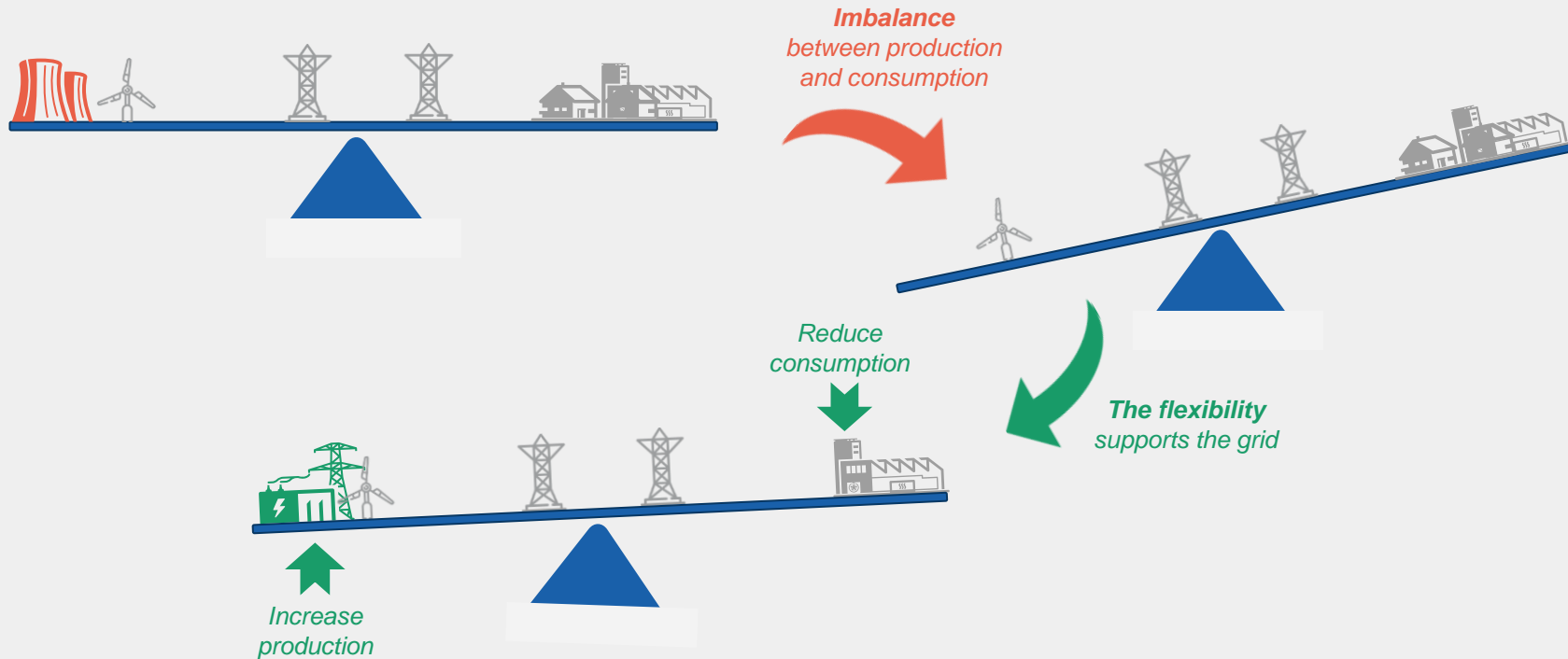


Aggregation business models in the EU: best practices vs main barriers

Thursday 29th of September 2022

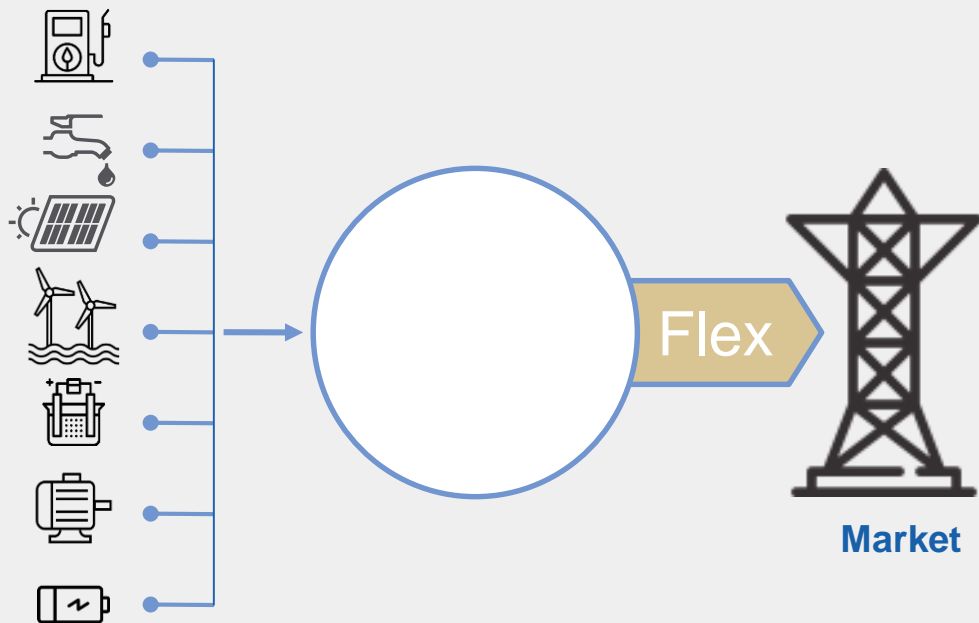
The ultimate just-in-time product

Building energy products to solve imbalances in the grid.



Advantages for demand response participants

Through different technologies



1 **Support the grid** by producing/consuming more or less.

2 **Supplementary revenues** for our partners in return.

3 **Energy transition**

Flexibility can be found everywhere

Active role for decentralization



Generator set



Cold storage



Electrolysis



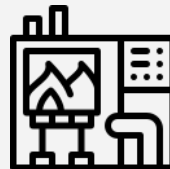
CHP



Pumps



Renewables



Furnace



Batteries

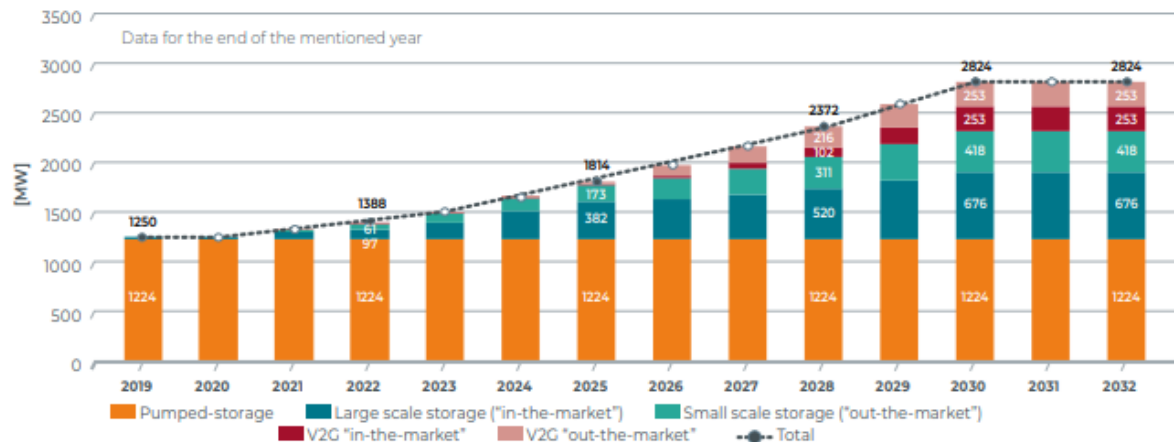
Flexcity pool further opportunities

Importance of storage

Main growth from:

- large/small scale storage projects
- Electric vehicles
- Heat pumps

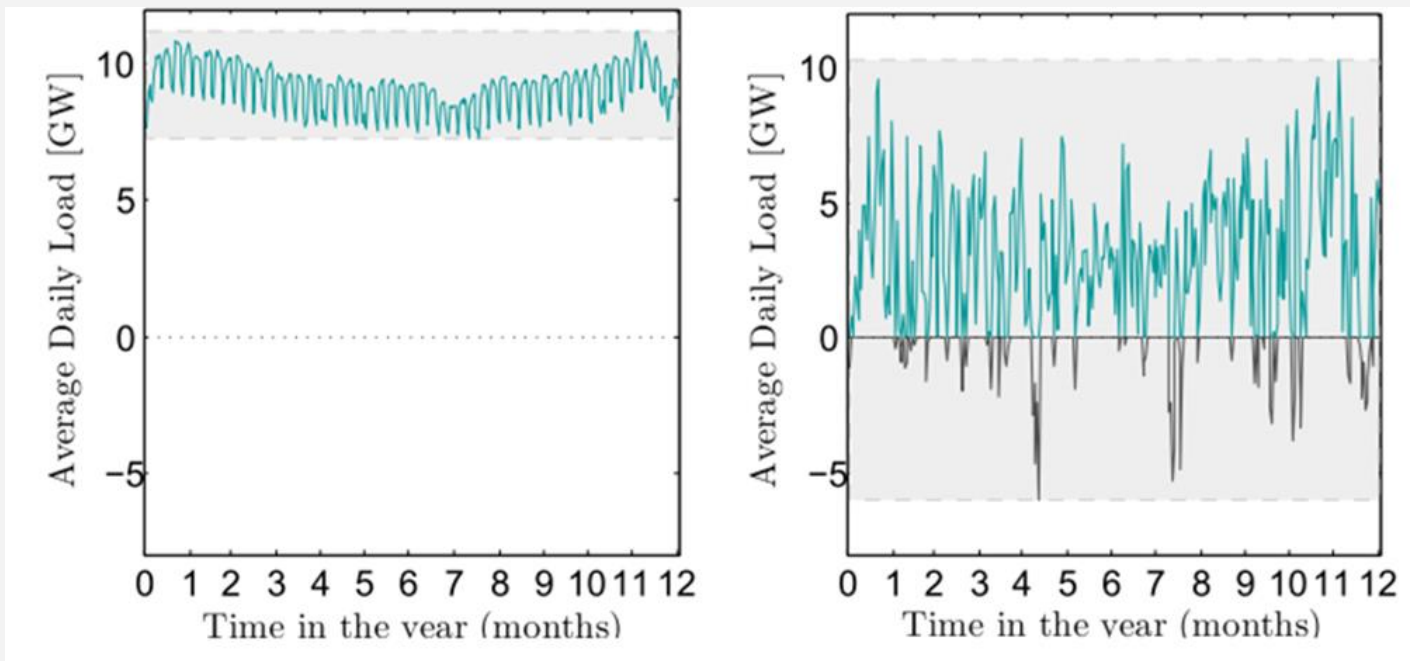
[FIGURE 3-26] — EVOLUTION OF INSTALLED CAPACITY OF STORAGE FACILITIES IN THE 'CENTRAL' SCENARIO



Source: elia flex & adequacy study

Facilitating the energy transition

Flexibility balancing new grid participants



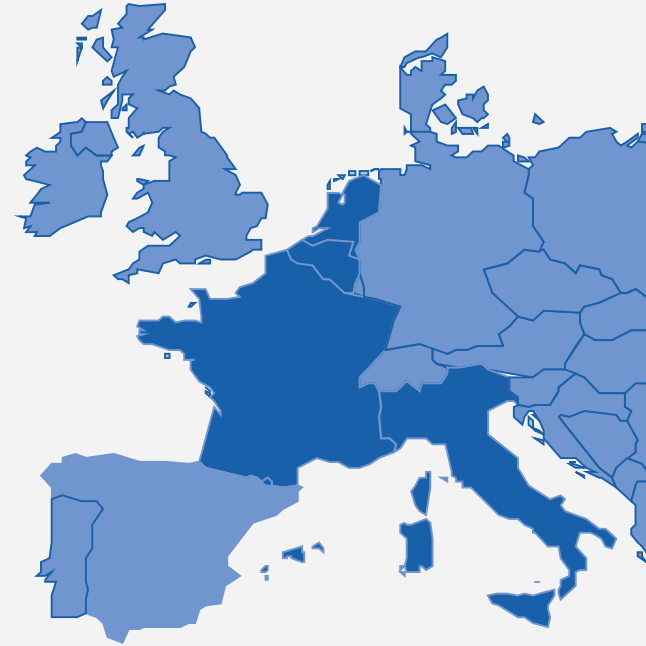
Participants are remunerated to help balancing the grid

Many options exist

Be flexible at the right moment

€

International review - Some take aways



International review - Some take aways

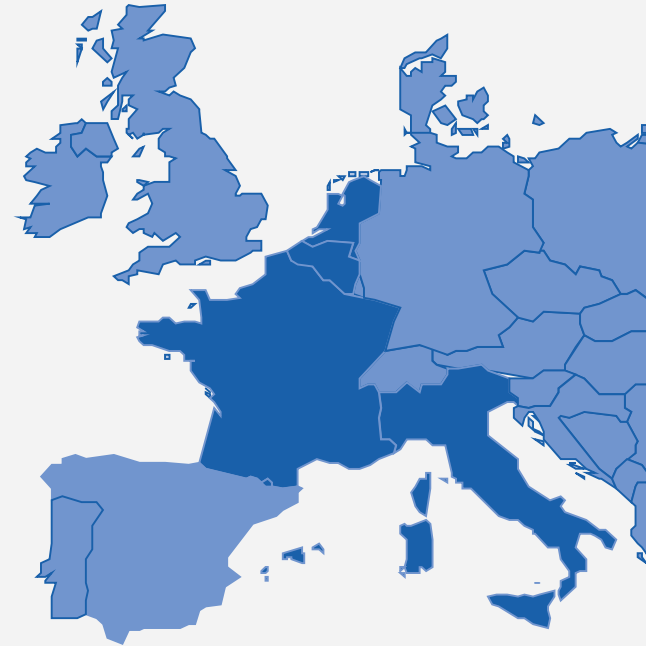
“In some countries (e.g. Spain) we are still defining the role of independent aggregator”



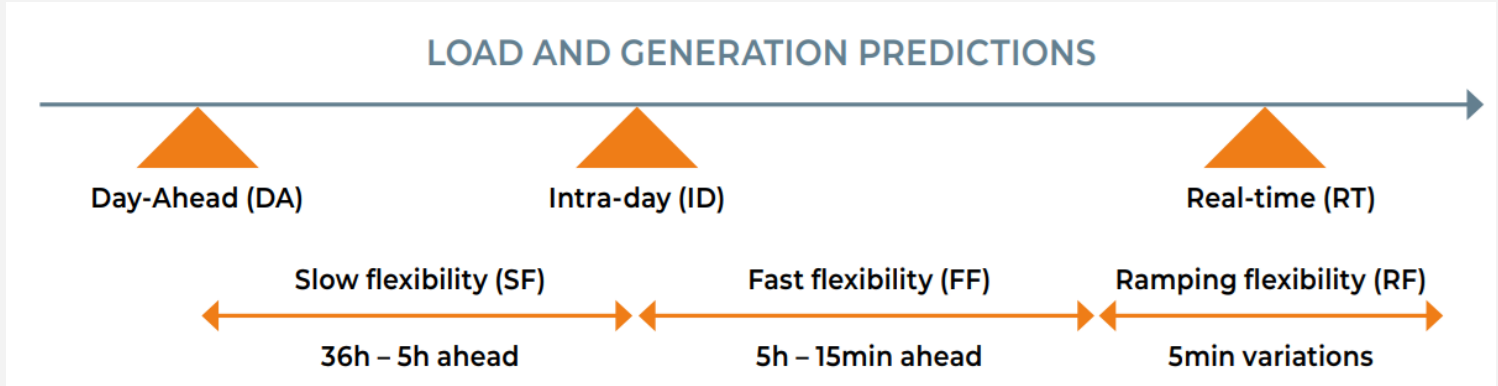
International review - Some take aways

“In some countries (e.g. Spain) we are still defining the role of independent aggregator”

#1: The market is slow in creating an aggregation friendly regulatory scheme.

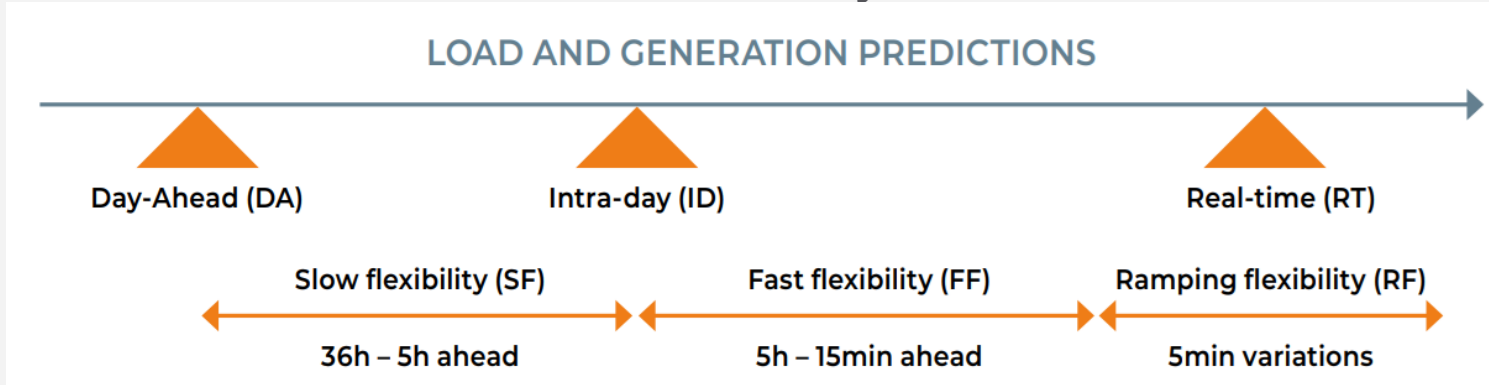


Different timeframes for flexibility

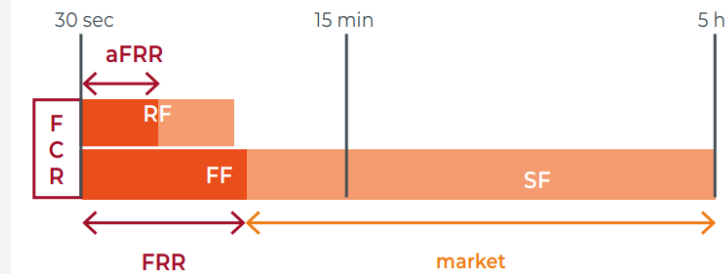


Different timeframes for flexibility

Contracted reserves of market based flexibility



- Grid operator contracts reserves (red)
- Reservation remuneration remains important for many flexibility service providers



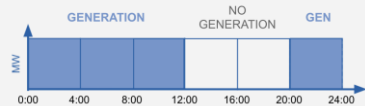
Remunerated to help balancing the grid

Many options exist

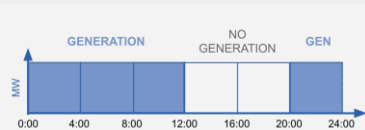
ARBITRAGE

Schedule generation at economic optimum

Decision? Day ahead



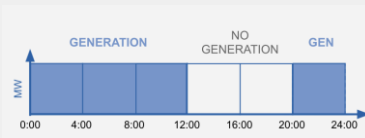
Delivery? Day ahead



RESERVES

Adapt generation at request of TSO

Decision? Day ahead



Delivery? Real-time



BALANCING

Adapt generation following imbalance price

Decision? Real-time



Delivery? Real-time



Launch of new flex services

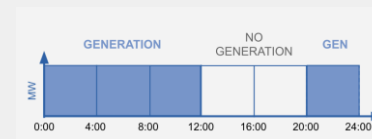
- RTE (FR) freezes the opening of the aFFR service and mFRR down service
- Terna (IT) is still considering the aFRR service UVAM as a pilot, downscaling volumes



RESERVES

Adapt generation at request of TSO

Decision? Day ahead



Delivery? Real-time



Launch of new flex services

- RTE (FR) freezes the opening of the aFFR service and mFRR down service
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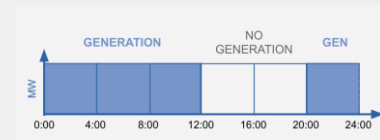
#2: The market is delaying the launch of new products for aggregation



RESERVES

Adapt generation at request of TSO

Decision? Day ahead



Delivery? Real-time



More reserve capacity requirements

Detailed view (BE)

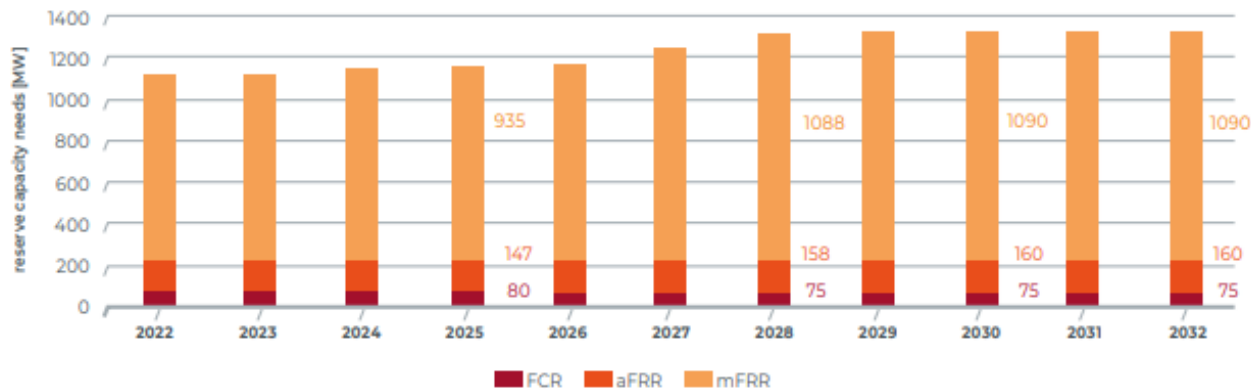


Long term trend

- FCR: +/- constant
- aFRR: +10%
- mFRR: +20%

Prices put volume exercise under pressure today!

[FIGURE 4-32] — PROJECTIONS OF RESERVE CAPACITY NEEDS TOWARDS 2032



More reserve capacity requirements

Detailed view (BE)

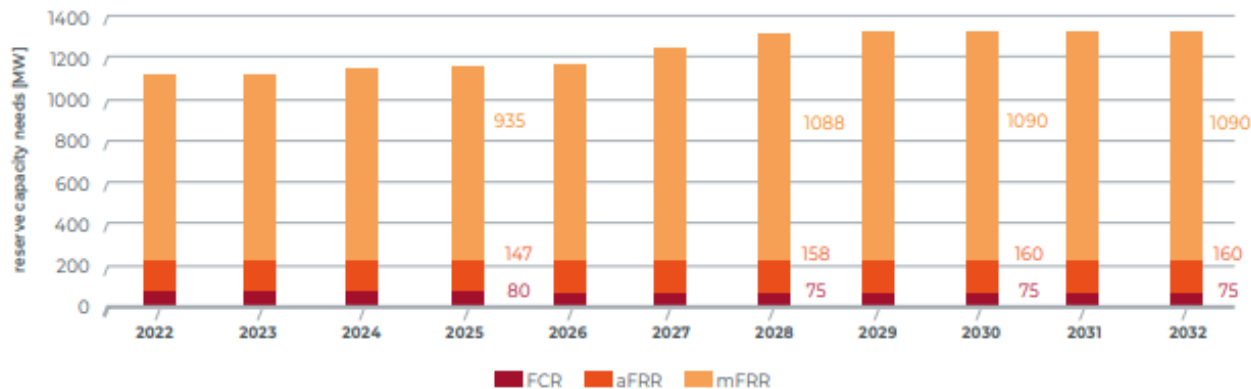


Long term trend

- FCR: +/- constant
- aFRR: +10%
- mFRR: +20%

Prices put volume exercise under pressure today!

[FIGURE 4-32] — PROJECTIONS OF RESERVE CAPACITY NEEDS TOWARDS 2032



#3: We need a long term vision on the need for flexibility

Real time system data drives good services



Imbalance prices 1'

Elia publishes an imbalance price calculated based on cumulative activated volumes per minute.

Cumulative imbalance price and components per minute

This page provides information about the cumulative imbalance price and its components for every minute of the previous hour.

Time interval for publication of data

At the specified time, the most recent available data are collected and displayed as quickly as technically possible. The **cumulative NRV and SI** values published differ from those of the Current System Imbalance, as the latter values are instantaneous values.

All published values are **non-validated values** and can therefore only be used for information purposes.

Situation at 28/09/2022 from 17:41 to 18:39

Quarter	Minute	Quality status	NRV (MW)	SI (MW)	a (€/MWh)	MIP (€/MWh)	MDP (€/MWh)	SR (€/MWh)	SI <-I C (MW)	Price (€/MWh)
18:30 > 18:45	18:39	Non-validated	-71,841	71,081	0,00	509,53	142,10			142,10
18:30 > 18:45	18:38	Non-validated	-77,119	78,122	0,00	509,53	142,10			142,10
18:30 > 18:45	18:37	Non-validated	-79,141	80,344	0,00	509,53	142,10			142,10

Imbalance Prices 1min

- Quarter ▼
- Minute ▼
- Quality status ▼



BALANCING

Adapt generation following imbalance price

Decision? Real-time

Delivery? Real-time

Data availability is crucial to enable new services and improve existing services

- Large **gaps** wrt **data availability between** different **TSOs**
- A **lack of data** results in **less insights**
 - Difficult to understand market conditions, understanding competitors, ..
- Example
 - Elia (currently 64 data sets available)
 - Tennet (currently 19 data sets available)
 - Germany?

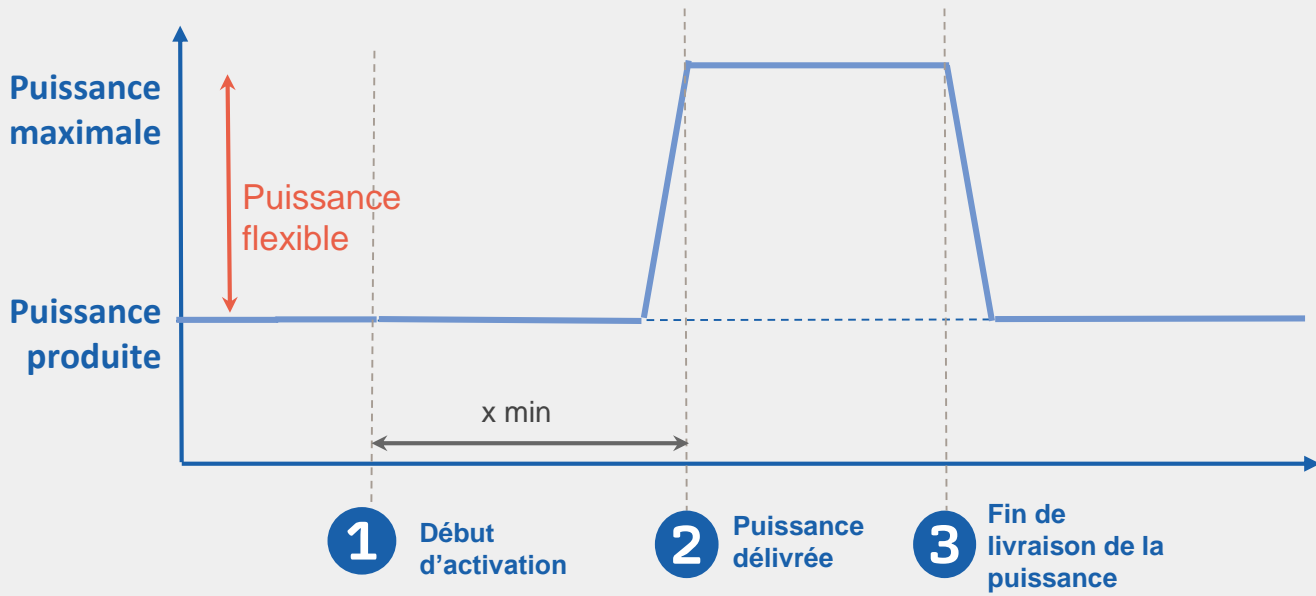
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 - Difficult to understand market conditions, understanding competitors, ..
- Example
 - Elia (currently 64 data sets available)
 - Tennet (currently 19 data sets available)
 - Germany?

#4: We need data from market facilitators

mFRR (R3)

Convergence of design

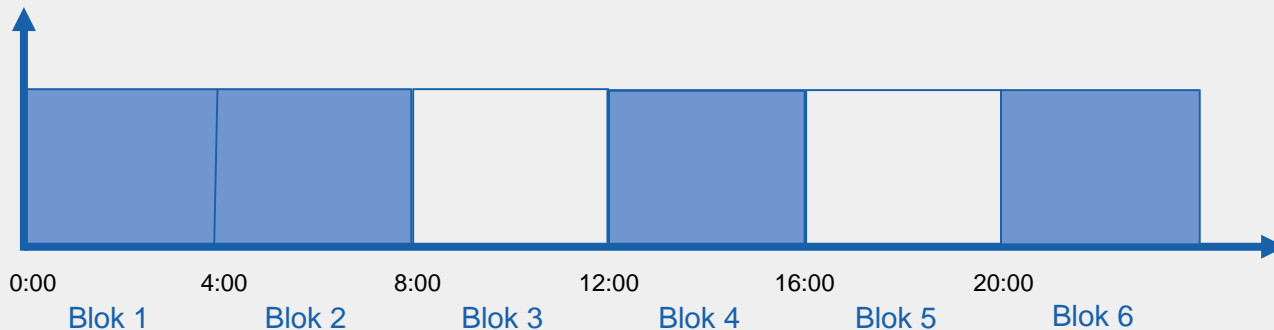


mFRR (R3)

Different periods of contracting

- BE: 4 hourly blocks
- NL: 1 day block
- FR: year tendering (Weekday+weekend) +daily tendering

mFRR

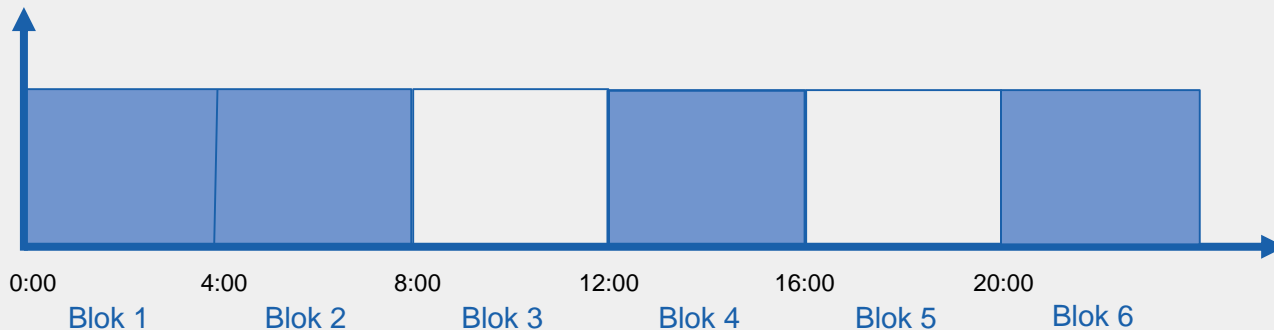


mFRR (R3)

Different periods of contracting

#5: European energy market for flex services

mFRR



Current energy market crisis

Let's continue pushing flex market development forward

- Flex as part of the solution “Save gas for a safe winter”
- Market convergence?
- Price caps?

PICASSO

The Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation (PICASSO) is the implementation project endorsed by all TSOs through the ENTSO-E Market Committee to establish the European platform for the exchange of balancing energy from frequency restoration reserves with automatic activation or aFRR-Platform, pursuant to Article 21 of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EB GL).

30 TSOs + ENTSO-E (Observer)			
PICASSO Members (26 TSOs)		PICASSO Observers (4 TSOs + ENTSO-E)	
Austria	Hungary	Latvia	
Belgium	Italy	Lithuania	
Croatia	The Netherlands	Estonia	
Czech Republic	Norway	North Macedonia	
Denmark	Poland	ENTSO-E	
Finland	Portugal		
France	Romania		
Germany	Slovak Republic		
Greenland	Slovenia		
Sweden	Spain		
Bulgaria	Greece		
Switzerland	Luxembourg		





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