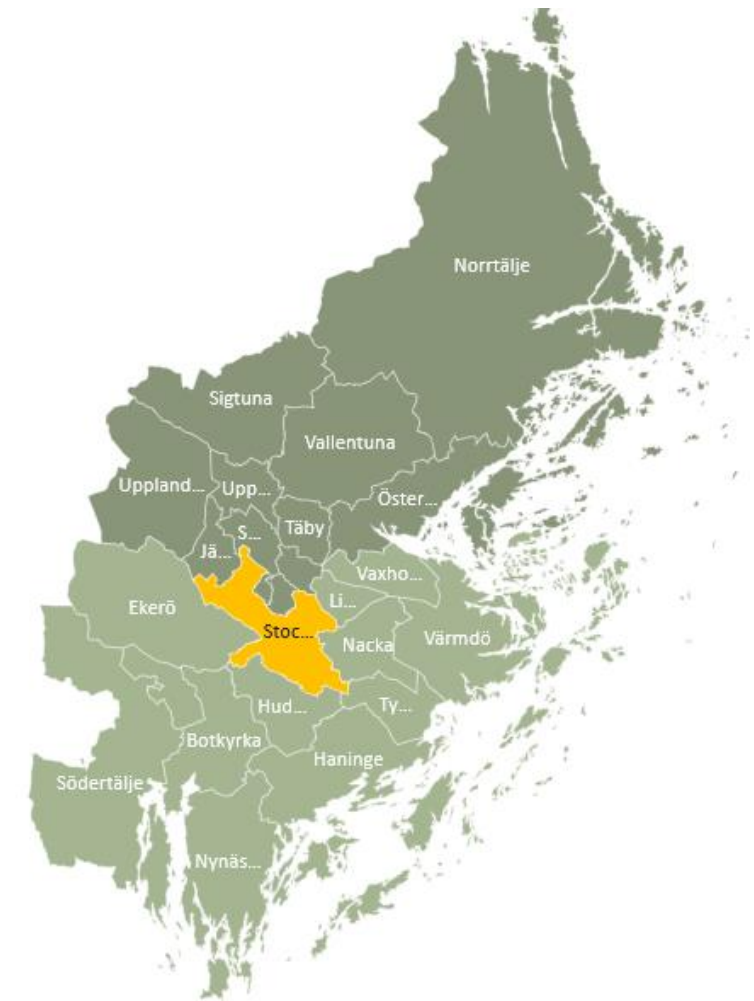
Unlock capacity in the electricity grid and more efficient use of the grid  
(Switch)





# What is sthlmflex?

- > Svenska Kraftnät, Ellevio and Vattenfall Eldistribution have chosen to jointly find solutions to the **congestion problem** and the **operating situation** in the Stockholm region.
- > sthlmflex is a research project aimed to create and test a **flexibility market** in "Storstockholm" (all 26 municipalities).
- > Even though the EU-financed Horizon 2020-project [CoordiNet](#) demonstrates **flexibility markets** in Sweden, the sthlmflex-project is unique since it both tests an increased DSO-TSO coordination as well as coordination and cooperation between DSO and DSO.
- > The project guarantees the security of delivery for utility customers in the Stockholm region and enables connection of new customers, both by buying flexibility services, but also by increasing capacity with a total regional subscription thanks to increased coordination.



**R&D Project: sthlmflex**  
**Project Owner: Svenska Kraftnät in cooperation with Vattenfall Eldistribution and Ellevio**  
**Market Operator: NODES**  
**Supplier of flexibility tools: EON Energidistribution**



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# Ancillary Services and mFRR

# What are ancillary services?

**Procure  
downward  
regulation**

Over  
50 Hz



50 Hz

**Procure  
upward  
regulation**

Below  
50 Hz

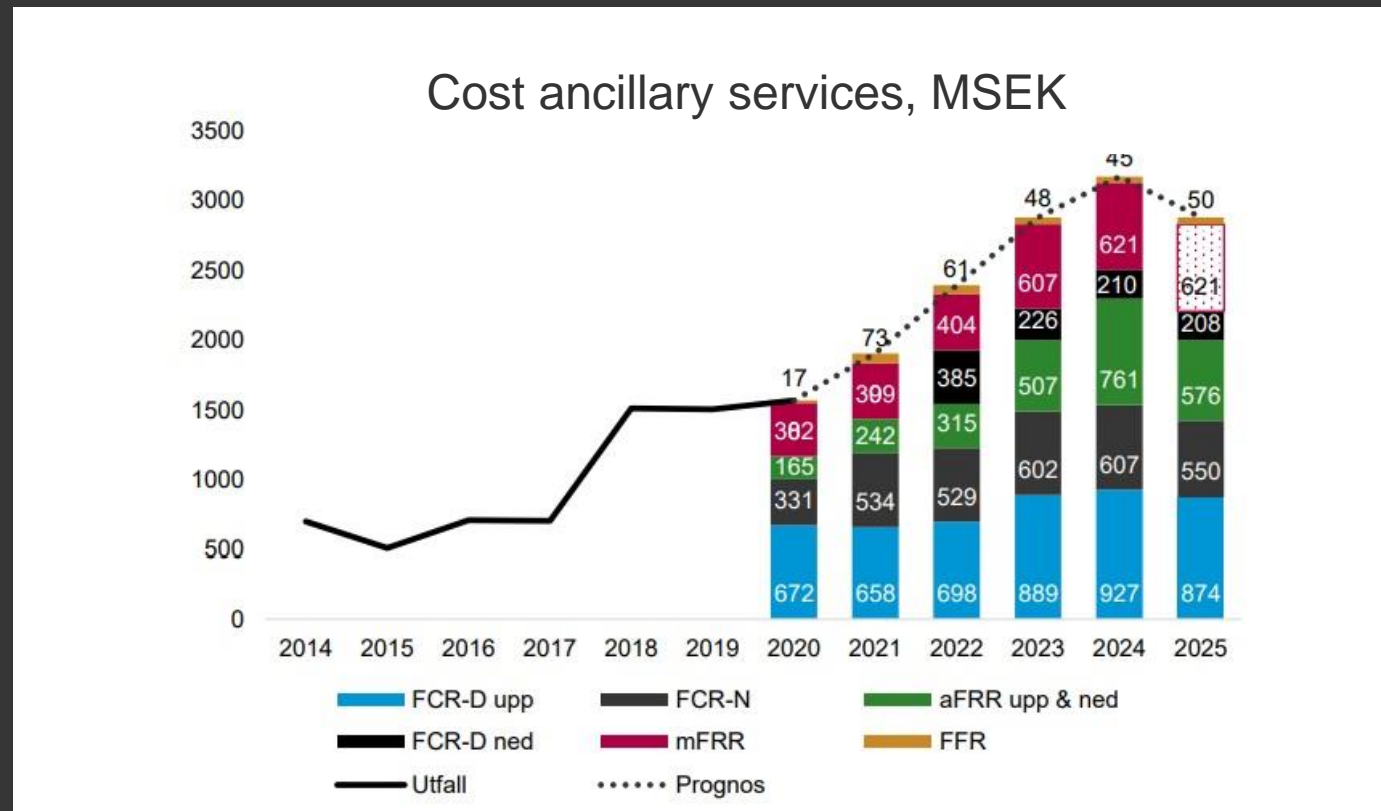




# Some reasons to provide ancillary services for Svenska kraftnät

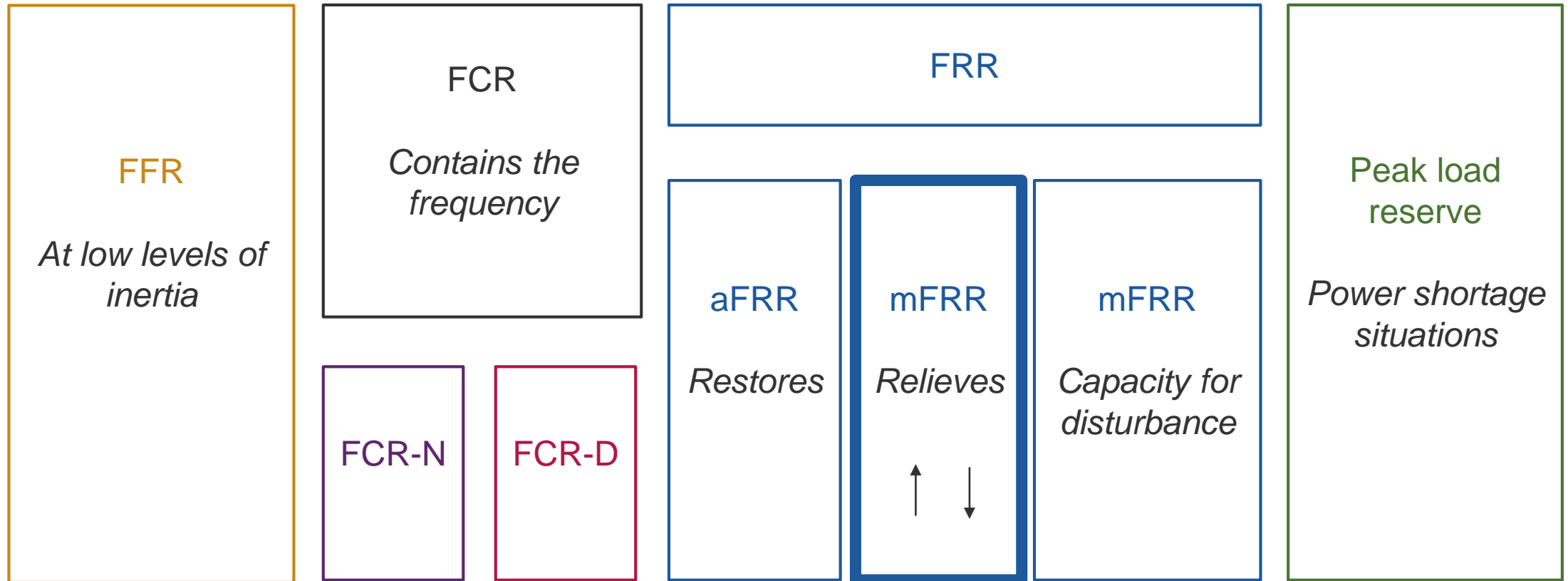
1. Business opportunity. Bids can be activated for several purposes which increases the chance for remuneration
2. There is a technical and economic potential
3. Contribute to the energy transition and the climate goals
4. Contribute to the operational security of the power system

Current cost for ancillary services: about 2 billion SEK per year  
and costs are expected to increase

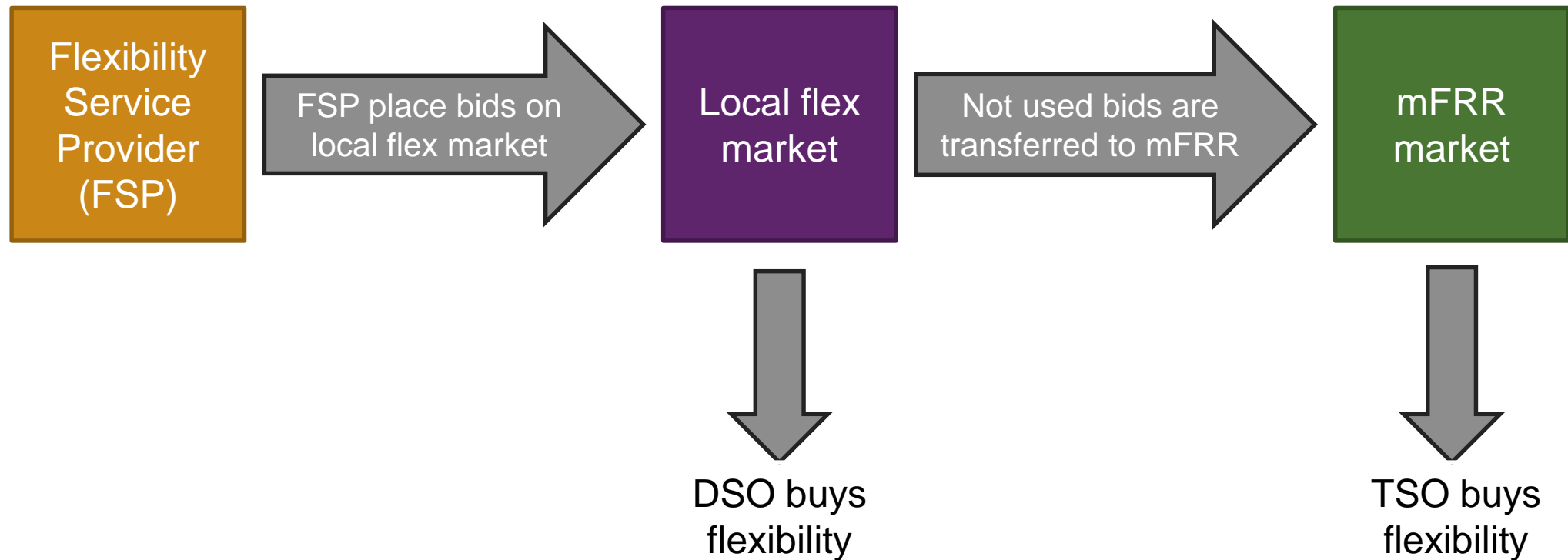




# Markets today



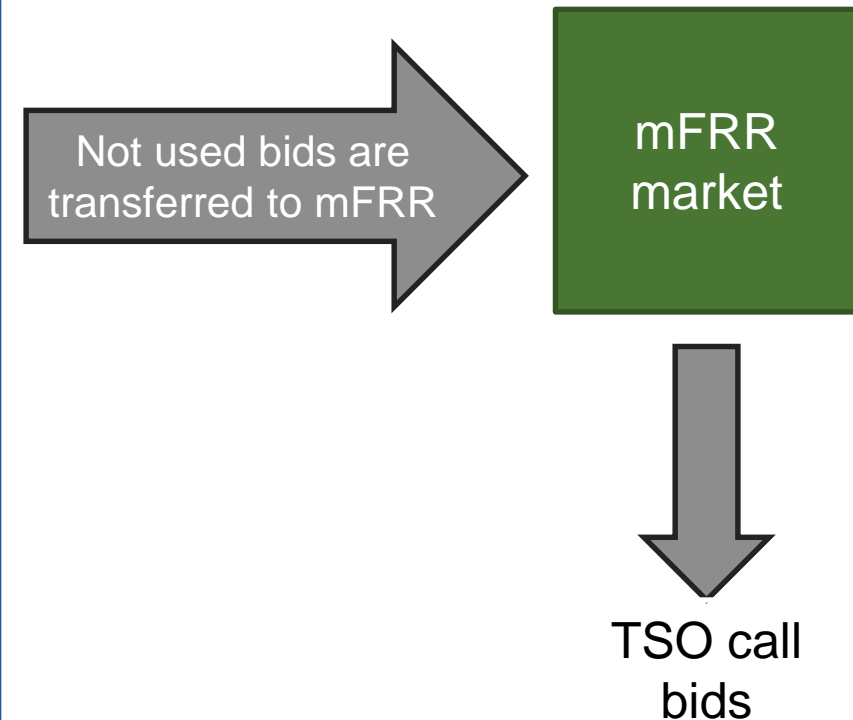
# Coordination with mFRR



# Coordination with mFRR

## HOW?

- ✓ Flexibility providers must go through a prequalification process
- ✓ The bid size has to be at least 1 MW
- ✓ The Balance Responsible Party (BRP) of the flexibility provider must be involved in the process
- ✓ Financial compensation goes to the BRP when bids are activated



## mFRR – manual Frequency Restoration Reserve

### Technical Requirements

**Minimum bid size :** 1 MW \*

**Activated:** electronic ordering, through the flex platform\*

**Activation time:** within 15 min (at any time during the hour)

**Endurance:** minimum 1 h

**Activation:** by the flexibility provider \*

## Restores and relieves



\*This only applies for the flexibility markets



## mFRR – manual Frequency Restoration Reserve

### Market Conditions

**Pricing:** Pay-As-Cleared if called for balancing. Pay-As-Bid if called for network congestions (special regulation)

**Aggregation:** yes, but only within the same electricity area and BRP, or according to agreement\*

**Granularity:** mFRR bids must increase with the minimum step size of 1 MW

**Availability:** can vary every hour

**Gate Closure Time:** 45 min before operational hour

**Verification of Delivery:** based on measured values

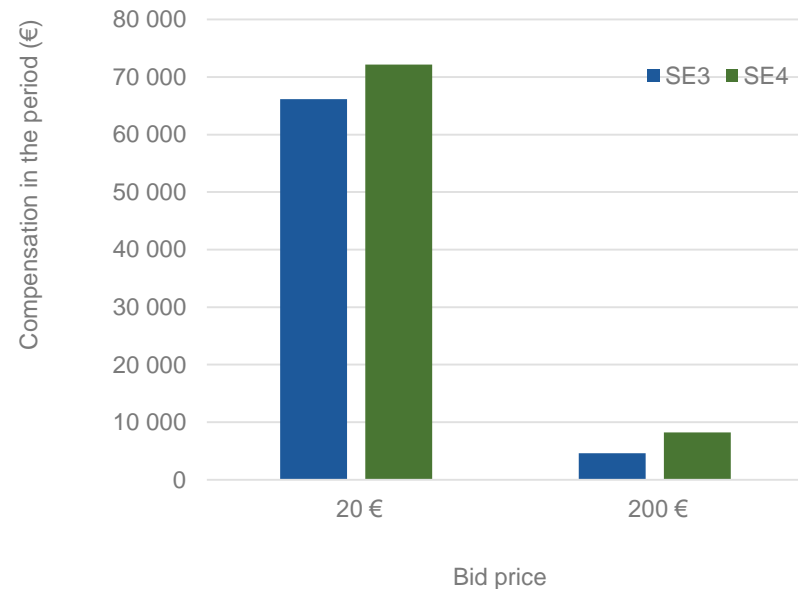
## Restores and relieves



\*This only applies for the flexibility markets

# Example of compensation from mFRR

Example calculation – maximum compensation from mFRR winter 20/21



Nmbr of activations	20 €	200 €
SE3	1 032	18
SE4	1 034	31

- > The example shows the theoretical compensation for a FSP that participated on mFRR with 1 MW *all hours* during the winter 2020/2021
- > The period is 2,904 h, of which up-regulation purchases were made during 1,111 h (~ 40% of the hours)

## Assumptions

- FSP places either a bid with a price of 20 € or 200 €. If the spot price is higher than the bid price, it is assumed that the bid is placed at the spot price.
- FSP is always called if upregulation is purchased and if the bid price is lower than the call price in the current electricity area
- FSP is always assumed to be called for balance reasons, not for grid reasons (ie always called according to pay-as-cleared)

See historical prices for mFRR here :  
[Market data | Nord Pool \(nordpoolgroup.com\)](https://nordpoolgroup.com)

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# Possibility to participate with bids of 1 MW outside of local flexibility markets

Contact: [mFRR@svk.se](mailto:mFRR@svk.se)

- > The resources participating on the local flexibility markets must be situated in Uppsala, Stockholm or the Malmö region
- > Other resources are offered the possibility to participate in the 1 MW pilot at Svenska kraftnät
- > Time Plan: From January 2021 until the requirement of minimum bid size is 1 MW for all bids



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# Experiences winter 2020/2021



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## Winter 20/21 – the mFRR pilot

- ✓ A couple of flex providers initially expressed interest in joining the mFRR pilot
- ✓ Within CoordiNet, there was no FSP that decided to participate in the pilot, why coordination with mFRR has not yet been implemented within CoordiNet
- ✓ Within sthlmflex, one approved pre-qualification was carried out when the winter period had begun, unfortunately the participation was prevented by Svk's IT development being delayed

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## Interviews with flexibility providers have shown difficulties associated with participation on the mFRR market

Can't reach  
minimum bid  
size

Demand for 1  
MW, which can  
be difficult for  
small actors

Complicated to  
participate

Participating in  
a flex market is  
already outside  
ordinary  
operation and  
mFRR "feels"  
difficult

No automation

The internal  
processes of  
FSPs are not  
sufficiently  
automated to  
participate in a  
market with  
short notice

Troubles with  
activation time

Unable to  
respond to a  
signal and be  
fully activated  
within 15  
minutes

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# About the prequalification process

The prequalification aims to test the ability of the resources  
and to verify that requirements are met.

Svk ensures that we get the volume and quality we buy.



# What tests are included in the prequalification?

- > Test according to test program
  - > Full Activation Time
  - > Endurance
  - > Capacity (Volume)
  - > Requirements for measuring and logging of data

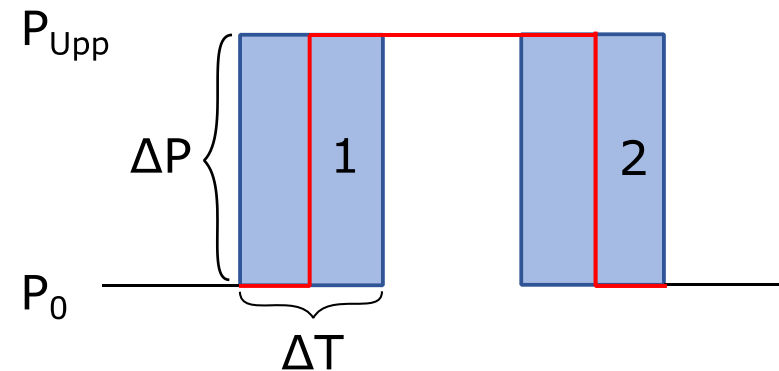



Figure 1: Activation Sequence for mFRR upward regulation.

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# Application Form

- > General information:
  - > Activation Process
  - > Description of control system (block diagram)
  - > Description of systems used for aggregation
  - > Technical Data
- > Test Results
- > Description of measured data

 SVENSKA  
KRAFTNÄT

Ansökan om tillhandahållande  
av manuell  
frekvensåterställningsreserv  
(mFRR)

[Ansökande företag (Balansansvarig)]

[Enhet/Grupp]

Datum  
[ÅÅÅÅ-MM-DD]

Utgåva: 2.1  
Gäller fr.o.m.: 2020-11-03

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# Process – Step by Step

1. Inform Svenska kraftnät of planned date for testing, so that Svenska kraftnät can send an observer
2. Svenska kraftnät asks for necessary adjustments of the date of testing
3. Test is performed according to the "Test Program Template".
4. A formal application is sent to Svenska kraftnät
5. Svenska kraftnät evaluates the application and, if needed, requests additional information
6. Application is approved or not accepted

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# Examples of new technologies in our markets



Data centers

- > Controls consumption by turning on and off units



Energy storage

- > UPS are used to control the consumption



EV chargers

- > Controls consumption by adjusting how electric cars are being charged

- ✓ Start planning well in advance
- ✓ Review all available information - stakeholder meetings, documents, frequently asked questions & answers
  - ✓ Ask us questions



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# Short information on upcoming changes and a summary

## A power system in change also changes the markets for ancillary services

- More products
- Bigger volumes and more hours
- Increased geographical spread
- Shorter market time frames and endurance
- Smaller bid size
- New role – Balancing Service Provider
- Procurement closer to real time
- Increased digitalization and automation
- New solution for real time measurements

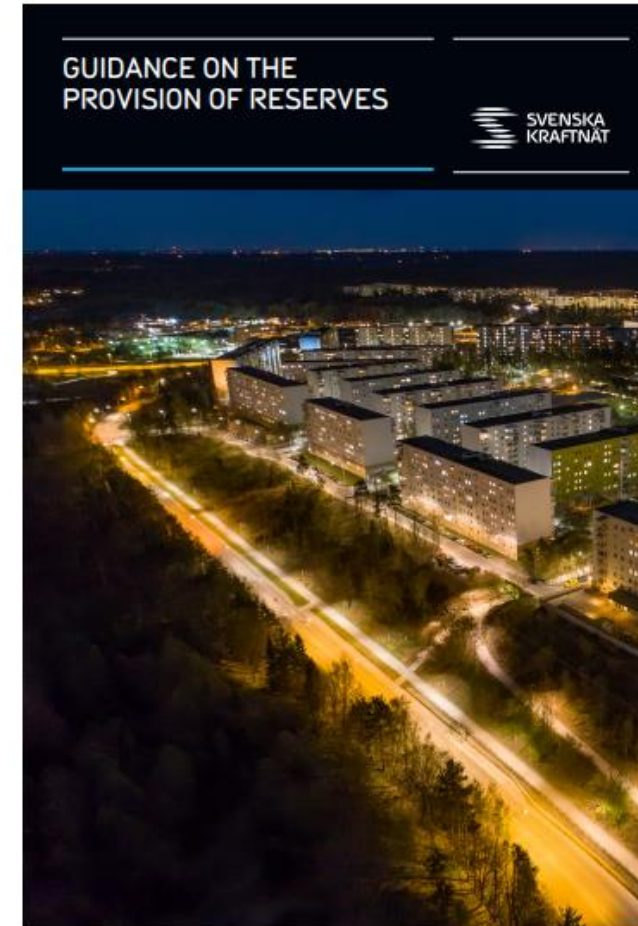
# New Possibilities - Pilots and Market Development

- More resources must contribute to maintain a safe and reliable power system
- Pilots and market developments creates new possibilities to participate
- Possible to make money while contributing to the benefit of society



# Get started

- > Find out about current information about ancillary services:  
[Ancillary services](#)
- > Read about the requirements for each ancillary service in the Balance Responsibility Agreement and Appendix 1-5  
[Balansansvarsavtal](#)
- > Review test programs and plan pre-qualification:  
[Prequalification](#)



# Plan

## Sthlmflex

- > Market start 1 december 2021 – 31 mars 2022
- > If you want to participate in sthlmflex: Fill in the form [Expression of Interest](#) (new flexibility providers) or confirm interest/continued participation (current flexibility providers) to NODES **no later than the 7th of June 2021.**

## CoordiNet

- > Market start 1 november 2021 – 31 mars 2022
- > If you want to participate in CoordiNet:
  - > Uppsala: Register an [expression of interest](#) to Vattenfall Eldistribution no later than the 21st of August 2021
  - > Skåne: Register an [expression of interest](#) to E.ON Energidistribution

There is no formal deadline to forward bids to mFRR, we recruit and prequalify resources continuously. The earlier you express your interest, the bigger possibility the prequalification will be finished in time for the pilot this winter.

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Would you like to participate in mFRR via sthlmflex or CoordiNet? Contact:

**Magnus Lindén, project manager local flexibility markets**

[magnus.linden@svk.se](mailto:magnus.linden@svk.se)

070 994 13 58

**Linda Schumacher, assistant project manager, local flexibility markets**

[linda.schumacher@svk.se](mailto:linda.schumacher@svk.se)

079 075 02 57

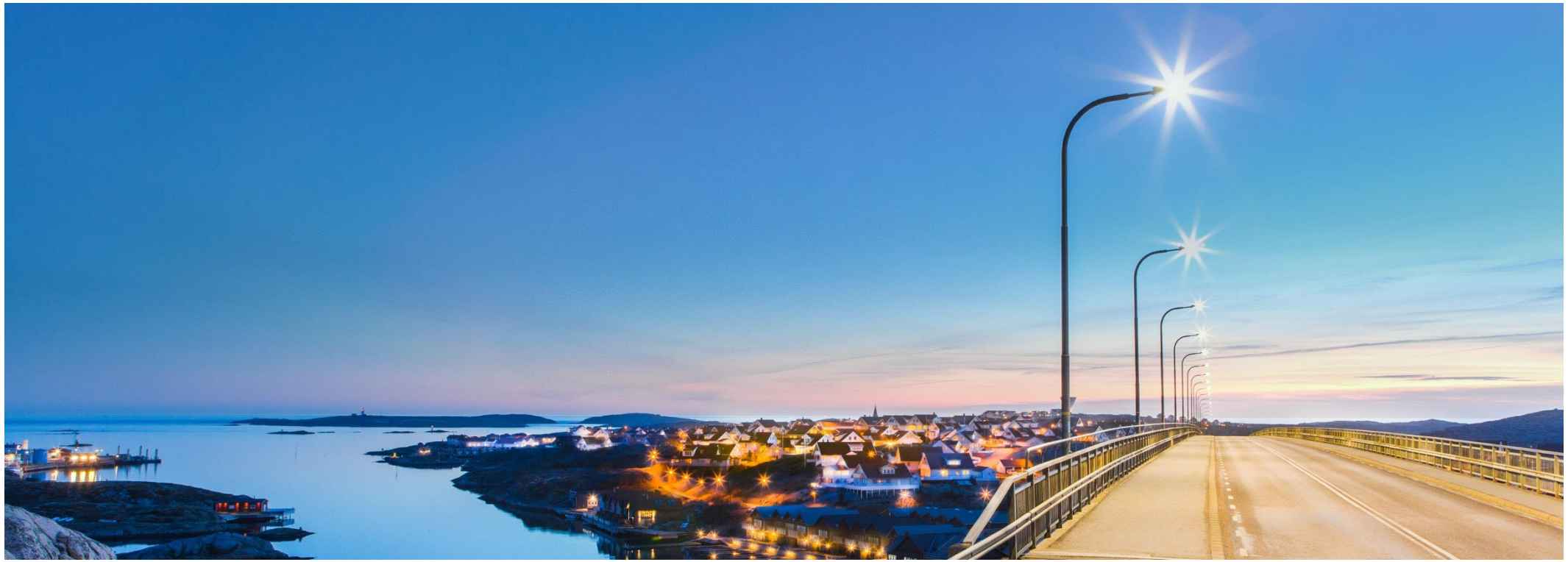
**For general questions about mFRR and pre-qualification:**

[mfr@svk.se](mailto:mfr@svk.se)



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# Questions?





Thank you!