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Thesis:

“The implementation of the EU Target Model in Greece: The creation of the Hellenic Energy Exchange and the operation of forward and spot markets for electricity”

Efstathia Koutsopoulou

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Efstathia Koutsopoulou

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Summary

The European Target Model for electricity markets has been shaped over the past three decades by successive legislations and reforms with the aim of creating a liberalized integrated market fostering efficient cross border trade and competition. The operation of a single market requires the implementation of harmonized rules across the EU Member States as regards capacity allocation, congestion management and market coupling enabling cross-border exchanges of electricity. To this end, the majority of the EU countries have established organized markets, mainly power exchanges, operating in alignment with the EU Target Model rules facilitating energy transactions in a transparent and reliable manner. In 2020, Greece has adopted the necessary legislative and regulatory acts for the restructuring of the wholesale electricity market including the establishment of the Hellenic Energy Exchange operating the new markets, along with the Transmission System Operator.

This thesis explores the EU background on the basis of which this major reform took place and presents the new regulatory framework for the operation of forward, day-ahead, intra-day and balancing markets for electricity, with a focus on the rules for access, participation and clearing of the transactions, followed by an assessment of the first year of the operation of the new markets.

Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
ATHEXClear	Athens Exchange Clearing House
BM	Balancing Market
BSPs	Balancing Service Providers
BRPs	Balancing Responsible Parties
CACM	Capacity Allocation and Congestion Management
CCGT	Combined cycle gas turbine
CEER	Council of European Energy Regulators
DAM	Day-Ahead Market
DAS	Day-Ahead Scheduling
DSO	Distribution System Operator
EC	European Commission
EnExClear	Energy Exchange Clearing House
ENTSO-E	European association for the cooperation of transmission system operators (TSOs) for electricity
EUPHEMIA	Pan-European Hybrid Electricity Market Integration Algorithm
EC	European Commission
FCA	Forward capacity allocation
HEnEX	Hellenic Energy Exchange
HCMC	Hellenic Capital Market Commission
IDM	Intra Day Market
NEMO	Nominated Electricity Market Operator
OTC	Over-the-counter
RAE	Regulatory Authority for Energy
SMP	System Marginal Price
TSO	Transmission System Operator

Chapter 1: INTRODUCTION

The goal of the so-called EU Target Model is the operation of a single energy market accomplished through the application of harmonized rules regulating the organization of the regional energy markets in such way as to facilitate the effective transmission of energy via interconnections and the cross-border trade and achieve market coupling and price convergence across Europe.

In November 2020, the new electricity markets established in accordance with the rules of the EU Target Model commenced operation in Greece¹, namely the: (a) Financial Energy (Derivatives) Market, (b) Day-Ahead Market, (c) Intra-Day Market, and (d) Balancing Market. Subsequently, the market coupling of the day-ahead markets, i.e. the simultaneous auctioning process, took place with Italy in December 2020 and with Bulgaria in May 2021.

This reform put into place by the enactment of Law 4425/2016², as amended by Law 4512/2018³, and the adoption of secondary (normative) rules consisting of the Trading and Clearing Rulebooks and regulatory and technical decisions, issued by the competent regulatory authorities and the respective Market and System Operators. As stated by the Regulatory Authority for Energy (RAE) on the start of the operation of the new markets *“the participants in the wholesale electricity market in Greece finally have all the possibilities to become active according to the main principles of the European Target Model, which is already applied in all other Member States of the European Union. To name a few, the possibility of bilateral contracts between producers and suppliers, the possibility to correct their positions in an intraday timeframe, the introduction of risk mitigation tools and the creation of reliable price signals for the necessary investments”*.⁴

The aim of this thesis is to present the EU Target Model regulatory framework and its implementation in the Greek legal order in particular as regards the operation of the wholesale electricity market by the Hellenic Energy Exchange, the Transmission System Operator and the Clearing House.

¹ RAE Decision 1298/2020, Government Gazette Issue B' 4415/07.10.2020.

² Law 4425/2016 on the National Mechanism of Coordination, Monitoring and Evaluation of the Social Integration and Social Cohesion Policies, on regulations regarding social solidarity and other provisions, Government Gazette Issue A' 185/30.09.2016.

³ Law 4512/2018 on Arrangements for the implementation of the structural reforms of the Economic Adjustment Programmes and other provisions, Government Gazette Issue A' 5/17.01.2018.

⁴ RAE Announcement on the start of operation of the markets of the European Target Model, November 2020, viewed 10.01.2021 <http://oldsite.rae.gr/site/categories_new/about_rae/factsheets.csp?type=general>.

In particular, the first chapter provides a review of the EU regulatory framework shaping the EU Target Model and the main elements applicable to cross-border exchanges of electricity, capacity allocation, congestion management and market coupling, and demonstrates how power exchanges are operating in Europe.

The second and third chapter focus on the implementation of the EU Target Model rules in the national legal order. First, the previous market structure is described, followed by a presentation of the legislative developments as regards the restructuring of the wholesale market and the establishment of the Hellenic Energy Exchange. In the third chapter, the rules stipulated in the Trading and Clearing Rulebooks and in the implementing regulatory and technical decisions as regards the operation of the Forward, Day-Ahead, Intra-Day and Balancing Markets are presented, with a focus on the terms and conditions for access, participation, trading and clearing of the transactions. A detailed list of the regulatory and technical decisions governing the new markets is also provided in Annex II.

In the concluding remarks, the operation of the new electricity markets over the first year of their operation is assessed, focusing on the positive changes as well as on the malfunctions which have been noticed, with the view of proposing measures for the functioning of an effective competitive market in line with the EU principles and targets for the benefit of end consumers as well as for the energy transition to sustainability.

Chapter 2: THE EUROPEAN UNION TARGET MODEL

2.1. LEGAL FRAMEWORK

The integration of the European energy market has been implemented over the past three decades by successive legislations and reforms. Four European legislative packages have been adopted in order to achieve a liberalized internal energy market with effective competition, namely in 1996 ('First Energy Package'), 2003 ("Second Energy Package"), 2009 ("Third Energy Package") and 2019 ("Clean Energy for all Europeans Package" or "Winter Package") setting the rules for the unbundling of supply, generation and networks, third party market access, and effective transfer of energy.

Although it has never been defined in any European regulation or Green paper, the EU Target Model was emerged through an institutional process originated in the Third Energy Package⁵, and was shaped by the Framework Guidelines issued by the Agency for the Cooperation of Energy Regulators (ACER) and the Network Codes (NCs) proposed by the European Network of Transmission System Operators for Electricity (ENTSO-E) which subsequently were approved by the European Commission with the adoption of the relevant Regulations.

Specifically, the following legislation has been adopted by the EU providing harmonized rules for cross-border electricity exchanges and for the operation of the wholesale electricity markets:

- **Third Energy Package / Clean Energy Package**

Regulation (EC) No 713/2009 establishing an Agency for the Cooperation of Energy Regulators⁶ which has been repealed by Regulation (EU) 2019/942.⁷

Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity⁸ which set the fundamental principles and mechanisms to harmonize the rules for cross-border exchanges in electricity, including the establishment of a compensation mechanism for cross-border flows of electricity, principles on cross-border

⁵ Glachant J.M. (2016).

⁶ Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators, OJ L 211, 14.8.2009, p. 1–14.

⁷ Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators, OJ L 158, 14.6.2019, p. 22–53.

⁸ Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003, OJ L 211, 14.8.2009, p. 15–35

transmission charges and guidelines for congestion management and allocation of available capacities of interconnections between national transmission systems

In addition, by the above Regulation, the European Network for Transmission System Operators for electricity (ENTSO-E) was established, which together with the Agency for the Cooperation of Energy Regulators (ACER), are responsible for (i) the creation of detailed network access rules and technical codes, and (ii) the development of common safety and emergency standards and procedures.

Regulation (EC) No 714/2009 has been repealed and replaced within the framework of the Clean Energy for all Europeans package by **Regulation (EU) 2019/943 on the internal market for electricity** (recast)⁹ which updates the general rules for the functioning of the electricity markets including rules related to the operation of the day ahead, intra-day and balancing markets, the development of renewable forms of energy and rules for network access, capacity allocation and congestion management.

Directive 2009/72/EC concerning common rules for the internal market in electricity¹⁰ which laid down the rules relating to the organization, functioning and further liberalization of the electricity market, including rules for the effective unbundling of activities of the energy activities. Directive 2009/72/EC has been repealed by **Directive (EU) 2019/944**¹¹ within the framework of the Clean Energy for all Europeans package.

- **Market codes**

Regulation (EU) No 2015/1222 establishing a **guideline on capacity allocation and congestion management**¹² (**CACM Regulation**) provides binding rules for the Transmission System Operators (TSOs), Nominated Electricity Market Operators (NEMOs), Regulatory Authorities and the Agency for the Cooperation of Energy Regulators for the implementation and operation of EU-wide single market coupling in the day-ahead and intraday timeframes.

⁹ Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, OJ L 158, 14.6.2019, pp. 54–124.

¹⁰ Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC, OJ L 211, 14.8.2009, pp. 55–93.

¹¹ Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ L 158, 14.6.2019, pp. 125–199.

¹² Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management, OJ L 197, 25.7.2015, pp. 24–72.

CACM Regulation was preceded by ENTSO-E Network Code for capacity allocation and congestion management that was based on ACER Framework Guidelines (2011).¹³

Regulation (EU) No 2016/1719 establishing a **guideline on forward capacity allocation** (“FCA Regulation”)¹⁴ sets the rules on cross-zonal capacity allocation in the forward timeframe, on the establishment of a common methodology to determine long-term cross-zonal capacity, on the establishment of a single allocation platform at European level offering long-term transmission rights (LTTRs), and on the possibility to return long-term transmission rights for subsequent forward capacity allocation or transfer long-term transmission rights between market participants.

FCA Regulation was adopted following ENTSO-E proposal for the Network Code on Forward Capacity Allocation¹⁵ formed in line with ACER CACM Framework Guidelines.

Regulation (EU) No 2017/2195 establishing a **guideline on electricity balancing** (“Electricity Balancing Regulation”)¹⁶ lays down common principles and technical, operational and market rules to govern the functioning of electricity balancing markets, including rules for the procurement and the settlement of balancing services (procurement of balancing capacity and activation of balancing energy), the roles, rights and obligations of the Balancing Service Providers (BSPs) and Balancing Responsible Parties (BRPs) and harmonised methodologies for the allocation of cross-zonal transmission capacity for balancing purposes.

The Electricity Balancing Regulation was adopted following ENTSO-E Network Code on Electricity Balancing based on ACER’s Framework Guidelines for CACM.¹⁷

¹³ ACER (2011), Framework Guidelines on capacity allocation and congestion management for electricity, FG-2011-E-002.

¹⁴ Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation, OJ L 259, 27.9.2016, pp. 42–68.

¹⁵ ENTSO-E (2013), Network Code on Forward Capacity Allocation.

¹⁶ Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, OJ L 312, 28.11.2017, pp. 6–53.

¹⁷ ACER (2012), Framework guidelines on electricity balancing, FG-2012-E-009.

- **Grid connection codes**

Regulation (EU) No 2016/1388 establishing a **Network Code on Demand Connection**¹⁸ (“DC NC”) lays down the requirements for grid connection of transmission-connected demand facilities, transmission-connected distribution facilities, distribution systems and demand units.

Regulation (EU) No 2016/1447 establishing a **network code on requirements for grid connection of high voltage** direct current systems and direct current-connected power park modules (“HVDC NC”).¹⁹

Regulation (EU) No 2016/631 establishing a **network code on requirements for grid connection of generators**²⁰ (“RFG NC”) sets out the requirements for grid connection of power-generating facilities to the interconnected system.

- **Operation codes**

Regulation (EU) No 2017/1485 establishing a **guideline on electricity transmission system operation**²¹ (“SOGL NC”) sets out technical rules for the operation of the transmission systems, including requirements and principles concerning operational security, rules for data exchange, training and certification of system operator employees etc.

Regulation (EU) No 2017/2196 establishing a network code on **electricity emergency and restoration**²² (“ER NC”) sets the minimum requirements and actions to be carried out by the TSOs, DSOs, significant grid users (SGUs), defence service providers, restoration service providers, balance responsible parties, balancing service providers and NEMOs specifically in the emergency, blackout and restoration states.

¹⁸ Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection, OJ L 223, 18.8.2016, pp. 10–54.

¹⁹ Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules, OJ L 241, 8.9.2016, pp. 1-65.

²⁰ Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, OJ L 112, 27.4.2016, pp. 1-68.

²¹ Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation, OJ L 220, 25.8.2017, pp. 1-120.

²² Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration, OJ L 312, 28.11.2017, pp. 54-85.

- **Competition**

Regulation (EU) No 1227/2011 on wholesale energy market integrity and transparency²³ (REMIT Regulation) which establishes rules prohibiting abusive practices affecting wholesale energy markets. It provides for the monitoring of wholesale energy markets by the ACER in close collaboration with national regulatory authorities. Market participants, shall provide to ACER the record of wholesale energy market transactions, including orders to trade.

Commission Implementing Regulation (EU) No 1348/2014²⁴ providing rules about data reporting procedures and details on the wholesale products subject to the reporting obligation in accordance with the REMIT Regulation.

2.2. MAIN CHARACTERISTICS

According to *Glachant*²⁵, the EU Target Model has at least three key characteristics:

« [...] 1. It brings a large “merit order” at a European scale from a reference pricing mechanism being the one of energy traded in Power Exchanges on Day-Ahead.
2. It simplifies TSO cross-border trading by “zoning” the grids, as if each EU TSO grid was some type of “national copper plate”; and, by “coupling” the allocation of grid access between these “zoned area copper plate” grids with the merit order built into the PXs in Day-Ahead trading. This is done only after having chosen a guaranteed inter-zonal capacity calculated *ex ante* (on the same Day-Ahead horizon) by the grid transmission operators (the TSOs).
3. This ‘Target Model’ has its own “last mile” hard task being to open a similar “zones cross-border” process for the shortest time frames (Intraday & Balancing) as to “Europeanise” the last step to power reserve & energy balancing procurement between the TSO grid zones».

In specific, the main principles, rules and procedures prescribed in the above EU legislative acts, foresee the following:

²³ Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency, OJ L 326, 8.12.2011, pp. 1-16.

²⁴ Commission Implementing Regulation (EU) No 1348/2014 of 17 December 2014 on data reporting implementing Article 8(2) and Article 8(6) of Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency, OJ L 363, 18.12.2014, pp. 121–142.

²⁵ Glachant J.M (2016).

- **Designation of Nominated Electricity Market Operators (NEMO)**

The EU Members States shall designate at least one entity in each bidding zone responsible for the performance of the tasks related to single day-ahead or single intraday coupling.²⁶ NEMOs tasks include receiving orders from market participants, having overall responsibility for matching and allocating orders in accordance with the single day-ahead and intraday coupling results, publishing prices, clearing and settling the contracts resulting from the trades.²⁷ NEMO's may delegate all or part of any of the above tasks to third parties in the case the third party can carry out the respective function at least as effectively as the delegating entity.²⁸

- **Optimal definition of bidding zones**

Bidding zones are geographic areas within which market participants are able to exchange energy without capacity allocation²⁹, whereas exchanges between bidding zones require cross-zonal capacities, which are limited in order to avoid congestions within the electricity network.³⁰ Bidding zones should be defined in a way that prevents structural and other major physical congestions in the network caused by electricity exchanges.³¹ CACM Regulation requires from TSOs and ACER to regularly analyze the efficiency of existing bidding zone configuration. In case the existing bidding zone configuration is determined as inefficient, TSOs need to perform a bidding zone review which essentially compares the existing bidding zone configuration with possible alternatives against a set of criteria, which aims to maximise the overall market efficiency.³²

- **Market coupling through price convergence**

At the heart of the EU Target Model is the concept of market and price coupling, both at the day-ahead and intraday timeframes. Market coupling is the method by which energy prices and volumes for each local market are calculated by gathering all bids and offers in the different local markets in order to match them at European level on a marginal pricing basis.³³ The

²⁶The list with the designated NEMOs can be found at ACER's website viewed 09.09.2021 <https://extranet.acer.europa.eu/en/Electricity/MARKET-CODES/CAPACITY-ALLOCATION-AND-CONGESTION-MANAGEMENT/Pub_Docs/NEMO%20list.pdf>.

²⁷Articles 2 (23), 4 and 7 of CACM Regulation.

²⁸ Article 81 of CACM Regulation.

²⁹ Article 2 (65) of Regulation (EU) 2019/943.

³⁰ACER's explanatory note on the Framework Guidelines on capacity allocation and congestion management (CACM Regulation).

³¹ Preamble (11) of CACM Regulation.

³² Chapter 2 of CACM Regulation and article 14 of Regulation (EU) 2019/943.

³³ ENTSO-E, Network code on Capacity Allocation & Congestion Management (CACM) Supporting Document, p. 23.

purpose of market coupling is to allocate capacity by optimizing the total economic surplus of the different coupled spot markets' order books, while ensuring that the physical limits of the grids are respected.³⁴ Therefore, market coupling enables cross-zonal capacity to be used in the 'right economic direction' (from low- to high- price areas) in case of a price differential across a given bidding-zone border.³⁵ To achieve this target, a single price coupling mechanism should be implemented across all European countries.

In particular, single **day-ahead** timeframe market coupling is organized as an EU-wide **implicit auction** and price coupling is achieved by a common algorithm, called EUPHEMIA (acronym of Pan-European Hybrid Electricity Market Integration Algorithm), used for the calculation of electricity prices across Europe and for the implicit allocation of the cross-border capacity.³⁶ This means that available interconnection capacity and energy flows are effectively traded together, i.e. electricity buyers bid for electricity supplied by electricity generators from the other side of the interconnector and transmission capacity is included in the price.³⁷

In the **intraday** timeframe interconnection capacity is also allocated implicitly with the difference **that the coupling** is organized (via the XBID platform) as **continuous trading** that continuously matches the bids and offers provided by market participants, while regional auctions can be implemented where appropriate.³⁸

- **Coordinated capacity calculation**

To implement single day-ahead and intraday coupling, the available cross-border capacity needs to be calculated in a coordinated manner by the TSOs. For the capacity calculation, the EU Target Model foresees that TSOs establish coordinated methodologies to calculate the available transfer capacity (ATC). There are two permissible approaches when calculating cross-zonal capacity for day-ahead and intra-day timeframes: flow-based or based on coordinated net transfer capacity.³⁹ Flow-based capacity calculation should be applied on all bidding zone borders, which are electrically interdependent with other bidding zone borders. Coordinated net transfer capacity calculation may be used on bidding zone border where physical flows are not dependent on exchanges on borders.⁴⁰

³⁴ Mäntysaari P. (2015), EU Electricity Trade Law, p. 421.

³⁵ ACER (2020), Market Monitoring Report 2019 – Electricity Wholesale Markets Volume, p. 44.

³⁶ NEMO Committee (2019), EUPHEMIA Public Description, p.

³⁷ Mäntysaari P. (2015), p. 424.

³⁸ Article 63 of CACM Regulation.

³⁹ Preamble (6) and 7 of CACM Regulation.

⁴⁰ Article 20 of CACM Regulation and ACER's explanatory note on the Framework Guidelines on capacity allocation and congestion management (CACM Regulation).

As regards the forward market the EU Target Model prescribes that transmission capacity should be allocated in explicit auctions (i.e. interconnection capacity is sold as a separate product from energy flows), via Physical Transmission Rights (PTRs) with "use-it-or-sell-it" principle or via Financial Transmission Rights (FTRs).⁴¹

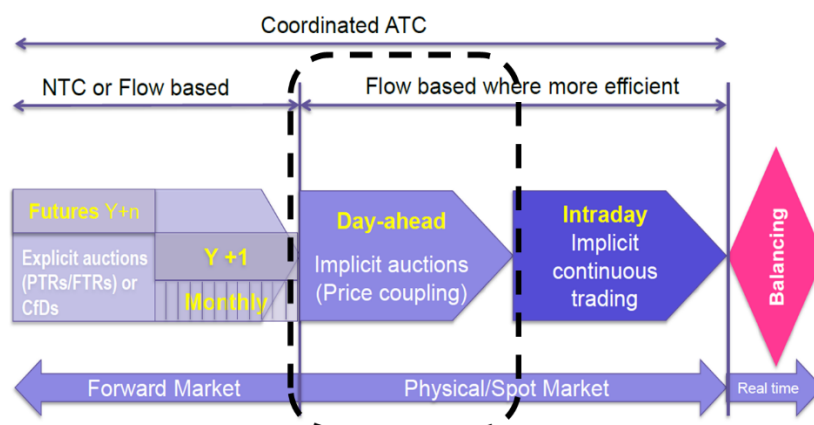


Figure 1: Electricity Markets in the Context of the EU Target Model
(Source: ENTSO-E)

- **Balancing**

As it is not possible to store electricity in large quantities in the wholesale market, there must be a continuous balance between electricity generation and consumption.⁴² The EU Target Model foresees three main procedures for the electricity balancing performed by the TSOs: (a) the procurement of reserves (balancing capacity) from balancing service providers (BSPs), (b) the activation of balancing energy and (c) the financial (imbalance) settlement of the balance responsible parties (BRPs). The integration of the EU balancing markets also requires the development of harmonised methodologies for the allocation of cross-zonal transmission capacity for balancing purposes and the harmonization of balancing products.⁴³

⁴¹ Article 31 of the FCA Regulation.

⁴² Mäntysaari P. (2015), p. 312

⁴³ Preamble (5) of Electricity Balancing Regulation.

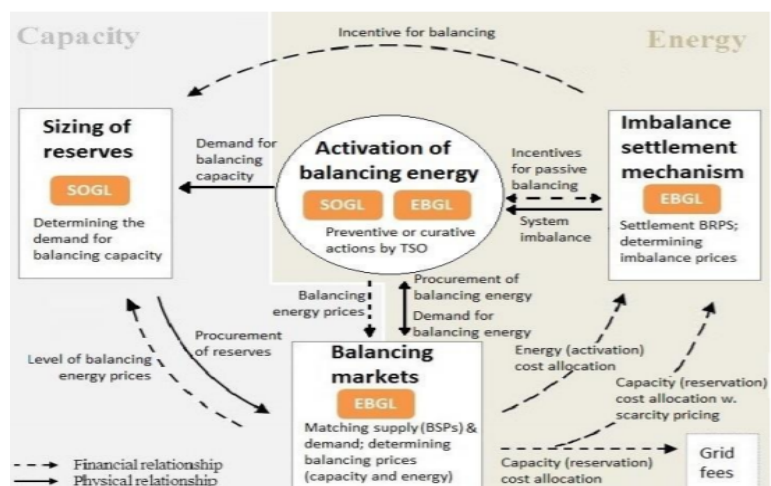


Figure 2: The procedures of the balancing mechanism, financial and physical relationships and relevant EU network codes (Source: FSR, The EU Electricity Codes, 2019 edit., adapted from Hirth and Ziegenhagen, 2015⁴⁴)

- **Congestion management**

Network congestion problems shall preferentially be solved with non-transaction based methods, i.e. methods that do not involve a selection between the contracts of individual market participants. Transaction curtailment procedures shall only be used in emergency situations where the transmission system operator must act in an expeditious manner and re-dispatching or countertrading is not possible.⁴⁵

2.3. POWER EXCHANGES IN EUROPE

Role

Power Exchanges (PXs) have been developed the last decades in Europe along with the liberalization of the energy markets. A Power Exchange is an organized market operating as a competitive wholesale trading facility (electronic auction platform) designed for energy commodities where different forms of energy and energy-related financial products are traded based on standard characteristics, quality and transaction terms and where demand and supply determine a public market clearing price.⁴⁶

PXs play an important role in liberalized energy markets as they: (a) provide a distribution channel for electricity producers and increase security of supply for electricity wholesalers, retailers and large end consumers and can also serve as marketplace for transmission capacity,

⁴⁴ Schittekatte T. et al (2019), p. 58.

⁴⁵ Article 16 of Regulation (EU) 714/2009 and article 16 of Regulation (EU) 2019/943.

⁴⁶ Ioannidis F. et al (2019).

(b) a pricing mechanism for both electricity and transmission capacity; (d) facilitate the transfer and management of risk; (e) increase liquidity and transparency necessary for the efficient functioning of electricity markets.⁴⁷ Overall, PXs, as any other commodities exchanges, are a place of limitation of monopoly power and development of competition both in terms of supply and demand where anonymous transactions take place under the same terms.⁴⁸

A list of the PXs in Europe can be found at the Association of European Energy Exchanges (Europex) website.⁴⁹ The two most important European spot markets are Nord Pool (the Nordic and Baltic area and the UK)⁵⁰ and EPEX Spot (western central Europe)⁵¹. Nordpool is a Nominated Electricity Market Operator in 15 European countries; in 2019 Nord Pool Nord Pool had a total turnover of 494 TWh of power traded.⁵² EPEX Spot operates the organised wholesale market for power trading across 13 European countries; 615 TWh have been traded on EPEX SPOT in 2020 – one third of the yearly European electricity consumption.⁵³

Organization and regulation

PXs can facilitate the transactions of energy related transactions that are settled both financially (financial exchanges) and physically (spot exchanges). PXs operate in a highly regulated environment. As a rule, financial (derivative) contracts fall within the regulatory regime of financial markets. Contracts for the physical supply of electricity traded in the spot markets do not fall within the regulatory regime applicable to financial markets – provided that these contracts can only be settled physically.⁵⁴

In particular, from a regulatory perspective, financial exchanges are governed by the Regulation⁵⁵ and Directive on markets in financial instruments⁵⁶ (MIFIR/MIFID II) and the Market Abuse Regulation⁵⁷ (MAR). The clearing of the financial derivatives falls within the

⁴⁷ Mäntysaari P. (2015), p. 170.

⁴⁸ Psaroudakis G. (2017).

⁴⁹ <https://www.europex.org/about/association/#who>

⁵⁰ <https://www.nordpoolgroup.com>

⁵¹ <https://www.epexspot.com/en>

⁵² <https://www.europex.org/members/nord-pool/>

⁵³ <https://www.europex.org/members/epex-spot/>

⁵⁴ Mäntysaari P. (2015), p. 175.

⁵⁵ Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012, OJ L 173, 12.6.2014, pp. 84–148.

⁵⁶ Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU, OJ L 173, 12.6.2014, pp. 349–496 (MIFID II Directive).

⁵⁷ Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (market abuse regulation) and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC, OJ L 173, 12.6.2014, pp. 1–61.

scope of the EMIR Regulation⁵⁸ and is performed by central counterparties (CCPs). A CCP is an entity that interposes itself between the counterparties to the contracts traded on one or more financial markets, becoming the buyer to every seller and the seller to every buyer⁵⁹ and undertakes measures for the mitigation of counterparty credit risk (risk management), i.e. calculates the net obligations and ensures that financial instruments, cash or guarantees are available to secure the exposures arising from those positions.⁶⁰ OTC markets do not fall within the scope of MIFID II, but could fall under the EMIR Regulation under certain conditions (e.g. OTC derivative contracts).⁶¹ Spot exchanges are governed by the EU Target Model regulatory regime mentioned above.

The operation of the financial and spot markets and the clearing can be undertaken either by the same entity or by separate entities⁶², subject to the respective authorizations depending on the market (i.e. financial or spot) and function (i.e. trading or clearing).

Operation of spot exchanges

(a) Markets and trading

Spot exchanges include a day-ahead market, an intraday market supplemented by a balance adjustment market operated by the TSOs. Access to trading in spot exchanges is limited to market participants that have access to the grid and transmission capacity, therefore in order to access trading in spot markets it is required evidence of the applicant's capability for physical settlement, i.e. the relevant contract with the TSOs has to be already in place for the applicant. In addition, the participant must be able to participate in clearing directly or indirectly, i.e. by appointing a representative for the clearing.

Spot exchanges usually provide an **auction** framework of bidding based trading for physical delivery of the energy during a particular hour of the next day (except in England and Wales, where half-hour contracts are traded).⁶³

There are different kind of bids (orders) in auctions depending on the operational rules of the PX. The basic form is the single contract order that is limited to electricity supply during certain

⁵⁸ Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories, OJ L 201, 27.7.2012, pp. 1-59 (EMIR Regulation).

⁵⁹ Article 2 (1) of EMIR Regulation.

⁶⁰ Tarnanidou Ch. (2016), p. 193.

⁶¹ The conditions are stipulated in article 1 and 4 (1) of EMIR Regulation.

⁶² For a detailed analysis of the different models see Tarnanidou Ch. (2016), p. 223.

⁶³ Madlener R. et al (2002), p. 7.

hour. In addition, participants can add several execution conditions to their bids, and they can offer or ask the same quantity of power and price for a period of consecutive hours called block orders.⁶⁴ There are also other types of orders depending on the way of execution, e.g. limit orders which carry a price limit and can be executed at this price or at a better price. All the submitted bids are collected in a sealed order book, i.e. the participants know only their own bids.⁶⁵

Some exchanges provide an alternative trading form to the auction system called **continuous trading**, i.e. each incoming bid is immediately checked and matched if possible according to price/time priority.⁶⁶

The bids and offers collected by the PXs within different timeframes serve as a necessary input for capacity calculation in the single day-ahead and intraday coupling process.

(b) System price and financial clearing

In the day-ahead market bids to supply are ranked in ascending order of price for every hour (or sometimes half hour) period of the following day. Offers to purchase are then ranked in descending order of price. The point where supply and demand intersects is the system (marginal) price for the entire geographic region covered by the power exchange,⁶⁷ i.e. the highest accepted bid is the one that determines the price. In auctions, all purchase bids with a price limit higher than the market clearing price and all the sale bids with a price limit lower than the market clearing price are executed, whereas continuous bids are normally matched according to price acceptance of bids of the opposite side.⁶⁸

Clearing includes the processes of the calculation of net positions complemented by various auctions that reduce the counterparty risk (i.e. use of collaterals or margin requirements). The financial clearing is undertaken by the clearing house or central counterparty. Clearing is followed by settlement, i.e. the payment of the purchase price for the bought volumes.⁶⁹

⁶⁴ Mäntysaari P. (2015), p. 206.

⁶⁵ Madlener R. et al. (2002), p.7.

⁶⁶ Madlener R. et al. (2002), p.8.

⁶⁷ Mäntysaari P. (2015), p. 198.

⁶⁸ Madlener R. et al. (2002), p.10-11.

⁶⁹ Mäntysaari P. (2015), p. 225.

(c) Clearing of physical flows – balancing

The party's supply and off take obligations must be communicated by the PX to the system operator. Physical real-time matching of supply and demand is made by the system operator that has to monitor the frequency of the power system and call up a balance provider to provide balancing services in order to keep the frequency within narrow bounds.⁷⁰ Market participants can thus provide in a separate market, **balancing services** to the TSO in two main ways, either by supplying balancing energy to the grid or by reducing electricity consumption (demand response).

⁷⁰ Mäntysaari P. (2015), p. 198

Chapter 3: THE REFORM OF THE GREEK WHOLESALE ELECTRICITY MARKET

3.1. THE PREVIOUS MARKET STRUCTURE (MANDATORY POOL)

Until 30th October 2020, the Greek wholesale electricity market was organized as a **Mandatory Pool** through which all electricity produced and consumed in the interconnected system was traded and which was operating according to the Day Ahead Scheduling (DAS) in accordance with the provisions of the Grid and Power Exchange Code as described briefly below.

According to the DAS model producers were obliged to bid for the total of their available capacity (for energy and ancillary services) and, accordingly, suppliers were obliged to bid for the entire demand they represent. The main characteristic of this model was its obligatory nature, i.e. whoever intended to enter the wholesale market was obliged to participate in this compulsory auction, whereas bilateral physical delivery contracts between producers and suppliers were not allowed.⁷¹

More specifically generators (apart from RES generators), self-producers and importers declared an offer price for each hour of the following day D for their available capacity to supply electricity to the system (price, volume). At the same time, all buyers of electricity, retailers, exporter, hydro-pumped storage and self-supplied consumers submitted demand declarations for each hour of the following day D, without price offer.

The day ahead market cleared on an hourly basis according to a **System Marginal Price (SMP)**, corresponding to the economic offer of the block lastly accepted in the economic merit order to meet demand. Thus, the SMP was the price charged by all those who injected energy into the interconnected system, and the price paid by all those who requested energy from the interconnected system.⁷²

More specifically, the DAS model incorporated the following individual markets:

- **Day Ahead Market (DAM)**, where all the electricity produced and consumed in the Interconnected System is being traded; and in which generators and traders (importers) offer electricity and they are remunerated for it by the suppliers and the traders (exporters) who absorb it.

⁷¹ Dagoumas Ath. (2012), p. 218.

⁷² Fortsakis Th. et al. (2016), p. 327.

- **Day Ahead Ancillary Services Market (DAASM)**, where the ancillary services and reserves necessary for the Hellenic electrical system were assured. The DAASM ensured the quality and reliability of the country's electricity supply.
- **Physical Transmission Rights Auctions**, for the sale of daily, monthly and yearly allocation of interconnections transmission rights.

The energy market, which covered the quantitative energy needs of the consumers, and the ancillary services market assuring the reliability of the system were optimized simultaneously in the process of the day-ahead scheduling.⁷³

In addition to the DAM, the following market mechanisms were also available⁷⁴:

- The **“Imbalance Settlement Mechanism”**, in which deviations from day-ahead schedules were charged or compensated, based on the Marginal Imbalance Price (IMP), depending on whether they reflect the TSO dispatch instructions or plant-specific reasons.
- The **“Transitional Flexibility Remuneration Mechanism”**, where producers were remunerated for their availability to provide flexibility services to the TSO. In particular, on instruction from the TSO and subject to a specified notice period, beneficiaries had to increase or decrease the amount of electricity injected into the electricity system at a specified minimum rate on a multi-hour time-scale.
- The **“Variable Cost Recovery Mechanism”**, whereby producers recovered at least their Variable Cost if their units are operating at a lower cost than their variable cost.
- The **“Regulated Auctions for Forward Baseload Electricity Products”** known as “NOME auctions” foreseen by L. 4389/2016, and aiming at reducing the share of the incumbent electricity producer and supplier in the Greek wholesale and retail energy markets.

According to RAE, the Mandatory Pool model with the aforementioned structure could not support the coupling of the Day-Ahead Market with the neighboring coupled countries which are energy-only markets. In addition, the electricity market did not include separate markets,

⁷³ Vlachou A. (2018), p. 32.

⁷⁴ Filippopoulou O. (2021), p. 46.

i.e. Day-Ahead, Intraday and Balancing Market operating in other European countries in accordance with the European rules.⁷⁵

3.2. THE CREATION OF THE FORWARD AND SPOT MARKETS

The restructuring of the Greek electricity market in order to comply with the European Union rules was initiated with the adoption of L. 4425/2016⁷⁶, which was amended and further supplemented by L. 4512/2018⁷⁷ introducing the creation of the four new electricity markets and the establishment of the Hellenic Energy Exchange.

Specifically, L. 4425/2016 provided for the development of the following four markets:

- 1) **Energy Financial (Derivatives) Market or Forward Market**
- 2) **Day-Ahead Market (DAM)**
- 3) **Intra-Day Market (IDM)**
- 4) **Balancing Market**

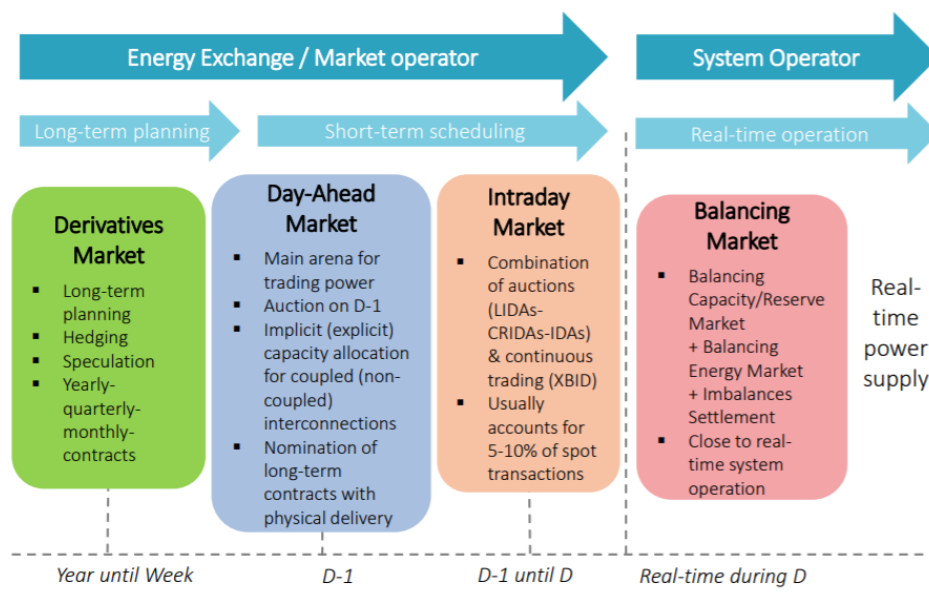


Figure 3: The sequence of the new electricity markets (Source: Papadionysiou E.⁷⁸)

The **Energy Financial (Derivatives) Market, the Day-Ahead Market and the Intra-Day Market** are operated by the **Hellenic Energy Exchange** (hereinafter “HEnEx”) according to

⁷⁵ RAE Decision 67/2017 “Guidelines to the competent Operators for the adoption of the Market Regulations according to Law 4425 for the restructuring of the Greek electricity market implementation the legislation for the integration of the single European electricity market”, Governmental Gazette Issue B’ 774/13.03.2017.

⁷⁶ Government Gazette Issue A’ 185/30.09.2016.

⁷⁷ Government Gazette Issue A’ 5/17.01.2018

⁷⁸ Papadionysiou E. (2019).

the rules and procedures stipulated in the “**Financial Energy Market Rulebook**” and in the “**Day-Ahead & Intra-Day Markets Trading Rulebook**” respectively, supplemented by technical decisions issued by HEnEx and methodologies or other approvals issued by the Hellenic Capital Market Commission (hereinafter “HCMC”) and the Regulatory Authority for Energy (hereinafter “RAE”).⁷⁹

The **Balancing Market** is operated by the Independent Transmission System Operator (hereinafter TSO”, or “ADMIE S.A.” as per its Greek initials) according to the rules and procedures stipulated in the “**Balancing Market Rulebook**” supplemented by technical decisions issued by the TSO as well as by methodologies or other approvals issued by RAE.⁸⁰

The **clearing (financial settlement)** of the DAM, IDM and the Balancing Market is undertaken by the **Hellenic Energy Exchange Clearing House S.A.** (hereinafter “EnExClear”) according to the rules of the “**Clearing Rulebook for Transactions on DAM and IDM**” and the “**Clearing Rulebook for Positions on the Balancing Market**” supplemented by technical decisions issued by EnExClear as well as by methodologies or other approvals issued by RAE.⁸¹ The clearing of the Energy Financial Market is performed by the **Athens Exchange Clearing House S.A** (hereinafter “ATHEXClear”) in accordance with the rules of the “**Rulebook for Clearing Derivatives Transactions**”.

	SPOT Markets			Derivative Markets
Market	Day Ahead	Intraday	Balancing	Energy Derivatives Market
Type of Market	Physical	Physical	Physical	Cash Settlement with optional Physical Delivery
Trading	HEnEx	HEnEx	ADMIE	HEnEx
Clearing	EnExClear	EnExClear	ADMIE	ATHEX Clear
Cash Settlement	EnExClear	EnExClear	ADMIE	ATHEX Clear
Technical and Operational Support	ATHEX	ATHEX	ADMIE	ATHEX

Figure 4: The structure and the operators of the new electricity markets in Greece (Source: Papadionysiou E.⁸²)

⁷⁹ See detailed list of decisions in Annex II.

⁸⁰ See detailed list of decisions in Annex II.

⁸¹ See detailed list of decisions in Annex II.

⁸² Papadionysiou E. (2019).

3.3. THE ESTABLISHMENT OF THE HELLENIC ENERGY EXCHANGE

HEnEx was created according to the provisions of articles 80 and 96 of L. 4512/2018, amending article 9 of L. 4425/2016 and issuing new article 117A of L. 4001/2011, providing for the establishment of a new entity, the Hellenic Energy Exchange (HEnEx), emerging from the spin-off of the previous Market Operator (LAGIE S.A.) and the transfer of the activities related to the operation of the electricity market to the new entity.⁸³ The new entity was founded on 18.06.2018 and commenced operation as a Power Exchange for the operation of the Day Ahead and Intra-Day Markets on 10.3.2020 following the approval of RAE⁸⁴ confirming HEnEx's compliance with the requirements provided in articles 9 - 11 of L. 4425/2016 as regards its organization arrangements (e.g. minimum share capital, internal structure and policies, independence and adequacy of the BoD members).

The current shareholders of HEnEx are: DAPEEP S.A. (22%), ADMIE S.A. (20%), DESFA (7%), Athens Stock Exchange (21%), EBRD (20%), Cyprus Stock Exchange (10%).⁸⁵ For the acquisition or transfer of shares of HEnEx as a result of which the shareholder participation percentage reaches or exceeds 20%, 1/3, 50% or 2/3 of its share capital, the prior approval of RAE is required (article 9 par. 7 of L. 4425/2016). In addition, the total participation of companies, in which the State holds all or the majority of the voting rights, shall not be reduced to a percentage less than 35% and shall not be more than 49% of its share capital and voting rights (article 117B par. 1 of L. 4001/2011).

HEnEx acts as **Nominated Electricity Market Operator (NEMO)** within the meaning of CACM Regulation responsible for the operation of the single day-ahead and intraday coupling, designated as such for a term of five (5) years by virtue of RAE Decision 1124/2019. In particular, for the designation RAE examined HEnEx's compliance with the criteria provided in article 6 of CACM Regulation, and confirmed that the company has adequate resources for common, coordinated, compliant and cost-efficient operation of single day-ahead and/or intraday coupling, including the resources necessary to fulfil the NEMO functions, financial resources, the necessary information technology, technical infrastructure and operational procedures as well as adequate level of business separation from other market participants.

Greece has a legal monopoly NEMO status in the sense of article 5 of CACM Regulation, as it is explicitly provided in par. 1 of article 8 of L. 4425/2016, according to which the

⁸³ Following the spin-off of the market operation branch LAGIE was renamed to DAPEEP which undertook the operation of the RES and Guarantees of Origin (RES & GO Operator).

⁸⁴ RAE Decision 36/2020, Government Gazette Issue B' 742/10.03.2020.

⁸⁵ <https://www.athexgroup.gr/energy-exchange-group> (viewed 09.09.2021).

designation of more than one NEMO in Greece is excluded. As stated above, NEMOs tasks include: (a) receiving orders from market participants, (b) having overall responsibility for matching and allocating orders in accordance with the single day-ahead and intraday coupling results, (c) publishing prices and (d) settling and clearing the contracts resulting from the trades according to relevant participant agreements and regulations.

In particular, the **clearing and the settlement** of energy exchange resulting from the single day-ahead and intraday coupling and the activity of the shipping agent provided in article 68 of CACM Regulation has been delegated by HEnEx, to its 100% subsidiary **EnExClear** pursuant to article 81 of CACM Regulation.

In addition, HEnEx acquired on 16.3.2020 the permission from the Hellenic Capital Market Authority required according to article 47 par. 3 of L. 4514/2018 and article 15 par. 1 of L. 4425/2016 for the operation of the Energy Financial (Derivatives) Market following an opinion issued by RAE⁸⁶ as regards the financial means settled by physical delivery.

⁸⁶RAE Opinion 5/2020.

Chapter 4: THE OPERATION OF THE NEW ELECTRICITY MARKETS

4.1. THE ENERGY FINANCIAL (DERIVATIVES) MARKET

4.1.1. Overview

The development of the Energy Financial Market, although is not an obligation stemming from the EU regulatory framework, is attempting to improve the operation of the electricity spot markets by: (a) enabling the market participants to lock in prices and quantities and thus limiting exposure to the more volatile spot markets depending on weather conditions, technical limitations and fuel prices, (b) mitigating the incentives to exercise market power and distort competition by putting participants in a more balanced position entering the spot markets and (c) coordinating investment in new resources assuring that adequate resources will be available when and where is most needed.⁸⁷

The Energy Financial Market, called also Derivatives Market or Forward Market (hereinafter the “Derivatives Market”) operates as a centrally organized (regulated) market within the meaning of article 4 par. 21 of Law 4514/2018⁸⁸, in which derivatives are traded, i.e. financial products whose value depends on (or derives from) the values of other, more basic, underlying variables.⁸⁹

The aim of the derivatives is mainly to compensate for the risk of fluctuations in electricity prices (*hedging*) or to capitalize i.e. capitalizing on price differences over space or time (*speculate or arbitrage*).⁹⁰

The Derivatives Market is operated by HEnEx through the electronic Trading System according to the rules laid down in the Energy Financial Market Rulebook⁹¹ approved by the HCMC⁹² and in line with the provisions of the Commission Delegate Regulation (EU) 2017/566⁹³ and

⁸⁷ECCO International Inc. (2017), p.9.

⁸⁸Law 4514/2018, Markets for financial instruments and other provisions, Government Gazette Issue A 14/30.01.2018. Law 4514/2018 implemented MIFID II Directive.

⁸⁹Hull J. (2018), p. 1.

⁹⁰Mäntysaari P. (2015), p. 573

⁹¹ Financial Energy Market Rulebook (Derivatives Market), 1st edition, 2020, viewed 29.08.2021 <https://www.enexgroup.gr/documents/20126/184422/20200305_Derivatives_Tr_Rulebook_EN.pdf>.

⁹² HCMC Decision 1/872/4.3.2020, Government Gazette Issue B' 1491/2020.

⁹³Commission Delegated Regulation (EU) 2017/566 of 18 May 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards for the ratio of unexecuted orders to transactions in order to prevent disorderly trading conditions, OJ L 87, 31.3.2017, p. 84–89.

the Commission Delegated Regulation (EU) 2017/584.⁹⁴ ATHEXClear, acting as central counterparty, undertakes the clearing of the transactions of the Derivatives Market in accordance with the rules stipulated in the Rulebook for Clearing Derivatives Transactions.⁹⁵

4.1.2. Participation

Participation in the Derivatives Market is permitted to the following entities⁹⁶:

- (a) credit institutions or investment firms that have been duly licensed to execute orders on behalf of clients or trade for own account in accordance with par. 5 and 6 of article 4 of Law 4514/2018 and Directive 2014/65/EU as far as they relate to transactions in commodity derivatives under article 4 par. 50 of Law 4514/2018. They may conduct transactions for their own account or on behalf of their clients;
- (b) any company engaged in energy-related activity which conduct transactions for their own account, i.e. producers, suppliers, traders, RES producers, RES aggregators.

4.1.3. Products

According to article 2.1.2. of the Financial Energy Market Rulebook the derivatives traded in the Derivatives Market are “futures” and “options”⁹⁷ contracts the underlying value being energy indices or other relevant energy products as defined in HEnEx Decisions⁹⁸. Trading in the Trading System is conducted anonymously, not only with respect to the orders forwarded to it, but also the trades executed therein.⁹⁹ Transactions in the Derivatives Market are designed to occur on the days set in the trading days calendar which is issued by HEnEx two months before the end of each year.

In specific, “**futures**” are contracts by virtue of which one party undertakes the obligation to sell (seller) and the other party the obligation to buy (buyer) on the predetermined expiration date of the contract, its underlying asset at a predetermined price.¹⁰⁰ “**Options**” are contracts by

⁹⁴Commission Delegated Regulation (EU) 2017/584 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying organisational requirements of trading venues, OJ L 87, 31.3.2017, p. 350–367.

⁹⁵ Rulebook for Clearing Derivatives Transactions, version 2.3, June 2019, viewed 10.08.2021 <<https://www.athexgroup.gr/documents/10180/21545/Derivatives+Clearing+Rulebook++24062019+%CE%99%CE%A3%CE%A7%CE%A5%CE%A3%2028022020N.pdf/639dd443-4ec1-479c-b049-aa442d0ff51>>.

⁹⁶Financial Energy Market Rulebook, article 1.2.1.

⁹⁷ Although mentioned in the Financial Energy Market Rulebook Rulebook, options have not been yet implemented.

⁹⁸ As regards Futures see HEnEx Decision No 5 “Electricity Futures Contract Specifications in the Financial Energy Market (Derivatives Market) of HEnEx” viewed 10.08.2021 <https://www.enexgroup.gr/documents/20126/184422/20210409_HEnEx_Der_Decision_5_EN.pdf>.

⁹⁹ Article 2.1.1. par. 3 of the Financial Energy Market Rulebook.

¹⁰⁰ Article 3.3.1.1. of the Financial Energy Market Rulebook.

virtue of which one party sells (seller) and the counterparty acquires (buyer), for a premium, the right (Option), without undertaking any relevant obligation, to buy from the seller of the option (call option) or sell to the seller of the option (put option) the underlying asset of the contract at a predetermined price on the predetermined expiration date of the contract (European option).¹⁰¹ The exercise of an Option is freely revocable up to the expiration date. With the exercise of the Options, the relative position is opened for both for the buyer and the seller in the corresponding Futures Contract of the same load profile and delivery period.¹⁰²

Futures and Options are categorized as follows: (a) based on the load profile: (i) baseload contracts (24h), (ii) peakload contracts (8:00-22:00), (iii) off-peak load contracts (20:00-8:00) and (b) based on the delivery duration (i) yearly contracts, (ii) quarterly contracts, (iii) monthly contracts.¹⁰³

4.1.4. Settlement

Futures Contracts are settled on the expiry of the contract either financially or physically.

In the **financial settlement**, the parties are obligated to settle in cash on the expiry of the contract the difference between the price agreed and the higher or lower final settlement price, i.e. the price calculated by ATHEXClear on the basis of the average of all daily spot market indices of the Day-Ahead Market for the specific load profile and delivery period of the contract.¹⁰⁴

Physical settlement (physical delivery) takes place with injection or withdrawal of the electricity underlying the Forward Contract into the transmission system.¹⁰⁵ The right to physically settle futures traded in the Derivatives Market is provided only to Participants in the Day-Ahead Market who hold the relevant derivatives positions and exercise the physical settlement right.¹⁰⁶

¹⁰¹ Articles 3.3.2.1. and 3.3.2.3. of the Financial Energy Market Rulebook.

¹⁰² Article 3.3.2.3. par. 9 of the Financial Energy Market Rulebook. In the event of the exercise of an Option, ATHEXClear has the right to randomly choose the sellers of that option, to whom it will assign the respective options.

¹⁰³ Articles 3.3.1.2. and 3.3.2.2. of the Financial Energy Market Rulebook.

¹⁰⁴ HEnEx Decision No 5 “Electricity Futures Contract Specifications in the Financial Energy Market (Derivatives Market) of HEnEx”, article 3.

¹⁰⁵ Article 3.3.1.5 of the Financial Energy Market Rulebook.

¹⁰⁶ Article 2.1.1. par. 11-13 of the Financial Energy Market Rulebook. Physical Settlement Declarations are submitted by ATHEXClear with registration in the Energy Trading Spot System (ETSS) of HEnEx, upon submission to ATHEXClear of the relevant declarations for exercising the physical settlement right by the Clearing Members on behalf of the Participants. The Participants are solely responsible for the conduction of the physical settlement whereas ATHEXClear and the Clearing Members are solely responsible for the proper transmission of the relevant declarations.

4.1.5. Registration of financial products in the Day-Ahead Market

ATHEXClear is responsible for the registration of the quantities (without the prices) traded in the Derivatives Market in the Energy Trading Spot System (ETSS) of HEnEx.¹⁰⁷

HEnEx is responsible for submitting the orders in the Day-Ahead Market for the quantities of energy traded in the Derivatives Market, which are Priority Price Taking Orders, i.e. orders priced at the minimum accepted price in the Day-Ahead Market.¹⁰⁸ (see below section 4.3.3.)

The registration process is specified in HEnEx Technical Decision No 4.¹⁰⁹

4.1.6. Restrictions

Suppliers with market share over 4% in the retail market, are allowed to register in the Day-Ahead Market only the 20% of the quantities traded via energy financial products which are settled physically.¹¹⁰ Taking into account the structure of the Greek market this measure has been introduced in accordance with article 18 par. 6 of L. 4425/2016, as a market power mitigation measure, in order to prevent any market abuse by the dominant participant¹¹¹ and in order to safeguard the functioning of the spot markets with adequate liquidity where the clearing price reflects the short-term marginal production cost.¹¹²

¹⁰⁷ Article 6.3. par. 1 of the DAM & IDM Trading Rulebook.

¹⁰⁸ Article. 4.1.3.2. par. 9 of the DAM & IDM Trading Rulebook.

¹⁰⁹ HEnEx Decision No 4 "Registration of Energy Financial Instruments and other energy wholesale products with physical delivery obligation", viewed 28.8.2021 <https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_04_EN.pdf>.

¹¹⁰ RAE Decision 1008A/2020, Government Gazette Issue B' 3385/2020, which has been prolonged by RAE Decision 1657/2020, Government Gazette Issue B 6027/2020.

¹¹¹ Analysis of the impact of bilateral contracts on wholesale markets where a market participant has dominant position has been performed by Dagoumas Ath. (2019).

¹¹² See Explanatory Report of L. 4425/2016 and RAE Decision 1008A/2020.

4.2. BILATERAL - OVER THE COUNTER - CONTRACTS

Energy trading can also take place via bilateral contracts outside an organized market (over the counter – OTC). The terms of the OTC contracts are negotiated freely between the counterparties.¹¹³

The main advantage of the OTC contracts is the directness of the communication, the confidentiality and the negotiation of the terms of the transaction, which allows trading with any commonly, agreed characteristics without the need to adapt to standard products.¹¹⁴ On the other hand, as opposed to transactions taking place in the organized Energy Financial Market, where the clearing house acting as central counterparty safeguards the fulfillment of the transaction, with the OTC contracts participants face the risk of their counterparties financial insolvency¹¹⁵, thus the parties must bilaterally agree, among others, on the collateral and payment arrangements.

There are various types of electricity OTC contracts. The most basic form is an electricity forward contract for the supply and off-take of a fixed amount of electricity at a pre-specified contract price at certain time in the future. Alternatively, the contracts can be load-serving contracts or schedules designed to match the pre-estimated load.¹¹⁶ The last years as the public support schemes for RES (under feed-in tariff contracts) are gradually being replaced by the obligation of the RES producers to participate in the wholesale electricity markets, long-term bilateral agreements for the sale of energy generated by RES stations to a supplier or end consumer, have emerged. The so called green (corporate) Power Purchase Agreements (PPAs) are suitable instruments to reduce risk for developers and financing parties as renewables have high initial investment costs, ensure price visibility and improve the environmental footprint of the counterparty (supplier or large consumer) and overall contribute to the growth of renewables.¹¹⁷

¹¹³ In practice, it is customary to use model agreements such as the EFET General Agreement concerning the Delivery and Acceptance of Electricity, available at [https://data.efet.org/Files/IBOR%20transition/IBOR%20transition%20-%20New%20EFET%20templates/EFET%20General%20Agreement%20Power%20-%20202.1\(a\)%20\(09.03.2021\).pdf](https://data.efet.org/Files/IBOR%20transition/IBOR%20transition%20-%20New%20EFET%20templates/EFET%20General%20Agreement%20Power%20-%20202.1(a)%20(09.03.2021).pdf) (viewed 31.8.2021), or for the sale/purchase of electricity produced by RES the EFET Power Purchase Agreement, available at [https://data.efet.org/Files/IBOR%20transition/IBOR%20transition%20-%20New%20EFET%20templates/EFET%20Power%20Purchase%20Agreement%20-%20Part%20II%20\(General%20provisions%20-%20non-executable\)%20-%20in%20cooperation%20with%20RE-Source.pdf](https://data.efet.org/Files/IBOR%20transition/IBOR%20transition%20-%20New%20EFET%20templates/EFET%20Power%20Purchase%20Agreement%20-%20Part%20II%20(General%20provisions%20-%20non-executable)%20-%20in%20cooperation%20with%20RE-Source.pdf) (viewed 31.8.2021).

¹¹⁴ Gountis B. (2021), p. 115.

¹¹⁵ Liapis D. (2018), p. 212.

¹¹⁶ Mäntysaari P. (2015), p. 473.

¹¹⁷ Mendicino L. et al (2019).

In terms of regulation, OTC contracts do not fall within the scope of the MIFID regime as they are neither traded on a regulated market, nor regarded as “financial instruments”. Certain OTC derivatives could fall within the scope of EMIR provided they are declared subject to the clearing obligation.¹¹⁸

The quantities traded through OTC contracts with obligation of physical delivery, shall be registered in the Day-Ahead Market and are subject to the same limitations in terms of quantities allowed to be entered in the Day-Ahead Market applicable to the financial products. Registration of the quantities in the Energy Trading Spot System is made by both parties of the contract¹¹⁹ according to the procedure specified in HEnEx Technical Decision No 4.¹²⁰ Then HEnEx is responsible for submitting the orders in the Day-Ahead Market, which, as the financial products, are submitted as Priority Price Taking Orders, i.e. orders priced at the minimum accepted price in the Day-Ahead Market.¹²¹ (see below section 4.3.3.)

¹¹⁸ Article 4 (1) of Regulation EMIR Regulation.

¹¹⁹ Article 6.3. par. 2 of the DAM & IDM Trading Rulebook.

¹²⁰ HEnEx Decision No 4 "Registration of Energy Financial Instruments and other energy wholesale products with physical delivery obligation", viewed 28.08.2021 <https://www.enexgroup.gr/documents/20126/144557/20200507_Ddecision_04_EN.pdf>.

¹²¹ Article 4.1.3.2. par. 9 of the DAM & IDM Trading Rulebook.

4.3. THE DAY-AHEAD AND INTRA-DAY MARKETS

4.3.1. Overview

In the **Day-Ahead Market (DAM)** the participants submit orders to buy or sell electricity with obligation of physical delivery for the next day (Delivery Day-D). Participation in the DAM is optional, except for the **producers (i.e. owners of dispatchable power plants), who are obliged** to submit sell orders for the available capacity of the generating units they represent, which has not been allocated via energy financial products transactions or OTC with obligation of physical delivery. As stated above, energy quantities resulting from the trades carried out within the Derivatives Market or from OTC contracts are also registered in the DAM. In compliance with the CACM Regulation cross-zonal capacities are allocated through implicit auctions implemented through the pan-European Day-Ahead coupling algorithm, Euphemia.

The **Intra-Day Market (IDM)** allows participants to update their trading position as delivery time approaches. In the IDM transactions to buy and sell electricity are auctioned after the gate closure of the DAM for physical delivery at Delivery Day D. Participation in the IDM is **optional** for all participants. Currently, in the IDM contracts are traded in local intraday auctions (1-h, 24 market time units). In the future, after the IDM coupling, there will be (a) complementary intraday auctions (1-h, 24 market time units) and (b) continuous intraday trading (30 min, 48 market time units). Specifically, the design of the IDM will be adapted to implement pan-European continuous intraday trading through the already agreed intraday solution, in combination with intraday auctions.¹²²

The DAM and IDM operate, as described below, according to the rules and procedures stipulated in the **Day-Ahead & Intra-Day Markets Trading Rulebook** (hereinafter DAM & IDM Trading Rulebook and/or Trading Rulebook) approved by RAE¹²³ as in force currently following two amendments¹²⁴, supplemented by technical decisions issued by HEnEx, methodologies and other approvals issued by RAE.¹²⁵

The trades in the DAM and IDM are concluded with the participation of the participants, who shall indicate the Clearing Member representing them for the clearing purposes towards the

¹²² Ioannidis F. et al. (2019).

¹²³ RAE Decision 1116/13.11.2018, Government Gazette Issue B' 5914/31.12.2018.

¹²⁴ RAE Decision 820/2020, Government Gazette Issue B' 1941/2020 and RAE Decision 1228/2020, Government Gazette Issue B' 4124/2020.

¹²⁵ See list of decisions in Annex II.

Clearing House. The Clearing Member shall be liable towards the Clearing House for the clearing and settlement of the financial part of the transaction.

For entering and participating in the DAM and IDM the applicant/participant shall pay the following **fees and charges** set by RAE¹²⁶ in accordance with article 6 par. 1 of L. 4425/2016:

- Administrative fee for the appraisal of the application
- Administrative fee for the initial registration
- Annual subscription fee
- Trading fee on the executed trading volume in MWh
- Commission on Behalf Of Trading (OBOT)
- Commission to use a common access point

The procedure for the calculation and payment of the above fees is stipulated in HEnEx Technical Decision No 6.¹²⁷

In the case of **non-compliance** with the applicable legislative and regulatory framework and the operational rules stipulated in the Trading Rulebook and in the relevant implementing decisions of RAE and HEnEX, HEnEx may impose measures against the violating participant in accordance with the procedure stipulated in article 3.7.1. of the DAM & IDM Trading Rulebook and the methodology specified in RAE Decision 945/2020.¹²⁸

4.3.2. Admission requirements

Access to the DAM and IDM for the execution of trades is permitted to entities that are authorized by HEnEx according to the procedure stipulated in Chapter 3 of the DAM & IDM Trading Rulebook.

¹²⁶ RAE Decision 950/2020 “Administrative fees and charges for the operation of the DAM and IDM for the years 2020-2022”, Government Gazette Issue B’ 2542/2020, available also at https://www.enexgroup.gr/el/c/document_library/get_file?uuid=c6aaeb1b-07ad-7f54-7e72-153a98a23f3c&groupId=20126 (viewed 28.08.2021).

¹²⁷ HEnEx Decision No 4 “Calculation, pricing and settlement procedures concerning the fees and charges of section 3.12, as well as the Non-Compliance Charges of the sections and sub-sections 4.4.2 and 6.8”, available at https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_06_EN.pdf (viewed 28.08.2021).

¹²⁸ RAE Decision 945/2020 “Methodology of imposing measures against the Participants in accordance with the provisions of section 3.7 of the Day-Ahead Market and the Intra-Day Market Rulebook and article 18 par. 4 of L. 4425/2016, as applying”, Government Gazette Issue B 3252/2020, available also at https://www.enexgroup.gr/documents/20126/211889/20200805_RAE_Proposal_09_MeasuresAgainstParticipants_EN.pdf (viewed 28.08.2021).

In particular, two types of entities are **eligible to participate** in these markets¹²⁹:

- a) legal entities or natural persons who hold a license to exercise an energy activity, or they are exempted by law from the obligation to obtain a license in order to exercise such activity, i.e. Producers, Suppliers, Traders, RES & High Efficiency CHP Producers, RES Aggregators, and Self-Supplying Consumers;
- b) the TSO (ADMIE S.A.), the RES & GO Operator (DAPEEP S.A.), the Last Resort Supplier and the Last Resort RES Aggregator acting on behalf or as representatives of certain participants or under their public interest capacity for the execution of specific tasks.

An applicant shall be authorized by HEnEx to become a participant in the DAM and IDM, provided that the conditions stipulated in article 3.4. of the Trading Rulebook are fulfilled, the required documentation is submitted and the procedure prescribed in HEnEx Technical Decision No 1¹³⁰ is successfully completed as follows:

- submission of the “Participant Membership Application”¹³¹, accompanied with the supporting documentation including, among others, the licenses, corporate and representation documentation, good standing certificates, the documentation required for the purposes the REMIT Regulation EU 1227/2011, financial statements;
- payment of the applicable administrative fee for the appraisal of the application;
- approval by the Clearing House that the person concerned will act as a Direct Clearing Member or submission of a certificate of cooperation (joint statement) with a General Clearing Member of the Clearing House in respect of the Clearing of its trades (see below section 4.5.2.);
- submission of the Balance Responsible Party Contract with the TSO (see below section 4.4.);
- maintenance of appropriate organizational, operational and techno-economic infrastructure as well as adequate and suitable control and security mechanisms for the electronic processing of data and internal control procedures with respect to its participation in HEnEx Markets. To this end, the “Participant Membership

¹²⁹ Article 3.2. of the DAM & IDM Trading Rulebook.

¹³⁰ HEnEx Technical Decision No 1 “Procedure for Acquiring the Participant capacity, Participant resignation and other issues regarding Participants in HEnEx Day-Ahead and Intra-Day Market”, available at https://www.enexgroup.gr/documents/20126/144557/20200906_Decision_01_EN.pdf (viewed 17.12.2020)

¹³¹ Submission of the “Participant Membership Application” is considered as acceptance by the applicant of the all the provisions of the DAM & IDM Trading Rulebook (article 3.4. par. 5 of the DAM & IDM Trading Rulebook).

Application” shall be accompanied by a know-your-client form clearly setting out the organizational procedures under which it intends to operate as a Participant.

HEnEx evaluates the completeness of the application within ten (10) days from its receipt and in case of approval it issues a Participant Registration Certificate. Subsequently, the Participant must perform, within one month, the following steps for the **activation of its participation** prescribed in article 2.1.2.2. of the HEnEx Technical Decision No 1:

- a) have the required technological infrastructure to ensure successful connection to HEnEx's Energy Trading Spot System (ETSS);
- b) have at least one Certified Trader and adequate number of Certified Traders taking into consideration the volume of trades it will be performing. The procedure for the certification of the trader is stipulated in HEnEx Technical Decision No 2.¹³²
- c) if the Participant intends to become active as a Direct Clearing Member, it must submit a certificate from EnExClear certifying that it meets the requirements to act as a Direct Clearing Member.
- d) pay to HEnEx the applicable initial registration fee and the applicable annual subscription fee.

The capacity of the Participant cannot be transferred or assigned to a third party.¹³³

The Participant's membership is automatically **terminated** in the following cases: a) termination or cancellation or revocation, as the case may be, of the license or non- fulfillment of the conditions for exemption from the licensing obligation in accordance, b) lack of a valid Balance Responsible Party Contract, c) lack of a valid approval by the Clearing House that the Participant is a Direct Clearing Member or non-existence of a certificate of cooperation with a General Clearing Member.¹³⁴

HEnEx maintains a Participants Registry, with the data of each Participant as well as a separate registry for the Certified Traders.

¹³² HEnEx Technical Decision No 2 "Professional competence of Participants' Certified Energy Traders participating in the Day-Ahead & Intra-Day Market of HEnEx", available at https://www.enexgroup.gr/documents/20126/144557/20200507_Ddecision_02_EN.pdf (viewed 28.08.2021)

¹³³ Article 3.3. of the DAM & IDM Trading Rulebook.

¹³⁴ Article 3.7.2.1. of the DAM & IDM Trading Rulebook.

4.3.3. Participation in the Day-Ahead Market

The trading in the DAM is taking place in accordance with the general provisions stipulated in Chapter 4 of the DAM & IDM Trading Rulebook and in the relevant HEnEx Technical Decisions and RAE's Decisions.

- **Participation**

In the DAM the participants submit orders to buy or sell electricity with obligation of physical delivery the next day (Delivery Day-D) through the Energy Trading Spot System (ETSS).

Participation in the DAM is semi-compulsory, i.e. it is optional for all Participants except for the Producers registered in the Participants' Registry (i.e. owners of dispatchable power plants). The DAM constitutes a compulsory market for Producers, which are obligated to submit sell orders for the available capacity of the generating units they represent, which has not been already allocated via energy financial products transactions or other transactions concerning wholesale energy products with obligation of physical delivery.¹³⁵ In case the Producers do not comply with the obligation to provide all available capacity of the generating units they represent as stated above, non-compliance charges shall apply as per RAE Decision 1656/2020.¹³⁶

- **Trading timeline**

DAM operates every calendar day D-1 for Delivery Day D. The Delivery Day-D comprises of twenty-four (24) time units (**Market Time Units**), each unit equals to one (1) hour, starting at 01:00 Eastern European Time (EET) on calendar day D and ending at 01:00 EET on the next calendar day D+1. The gate for the submission of the orders opens at 11:00 EET, D-2 and closes at 12:00 EET, D-1.¹³⁷

¹³⁵ Article 7 par. 2 of L. 4425/2016 and article 4.1.4. of the DAM & IDM Trading Rulebook.

¹³⁶ RAE Decision 1656/2020 "Defining the Regulatory Parameters for Calculating the Non Compliance Charge for the non legal submission of Sell Orders relating to the Available Capacity for the year 2020 subject to the provisions of sub-section 4.4.2.1 of the Day-Ahead and Intra-Day Markets Trading Rulebook and article 18 par. 4 of L. 4425/2016, as applying", Government Gazette Issue B 6075/31.12.2020, available also at https://www.enexgroup.gr/documents/20126/211889/20201223_R%CE%91%CE%95_Decision_NonComplianceProducers_Sell_2021_en.pdf/9309152b-d8d7-79ec-304e-b6a470fea146?t=1609930433130 (viewed 28.8.2021).

¹³⁷ Article 4.1.2. of the DAM & IDM Trading Rulebook and HEnEx Decision No 10 «Timeline Procedures for the Day-Ahead and Intra-Day Market», 2020, available at https://www.enexgroup.gr/documents/20126/144557/20201006_Decision_10_EN.pdf (viewed 10.08.2021).

The timeline procedure is provided in HEnEx Technical Decision No 10.¹³⁸

- ***Products - Order Types – Limits***

The products admitted for trading in the DAM, are hourly products (for each Market Time Unit) which are types of commercial contracts of electricity with physical delivery (injection or offtake) within the bidding zones of the Hellenic Transmission System.¹³⁹

The sell/buy orders are submitted to the DAM as follows¹⁴⁰:

- Per production unit and bidding zone as regards the Producers.
- Per portfolio (regardless of the technology) and per bidding zone as regards RES Producers, RES Aggregators and Last Resort RES Aggregator. The RES Aggregators submit separate orders for sell and buy.
- Per portfolio as regards the Suppliers, the Last Resort Supplier and the Self-Producers.

In particular, the types of orders that result from DAM products are hourly hybrid orders, block orders¹⁴¹, linked block orders and exclusive group of block orders (defined in detail in article 4.1.3.1 of the DAM & ID Trading Rulebook). By RAE Decision 87/2021¹⁴² certain restrictions to access specific order types are provided.

The orders submitted to the DAM & IDM shall abide by the **price limits** set by HEnEx Decision No 8¹⁴³, i.e. maximum 3,000€/MWh, minimum -500€/MWh. It should be noted that, according to article 10 of the Regulation (EU) 2019/943, neither maximum nor minimum limits on order submission prices nor on the clearing prices of energy transactions are allowed to be set. However, as stated explicitly, NEMOs may apply **technical price limits** on order submission prices within the timeframe of DAM and IDM. In addition, in accordance with paragraph 2 of the same article, NEMOs may apply harmonized limits on clearing prices for DAM and IDM,

¹³⁸ HEnEx Decision No 10 “Timeline Procedures for the Day-Ahead and Intra-Day Market”, available at https://www.enexgroup.gr/documents/20126/144557/20201006_Decision_10_EN.pdf (viewed 28.08.2021).

¹³⁹ Article 4.1.3 of the DAM & IDM Trading Rulebook.

¹⁴⁰ Article 4.1.4. of the DAM & IDM Trading Rulebook.

¹⁴¹ Block orders are aggregate bids for several hours, with a fixed price and volume throughout these hours. For instance, a block of consecutive hours might allow an electricity producer to spread out the start-up costs and also to offer lower prices. Mäntysaari P. (2015), p. 205.

¹⁴² RAE Decision 87/2021 “Regarding the access of the Participants to specific Order Types, the parameters for submitting them as well as the technical details as regards their content, in accordance with the provisions of subsection 4.1.3.1 of the Day-Ahead and Intra-Day Markets Trading Rulebook and article 18 par. 4 and 5 of L. 4425/2016, as in force”, Government Gazette Issue B 640/18.02.2021.

¹⁴³ HEnEx Decision No 8 "Maximum and Minimum Day-Ahead and Intra-Day Market Order Prices", 2020, available at https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_08_EN.pdf (viewed 12.08.2021).

which should be sufficiently high, so as not to restrict trades, taking into account the maximum value of lost load.

The market order limits set by the aforementioned HEnEx Decision coincide with the harmonized maximum and minimum clearing prices set by ACER Decision 4/2017¹⁴⁴ in accordance with article 41 of the CACM Regulation.

Furthermore, in the DAM Priority Price-Taking sell/buy orders can be submitted which are one-step Hourly Hybrid Orders priced at the minimum/maximum accepted price in the DAM. Priority Price-Taking sell/buy orders are submitted by the TSO, the RES & GO Operator, the Last Resort RES Aggregator and HEnEx among others for (a) the mandatory hydro injection, (b) the production of RES in commissioning, (c) the transmission system losses, (d) the production of RES stations under feed-in tariff regime, (f) the energy quantities that have been committed through trades executed within the Energy Derivatives Market or OTC contracts etc.¹⁴⁵

The above types of orders are part of the products included in ACER's Decision No 37/2020¹⁴⁶ regarding the products that can be taken into account in the single Day-Ahead coupling according to article 40 of the CACM Regulation.

- ***Validation of Orders - Market Coupling - Clearing Prices***

After the DAM gate closure time, HEnEx processes and anonymizes the valid orders submitted to the ETSS in the Local Order Book in order to submit them to the Shared Order Book of the Market Coupling Operator (MCO)¹⁴⁷, which is responsible for the matching orders from the day-ahead and intraday markets for different bidding zones across Europe and simultaneously allocating cross-zonal capacities.¹⁴⁸

The MCO uses the price coupling algorithm EUPHEMIA to match bids and offers in an optimal manner.¹⁴⁹ The valid orders included in the DAM Local Order Book are economically binding, meaning that in case of acceptance by EUPHEMIA they shall be subject to clearing and financial settlement. EUPHEMIA uses the **marginal pricing principle** according to which all

¹⁴⁴ ACER No 4/2017 on the nominated electricity market operators' proposal for harmonized maximum and minimum clearing prices for Single Day-Ahead coupling, available at https://tge.pl/pub/TGE/files/MC/ACER_Decision_04_2017_on_NEMOs_HMMCP_for_single_day_ahead_coupling.pdf (viewed 27.08.2021).

¹⁴⁵ Article 4.1.3.2. of the DAM & IDM.

¹⁴⁶ ACER Decision No 37/2020 on the Products that can be taken into account in the Single Day-Ahead Coupling.

¹⁴⁷ Article 4.3.1. of the DAM & IDM Trading Rulebook.

¹⁴⁸ The NEMOs undertake the role of the MCO in rotation.

¹⁴⁹ Preamble (5) and article 38-39 of the CACM Regulation.

accepted bids will have the same price per bidding zone per market time unit (market clearing price).¹⁵⁰ This means that the sale orders which have been submitted with price that is less or equal to the market clearing price and buy orders which have been submitted with price that is higher or equal than the market clearing price are accepted.¹⁵¹

After completing the process of executing the Price Coupling Algorithm, the MCO delivers the preliminary Day-Ahead Market Coupling Results to HEnEx. HEnEx confirms that the preliminary Day-Ahead Market Coupling Results have been calculated in accordance with the submitted orders and sends confirmation to the MCO. HEnEx publishes the final Day-Ahead Market Coupling results on its website and informs Participants concerning the execution status of their orders.

The **Day-Ahead Market Coupling results** consist of the following¹⁵²:

- (a) Market clearing prices per Market Time Unit of the specific physical Delivery Day and bidding zone,
- (b) Net delivery position of each bidding zone,
- (c) Accepted energy quantities of the hourly hybrid orders and the acceptance status and ratio of block orders.

- ***Post Coupling operations – transfer of information***

After the end of the coupling operations, specific information is transferred from the DAM to the IDM through ETSS for each Market Time Unit of each Delivery Day D. Namely the:

- scheduled imports and exports on each interconnection to the TSO, in order to compute the cross zonal capacity after the DAM solution. This cross zonal capacity will be available for use in the IDM trading processes;
- market schedules of each one of the Participants for each Market Time Unit of the Delivery Day.

- ***Clearing***

The clearing of the DAM is performed by the EnExClear acting as Clearing House in accordance with the rules of the Clearing Rulebook (see below section 4.5.).

¹⁵⁰ Article 38 par. 1 (b) of the CACM Regulation.

¹⁵¹ Filoppopoulou O. (2021), p. 16.

¹⁵² Article 4.3.4. of the DAM & IDM Trading Rulebook.

HEnEx forwards via the ETS the Day-Ahead Market results to the EnExClear which calculates the credits and debits of the Participants resulting from their participation in the DAM. In particular, HEnEx forwards to EnExClear the following information for the purposes of the clearing¹⁵³:

- market clearing price per bidding zone and per Market Time Unit;
- accepted energy quantity of the sell order of each Participant in each Market Time Unit;
- accepted energy quantity of the buy order of each Participant in each Market Time Unit.

4.3.4. Participation in the Intra-Day Market

The trading in the IDM is performed in accordance with the general provisions stipulated in Chapter 5 of the DAM and IDM Trading Rulebook and in the relevant HEnEx Technical Decisions and RAE's Decisions.

- *Participation*

In the IDM participants submit orders to buy and sell electricity with obligation of physical delivery after DAM gate closure time, at each calendar day D-1 and/or at each calendar day D. Participation in the IDM is optional for all Participants.

IDM includes the following procedures:

- 1) Local Intra-Day Auctions (LIDAs) in non-coupling mode;
- 2) Complementary Regional Intra-Day Auctions (CRIDAs);¹⁵⁴
- 3) Continuous Intra-Day Trading in coupling mode.¹⁵⁵

- *Trading timeline*

During the operation of LIDAs, three auctions are taking place. The **first auction (LIDA and/or CRIDA)** Gate Opening Time (GOT) is at 14:00EET, D-1, and the respective Gate Closure Time (GCT) for LIDA is at 15:30EET, D-1 and for CRIDA is at 16:00EET, D-1. The **second auction (LIDA and/or CRIDA)** GOT is at 16:30EET, D-1 and the respective GCT is at 23:00EET, D-1. Finally, the **third auction (LIDA and/or CRIDA)** GOT is at 23:30EET,

¹⁵³DAM & IDM Trading Rulebook article 4.4.3.

¹⁵⁴ During the implementation of the Pan-European Intra-Day Auctions (PEIDAs), the CRIDAs will be replaced by the PEIDAs according to the provisions of Decisions ACER 1/2019, 4/2020 and 5/2020, and any other decision issued in virtue of articles 55, 37 and 53 of the CACM Regulation.

¹⁵⁵ Not yet in force. Expected to enter into force around March 2022.

D-1 and the respective GCT is at 11:00 EET, D. For the first and second auction participants may submit orders for any Market Time Unit of Delivery Day D, whereas at the third auction participants may submit orders for any Market Time Unit of the second half of Delivery Day D.¹⁵⁶ In the Continuous Intra-Day Trading, participants may submit orders for Market Time Units of Delivery Day D up to sixty (60) minutes before each Market Time Unit.

The LIDA and CRIDA Market Time Unit is equal to one (1) hour. The Continuous Intra-Day Trading Market Unit is equal to thirty (30) minutes. The Delivery Day D comprises of twenty-four (24) Market Units in LIDAs and CRIDAs, and forty-eight (48) Market Time Units in Continuous Intra-Day Trading.

- ***Products – Order Types***

The products traded in the LIDAs and CRIDAs are hourly products, whereas the products traded in the Continuous Trading are hourly and half-hourly products. In all cases the products are types of commercial contracts of electricity with physical delivery (injection or offtake) within the bidding zones of the Hellenic Transmission System.¹⁵⁷

The LIDAs support hourly hybrid orders, the CRIDAs hourly hybrid orders and block orders and the Continuous Trading regular orders, linked orders and iceberg orders (defined in detail in articles and 5.4. and 5.5. of the DAM and IDM Trading Rulebook).

- ***Market Coupling - Results***

During the operation of the coupling, after the CRIDA Gate Closure Time, HEnEx processes and anonymizes the validated Orders in the Local Order Book, in order to submit them to the CRIDA Operator. In the Continuous Intra-Day Trading, HEnEx processes and anonymizes on a continuous basis the validated Orders in the Local Order Book, in order to submit them to the Shared Order Book (XBID platform) of the MCO.

After the end of the coupling operations, specific information is transferred from the IDM to the Balancing Market through ETSS. Namely the:

- scheduled imports and exports on each interconnection of the Hellenic Transmission System, in order TSO to calculate any cross zonal capacity after the IDM solution.

¹⁵⁶ Article 5.2.2 of the DAM & IDM Trading Rulebook and HEnEx Decision No 10 «Timeline Procedures for the Day-Ahead and Intra-Day Market», 2020.

¹⁵⁷ Article 5.3. of the DAM & IDM Trading Rulebook.

- final market schedules (i.e. namely the energy schedule resulting from the IDM solution) of each one of the Participants for each Market Time Unit of the Delivery Day.
- *Clearing*

The IDM clearing is performed by EnExClear acting as the Clearing House in accordance with the Clearing Rulebook (see below section 4.5).

After notifying the IDM results to Participants, HEnEx sends the IDM Results via the ETSS to EnExClear in order the latter to calculate the credits and debits of Participants resulting from their participation in the IDM.

4.4 THE BALANCING MARKET

4.4.1. Overview

Balancing means all actions and processes, through which the TSOs ensure, in a continuous way, the maintenance of system frequency within a predefined stability range, and compliance with the amount of reserves needed with respect to the required quality.¹⁵⁸ The balancing process consists of three main steps: 1) TSOs dimension their needs for balancing reserves, 2) TSOs procure the required balancing capacity and 3) TSOs procure balancing energy.¹⁵⁹

The Balancing Market (BM) operates, as described in brief below, according to the rules and procedures provided in the **Balancing Market Rulebook** (hereinafter “BM Rulebook”) approved by RAE¹⁶⁰, as in force currently following five amendments¹⁶¹, supplemented by technical decisions issued by the TSO (ADMIE S.A.) as well as by methodologies and other approvals issued by RAE¹⁶², all of them applying the guidelines and principles stipulated in the Electricity Balancing Regulation.

The balancing market in Greece is based on the **unit based/central dispatching model**¹⁶³: The TSO, selects the bids (which are given per production unit) with the lowest price on the basis of an optimization algorithm, and issues corresponding orders to each production unit selected for the provision of each service. Specifically, in the first stage, it is ensured that the System has sufficient available capacity to provide balancing services in accordance with the TSO’s estimates and then, when necessary, the required orders are issued to the entities that provide balancing services. Entities that provide balancing services submit bids to the market per unit, and per bidding zone.¹⁶⁴

¹⁵⁸ Article 2 (1) of Regulation (EU) 2017/2195.

¹⁵⁹ ENTSO-E (2018), “An Overview of the European Balancing Market and Electricity Balancing Guideline”, available at https://eepublicdownloads.entsoe.eu/clean-documents/Network%20codes%20documents/NC%20EB/entso-e_balancing_in%20europe_report_Nov2018_web.pdf (viewed 27.12.2020).

¹⁶⁰ Decision 1090/2018, Government Gazette Issue B’ 5910/31.20.2018 and B’468/18.02.2019 (corrigendum).

¹⁶¹ RAE Decisions 938/2020 (GG Issue B 2757/07.07.2020), 1357/2020 (GG Issue B 4516/14.10.2020), 1572/2020 (GG Issue B 5484/2020), 54/2021 (GG Issue B 531/2021), 609/2021 (GG Issue B 3500/2021).

¹⁶² See list of decisions in Annex II.

¹⁶³ According to Article 2(18) of the Electricity Balancing Regulation ‘central dispatching model’ is a scheduling and dispatching model where the generation schedules and consumption schedules as well as dispatching of power generating facilities and demand facilities, in reference to dispatchable facilities, are determined by a Transmission System Operator within the integrated scheduling process. The same definition is in this regard used in Article 2(29) of Regulation (EU) 2019/943.

¹⁶⁴ <https://www.admie.gr/en/market/general/capacity-calculation>

In particular, the Balancing Market consists of the following separate markets/processes:

- **Balancing Capacity Market:** Its purpose is to reserve sufficient balancing resources in real time, in accordance with the System's reserve requirements, which (capacity) is retained by the Participants for a predetermined period of time.¹⁶⁵
- **Balancing Energy Market:** Its purpose is to balance energy supply and demand, considering the Market Schedules and the state of the system in real time. In this market the Participants offer energy, which is used by the TSO to maintain the system frequency within a predetermined range, as well as the balance between electricity generation and demand, while observing the electricity exchange programs with neighboring countries.¹⁶⁶
- **Imbalance Settlement:** The mechanism for charging or paying a Balance Responsible Party for their imbalances.¹⁶⁷

4.4.2. Entities

According to article 10 of the BM Rulebook, the entities participating in the Balancing Market are the following:

➤ **Balancing Services Entities:** They provide Balancing Energy¹⁶⁸ and/or Balancing Capacity¹⁶⁹ (jointly referred as “Balancing Services”). They are represented by Balancing Service Providers (BSPs)¹⁷⁰. The Balance Service Entities include the following:

- Dispatchable Generating Units: Conventional Dispatchable Generating Unit with an installed capacity above 5 MW and Dispatchable CHP Units above 35 MWe. A Generating Unit shall be represented by one Producer.

¹⁶⁵ Article 5 (k) of L. 4425/2016 and article 3 par. 4 of the BM Rulebook.

¹⁶⁶ Article 5 (l) of L. 4425/2016 and article 3 par. 1 of the BM Rulebook.

¹⁶⁷ Article 2(9) of Regulation (EU) 2017/2195.

¹⁶⁸ The energy used by the TSO to make a balance, i.e. to cover generation/demand balances. It is divided into upward and downward balancing energy (article 3 (49) of the BM Rulebook).

¹⁶⁹ A volume of reserve capacity that a Balancing Service Provider has agreed to hold in each Dispatch Period and in respect to which the Balancing Service Provider has agreed to submit bids to the TSO for a corresponding volume of Balancing Energy for the duration of the contract (article 3 (61) of the BM Rulebook).

¹⁷⁰ Articles 3 (6) and 16 of Regulation (EU) 2019/2195.

- Dispatchable RES Units Portfolios: RES Units portfolio, that includes one or more RES Units with obligation to participate in the market¹⁷¹ connected to a particular bidding zone and which, based on their technical capacity, can offer balancing services. A Dispatchable RES Units Portfolio shall be represented by one RES Producer or a RES Aggregator.¹⁷²
- Dispatchable Load Portfolios: Load portfolio, that includes one or more loads connected to a particular bidding zone and which, based on their technical capacity can offer balancing services. A Dispatchable Load Portfolio shall be represented by a Demand Response Aggregator. Dispatchable Load Portfolio that includes only one load can be represented by one consumer.¹⁷³

➤ **Balance Responsible Entities**: They assume responsibility for the imbalances they cause. They are represented by Balance Responsible Parties (BRPs)¹⁷⁴. The Balance Responsible Entities are the following:

- All BSPs
- Non-Dispatchable RES Units Portfolios: RES Units portfolio that includes one or more RES units with market participation obligation connected to a particular bidding zone and which do not offer Balancing Services to the TSO. Every Non-Dispatchable RES Units Portfolio shall be represented by one RES Producer or a RES Aggregator.¹⁷⁵
- Non-Dispatchable Load Portfolios: Load portfolio, that includes one or more loads connected to a particular bidding zone and which do not offer Balancing Services to the TSO. Every Non-Dispatchable Load Portfolio shall be represented by one supplier or one consumer.¹⁷⁶
- RES Units Portfolios without Market Participation Obligation: RES Units Portfolio without market participation obligation¹⁷⁷ connected to a specific bidding zone. RES Units Portfolios without market participation obligation shall be represented by the RES & GO Operator (DAPEEP). DAPEEP has balance responsibility for the RES Units Portfolios without Market Participation Obligation.

¹⁷¹ RES units with market participation obligation are: the RES Units for which a Contract for Differential State Aid Support has been concluded in accordance with the provisions of L. 4414/2016 as well as the RES Units covered by the provisions of article 3 (19) and article 12A of L. 4414/2016 (article 3 (88) of the BM Rulebook).

¹⁷² Article 3 (136) of the BM Rulebook.

¹⁷³ Article 3 (133) of the BM Rulebook.

¹⁷⁴ Articles 3 (7) and 17 of the Electricity Balancing Regulation.

¹⁷⁵ Article 3 (137) of the BM Rulebook.

¹⁷⁶ Article 3 (134) of the BM Rulebook.

¹⁷⁷ RES Units without market participation obligation are: the RES Units for which either a Feed-in Tariff Agreement has been concluded in accordance with the provisions of L. 4414/2016, or a Power Purchase Agreement has been concluded in accordance with the provisions of article 12 of L. 3468/2006.

- Import Portfolios and Export Portfolios.

In addition to the above, the Contracted Generating Units are foreseen which do not participate in the Balancing Market procedures but provide additional services in any situation that may lead to the load and/or reserve requirements not being covered during the Integrated Scheduling Process (ISP), following conclusion of a relevant contract, as stipulated in the TSO Grid Code.

4.4.3. Admission requirements

- **General registration requirements**

According to article 4 of the BM Rulebook, the TSO keeps a Participants' Registry, which consists of the following sub-Registries:

- a) Balancing Service Providers Registry
- b) Balance Responsible Parties Registry
- c) Balancing Market Generating Units Registry
- d) Dispatchable RES Units Portfolio Registry
- e) Dispatchable Load Portfolio Registry

In order to register in the TSO Registries, the interested party shall submit the required documentation prescribed in article 8 of the BM Rulebook and follow the procedure laid down in the TSO's Technical Decision "Procedure for registration with the HETS Operator Registry".¹⁷⁸ Among others, the applicant must submit the legalization documents, the relevant licenses, guarantees, and must pay the registration fee, determined by RAE Decision 1415/2020.¹⁷⁹

- **Registration in the Balancing Service Providers Registry**

According to article 5 of the BM Rulebook, the following persons are entitled to register in the Balancing Service Providers Registry kept by the TSO, as long as they are able to provide Balancing Services: (a) Producers who own a power generating unit, which is located on the mainland or on the interconnected islands and has an installed capacity of over 5 MW, (b) RES Producers, with obligation to participate in the market, as long as they own a RES unit and they are not represented by a RES Aggregator, (c) Self-producers, (d) RES Aggregators, for RES

¹⁷⁸ TSO Technical Decision "Procedure for registration with the HETS Operator Registry", available at <https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis> (viewed 28.8.2021).

¹⁷⁹ RAE Decision 1415/2020 "Determination of fee for registration in the TSO's registers", Government Gazette Issue B 4768/2020, available at file:///C:/Users/tkoutsopoulou/Downloads/%CE%A1%CE%91%CE%95_1415-2020.pdf (last access 28.08.2021).

Units with obligation to participation in the market, (e) Demand Response Aggregators, and (f) Consumers, including Self-Supplied customers providing demand response services, as long as they are not represented by a Demand Response Aggregator.

Registration in the Balancing Service Providers Registry is mandatory for Producers who own power station of an installed capacity of over 5 MW, i.e. they have the obligation to provide balancing services.

For registration in the Balancing Service Providers Registry, the terms and conditions prescribed in the Methodology “Terms and Conditions for Balancing Service Providers” approved by virtue of RAE’s Decision 1033/2020¹⁸⁰ must be fulfilled.

Upon registration with the Balancing Service Providers Registry, the Balancing Service Providers are deemed to have concluded a Balancing Service Contract with the TSO, governed by the provisions of BM Rulebook.

- **Registration in the Balance Responsible Parties Registry**

Natural or legal persons, holding one or more of the following capacities, are obliged to register in the Balance Responsible Parties Registry kept by the TSO, (a) the entities entitled to become BSPs, as mentioned above (b) Suppliers, (c) Self-suppliers, (d) Traders and (e) the RES & GO Operator representing RES without obligation to participate in the market.

For registration in the Balance Responsible Parties Registry, the terms and conditions prescribed in the Methodology “Terms and Conditions for Balance Responsible Parties” approved by virtue of RAE’s Decision 1032/2020¹⁸¹ must be fulfilled.

Upon registration with the Balancing Service Providers Registry, the Balance Responsible Parties are deemed to have concluded a Balance Responsible Parties Contract with the TSO, governed by the provisions of BM Rulebook.

¹⁸⁰ RAE Decision 1033/2020 “Terms and Conditions for Balancing Service Providers”, Government Gazette Issue B’ 3493/2020, available also at <https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis> (viewed 28.08.2021).

¹⁸¹ RAE Decision 1032/2020, Government Gazette Issue B’ 3558/2020, available also at <https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis> (viewed 28.8.2021).

4.4.4. Operation of Balancing Capacity Market (Integrated Scheduling Process) - Balancing Energy Market - Imbalance Settlement

The Balancing Market comprises of three different processes: (a) the Integrated Scheduling Process, (b) the Balancing Energy Market and (c) the Imbalance Settlement.

- **Integrated Scheduling Process**

The Integrated Scheduling Process (ISP) is performed according to the provisions of Section II of the BM Rulebook and involves the procedures and actions undertaken by the participants and TSO in order secure the capacity available by the Balancing Service Providers and integrate (or not integrate) in the market schedule.

All procedures and actions related to ISP refer to a specific Dispatch Day D, which coincides with the Delivery Day of the Day-Ahead Market and the Intraday Market. The Dispatch Day D starts at 01:00 EET of calendar day D and ends at 01:00 EET of calendar day D+1. The Dispatch Day consists of individual Dispatch Periods. The duration of each Dispatch Period is set at half an hour. The first Dispatch Period of Dispatch Day D is 01:00 – 01:30 Eastern European Time.¹⁸²

During the ISP the BSPs, based on the forecasts for each Dispatch Period of the Dispatch Day published by the TSO, submit offers for upward or downward balancing capacity and energy, i.e. intention to provide reserves as regards capacity and intention to increase or decrease production or consumption as regards energy. The specific products available during the ISP are prescribed in article 36 par. 7 and 50-57 of the BM Rulebook.

After the ISP is executed, TSO publishes the results which provide: a) the integration (or no integration) schedule of the BSPs, b) the Balancing Capacity for each Balancing Service Entity and for each Dispatch Period of the Dispatch Day.

Details about the operation of the ISP are provided in the TSO Technical Decision: “Integrated Scheduling Process”.¹⁸³

¹⁸² Article 36 par. 2-4 of the BM Rulebook

¹⁸³ TSO Technical Decision “Integrated Scheduling Process”, available at <https://www.admie.gr/agora/rythmistiko-plaisio-agoras/methodologies-kai-tehnikes-apofaseis> (last access 27.12.2020)

- **Balancing Energy Market**

In Balancing Energy Market quantities and prices are determined for the activation of Balancing Energy by the respective BSPs, in order to balance energy supply and demand, taking into account the Market Schedules and the state of the transmission system in real time.¹⁸⁴

During this process, the TSO issues instructions to: (a) the Dispatchable Generating Units as regards their mode of operation, and (b) other Balancing responsible entities determining the injection or offtake of power.¹⁸⁵

- **Imbalance Settlement**

During the Imbalance Settlement, the calculation of the quantities of Balancing Energy and Balancing Capacity and the calculation of the monetary value of the Participants' debits and credits is performed in accordance with the rules of Section IV of the BM Rulebook.

The Balancing Energy, the Balancing Capacity and the imbalances are cleared every 15-minutes (Imbalance Settlement Period).

4.4.5. Transitional measures

Shortly after the launch of the new electricity markets, RAE, by exercising its monitoring responsibilities, noted an increase in the balancing costs, especially in the charges of UA-3: Financial Neutrality Uplift Account which is used to allocate to Balance Responsible Parties any remaining balance after the calculation of the debits and credits calculated by the TSO for the activated Balancing Energy for manual FRR, the activated Balancing Energy for automatic FRR, the energy activated for purposes other than balancing and Imbalance Settlement.¹⁸⁶

According to RAE's evaluation, the increase of the balancing costs was attributed to the following reasons¹⁸⁷:

- a) The implementation of restrictions in the saturated system of Peloponnese. To meet the above restrictions, in the BM the units are redispached during the resolution phase of the Integrated Scheduling Process, without being possible to distinguish between the

¹⁸⁴ Article 63 of the BM Rulebook.

¹⁸⁵ Article 65 of the BM Rulebook.

¹⁸⁶ BM Rulebook, article 95.

¹⁸⁷ See RAE's Report for the year 2020, page 48, available at https://www.rae.gr/wp-content/uploads/2021/04/%CE%A0%CE%B5%CF%80%CF%81%CE%B1%CE%B3%CE%BC%CE%AD%CE%BD%CE%B1_2020_final-2.pdf (viewed 28.08.2021).

energy activated for balancing purposes and that activated for other purposes (redistribution due to congestion), resulting in the possibility of production units in the specific geographical location to take advantage of the constraints of the System in order to set an arbitrarily high, or correspondingly low in the case of downward balancing energy, price.

- b) Large quantities of reserves were activated for upward and downward balancing energy. In particular, it was observed that mainly the producers owning thermal power plants were submitting simultaneously large volumes of upward and downward balancing energy, despite that the capacity imbalance of the system may be lower.
- c) Submission of a single step order for the technical minimum generation on balancing energy bids and intermittent load service.

Taking into account the above and in order to ensure the proper functioning of the BM and to mitigate any possible market abuse, RAE adopted **transitional measures** in the beginning of 2021. In particular, by virtue of RAE Decision 54/2021, the BM Regulation was amended: a) in order the submission by the BSPs of Balancing Energy Offers with negative prices is suspended until the existing restriction, due to congestion, is restored in the System of Peloponnese, and (b) to explicitly introduce the requirement that the quantity of first step of the upward (or the quantity of the last step of the downward, respectively) offer of Balancing Energy corresponds to the technical minimum generation.

4.5. CLEARING

4.5.1. Overview

According to CACM Regulation the **clearing and settlement of the transactions of the DAM & IDM** are undertaken by central counter parties which act as the counter party to market participants for all their trades with regard to the financial rights and obligations arising from these trades. In particular, the central counterparties undertake the task of entering into contracts with market participants, by novation of the contracts resulting from the matching process, and of organising the transfer of net positions resulting from capacity allocation with other central counter parties or shipping agents.¹⁸⁸

The clearing (financial settlement) of the DAM and IDM is undertaken by the EnEx Clearing House S.A. (EnExClear S.A.)¹⁸⁹, following the approval of RAE¹⁹⁰ confirming the company's compliance with the criteria stipulated in article 12 par. 4 of L. 4425/2016 as regards its organizational, financial and operational arrangements.

According to article 12 par. 2 of L. 4425/2016, the clearing process includes the following tasks:

- calculation of the quantities of energy and capacity purchase and sale and the corresponding positions, including the calculation of financial obligations and claims;
- invoicing to Market Participants;
- settlement of cash obligations and rights¹⁹¹;
- counterparty risk management by calculating margins and credit limits as well as managing guarantees and default fund.

The Clearing of the DAM & IDM is performed according to the rules and procedures provided in the Clearing Rulebook for Transactions on Day-Ahead and Intraday Markets (DAM & IDM

¹⁸⁸ Articles 2 (42) and 68 of the CACM Regulation.

¹⁸⁹ EnExClear S.A. is a 100% subsidiary of HEnEx incorporated on 02.11.2018.

¹⁹⁰ RAE Decision 1125/2020, Government Gazette Issue B' 428/2020.

¹⁹¹ The settlement of cash obligations and rights which arise from the positions in transactions as cleared through EnExClear and the collection of the corresponding amounts due is carried through the Cash Settlement Agent appointed by EnExClear (article 1.1. par. 4 of the DAM & IDM Clearing Rulebook and the Balancing Market Clearing Rulebook). In particular, cash settlement is carried out by EnExClear through TARGET2-GR, the Cash Settlement System, of the Bank of Greece, in accordance with Guideline ECB/2012/27 of European Central Bank, on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET2) (see EnExClear Technical Decision No 5 "Technical Procedures for Cash Settlement" for the DAM & IDM, available at https://www.enexgroup.gr/documents/20126/393427/20200413_Decision_5_EN.pdf and EnExClear Technical Decision No 10 "Technical Procedures for Cash Settlement of Balancing Market Positions", available at https://www.enexgroup.gr/documents/20126/393433/20200605_Decision_10_EN.pdf (viewed 28.08.2021).

Clearing Rulebook) approved by RAE by virtue of Decision 1125A/2020¹⁹², supplemented by technical decisions issued by the EnExClear as well as by other approvals issued by RAE¹⁹³.

EnExClear provides **clearing services also for the Balancing Market**. For the Balancing Market, EnExClear receives the positions (financial obligations and claims for the Market Participants), from the TSO and undertakes the following:

- invoicing Market Participants;
- settlement of cash obligations and rights¹⁹⁴;
- counterparty risk management by calculating margins and credit limits as well as managing guarantees and Default Fund

The calculation of cash obligations and claims is performed by the TSO and the results (Participants' positions) are communicated on a weekly basis to EnExClear to proceed to the next steps of the clearing process.

The execution of the above clearing services has been assigned by the TSO (ADMIE S.A.) to EnExClear following the approval of the outsourcing agreement by RAE¹⁹⁵ in accordance with the provision of par. 1 of article 12 of L. 4425/2016.

The clearing of the Balancing Market is performed according to the rules and procedures provided in the Clearing Rulebook for Balancing Market Positions (Balancing Clearing Rulebook) approved by RAE by virtue of Decision 943/2020¹⁹⁶ supplemented by technical decisions issued by the EnExClear as well as by other approvals issued by RAE.¹⁹⁷

¹⁹² Government Gazette B' 428/2020.

¹⁹³ See list of decisions in Annex II.

¹⁹⁴ Same procedure as the settlement of the DAM&IDM.

¹⁹⁵ RAE Decision 942/2020, Government Gazette Issue B' 2955/2020.

¹⁹⁶ Government Gazette Issue B 2955/2020.

¹⁹⁷ See list of decisions in Annex II.

4.5.2. Clearing Members

Clearing is carried out between EnExClear and the Clearing Members which guarantee the obligations of the Market Participants to EnExClear.

There are two categories of Clearing Members¹⁹⁸:

- a) **Direct Clearing Members** - undertake the clearing transactions they carry out (on their account) in the electricity markets as Participants. Thus, entities which have acquired the capacity of the Participant in DAM, IDM and in the Balancing Market are eligible to become Direct Clearing Member.
- b) **General Clearing Members** - undertake the clearing transactions conducted by Participants in the electricity markets. Eligible to become General Clearing Members are the following entities:
 - i. credit institutions provided in Law 4261/2014¹⁹⁹ or investment firms provided in Law 4514/2018²⁰⁰ whose registered office is in Greece, provided they meet the conditions set out in par. 1(b) of article 13, Law 4425/2016, and
 - ii. credit institutions of an EU member state, other than Greece, or of a third country as stipulated in Directive 2013/36/EU or a third-country investment firm or undertaking stipulated in Directive 2014/65/EU operating through a branch in Greece and/or remotely, provided it can be evidenced that, under the law governing the undertaking in question, the latter is permitted to access the clearing of the relevant transactions in accordance with the applicable provisions of par. 1(b), article 13, Law 4425/2016.²⁰¹

- ***Acquiring the capacity of the Clearing Member***

The capacity of Clearing Member is acquired after approval of the application submitted by the interested party to EnExClear. Clearing Members must have the appropriate organizational, operational, financial and technical infrastructure and adequacy. To acquire the status of Direct Clearing Member, the candidate must have previously acquired the status of Participant in the DAM, IDM and Balancing Market. General Clearing Members must have the necessary additional financial resources and operational capacity to perform this activity. In particular,

¹⁹⁸ Article 2.8. of the DAM & IDM Clearing Rulebook and the Balancing Clearing Rulebook.

¹⁹⁹ L. 4261/2014 “Access to the activity of credit institutions and prudential supervision of credit institutions and companies (incorporation of Directive 2013/36/EU), Government Gazette Issue A’ 107/2014.

²⁰⁰ L. 4514/2018 “Financial instruments markets and other provisions”, Government Gazette Issue A’ 14/2018.

²⁰¹ Article 2.10.1 par. 2 of the DAM & IDM Clearing Rulebook and the Balancing Clearing Rulebook

Direct Clearing Members must have own funds of at least €500,000.00, whereas General Clearing Members must have own funds of at least €3,000,000.00.²⁰²

The procedure for acquiring the capacity of the Clearing Member is described in EnExClear Technical Decision No 1.²⁰³

4.5.3. Execution of clearing

As far as **the clearing of the DAM & IDM transactions** is concerned, before the start of each trading day and/or during such day, each General Clearing Member declares in the System the Participant or Participants in electricity markets whose transactions it will be clearing on that trading day, as well as the credit limit, which it allocates to each of them for the relevant trading day. This declaration is deemed to include a statement of assignment of the clearing of the relevant transactions by Participants to the General Clearing Member and correspondingly a statement of undertaking of clearing by the General Clearing Member making the aforesaid declaration. Each Direct Clearing Member may, on each trading day, enter orders in the ETSS and conduct transactions only up to the credit limit allocated to it for the relevant trading day.²⁰⁴

As regards the **clearing of the Balancing Market**, each Direct Clearing Member undertakes the clearing, for each clearing day, of the positions it holds on its own account in the Balancing Market. Each Non-Clearing Member must, before its participation in the Balancing Market, declare the General Clearing Member that undertakes the clearing of its positions. This declaration is jointly submitted with the General Clearing Member to EnExClear.²⁰⁵

4.5.4. Financial obligations

Clearing Members must pay to EnExClear all registration fees, annual subscription fees and charges for connecting to the systems of EnExClear,²⁰⁶ as determined by EnExClear.²⁰⁷ In

²⁰² Article 2.10.4 of DAM & IDM Clearing Rulebook and the Balancing Clearing Rulebook

²⁰³ EnExClear Technical Decision No 1 “Procedure for acquiring the capacity of Clearing Member of the Day Ahead and Intraday Markets and Balancing Market, for resigning from the capacity of Clearing Member and other issues”, available at https://www.enexgroup.gr/documents/20126/0/Decision_1_20200605_en.pdf (viewed 28.08.2021).

²⁰⁴ Article 2.10.6. of the DAM & IDM Clearing Rulebook.

²⁰⁵ Article 2.10.6. of the Balancing Market Clearing Rulebook.

²⁰⁶ Article 2.10.9. of the DAM & IDM Clearing Rulebook and Balancing Market Clearing Rulebook.

²⁰⁷ EnExClear Technical Decision No 6 “Charges and Fees for the Clearing House EnExClear for the Clearing of Transactions on Day-Ahead & Intraday Market”, approved by RAE Decision 1007/2020 (Government Gazette Issue B’ 3267/2020), available also at https://www.enexgroup.gr/documents/20126/393427/20200618_Ddecision_6_EN.pdf (viewed 28.08.2021) and EnExClear Technical Decision No 11 “Charges and Fees of EnExClear for the Clearing of Positions on Balancing Market”, approved by RAE Decision 1031/2020 (Government Gazette Issue B’ 3212/2020), available also at https://www.enexgroup.gr/documents/20126/393433/20200619_Ddecision_11_EN.pdf (last access 28.8.2021).

addition, Clearing Members are required to provide collateral in favour of EnExClear to secure the proper fulfilment of their clearing and settlement obligations towards EnExClear.²⁰⁸

Furthermore, Clearing Members must participate in the Default Fund²⁰⁹ and pay their respective contributions to it.²¹⁰ Each Clearing Member keeps only one share account in the Default Fund. This account is opened upon acquisition of the capacity of Clearing Member. Clearing Members must make an initial contribution to the Default Fund in order to acquire the relevant capacity and maintain a share account the amount of which is calculated in accordance to the methodology provided in article 2.27 of the DAM & IDM Clearing Rulebook and the Balancing Market Clearing Rulebook as well as in the relevant technical decisions.

In particular, details about the methodology and/or procedure for the risk management, i.e.: (a) the calculation of margin requirements and intraday risk calculation (b) the acceptable collaterals for the cover of margin requirement and (c) rules for Default Fund's calculation are provided in EnExClear's Technical Decision No 3²¹¹ as regards the clearing of DAM & IDM transactions and in Decision No 9²¹² as regards the clearing of positions of the Balancing Market.

²⁰⁸ Articles 2.20 and 2.21. of the DAM & IDM Clearing Rulebook and the Balancing Market Clearing Rulebook.

²⁰⁹ The Default Fund constitutes a pool of assets created from the contributions of Clearing Members, the resources of which belong jointly (*pro indiviso*) to the Clearing Members in proportion to their participation therein. The Default Fund serves the purpose of covering the risk relating to the clearing operations in accordance with article 14 par. 2 of L. 4425/2016.

²¹⁰ Article 2.10.10. of the DAM & IDM Clearing Rulebook and the Balancing Market Clearing Rulebook.

²¹¹ EnExClear Technical Decision No 3 "Risk management procedures in the Clearing System and other related issues", approved by RAE Decision 934/2020 (Government Gazette Issue B 2614/2020), available at https://www.enexgroup.gr/documents/20126/393427/20200605_Decision_3_EN.pdf (viewed 28.08.2021).

²¹² EnExClear Technical Decision No 9 "Risk management procedures in the Positions Clearing System of Balancing Market", approved by RAE Decision 1034/2020 (Government Gazette Issue B 3383/2020), available at https://www.enexgroup.gr/documents/20126/393433/20200619_Decision_9_EN.pdf (last access 28.08.2021).

Chapter 5: CONCLUSION

Undoubtedly, the restructuring of the wholesale electricity market in Greece in accordance with the EU Target Model is an important steppingstone for the realization of the single European electricity market, which is expected to provide greater flexibility to all market participants.

The main positive elements identified in comparison to the previous market structure can be summarized as follows:

- Bilateral contracts between producers and suppliers/consumers are allowed. The quantities of energy of these contracts are registered in the Day-Ahead Market for physical delivery as agreed by the parties. Bilateral contracts are an important tool for the security of supply and for risk mitigation.
- The market participants have the possibility to correct their positions in an intraday timeframe, enabling thus the efficient integration of more volatile generation such as RES.
- The separation of the markets supports the formulation of a price according to respective service. For example, the physical constraints of the units and the network are subject to a separate market and are not taken into account for the formulation of the market price, as was the case in the mandatory pool structure.
- The new market provides transparency in transactions by limiting the possibility of manipulation due to the existence of separate markets in different time frames and due to the variety of products offered.²¹³
- The two commodities, transmission capacity and electrical energy are traded together. Implicit auctions ensure that electrical energy flows from the surplus areas (low price areas) towards the deficit areas (high price areas) thus also leading to price convergence.

Despite the above positive changes, the first year of the operation of the new markets in Greece did not bring the expected results in terms of price reduction for the benefit of end consumers. This can be attributed on the one hand on external factors, such as the COVID-19 crisis, the global increase of the natural gas prices and carbon emission rights, and on the other hand on the characteristics of the Greek wholesale market which is still not fully competitive.

²¹³ Pitsos N. (2021), p. 223.

It is considered remarkable that, the first two months of the operation of the new markets, the cost of the balancing market was extremely high; in specific in the period 1.1.2020-13.12.2020 the average cost of the Day-Ahead Market in which the thermal units and RES participate was determined at 57.98€/MWh, whereas the final cost of electricity in the wholesale market jumped to 80.65€/MWh because of the high balancing costs amounting to 22,67€/MWh. The total balancing cost reached 140 million within five weeks when in previous years on an annual basis the corresponding account was around 200 million.²¹⁴

The balancing cost has increased mainly due to the difficulty in predicting in real time the RES production and in the existence of saturated networks, resulting in the need for reserves offered by flexible thermal units in high prices. In specific, as analyzed in the Market Reform Plan, *«the main reason for seeing large volumes of balancing energy and respectively increased balancing cost relates to the high magnitude of deviations between the real-time generation schedule and the one derived from the DAM, the latter resulting from pure energy cost merit-order with practically insufficient pre-emption of reserves and other technical constraints by the participants. The intra-day, lacking liquidity at present, has not been able to modify the generators' positions significantly to approach the real-time generation schedule. Consequently, the DAM's generation schedule does not respect reserves and technical operation constraints, which implies that significant re-scheduling (re-dispatching is necessary). There has also been a network limitation in Peloponnese due to a delay of completion of the high voltage loop grid (due to local opposition that led to court cases for a small distance connection at a specific location), which made impossible the real-time operation of units located in Peloponnese at full capacity. Another cause of deviations relates to over-voltage issues occurring in the Northern system of Greece at low load times, which implies must-run instructions for a few lignite plants to maintain voltages within a reliable range. The aforementioned in conjunction with the fact that Demand response, electricity storage systems and RES are not yet eligible to offer balancing services inevitably lead to high balancing cost».*²¹⁵

Furthermore, despite the technical malfunctions, it can be argued that the design of the electricity market as a power exchange fits better to markets which have different characteristics and are more mature, namely markets that have better interconnections enabling thus the access to more market participants which consequently enhances competition. The Greek market reform although strictly legally it was in line with the EU Target Model rules, did not take into

²¹⁴ Liaggou Ch. (2020).

²¹⁵ Market Reform Plan for Greece – Preliminary for consultation only, version 5, July 2021, available at https://ec.europa.eu/energy/sites/default/files/greece_market_reform_plan.pdf (viewed 13.09.2021).

account the structural characteristics of the Greek market, such as the limited interconnections with other countries, areas with saturated networks (e.g. the Peloponnese network), and the inadequate market participation (competition). It is widely considered that the formulation of the market rules does not suffice for the creation of competitive market if a sufficient number of market participants does not exist.²¹⁶

In order to mitigate these first negative effects, RAE has undertaken transitional measures amending certain rules applicable to the Balancing Market. In particular, the BM Regulation was amended in order: a) the submission by the BSPs of Balancing Energy Offers with negative prices is suspended until the existing restriction, due to congestion, is restored in the System of Peloponnese, and (b) to explicitly introduce the requirement that the quantity of the first step of the upward (or the quantity of the last step of the downward, respectively) offer of Balancing Energy corresponds to the technical minimum generation. In addition, RAE is investigating permanent solutions for the smooth operation of the market, such as the distinction of the balancing energy and the energy needed for the purposes of re-dispatching.²¹⁷

Irrespective of the regulatory measures that it is self-evident that need to be adopted in order to have in place a clearer framework, actions should be taken in my opinion also from the perspective of compliance with the competition rules. In particular, considering the characteristics of the Greek market, which as stated above, it can be argued that is an oligopolistic market taking into account the actors who can formulate the market price (e.g. flexible power units), the competent competition authorities should start monitoring more thoroughly the operation of the new wholesale electricity market in order to identify possible distortion of competition, e.g. market abuse or tacit collusion actions. Indicatively, it is worth mentioning that the Spanish competition authority (CNMC) has imposed in 2015 a fine of €25 million to the company Iberdrola for market manipulation infringement under the REMIT Regulation. In particular, the Spanish competition authority found that Iberdrola's strategy, which consisted of reducing the quantity of electricity from its hydroelectric plants dispatched in the day-ahead market, was not justified by any exhaustion of its hydroelectric capacity, because the volumes held in its reservoirs were higher than those in previous years, even though Iberdrola then generated more, at lower prices. The CNMC concluded that Iberdrola's strategy was intended to cause entry by higher-priced CCGT plants, thereby securing a higher market price than that which would otherwise have arisen. As noted by the CNMC this type of conduct,

²¹⁶ See indicatively Psaroudakis G. (2017) and Polemis M. (2014).

²¹⁷ See TSOs proposal which was set by RAE under public consultation in July 2021, available at <https://www.rae.gr/2021/07/29/%CE%B4%CE%B7%CE%BC%CF%8C%CF%83%CE%B9%CE%B1-%CE%B4%CE%B9%CE%B1%CE%B2%CE%BF%CF%8D%CE%BB%CE%B5%CF%85%CF%83%CE%B7-%CF%84%CE%B7%CF%82-%CF%81%CE%B1%CE%B5-%CE%B5%CF%80%CE%AF-%CF%84%CF%89%CE%BD-%CE%B2%CE%B1/> (viewed 09.09.2021)

which leads to artificial market prices that do not correspond to available production capacity or to fundamental market data, constitutes typical market manipulation prohibited by REMIT.²¹⁸

Hence, in my opinion for the operation of an effective and competitive market it is important to reach the right balance between the ex-ante regulatory interference, such as imposition of constraints (e.g. price caps), which may lead to opposite results, i.e. restriction of competition and barriers to entry, and ex-post monitoring for detecting and deterring market abuse on wholesale energy markets by applying the tailor-made energy market abuse regime established by REMIT Regulation. RAE is currently designing a new Market Monitoring and Surveillance Mechanism (MMSM) to monitor market power in the wholesale electricity market (on the supply side) and in the retail market (on the demand side). The new tool is under development and aims via dedicated monitoring indices, flagging rules and data processing to verify and diagnose whether the market operates in a cost-reflective way and whether the degree of market competition is sufficiently intense.²¹⁹

Furthermore, the European Union's push towards climate change mitigation by setting more ambitious CO₂ reduction targets with the "Fitfor55" legislative package²²⁰, creates new challenges for the European energy market integration which have to be taken into consideration for the effective restructuring of the Greek electricity market. As noted by Glachant «any RES push is inevitably questioning the EU Target Model, since the design has roughly been conceived as a platform for CCGT plants competing cross-border»²²¹.

Therefore, as RES is becoming a major part of the market, it is crucial, as instructed by the new Regulation (EU) 2019/944 on the internal market for electricity, to remove the remaining barriers to cross-border trade and encourage investments into supporting infrastructure, for example, more flexible generation, interconnection, demand response and energy storage. With the participation of more actors in the market, especially the one that can offer balancing services such as RES producers with storage facilities, RES aggregators and demand response

²¹⁸ <https://www.twobirds.com/en/news/articles/2016/spain/spanish-authority-fines-iberdrola-25m-in-first-remit-infringement-decision>

²¹⁹ The MMSM was placed under public consultation by RAE on 6.10.2020, available at http://oldsite.rae.gr/site/categories_new/about_rae/factsheets/2020/gen/0610.csp and the results of the consultation are available at <https://www.rae.gr/2021/07/27/%CE%B1%CF%80%CE%BF%CF%84%CE%B5%CE%BB%CE%AD%CF%83%CE%BC%CE%B1%CF%84%CE%B1-%CE%B4%CE%B7%CE%BC%CF%8C%CF%83%CE%B9%CE%B1%CF%82-%CE%B4%CE%B9%CE%B1%CE%B2%CE%BF%CF%8D%CE%BB%CE%B5%CF%85%CF%83%CE%B7%CF%82-28/> (viewed 10.09.2021).

²²⁰ https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541

²²¹ Glachant J. (2016).

aggregators²²², and with the active involvement of the consumers either individually or cumulatively via energy communities, the dynamics of the market will change. Ideally, this will lead to a more competitive market with a variety of actors, services and products where new contractual relationships will emerge, such as the corporate RES-PPA contracts (green PPAs)²²³ offering liquidity, security of supply and risk mitigation. Therefore, the proper application of the “Clean Energy for all Europeans” package, especially as regards Directive (EU) 2019/944 on common rules for the internal market for electricity and Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources, which are currently under the process of implementation in Greece, is crucial in order to address the persisting obstacles for the completion of the internal market.

To conclude, the reform of the Greek electricity market is an ongoing process towards the creation of a competitive liberalized market which should serve both the EU Target Model purposes for affordable supplies of energy to European citizens, and also the climate change objectives towards the long-term decarbonization. Thus, as analyzed above, in addition to the measures undertaken for the implementation of the EU Target Model legal framework in the Greek legal order, additional actions are required in order to adapt the Greek market rules and governance to the changing policy and technology context, such as additional interconnections, the completion of the intra-day coupling, integration of demand response and storage and granting market access to active consumers.

²²² For the role of the demand response aggregators in Europe, see Kercher S. et al. (2021) and Biskas P. (2021).

²²³ The development of a specific legal framework and of an organized market in order to facilitate the development of a market for bilateral contracts has been proposed in Market Reform Plan for Greece – Preliminary for consultation only, version 5, July 2021, available at https://ec.europa.eu/energy/sites/default/files/greece_market_reform_plan.pdf (viewed 13.09.2021).

ANNEXES

ANNEX I: LEGISLATION

- **Regulation (EU) No 2019/943** of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast), OJ L 158, 14.6.2019, p. 54-24.
- **Regulation (EC) No 714/2009** of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity, OJ L 211, 14.8.2009, p. 15-35.
- **Regulation (EC) No 713/2009** of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators, OJ L 211, 14.8.2009, p. 1-14.
- **Regulation (EU) No 2019/942** of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators, OJ L 158, 14.6.2019, p. 22-53.
- **Regulation (EU) No 2015/1222** of 24 July 2015 establishing a guideline on capacity allocation and congestion management, OJ L 197, 25.7.2015, p. 24-72.
- **Regulation (EU) No 2016/1719** of 26 September 2016 establishing a guideline on forward capacity allocation, OJ L 259, 27.9.2016, p. 42-68.
- **Regulation (EU) No 2017/1485** of 2 August 2017 establishing a guideline on electricity transmission system operation, OJ L 220, 25.8.2017, p. 1-120.
- **Regulation (EU) No 2017/2195** of 23 November 2017 establishing a guideline on electricity balancing, OJ L 312, 28.11.2017, p. 6-53.
- **Regulation (EU) No 2016/631** of 14 April 2016 establishing a network code on requirements for grid connection of generators, OJ L 112, 27.4.2016, p. 1-68.
- **Regulation (EU) 2016/1388** of 17 August 2016 establishing a Network Code on Demand Connection, OJ L 223, 18.8.2016, p. 10-54.
- **Regulation (EU) 2016/1447** of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules, OJ L 241, 8.9.2016, p. 1-65.
- **Regulation (EU) 2017/2196** of 24 November 2017 establishing a network code on electricity emergency and restoration, OJ L 312, 28.11.2017, p. 54-85.
- **Regulation (EU) No 1227/2011** of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency, OJ L 326, 8.12.2011, p. 1-16.
- **Commission Implementing Regulation (EU) No 1348/2014** of 17 December 2014 on data reporting implementing Article 8(2) and Article 8(6) of Regulation (EU) No

1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency, OJ L 363, 18.12.2014, p. 121-142.

- **Directive 2009/72/EC** of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC, OJ L 211, 14.8.2009, p. 55-93.
- **Directive (EU) 2019/944** of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ L 158, 14.6.2019, p. 125-199.
- **Regulation (EU) No 600/2014** of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012, OJ L 173, 12.6.2014, p. 84-148.
- **Directive 2014/65/EU** of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU, OJ L 173, 12.6.2014, p. 349-496 (MIFID II Directive).
- **Regulation (EU) No 648/2012** of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories, OJ L 201, 27.7.2012, p. 1-59 (EMIR Regulation).
- **Regulation (EU) No 596/2014** of the European Parliament and of the Council of 16 April 2014 on market abuse and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC, OJ L 173, 12.6.2014, p. 1–61.
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- **Law 4001/2011** on the operation of electricity and gas energy markets, for exploration, production and transmission networks of hydrocarbons and other provisions, Government Gazette Issue A' 179/22.8.2011.
- **Law 4425/2016** on the National Mechanism of Coordination, Monitoring and Evaluation of the Social Integration and Social Cohesion Policies, on regulations

regarding social solidarity and other provisions, Government Gazette Issue A' 185/30.09.2016.

- **Law 4512/2018** on Arrangements for the implementation of the structural reforms of the Economic Adjustment Programmes and other provisions, Government Gazette Issue A' 5/17.01.2018.
- **L. 4261/2014** on access to the activity of credit institutions and prudential supervision of credit institutions and companies, Government Gazette Issue A' 107/5.5.2014.
- **Law 4514/2018** on markets for financial instruments and other provisions, Government Gazette Issue A' 14/30.01.2018.

ANNEX II: REGULATORY AND TECHNICAL DECISIONS

TABLE A

RAE/HCMC DECISIONS FOR THE APPROVAL OF THE OPERATION OF HEnEX S.A., EnExCLEAR S.A. , ATHEXClear S.A.

Subject	RAE Decision	Government Gazette
Designation of HEnEX S.A. as Nominated Electricity Market Operator/NEMO	1124/2019	
Approval of the operation of EnExClear S.A. as DAM and IDM Clearing House	1125/2019	B' 428/12.02.2020
Approval of the operation of HEnEx S.A. as Power Exchange in order to manage and operate DAM and IDM	36/2020	B' 742/10.03.2020

Subject	HCMC Decision	Government Gazette
Approval of HEnEX S.A. as operator of the Financial Energy Market	1/872/4.3.2020	B' 1491/21.4.2020
Extension of the operating license of the ATHEXClear for undertaking the clearing of the Financial Energy Market	1/871/28.2.2020	B' 1568/24.4.2020

TABLE B

RAE/HCMC DECISIONS FOR THE APPROVAL OF THE TRADING & CLEARING RULEBOOKS

B1. Day-ahead and Intraday Markets Trading Rulebook	RAE Decision	Government Gazette
Approval	1116/2018	B' 5914/31.12.2018
1 st amendment	820/2020	B' 1941/21.05.2020
2 nd amendment	1228/2020	B' 4124/24.09.2020

B2. Balancing Market Rulebook	RAE Decision	Government Gazette
Approval	1090/2018	B' 5910/31.12.2018 B' 468/18.02.2019 (corrigendum)
1 st amendment	938/2020	B' 2757/07.07.2020

2 nd amendment	1357/2020	B' 4516/14.10.2020
3 rd amendment	1572/2020	B' 5484/11.12.2020
4 th amendment	54/2021	B' 531/10.02.2021
5 th amendment	609/2021	B' 3500/31.07.2021

B3. Clearing of Day-ahead and Intraday Markets	RAE Decision	Government Gazette
Approval of Clearing Rulebook for Transactions on DAM & IDM	1125 ^A /2019	B' 428/12.02.2020

B4. Clearing of Positions on Balancing Market	RAE Decision	Government Gazette
Approval of the outsourcing contract between ADMIE S.A. (IPTO) and EnExClear S.A.	942/2020	B' 2955/20.07.2020
Approval of Clearing Rulebook for Positions on Balancing Market	943/2020	B' 3076/24.07.2020

B5. Financial Energy Market (Derivatives Market) Rulebook	HCMC Decision	Government Gazette
Approval of the Energy Financial Market Rulebook	1/872/4.3.2020	B' 1491/21.4.2020

B6. Clearing of Financial Energy Market	HCMC Decision	Government Gazette
Approval of the Rulebook for Clearing Derivatives Transactions (2 nd amendment to include energy financial products)	1/871/28.2.2020	B' 1568/24.4.2020

TABLE C
IMPLEMENTING DECISIONS FOR THE OPERATION OF THE TRADING AND
BALANCING MARKETS (METHODOLOGIES, SPECIAL APPROVALS AND
TECHNICAL DECISIONS)

C1. Trading in Day-ahead and Intraday Markets - RAE Decisions (Methodologies, Approvals)

Subject	RAE Decision	Government Gazette
Fees and Charges for the operation of the DAM and IDM	950/2020	B' 2542/24.06.2020
Methodology for Calculating Fees and Charges for the operation of the DAM and IDM	949/2020	B' 2541/24.06.2020
Regarding the access of the Participants to specific Order Types, the parameters for submitting them as well as the technical details as regards their content	947/2020 87/2021	B' 3054/23.07.2020 B' 640/18.02.2021
Methodology on the application of acceptance rules for Sell and Buy Orders, with interconnected price in the DAM and IDM	869/2020	B' 2384/17.06.2020
Methodology on the application of acceptance rules for Sell and Buy Orders, with interconnected price in the DAM and IDM (first amendment)	1229/2020	B' 4334/05.10.2020
Defining the Regulatory Parameters for Calculating the Non-Compliance Charge for the non- legal submission of Sell Orders relating to the Available Capacity for the year 2020	867/2020	B' 2560/26.06.2020
Definition of the percentage X% of the retail supply share and A% of energy quantities that are included in the validated Physical Offtake Nominations and correspond to energy quantities of trades on Energy Financial Instruments for the year 2020	1008A/2020 1657/2020	B' 3385/13.08.2020 B' 6027/2020
Definition of the Maximum and Minimum Clearing Price Thresholds for the DAM, for which HEnEx examines the possibility of conducting a Second Auction	870/2020	B' 2385/17.06.2020
Definition of the Maximum and Minimum Clearing Price Thresholds for the DAM, for which HEnEx examines the possibility of conducting a Second Auction (first amendment)	1456/2020	B' 4760/29.10.2020
Methodology of imposing measures against the Participants	945/2020	B' 3252/05.08.2020

Definition of the Administratively Defined Position Nomination Penalty Price of Energy Financial Instruments, as well as of any other parameter and technical detail	868/2020 1658/2020	B' 2330/15.06.2020 B' 5976/31.12.2020
Regulatory Parameters for Calculating the NonCompliance Charge for the non legal submission of Sell Orders relating to the Available Capacity for the year 2020	1656/2020	B' 6075/31.12.2020
Determination of the day of commencement of the DAM and IDM's decoupled operation	1298/2020	B' 4415/07.10.2020

C2. Trading in Day-ahead and Intraday Markets - HEnEx Technical Decisions

Subject	HEnEx Decision	Available at
Procedure for Acquiring the Participant capacity, Participant resignation and other issues regarding Participants in HEnEx Day-Ahead and Intra-Day Market.	No 1	https://www.enexgroup.gr/documents/20126/144557/20200730_Decision_01_EN.pdf
Professional competence of Participants' Certified Energy Traders participating in the Day-Ahead & Intra-Day Market of HEnEx.	No 2	https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_02_EN.pdf/864815a2-b683-6d19-beb9-d707ef6ca9d7?t=1614687984524
Special Terms on Cancellation of Orders and/or Trades in the the DayAhead Market and Intra-Day Market Auctions.	No 3	https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_03_EN.pdf
Registration of Energy Financial Instruments and other energy wholesale products with physical delivery obligation.	No 4	https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_04_EN.pdf
HTS Operator information management in HEnEx's Markets	No 5	https://www.enexgroup.gr/documents/20126/144557/20210421_Decision_05_EN.pdf/dd7365a2-875e-19f1-9760-300489569d1d?t=1620979948170
Calculation, pricing and settlement procedures concerning the fees and charges of section 3.12, as well as the Non-Compliance	No 6	https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_06_EN.pdf

Charges of the sections and sub-sections 4.4.2 and 6.8.		
Emergency trading procedures in HEnEx Day-Ahead and Intra-Day Markets.	No 7	https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_07_EN.pdf
Maximum and Minimum Day-Ahead and Intra-Day Market Order Prices.	No 8	https://www.enexgroup.gr/documents/20126/144557/20200507_Decision_08_EN.pdf
Technical issues on conversation files	No 9	https://www.enexgroup.gr/documents/20126/144557/20200518_Decision_09_EN.pdf
Timeline Procedures for the Day-Ahead and Intra-Day Market	No 10	https://www.enexgroup.gr/documents/20126/144557/20201006_Decision_10_EN.pdf

C3. Balancing Market - RAE Decisions (Methodologies, Approvals)

Subject	RAE Decision	Government Gazette
Terms and Conditions of Balancing Services Providers (BSPs)	1033/2020	B' 3493/24.08.2020
Terms and Conditions of Balance Responsible Parties (BRPs)	1032/2020	B' 3558/28.08.2020
Registration fee	1415/2020	B' 4768/29.10.2020
Determination of the Safety Maximum Reservoir Level and the Safety Minimum Reservoir Level	1392/2020	B' 4703/23.10.2020
Demand Response Baseline Calculation Methodology	798/2020	B' 1924/19.05.2020
Methodology of the determination of the zonal and systemic Balancing Capacity needs	1092/2020	B'3565/28.08.2020
Methodology for the calculation of Variable Cost Parameters for Thermal Production Units	948/2020	B' 3406/14.08.2020
	1393/2020 (amendment)	B' 4623/21.10.2020
Methodology for estimating the HETS Losses	953/2020	B' 2926/17.07.2020
Methodology for the calculation of Activated Balancing Energy	954/2020	B' 3191/03.08.2020

Methodology for the calculation of Activated Balancing Energy (first amendment)	1459/2020	B' 4800/ 30.10.2020
Methodology for the calculation of the Dispatchable Load Portfolio Baseline	798/2020	B' 1924/19.05.2020
Rules for suspension and restoration of market activities	1603/2020	B' 5944/31.12.2020
Rules for the settlement in case of suspension of market activities	1008/2020	B' 3227/04.08.2020
Numerical values of non-Compliance Charges' parameters for non-submission or unlawful submission of Balancing Energy and Capacity Offers	1358/2020	B' 4637/21.10.2020
Numerical values of non-Compliance Charges' parameters for significant unfavorable deviation from the Registered Characteristics of a Balancing Service Entity	1359/2020	B' 4637/21.10.2020
Numerical values of non-Compliance Charges' parameters for significant deviation from Dispatch Instructions	1360/2020	B' 4638/21.10.2020
Numerical values of non-Compliance Charges' parameters for significant systematic demand imbalances	1361/2020	B' 4643/21.10.2020
Numerical values of non-Compliance Charges' parameters for significant systematic imbalances in the production of RES Units Portfolios	1362/2020	B' 4643/21.10.2020
Infeasible Market Schedule Calculation Methodology and numerical values of non-Compliance Charges' parameters for systematic failure to attain a feasible Market Schedule	1363/2020	B' 4596/19.10.2020
Infeasible Market Schedule Calculation Methodology (first amendment)	1458/2020	B' 4800/ 30.10.2020
Instructed Energy Tolerance	1225/2020	B '4067/22.09.2020
Balancing Energy Deficit Premium	1226/2020	B' 4033/21.09.2020

C4. Balancing Market – TSO (ADMIE) Technical Decisions

Subject	Available at
Procedures of registration with the HETS Operator Registry"	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis
Dispatch Instructions	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis
Manual FRR	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis

Automatic FRR	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis
Balancing Market Settlement	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis
Integrated Scheduling Process	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis
Technical limits on bidding and clearing prices	https://www.admie.gr/en/market/regulatory-framework/methodologia-kai-tehnikes-apofaseis

C5. Clearing of Day-ahead, Intraday and Balancing Markets – RAE Decisions

Subject	RAE Decision	Government Gazette
Investment Policy	796/2020	B' 1949/21.05.2020
Investment Policy (first amendment)	944/2020	B' 3558/28.08.2020
Clearing of Transactions on Day-Ahead & Intra-Day Markets		
Risk Management procedures in the Clearing System and other related issues	934/2020	B' 2614/29.06.2020
Imposition of measures on Clearing Members	797/2020	B' 1950/21.05.2020
EnExClear Charges and Fees	1007/2020	B' 3267/05.08.2020
Clearing of Positions on Balancing Market		
Risk management procedures in the Positions Clearing System of Balancing Market	1034/2020	B' 3383/13.08.2020
Imposition of measures on Clearing Members	955/2020	B' 3417/14.08.2020
EnExClear Charges and Fees	1031/2020	B' 3212/03.08.2020

C6. Clearing of Day-ahead, Intraday and Balancing Markets – EnExClear Decisions

Subject	EnExClear Decision	Available at
Clearing of Transactions on Day-Ahead & Intra-Day Markets		
Procedure for acquiring the capacity of Clearing Member, for resigning from the capacity of	No 1	https://www.enexgroup.gr/documents/20126/0/Decision_1_20200605_en.pdf

Clearing Member and other issues		
Professional competence of Clearing Members	No 2	https://www.enexgroup.gr/documents/20126/0/Decision_2_20200605_en.pdf
Risk Management procedures in the Clearing System and other related issues	No 3 (approved by RAE Decision 934/2020)	https://www.enexgroup.gr/documents/20126/393427/20200605_Decision_3_EN.pdf
Default & Crisis Management Committee	No 4	https://www.enexgroup.gr/documents/20126/393427/20200605_Decision_4_EN.pdf
Technical Procedures for Cash Settlement	No 5	https://www.enexgroup.gr/documents/20126/393427/20200413_Decision_5_EN.pdf
EnExClear Charges and Fees	No 6 (approved by RAE Decision 1031/2020)	https://www.enexgroup.gr/documents/20126/393427/20200618_RESOLUTION+6+EnExClear+Fees+v1.pdf
Time Schedule of Clearing and Settlement Procedures for the HEnEx Electricity Markets	No 7	https://www.enexgroup.gr/documents/20126/0/Decision_7_20200413_en.pdf
Imposition of measures on Clearing Members	No 8 (approved by RAE Decision 797/2020)	https://www.enexgroup.gr/documents/20126/393427/20200430_Decision_8_EN.pdf
Clearing of Positions on Balancing Market		
Procedure for acquiring the capacity of Clearing Member, for resigning from the capacity of Clearing Member and other issues	common decision for DAM, IDM and Balancing (see above Decision No 1)	https://www.enexgroup.gr/documents/20126/0/Decision_1_20200605_en.pdf
Professional competence of Clearing Members	common decision for DAM, IDM and Balancing (see above Decision No 2)	https://www.enexgroup.gr/documents/20126/0/Decision_2_20200605_en.pdf
Default & Crisis Management Committee	common decision for DAM, IDM and Balancing (see above Decision No 4)	https://www.enexgroup.gr/documents/20126/393427/20200605_Decision_4_EN.pdf
Risk Management procedures	No 9 (approved by RAE Decision 1034/2020)	https://www.enexgroup.gr/documents/20126/393433/20200619_Decision_9_EN.pdf

Technical Procedures for Cash Settlement of Balancing Market Positions	No 10	https://www.enexgroup.gr/documents/20126/393433/20200605_Decision_10_EN.pdf
EnExClear Charges and Fees	No 11 (approved by RAE Decision 1031/2020)	https://www.enexgroup.gr/documents/20126/393433/20200619_Decision_11_EN.pdf
Time Schedule of Clearing and Settlement Procedures of Balancing Market Positions	No 12	https://www.enexgroup.gr/documents/20126/0/Decision_12_20200605_en.pdf
Imposition of measures on Clearing Members	No 13 (approved by RAE Decision 955/2020)	https://www.enexgroup.gr/documents/20126/393433/20200616_Decision_13_EN.pdf

C7. Financial Energy Market - HCMC Decisions

Subject	HCMC Decision	Government Gazette
Position limits on derivatives traded In the Financial Energy Market	2/287/4.3.3020	B' 1231/9.4.2020

C8. Financial Energy Market - HEnEx Decisions

Subject	HEnEx Decision	Available at
Procedure for acquiring the Member capacity, Membership resignation and other Membership issues	No 1	https://www.enexgroup.gr/documents/20126/184422/20200306_Decision_01_EN.pdf
Procedure for acquiring the Market Maker capacity and terms of market making	No 2	https://www.enexgroup.gr/documents/20126/184422/20200310_Decision_02_%CE%95%CE%9D.pdf
Members' professional competence	No 3	https://www.enexgroup.gr/documents/20126/184422/20200306_Decision_03_EN.pdf
Immediate imposition of measures against Members	No 4	https://www.enexgroup.gr/documents/20126/184422/20200306_Decision_04_EN.pdf

Electricity Futures Contract Specifications	No 5	https://www.enexgroup.gr/documents/20126/184422/20210409_HEnEx_Der_Decision_5_EN.pdf
Member Charges	No 6	https://www.enexgroup.gr/documents/20126/184422/20210409_HEnEx_Der_Decision_6_EN.pdf
Cessation of admission or deletion of existing series and suspension of trading on a Derivative	No 7	https://www.enexgroup.gr/documents/20126/184422/20200306_Decision_07_EN.pdf
Emergency trading procedures	No 8	https://www.enexgroup.gr/documents/20126/184422/20210409_HEnEx_Der_Decision_9_EN.pdf
Regulation of technical trading issues	No 9	https://www.enexgroup.gr/documents/20126/184422/20210409_HEnEx_Der_Decision_9_EN.pdf/b1eebb86-6721-90e2-de87-ee20381f1741?t=1617979729478
Technical issues on conversation files	No 10	https://www.enexgroup.gr/documents/20126/184422/20210409_HEnEx_Der_Decision_10_EN.pdf

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