


# Market design as a platform for flexibility (Georgian case)



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It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest.

AZ QUOTES

- Objectives of Day-Ahead and Intraday electricity markets are:
  - ✓ Creating a legal framework for the development of a competitive electricity market and formation of a fair price
  - ✓ Promoting efficient generation and consumption by introducing hourly trading, which allows for demand management
  - ✓ Establishment of a secure, transparent, accessible, and uniform system of a financial settlement
  
- The purposes of the Balancing and Ancillary Services market are:
  - ✓ Purchasing the balancing reserves in a transparent manner
  - ✓ Activating the balancing reserves – on the principle of merit order
  - ✓ Eliminating the imbalance by the fair and optimal price at any time
  - ✓ Congestion management based on economic principles
  - ✓ Enhancement of flexibility and renewable energy generation based on economic principles
  - ✓ Establishing a secure, transparent, accessible, and uniform system of a financial settlement
  
- ❖ *Fairness of the market ensured through proven principles*
  - ✓ Balance responsibility and hourly pricing will bring real benefits for all
  - ✓ Will provide structured and open market access solution to eligible (free) consumers
  - ✓ Introduction of self-dispatch concept
  - ✓ Will bring more transparency and financial discipline in the power sector

# Structural Congestion of Transmission Network

VOLTAGE LEVELS	
500 kv	
400 kv	
330 kv	
220 kv	
110 kv	



# Grid Code requirements to Generators' Speed Governors

When electricity frequency reaches limits, every energy unit/ aggregate shall stay synchronized with electricity system within a given time, so that the TSO is able to take measures for improving situation. Owner of energy unit/ aggregate is obliged to participate in frequency and voltage regulation through variation of active and reactive Power, in accordance with the requirements of TSO

During autonomous operation of energy unit, generator's speed governor system must also be able to operate at frequency range between 45.0Hz and 55, 0 Hz, if it's not limited with passport terms and conditions of producer.

Energy units/aggregates connected to the transmission network shall be equipped with automatic speed governor system. Each automatic speed governor system shall be responsive to  $\pm 0.015$  Hz frequency deviation

RFG and DCC requirements are transposed into Georgian Grid Code

**Most of the Generators have their Speed governors out of service**

**WHY?**

No payment for the FCR and AGC/aFRR services

Generators wish to have maximum output, speed governors interrupt this process

Speed governors fluctuate load on generator, which increase amortization

**Introducing appropriate balancing products will solve this problem**

## Electricity wholesale trading

### PX market

#### Forward Market

- ▶ Long term bilateral contracts
- ▶ CfD and financial contracts
- ▶ Hedging and trading

Fixed price

#### Day a head Market (DAM)

- ▶ Physical contracts
- ▶ Between generation and consumption balance is achieved

BRP-s  
balance is  
achieved

#### Intra Day (IDM)

- ▶ Physical contracts

Controlling  
BRPs balance

## TSO system control

### Balance in real time

#### Balancing Market

- ▶ Physical contracts
- ▶ Balance system

Balance  
system

#### System Operation

- ▶ Physical contracts
- ▶ Ancillary services

Frequency  
control

### Physical delivery

## TSO Imbalance settlement

#### Imbalance settlement

- ▶ Deviation
- ▶ BRP-s are responsible for their imbalances

Financial  
Balance

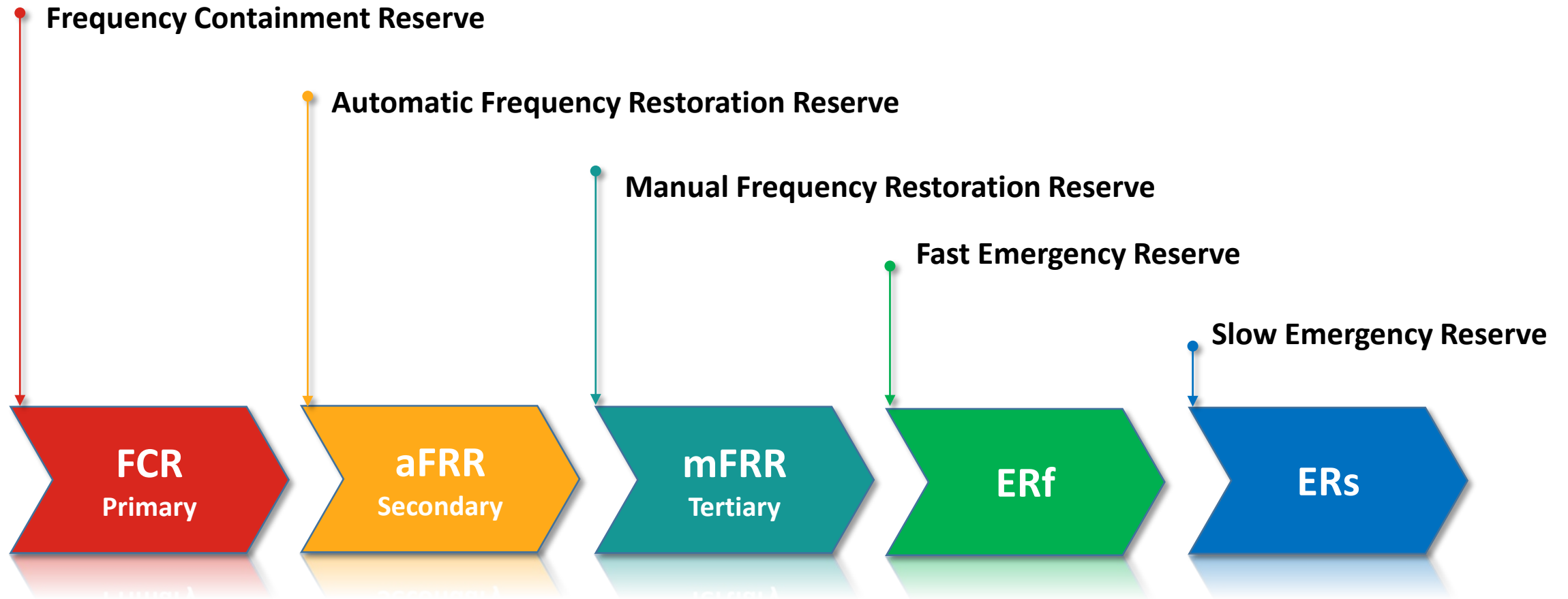
1- 10 Year

24 hours

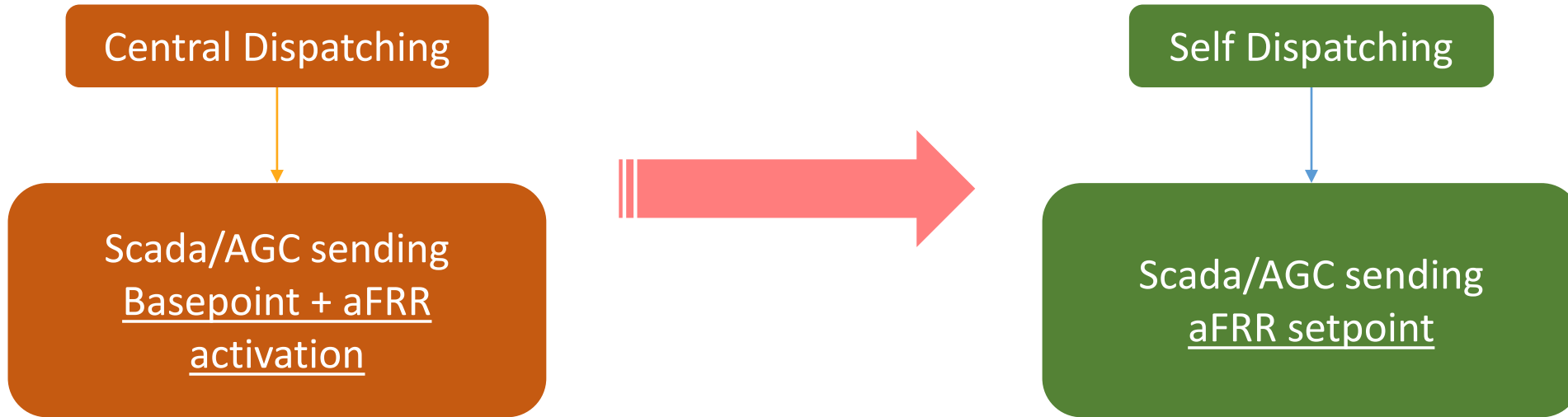
Intra day

Delivery day

1+ Month







**BSPs changing their appliances to meet the requirements to the new Basepoint free Scheme and participate on aFRR balancing product**

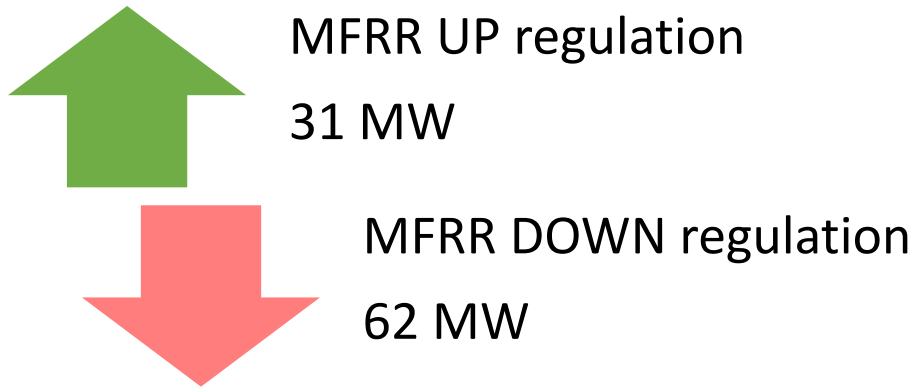


**Enguri HPP successfully changed scheme  
Few other are in the process**

# Motivation for Consumers/Storages to qualify as a BSP

**mFRR** is an asymmetric balancing product with the ramping up time 15 minutes, which gives a chance to consumers to qualify for this product

BRP of metallurgical Factories is already qualified for the mFRR Balancing product with the following amounts:



Some other metallurgical and data mining enterprises are considering to follow this practice (an not only for mFRR)

Pilot project of storage is under development that got incentive from perspectives of launching balancing market

FCR	
Power	2.5 MW
Capacity	3.13 MWh
Technology	LFP 1C
49.99 Hz discharging	50.01 Hz Charging

aFRR	
Power	2.5 MW
Capacity	6.5 MWh
Technology	LFP 0.5C
Duration of operation	8688 hour/year

## Simulation Activities

Making adjustments in Balancing market and Grid code rules

Preparing Dispatchers for the Self-Dispatch scheme

Preparing Market Management System to be 100% ready for the market go live

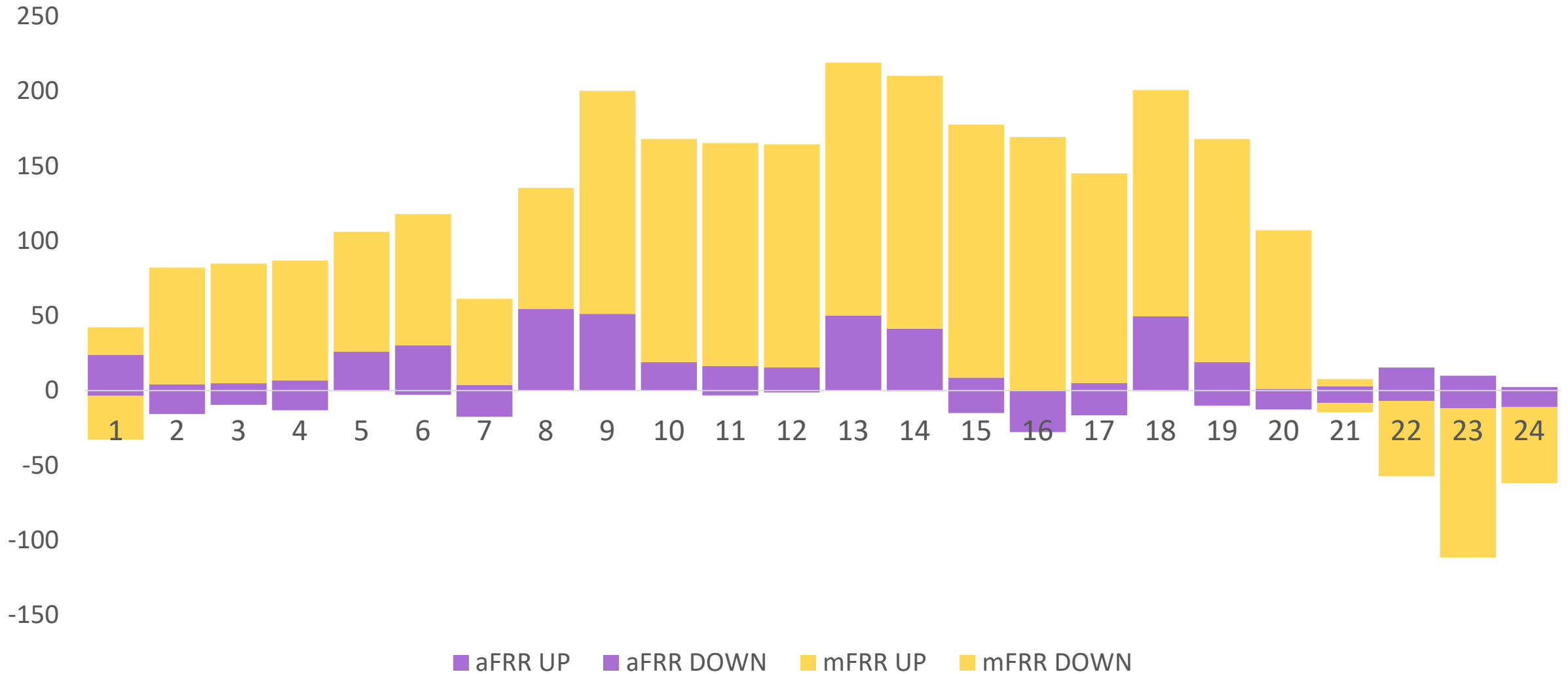
Analyzing High imbalance prices and finding ways how to mitigate them

Conducting training for the market participants and increasing their readiness for the go live

# Simulation Results for Day X



## FRR ACTIVATIONS in MWh

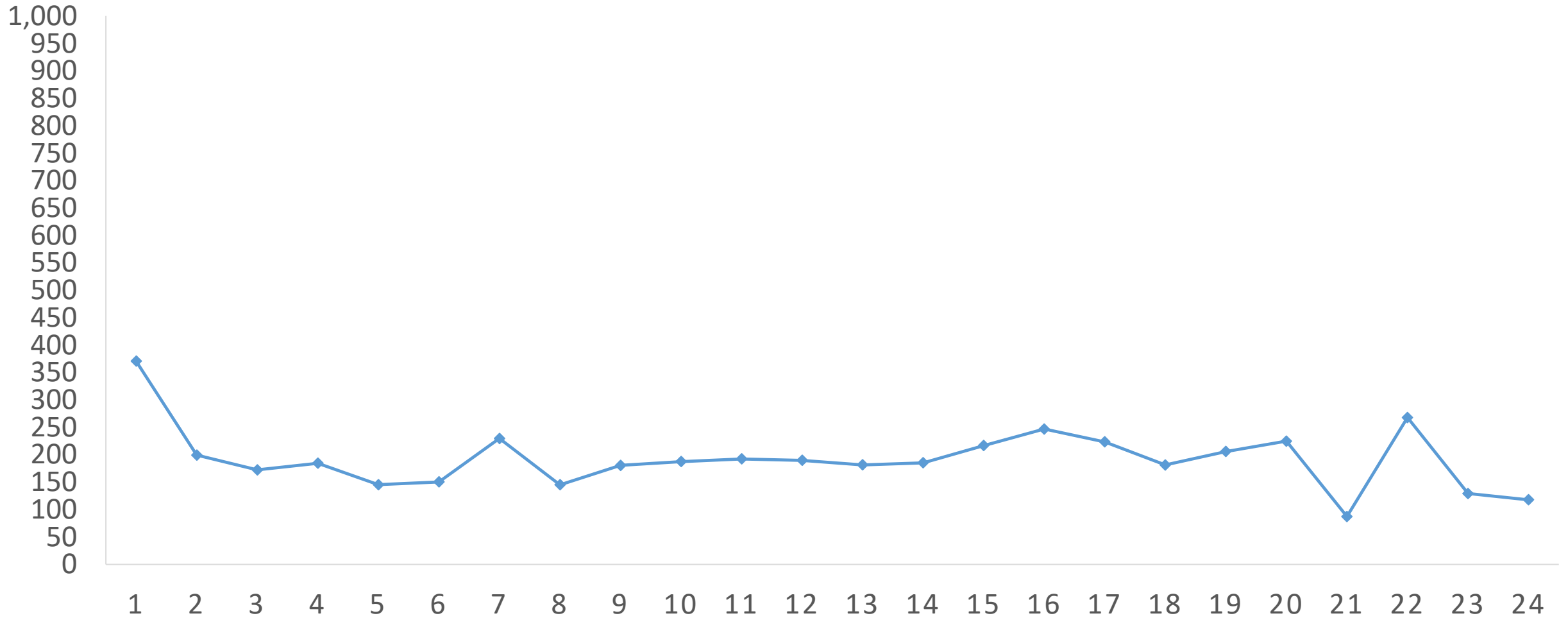


# Simulation Results for Day X



IMBALANCE PRICE  
GEL/MWH

1 Euros  $\approx$  2.7 GEL



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Thank You!

