



Hellenic Small Hydro Association

- ❖ Hellenic Small Hydro Association (HSHA) established in 2010.
 - ~150 HSHA members, representing 85% of the total installed capacity of SHP in Greece.
- ❖ HSHA main objectives:
 - promotes the exploitation of the untapped water resource
 - substantiates the advantages and benefits of small hydropower
 - represents and defends the interests of the SHP market
- ❖ Small hydro sector in action to:
 - increase the penetration of SHPP in the national energy mix
 - help achieving the national targets



today :

~ 150 SHPP, 300 MW, Utilization rate ~ 15%

Potential :

490 SHPP, ~ 1000 MW, Utilization rate ~ 50 %

The available SHPP capacity, techno-economically exploitable -
untapped today - **reaches 2000 MW** (7% of the RES in 2030).



Comparative advantages of SHPP (*versus other types of RES and economic sectors*)

- Higher energy efficiency
- Low cost energy
- Grid stabilization
- Helping increase penetration of unstable network technologies
- Large domestic added value
- Projects made by regionally Small and Medium Enterprises
- Long - life investments
- Multi - purpose projects (energy production, irrigation, water supply, flood protection, fire protection)
- Economic contributes to local communities
- Shpp for overall management of water resources (headen or treasure hydro)



SHPPs as projects for the overall management of water resources

- Significance of water management
- Integration of SHPP in water networks
- Energy recovery in water networks
- Better water management
- Huge multiplier interest and enormous potential for implementation
- New legislative framework (exemption of production license)



Benefits of hydropower for the new energy system

- Hydropower offers whole range of system services
- Hydropower is THE flexible tool in the system without CO2 emissions in operation
- Back-up and reserve capacity
- Quick-start and „Black-start“ capability
- Regulation and frequency response
- Voltage support
- Spinning reserve
- Energy storage
- Hydro Pump Storage is currently the most cost-efficient form of energy storage and cost-efficient way of providing flexibility



Small hydropower as provider of system services

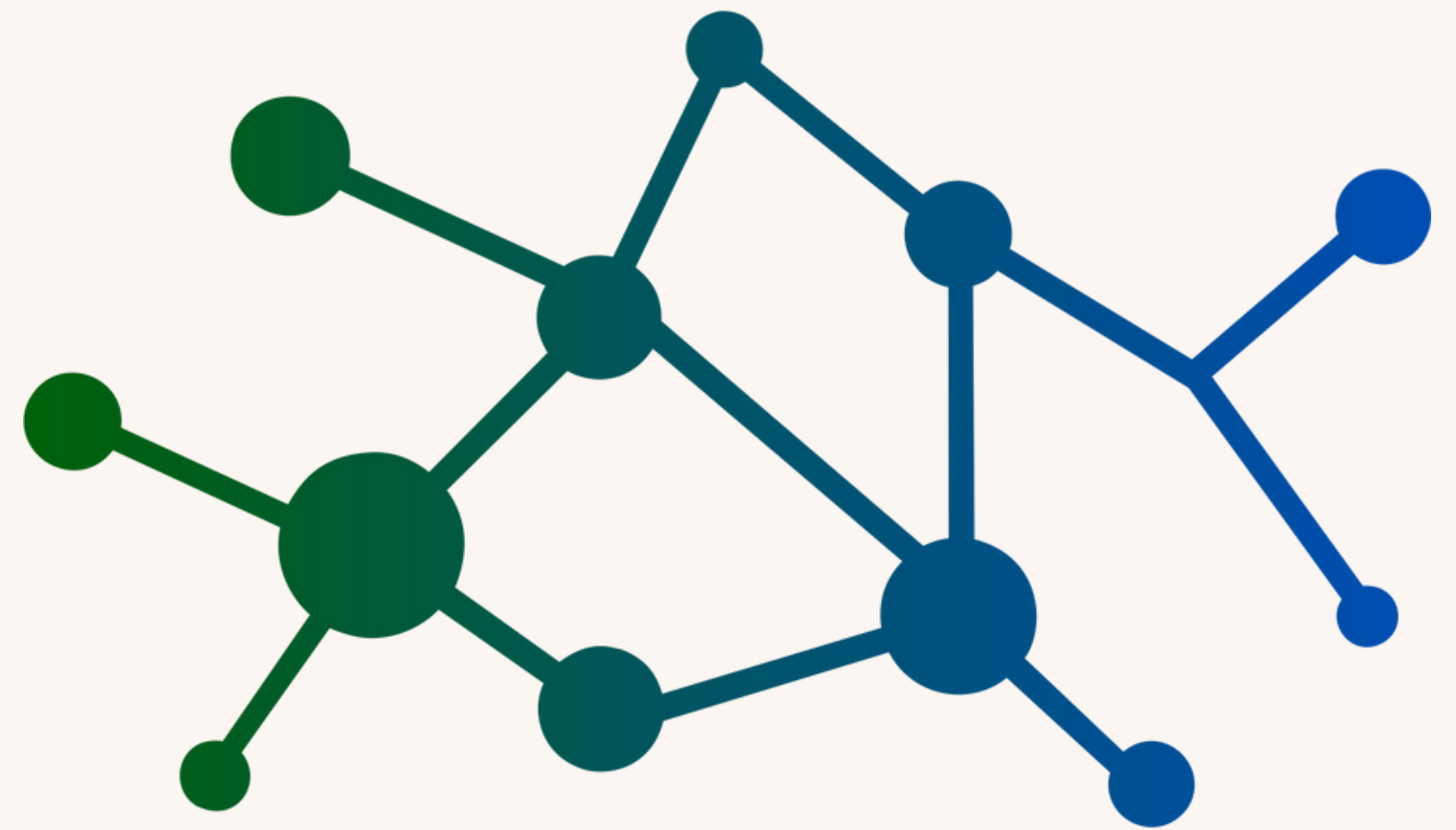
- Will become more and more a provider of whole range of system services
- Enables cost-effective integration of variable renewables
- Contributes to security of supply and stable grid operations
- Plays important tool in water management, flood protection and prevention of water scarcity



Navigating the Future of Energy Consumption

The Role of Energy Aggregators in a Dynamic Market and the potential for cooperation opportunities between Greece and the Arab Countries

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Forena Energy

Introduction

- **The energy sector globally is undergoing significant transformations, and Greece, with its rich history and commitment to progress, is right in the midst of these changes.**
- **We all recognize the challenges, but let's not forget, challenges bring unique opportunities. Opportunities to reshape how we generate, distribute, and consume energy in Greece.**



The European Energy Market Evolution

01.

The term "internal market" ensures the free exchange of goods, services, capital, and people.

02.

A pan-European energy market is the most cost-effective way to provide secure and affordable energy across the EU.

03.

The EU's efforts to unify the internal energy market began over 20 years ago, aiming for reduced grid costs, improved security of supply, competitive prices, and enhanced consumer services.

Legislative Framework – Clean Energy Package (CEP)

Planning

- The fourth energy package, known as the Clean Energy Package (CEP), builds on previous legislative efforts.
- The CEP supports the transition from fossil fuels to a carbon-free economy.

Strategy

The Target Model is a benchmark within the CEP, treating electricity as a commodity with prices determined by supply and demand, involving all stakeholders in an organized manner.

The Target Model in Action



- The Target Model facilitates power trading in different time scales through organized markets.
- Operation markets under the Target Model include the forward market (FM), day-ahead market (DAM), intra-day market (IDM), and balancing market (BM).
- Electricity is treated like any other commodity, with agreements for delivery over specified future periods at predetermined prices.

Implementation in Greece

– Current Status

- The Greek electricity market operates under the Target Model framework.
- Existing studies analyze market dynamics before and after the Target Model implementation, examining impacts on prices, liquidity, and overall market performance.
- Challenges identified include limited liquidity in certain markets and the volatile price environment in the balancing market.



Challenges in Implementing the Target Model in the Greek Electricity Market

Market Operation Challenges

- Smooth operation of DAM with sufficient liquidity.
- Limited volumes and liquidity in IDM.
- Challenges in BM due to volatile price environment in real-time transactions.
- Identification of challenges post the recent market reform.

Renewable Energy Integration

- Increasing penetration of renewable energy sources (RES) affecting market dynamics.
- Need for measures to accommodate intermittent renewables.
- Balancing variable RES with market demands.

Consumer Involvement

- Challenges in incorporating consumers into the market procedure.
- Necessity for consumer education and participation.
- Ensuring fair and transparent consumer interactions.

Introduction to Energy Aggregators in the Greek Energy Market (1/3)

Definition of Energy Aggregators

- Energy aggregators play a pivotal role in the evolving Greek energy market.
- These entities act as intermediaries, consolidating various small-scale energy resources and demand-side assets.
- Their role extends from balancing supply and demand to facilitating market participation for smaller players.



Introduction to Energy Aggregators in the Greek Energy Market (2/3)

Aggregator Contributions

- Aggregators enable the participation of diverse energy assets, including renewables, demand-side response, and storage.
- Streamlining the integration of distributed energy resources (DERs) into the market.
- Enhancing overall market efficiency through flexibility and diversity.



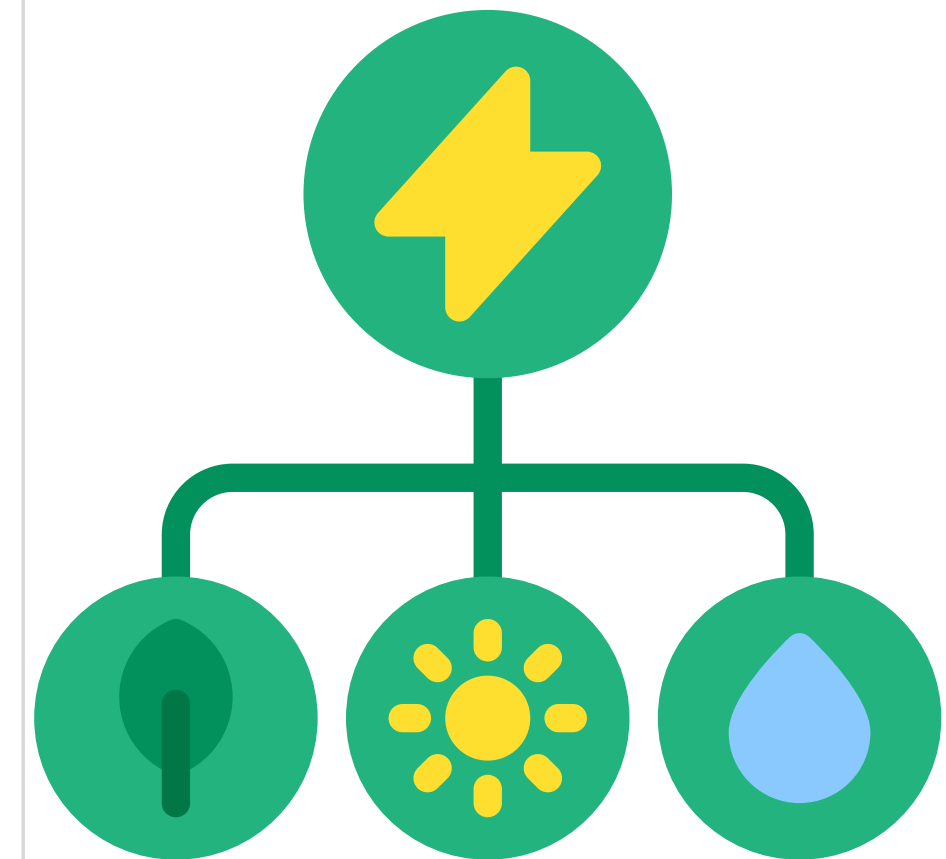
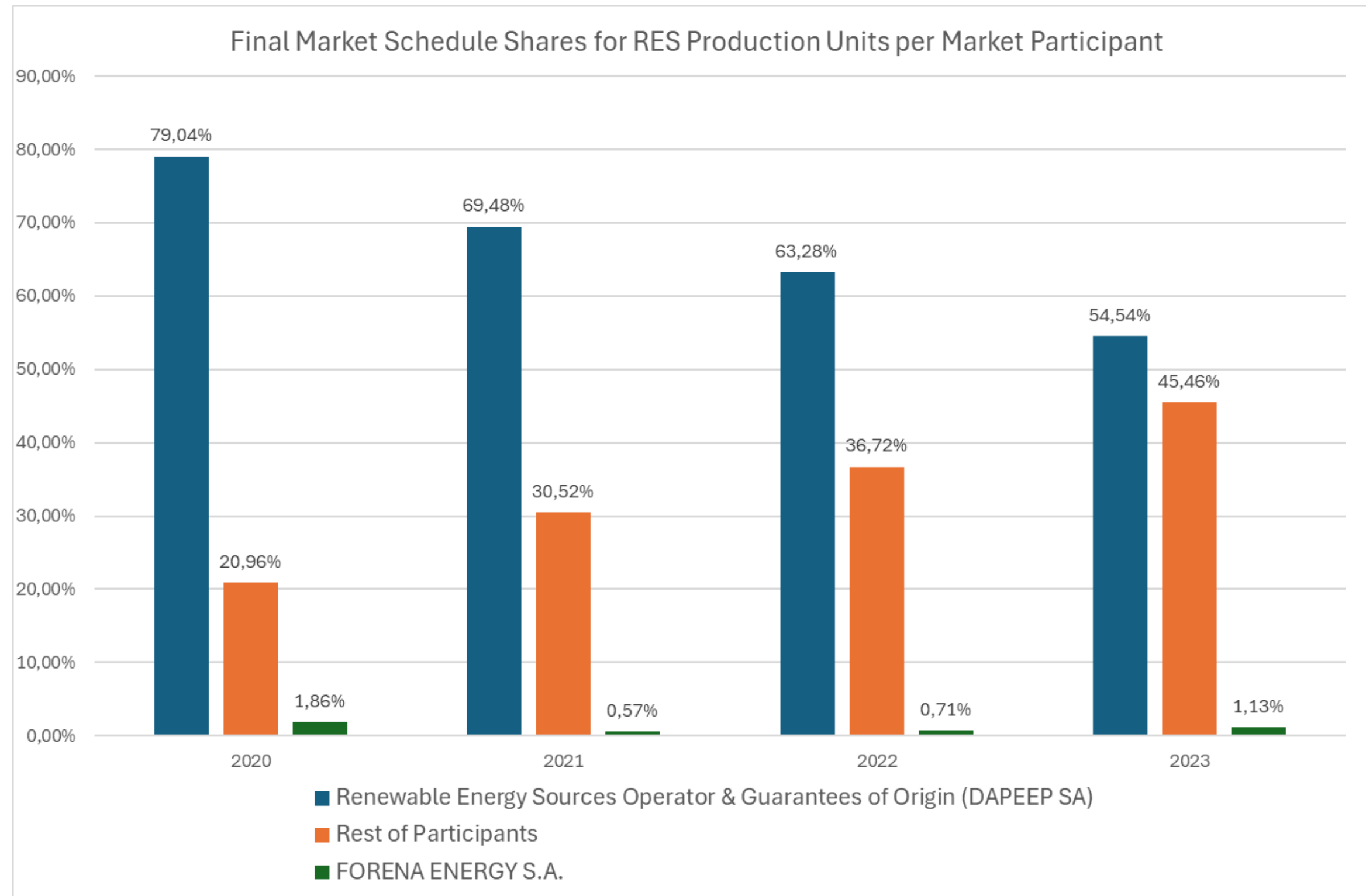
Introduction to Energy Aggregators in the Greek Energy Market (3/3)

Market Dynamics

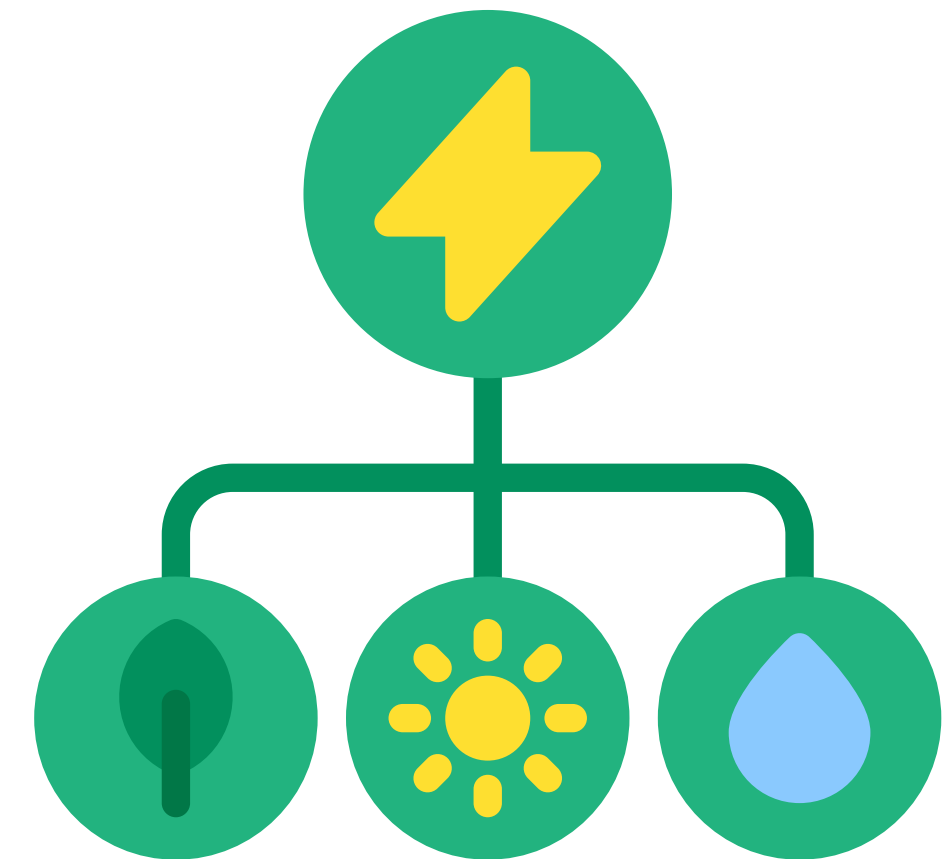
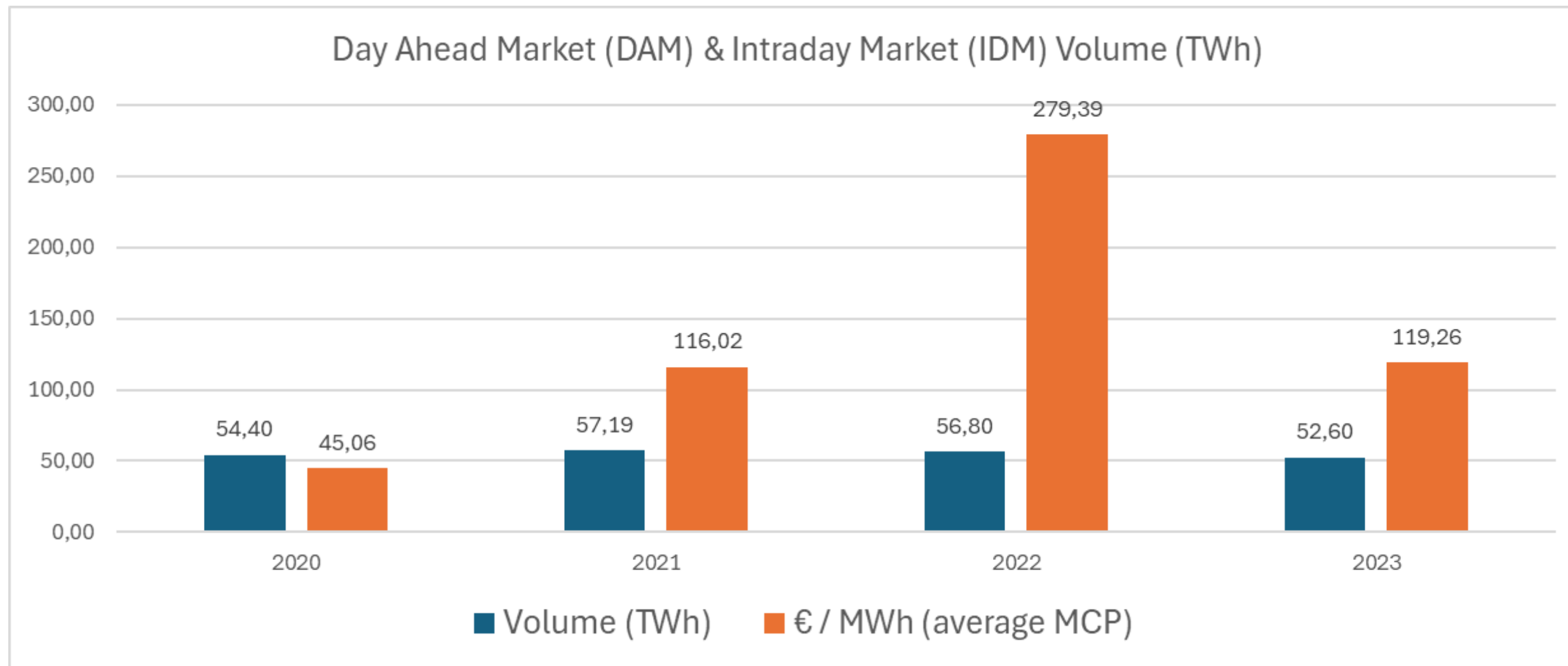
- The growing importance of aggregators aligns with the principles of the Target Model.
- They aid in achieving market objectives, such as improved competition, efficient use of resources, and market transparency.
- Addressing challenges posed by intermittent renewables through smart and flexible energy management.



Energy Exchange: Participants & Volume (1/2)



Energy Exchange: Participants & Volume (2/2)



Conclusions and Future Outlook

Market Maturity and Benefits

- Greek electricity market operates satisfactorily under the Target Model, offering benefits such as lower balancing costs.
- Rapid maturation evidenced by reduced overall capacity reserve requirements and better-managed balancing energy activation.

Challenges Addressed through Reforms

- Proposed measures aim to address challenges and enhance market efficiency.
- Market reforms align with Sustainable Development Goals, promoting cleaner energy, economic growth, and climate action.
- The Energy Price Cap that controls what money the aggregators and producers take from the markets

Future Prospects

- Anticipated benefits from coupling with neighboring markets, increased liquidity, and transparent market frameworks.
- New interconnections



FORENA ENERGY S.A. - a green Aggregator

Who we ARE...

- ▶ Established in the end of 2019 at the initiative of the Hellenic Association of Small Hydroelectric Plants (*HSHA*).
- ▶ 40 share holders (*persons and companies*) with the majority of our stakeholders currently owning operational or under construction RES units of all technologies (*mainly small hydros and PVs*)
- ▶ First Aggregation in the HEneX, May of 2020! - *CoVid - 19 did not stop us!*
- ▶ Holds 500MW aggregation permit (soon 1500 MW) and 300 MW supply permit!
- ▶ Ongoing Growth



Thank you very much!



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Because **Energy** is our passion!

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& ΣΗΘΥΑ. Εμπιστευτείτε μας για την εκπροσώπηση
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