

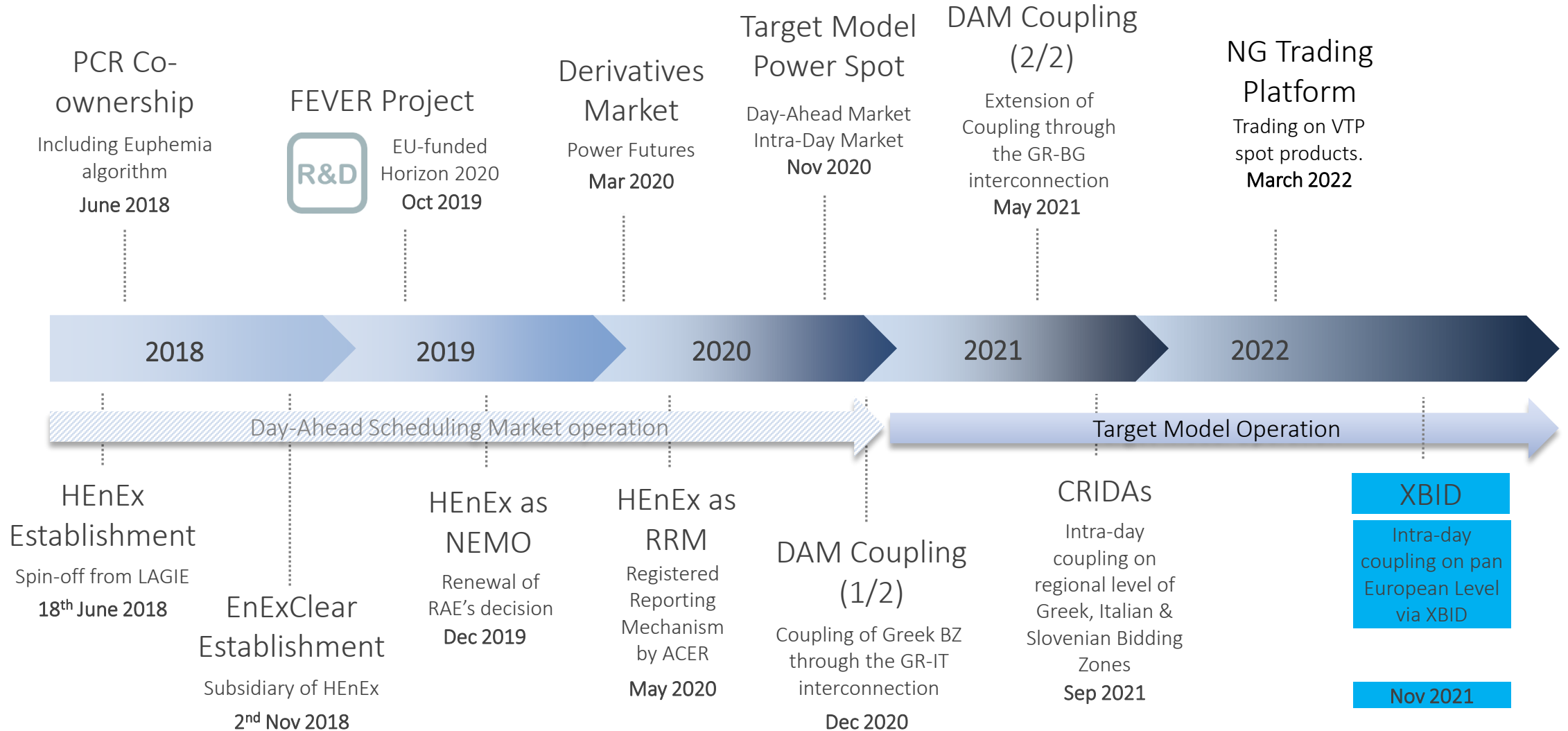


## *EnExGroup's Markets Status 2022 & Steps Forward*

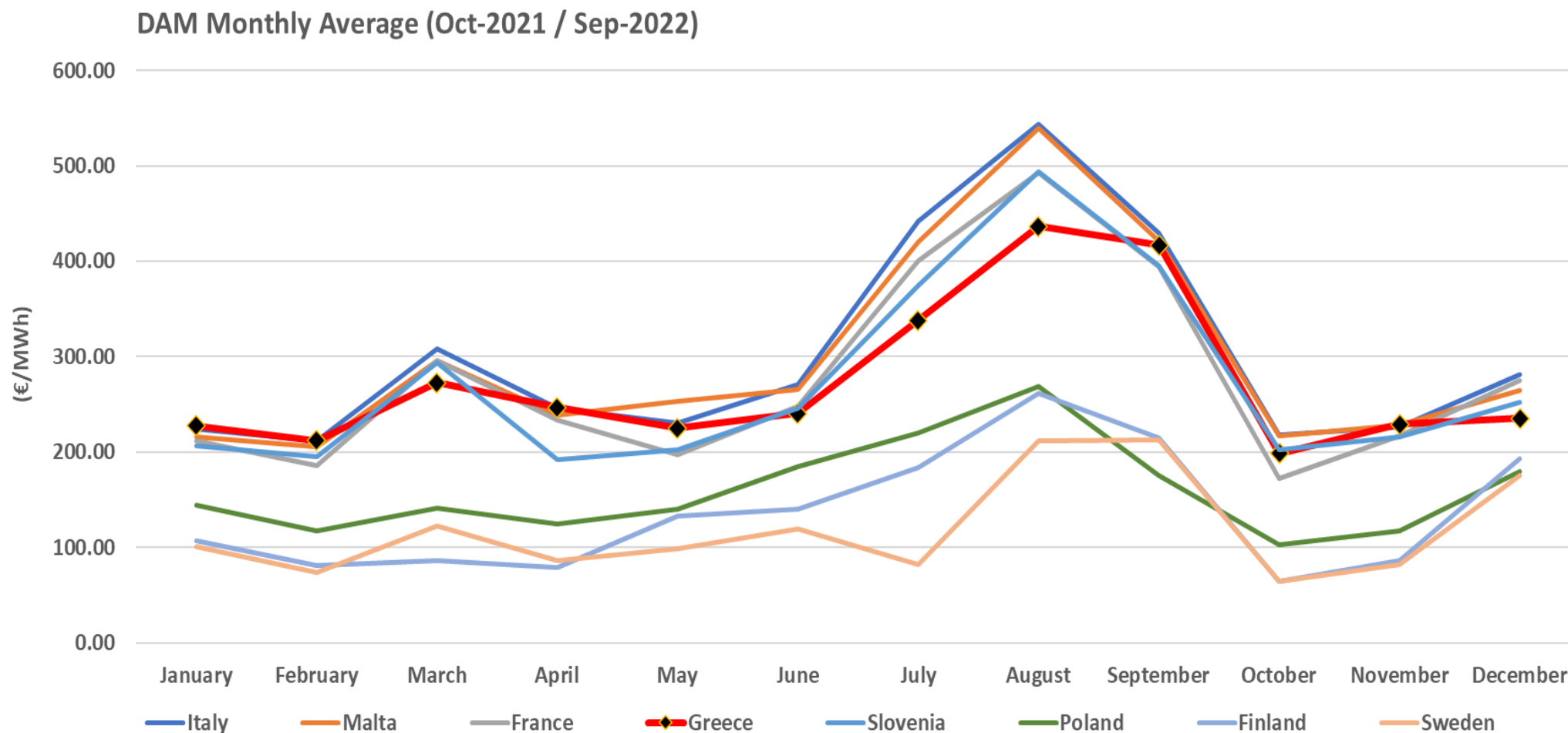
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*Dr. Christoforos-Anestis Zoumas,  
Acting COO & Director Markets Operation, HEnEx S.A*

# Energy Exchange Group | Milestones for Markets Development

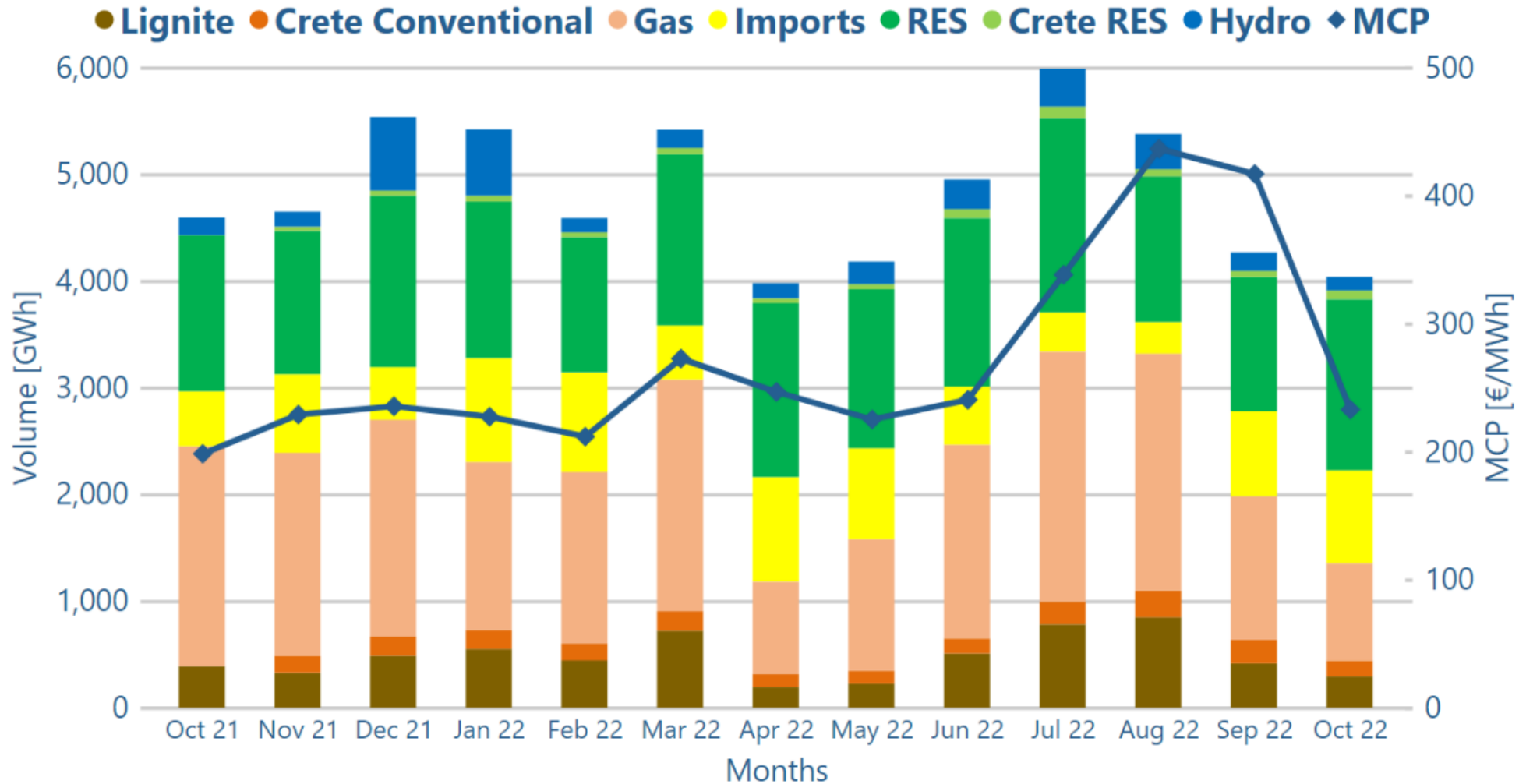


# Target Model figures | DAM Price Rank for GR - BZ

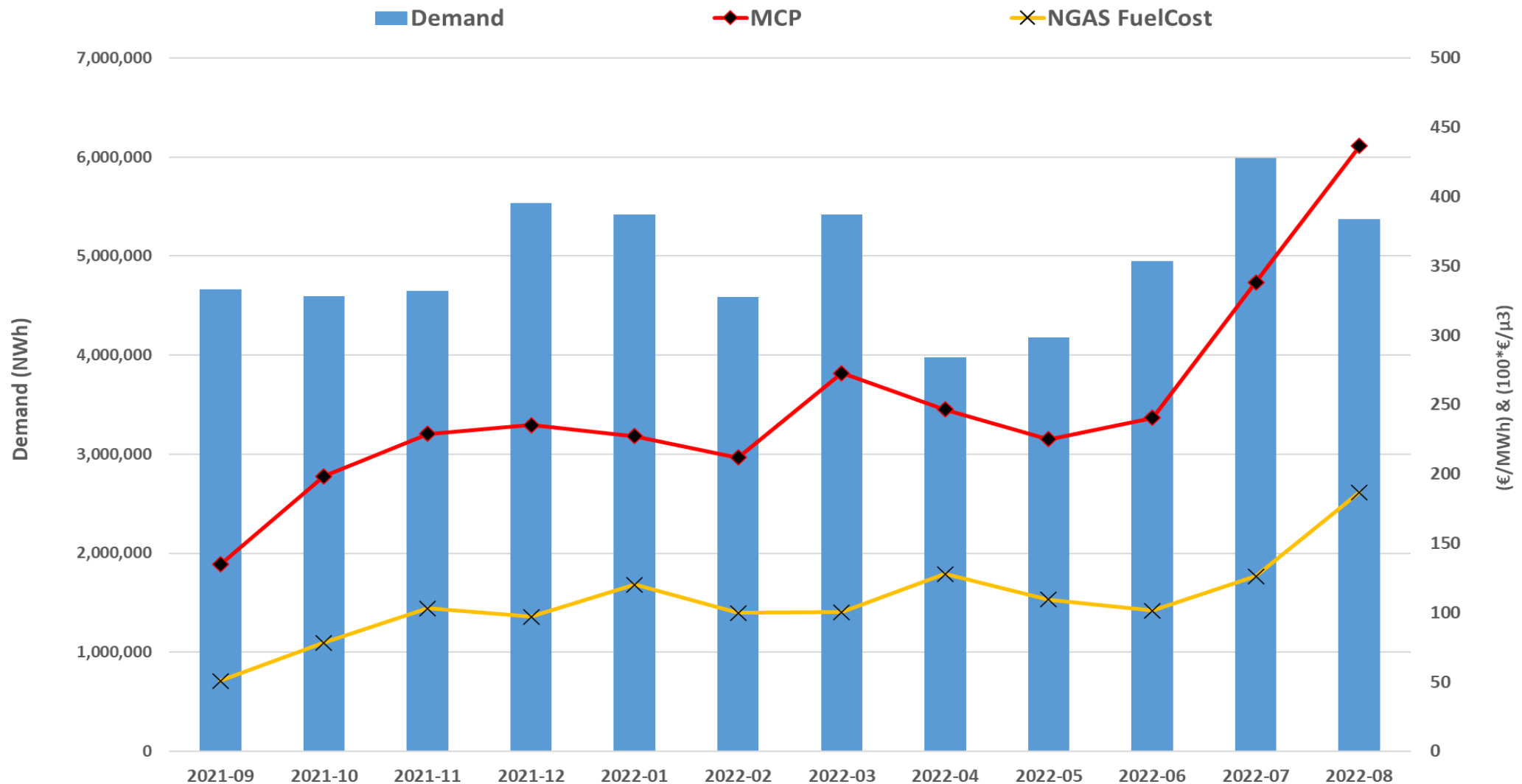


Country - BZ	Avg Price
Italy	303.43
Malta	297.96
France	277.72
Greece	273.55
Slovenia	273.36
Croatia	273.07
Hungary	270.06
Romania	261.81
Slovakia	261.32
Austria	259.48
Bulgaria	248.52
Belgium	244.96
Czech Republic	241.86
Netherlands	241.42
Republic Of Ireland	235.71
Germany	231.94
Denmark	212.37
Lithuania	211.76
Latvia	207.67
Portugal	192.62
Spain	192.18
Norway	182.85
Estonia	174.38
Poland	160.20
Finland	136.44
Sweden	119.38
<b>Total</b>	<b>230.23</b>

# Target Model figures | DAM Price & Production Mix

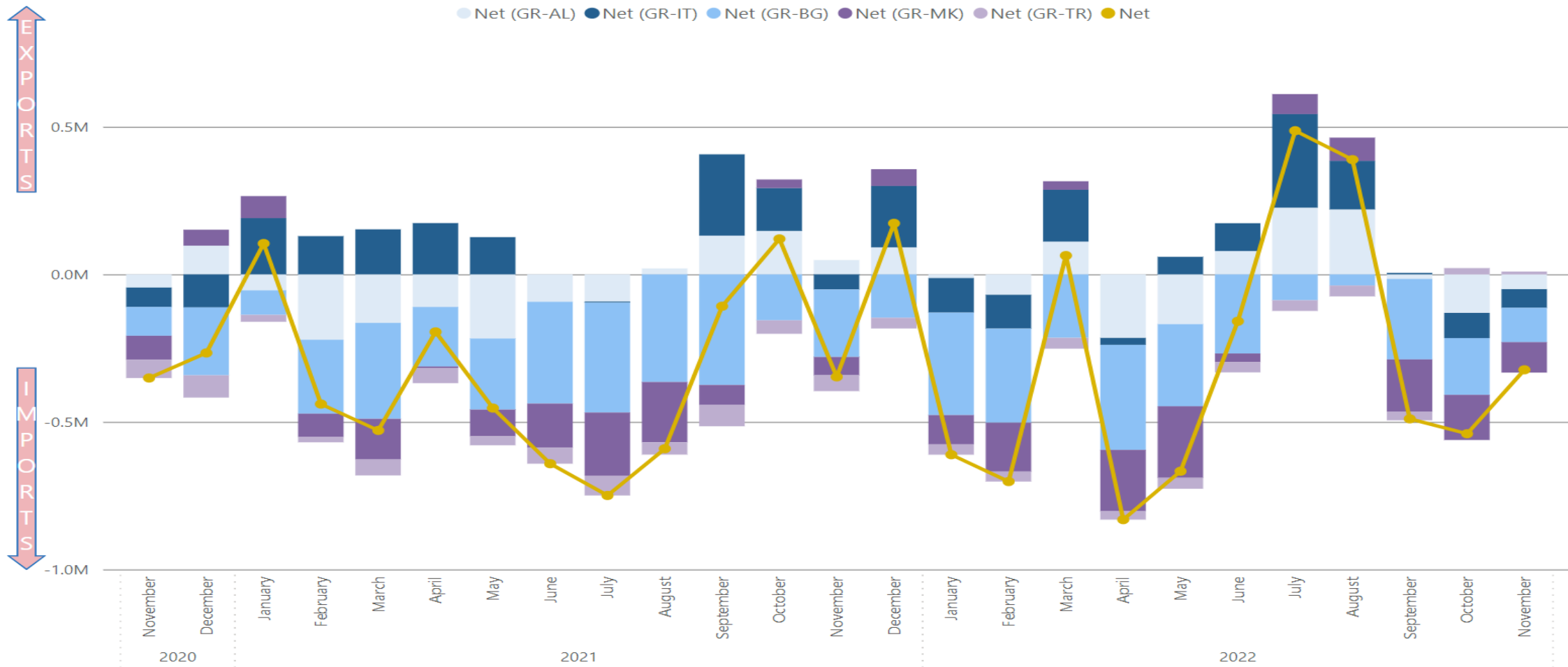


# Target Model figures | DAM Price & Fundamentals



# Target Model figures | Cross-border Volumes @ All CBSs

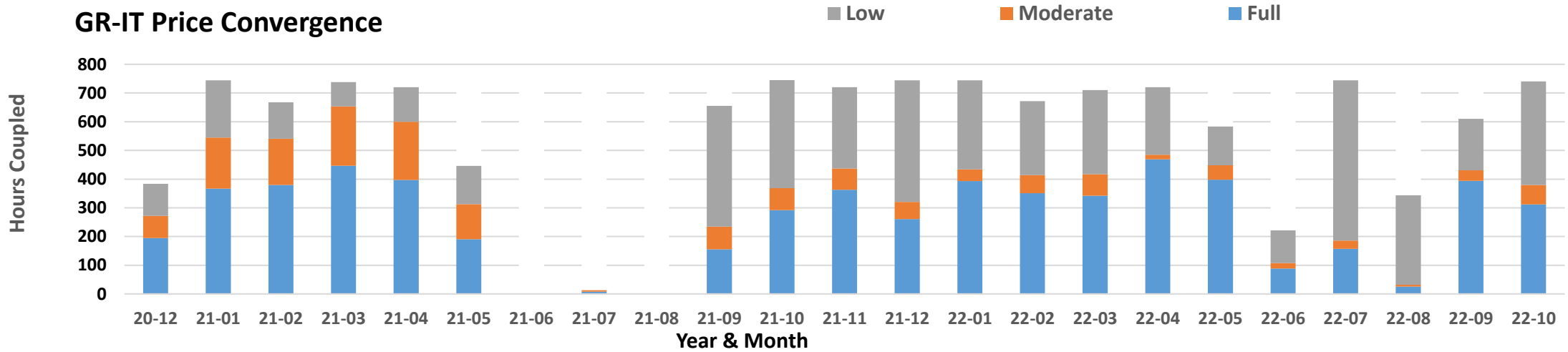
## Evolution: DAM Imports per month & Exports per month



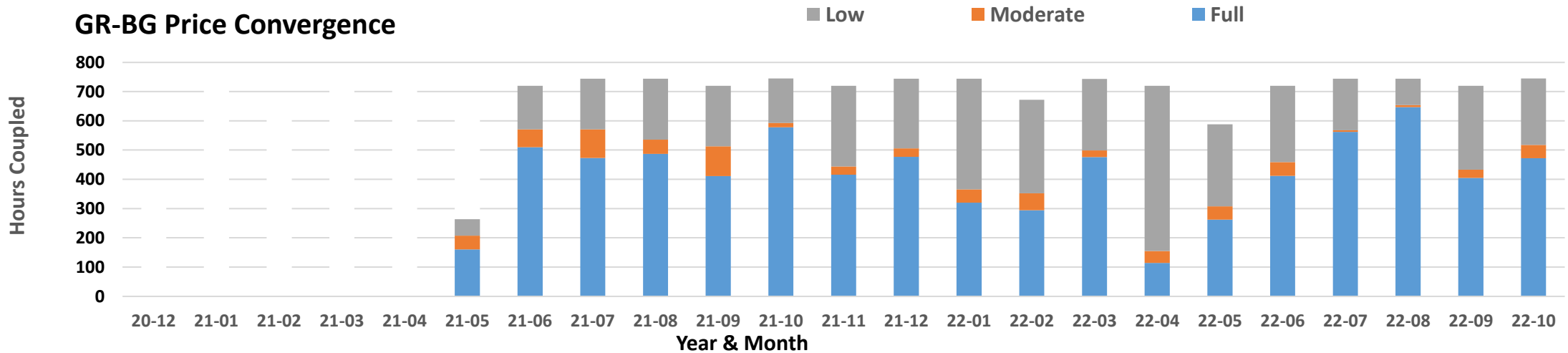
Nov2020 – mid November 2022

# Target Model figures | Price Convergence

## GR-IT Price Convergence



## GR-BG Price Convergence



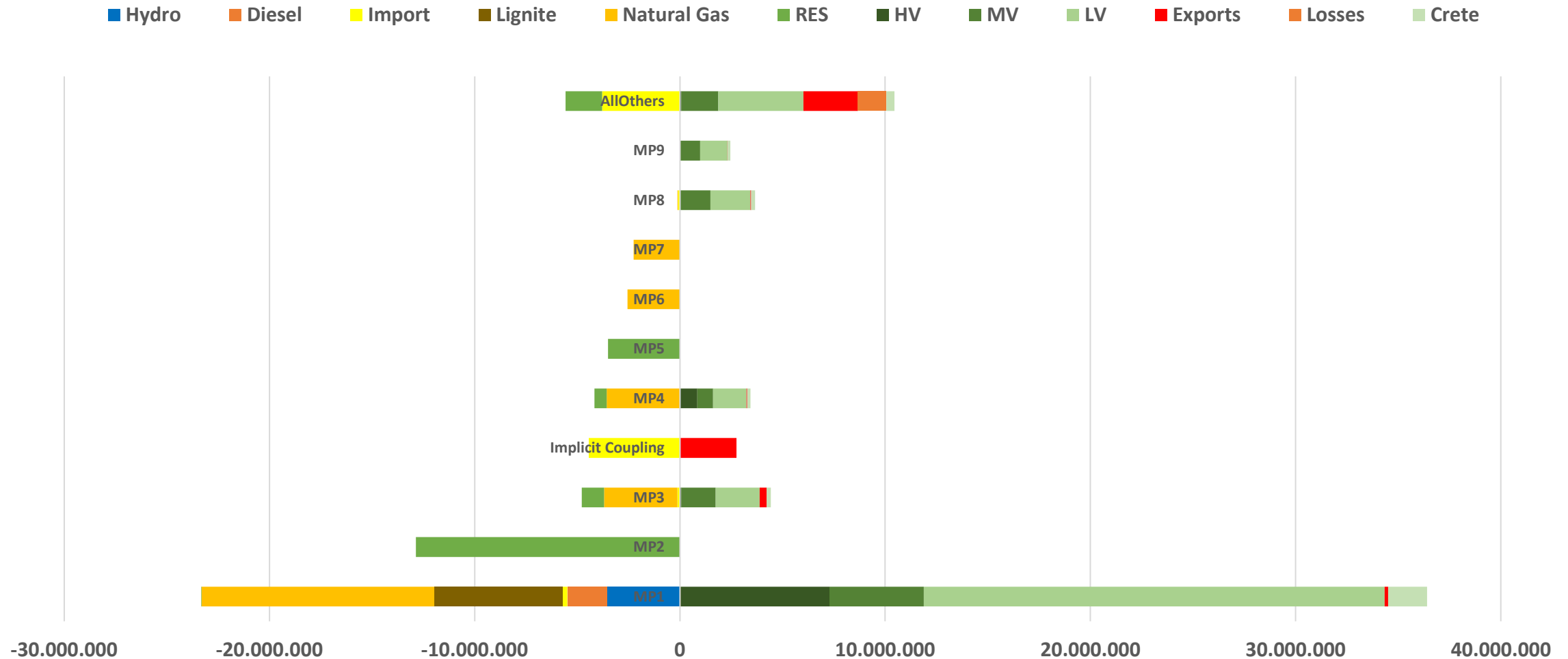
**Full convergence**  
(0-1 €/MWh difference)

**Moderate convergence**  
(1-10 €/MWh difference)

**Low convergence**  
(>10 €/MWh difference)

# Target Model figures | DAM Composition

## Top 10 MPs Portfolio Composition in DAM





# Intraday Spot | SIDC 4<sup>th</sup> XBID Wave

LIP	Go-live	Border	Participants	Foreseen allocation
14	4th wave	GR-IT, GR-BG	<b>NEMOs:</b> HENEX, GME, IBEX <b>TSOs:</b> IPTO, TERN, ESO	Implicit
17		SK-CZ, SK-HU, SK-PL	<b>NEMOs:</b> OKTE, OTE, EPEX, HUPX, Nord Pool, TGE <b>TSOs:</b> SEPS, ČEPS, MAVIR, PSE	Implicit

- Operational
- 3rd wave
- 2nd wave
- 4th wave





## DEMAND RESPONSE - Current status

- No Demand Response (DR) participation,
- Regulatory/rulebook framework in mature status

### Demand Response in Spot Power Markets

- Day-Ahead Market & Intra-day Market – CRIDAs/IDAs & XBID

Expected go-live: Q1 2023

### Business Design

- **New Participant:** Demand Response Aggregator
- **New Asset:** Dispatchable Load Portfolio (DLP)
- DLPs represented by different Load Representatives and DR-Aggregator

### Potential impact on DAM & IDM Clearing Prices

- Smooth MCP variations within the delivery day if considerable amount of DR is traded
- The biggest amount of DR flexibility is expected to be traded in the Balancing Market

## STORAGE - Current status

- Pump-hydro participation in Spot Market
- Relevant Legislation already concluded

### STORAGE in Spot Power Markets

- Day-Ahead Market & Intra-day Market – CRIDAs/IDAs & XBID

Expected go-live: Q1 2024

### Business Design Proposal

- Storage functionalities @ current assets/portfolios properties will become available for Storage/RES Aggregators
- Storage/RES aggregator portfolios will include a mix of RES and storage units physical units/plants

### Expected impact on the Spot Markets

- Smooth MCP variations and possible arbitrage opportunities.
- Mitigation of the generation-demand balance constraint
- Help accommodate higher RES integration

## IDAs - Current status

- Complementary Regional Intra-Day Auctions (CRIDAs),
- 3 Regional coupling Auctions, GR-IT-SI

### Pan-European IDAs

- Following DAM Principles
  - Making Available 15min Products
- Expected go-live: Q1 2024**

### IDAs Design

- Pan-European IDAs, same DAM principles/products
- In Greek market: evolution of CRIDAs to pan-European coupling → **inclusion of GR-BG border**

### Impact on IDM Market

- Improve interconnector capacity allocation and reveal congestion rent signals
- Increased liquidity of the auctions since more countries and more borders will be included

## DAM & IDM Products - Current status

- 60min resolution orders are provided DAM/CRIDAs
- Imbalance settlement is done in 15min

### 15min Products in DAM & IDM

**SDAC: big-bang go live in 2025**  
**SIDC IDAs: Q1 2024**  
**SIDC XBID: within 2023**

### Challenges

- SDAC EUPHEMIA algorithm issues to handle increasing model complexities and computational requirements
- **Prerequisite in Greek Market: TSO Integrated Scheduling Process adopts 15min resolution**

### Impact on the Spot Markets

- Reduced imbalances (imbalance settlement period is currently 15min) → Improve RES integration & forecasting.
- Smoother price formation & improved schedule feasibility

## Current Status

- According to the most recent law 4425/2016, all market participants are free to enter into bilateral contracts, freely or through the HEnEx financial energy (derivatives) market (with an option for physical delivery or not) or over the counter
- Bilateral contracts between suppliers and generators belonging to different entities have not been observed in the Greek market until now

## Recent Initiatives

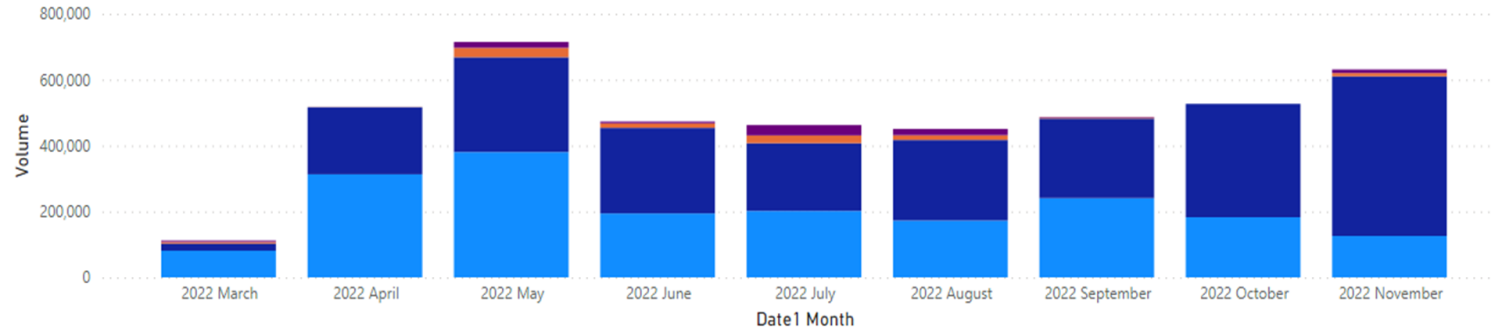
- On November 11th RAE initiated a public consultation, that will conclude on December 16th, to facilitate a debate on an PPA platform: The consultation includes:
  - The deliverables of a study performed by AFRY for RAE providing three alternatives for organizing a PPAs market.
  - The first part of the deliverables of a study performed by Grant Thornton for HEnEx for an EU benchmarking of the PPA landscape and a rough market size estimate for Greece.

- The main objective of this exercise is to create a non-mandatory platform, that will not compete with the auctions held by RAE, and that will enable the development of a regional PPA market.
- The Bulletin Board currently offered at Italy could provide some insight to what an HEnEx operated platform could look like, at least at its beginning.
- Results of the public consultation will be taken under consideration towards the implementation of a solution that will put into good use every competitive advantage that HEnEx can bring to the process:
  - non-discriminatory access, transaction efficiency, and transparency
- In parallel we are moving forward to the next phase of the Grant Thornton study:
  - collecting a Market Participants' wish-list
  - analyzing different options on platform setup and design parameters (eligible participants, contract standardization, clearing options, the role of banks in the ecosystem, cross-border functionality, etc.)
  - Process completion by February 2023.

# Natural Gas Trading Platform | Figures @ Nov-2022

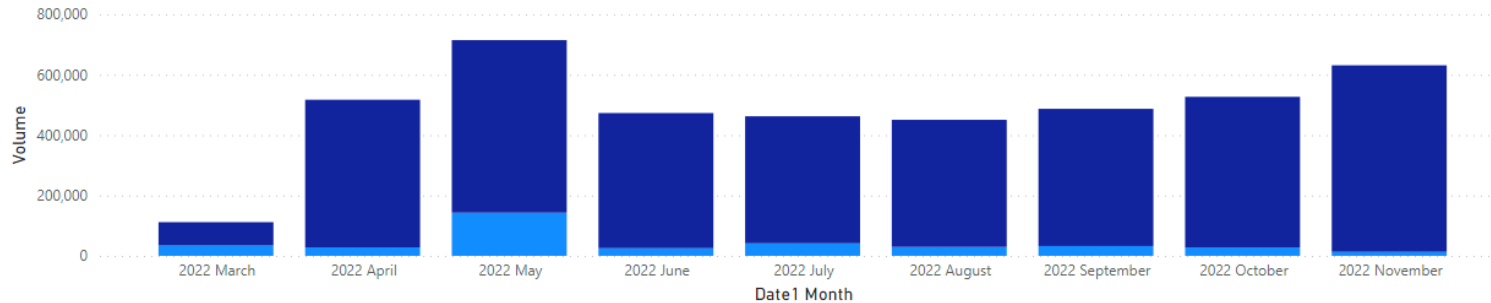
Traded Volume (by side) - Daily

Contract ● WD ● DA ● D+2 ● D+3



Traded Volume (by side) - Daily

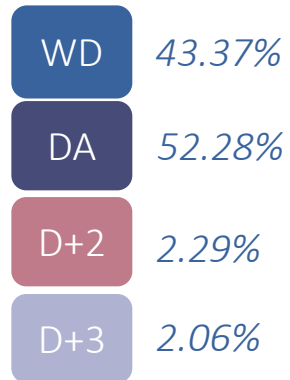
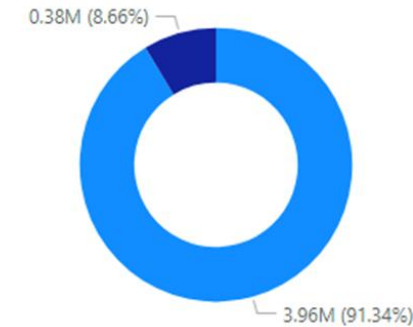
TrdPhase1 ● Auction ● Continuous



- › Total trades: 4,338,844 MWh since 21<sup>st</sup> March 2022
- › Maximum volume: 95,776 MWh, 2.2% of the total traded volume

18 Participants + the Greek TSO

● Continuous ● Auction

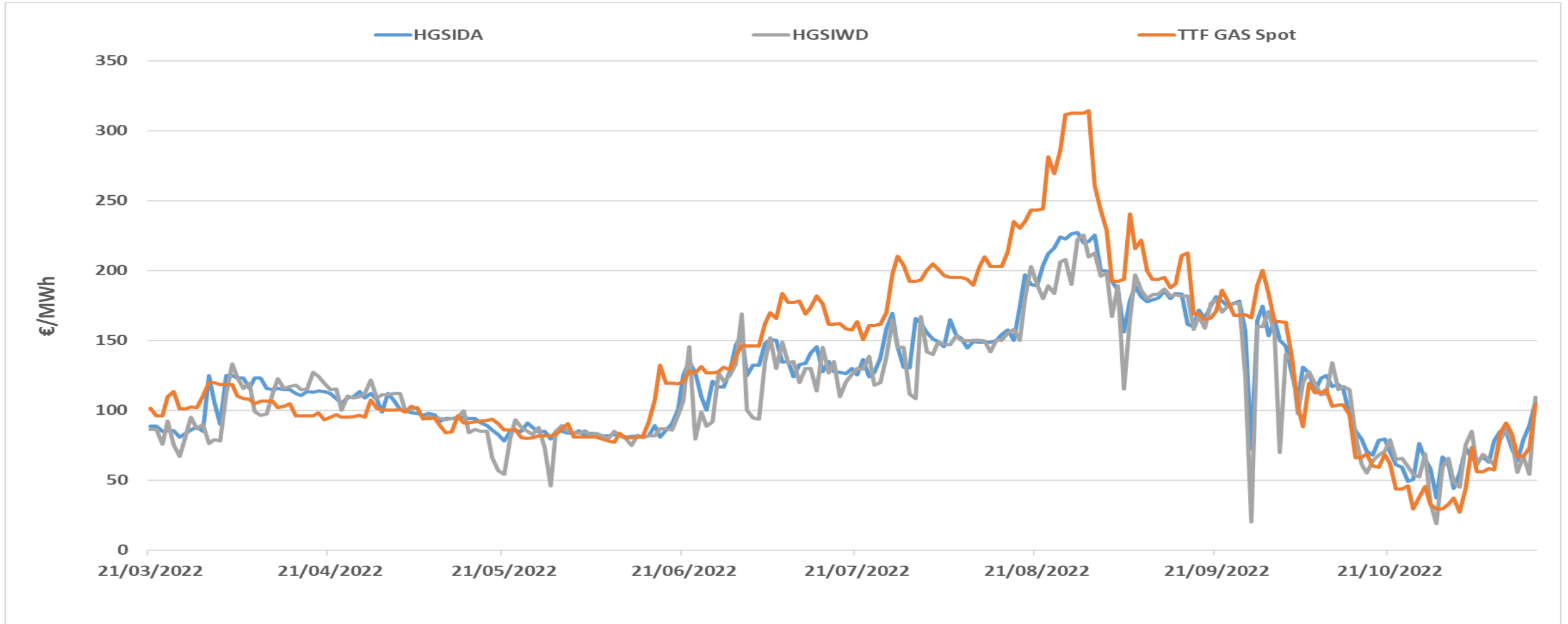


- › Continuous trading accounts for roughly 91% of the trades
- › Within-day and day-ahead account for almost 96% of the trades
- › The day-ahead share (52.28%) is constantly increasing





# Natural Gas Trading Platform | HGSIDW and HGSIDA



Correlation(TTF GAS Spot, HGSIDA) = 0.933

/

Correlation(TTF GAS Spot, HGSIDW) = 0.879