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REVISIONS HISTORY

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1 INTRODUCTION

This report is the second deliverable (corresponding to Output 1.2) of:

- Outcome 1 – “Compliance with the European framework of the Cypriot legislative and regulatory framework concerning the electricity market”

foreseen by the Grant Agreement:

- Implementation of the EU regulatory framework in the area of electricity in Cyprus.

The goal of the deliverable is to define a:

- Proposal for optimal changes in order to fill the gap in the legal and regulatory framework, trade and settlement rules and transmission and distribution rules.

To this aim, the following documents have been taken as a reference:

- the first deliverable (corresponding to Output 1.1) of Outcome 1 – “Compliance with the European framework of the Cypriot legislative and regulatory framework concerning the electricity market” – which is related to “Review of the existing legislation, regulatory decisions, trade and settlement rules and transmission and distribution rules; report on the related gap analysis with EU legislation, network codes and guidelines”;
- the Law for the Regulation of the Electricity Market approved on 7/10/2021.

References will be made also to the deliverables results of the following actions carried out by RSE to the benefit of MECI and already financed by the Directorate General for Structural Reform Support (i.e. DG REFORM) of the Europe Commission:

- SRSS/C2016/005 - “Technical and policy/regulation support to the Ministry of Energy, Commerce, Industry and Tourism with regard to its participation in the process for amending the existing Trade and Settlement Electricity Market Rules”, carried out in 2016 and in 2017;
- SRSS/S2017/048 - “Technical support to improve the penetration of renewable energy sources and energy efficiency in Cyprus”
 - Work package 1 – “Review and amendment of the Trade and Settlement Electricity Market Rules”, carried out in 2018 and in 2019.

The analysis reported in the following will be focused on the most relevant issues concerning the electricity market reform, that are:

- aggregation,
- energy communities,
- storage systems,
- intraday market,

- imbalance settlement period,
- balancing market data publication,
- technical bidding limits,
- capacity mechanisms,
- priority dispatch.

Therefore, on the basis of Output 1.1, which includes the above-mentioned topics, each identified gap between the European and the Cyprus frameworks will be addressed by proposing adequate changes to the latter and, where appropriate, by proposing different options with their pros and cons.

In Figure 1, on the basis of information provided by the Cyprus Authorities, we report the currently expected timeline for the major events that must be taken into account for the purpose of this report, aimed at the implementation in Cyprus of the European framework concerning the electricity market.

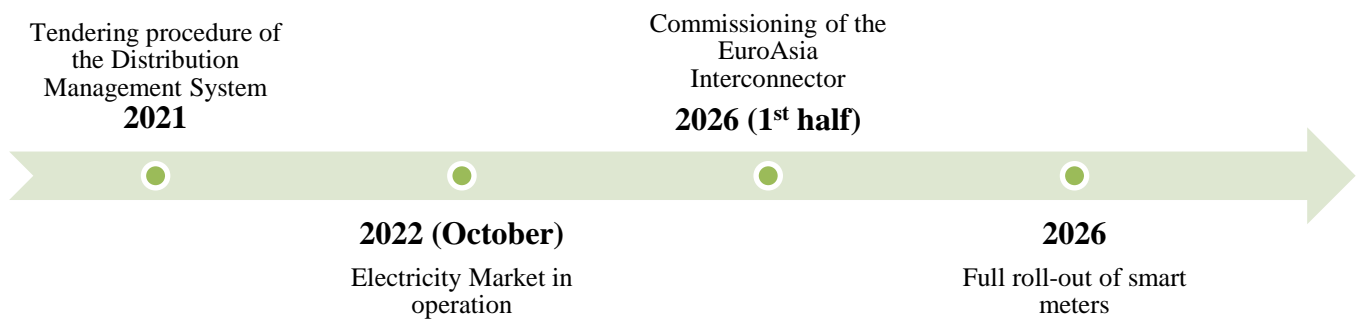


Figure 1 - Timeline of the main milestones concerning the evolution of the Cyprus electricity market

2 AGGREGATION

Taking into account the analysis reported in Output 1.1 regarding aggregation, we suggest the following recommendations:

- As far as the 20 MW maximum threshold is concerned, as reported in the previous RSE report *Revision and amendments to the new Trade and Settlement electricity market Rules in Cyprus* (Contract SRSS/S2017/048) issued in 2019, CERA stated that it has been set to avoid an excessive market concentration, given the small size of the Cyprus power system. Nevertheless, CERA also stated that “*this threshold could be increased, after gaining relevant experience with the operation of the market*”. Therefore, even if, in principle, a maximum size of an aggregate should not be defined since such limitation is not foreseen by the current European regulatory framework, we deem that CERA’s point of view is in line with the peculiarity of Cyprus, provided that, as the market will evolve, this threshold will be subject to review as it may prove too restrictive.
- As far as the 1 MW minimum threshold is concerned, we deem that such value is reasonable since the aggregate cannot be too small in order to provide to the Transmission System Operator (TSO) a significant contribution and to avoid that a limited number of aggregated entities endanger the reliability of the aggregate itself.
- With reference to the type of energy units which can participate in aggregation, we deem that the aggregation should not be limited to units of a single type (i.e. RES, CHP, etc.) because such limitations are not foreseen by the current European regulatory framework and might limit the flexibility of the aggregate. In Cyprus the aggregation is allowed for RES and CHP units (from 1 to 20 MW), storage (from 1 to 20 MW) as well as demand response (i.e. demand response is entitled to participate in the electricity markets – both energy and ancillary services markets – by cumulative portfolios of at least 300 kVA each); however it is not allowed to mix these three types of resources in one single aggregate, despite the indication of the IEM directive (see article 6 (1.c) and 7.2). Nevertheless, in Cyprus aggregators are able to participate both to the energy and to the ancillary services markets, in line with the European regulatory framework. Thus, we suggest enabling all types of resources to participate in a single aggregate.
- In the previous RSE report *Timetable for applying proposed amendments to the new Trade and Settlement electricity market Rules in Cyprus* (Contract SRSS/S2017/048) issued in 2019, it was highlighted that the TSRs and consequently the MMS would not have been compliant with an extended concept of aggregation and, in our understanding, this is still true. The market will therefore start without these amendments, which require additional efforts to be implemented, both on the TSRs side and on the MMS side. In addition, it was highlighted that, in order to involve the distributed resources in aggregation, the DMS would have been necessary. Given

these issues and the timeframe involved, it was suggested to proceed first with pilot projects, in order to gain experience useful to design and implement the final framework. Since no new information about the implementation of an extended concept of aggregation in the Market Management System and about the implementation of the Distribution Management System have been made available to us, we confirm our previous recommendations.

3 ENERGY COMMUNITIES

In order to implement in an effective way the concept of energy community, several issues must be dealt with, that are not explicitly taken into account in the Law for the Regulation of the Electricity Market, such as:

- 1) How energy sharing is handled?
- 2) May power plants providing energy to the communities also be owned by third parties that are not members of the communities themselves?
- 3) May existing plants provide energy to the communities or only new plants are allowed to do so?
- 4) What kind of incentive schemes are foreseen to support the development of energy communities?
- 5) How the size / extent of energy communities is regulated?
- 6) Are energy communities responsible for imbalances?
- 7) Has a differentiation been made between Renewable Energy Communities and Citizen Energy Communities?

CERA stated that it is still in the process of formulating the necessary Regulatory Decisions, therefore at the moment there are no clear positions on the aforementioned issues.

For a more detailed discussion on energy communities please refer to *Output 2.1 - Report on a new policy framework to support and promote flexibility in the electricity system and market* and for the related recommendations please refer to *Output 2.2 - Report with detailed policies and measures, objectives and targets in accordance with the Cypriot Integrated National Energy and Climate Plan, as required by Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, with specific reference to the dimension of the “Internal Energy Market”*.

4 STORAGE SYSTEMS

Taking into account the analysis reported in Output 1.1 regarding storage systems, we suggest the following recommendations:

- both the IEM Directive and the IEM Regulation see the energy storage facilities as a key element to provide flexibility services to foster the integration of renewable energy sources and to guarantee security of supply. In addition, energy storage services should be market-based and competitive. Within this context, market rules should remove barriers or discriminations and deliver appropriate incentives to investments in storage facilities;
- with reference to the ownership of energy storage facilities by DSO/TSO, in line with the articles no. 36 and 54 of the IEM Directive, DSOs/TSOs shall not own, develop, manage or operate energy storage facilities. However, Member States may allow DSOs/TSOs to own, develop, manage or operate energy storage facilities, where they are “fully integrated network components”¹ and the regulatory authority has granted its approval, or where all of the following conditions are fulfilled, namely:
 - (a) other parties, following an open, transparent and non-discriminatory tendering procedure that is subject to review and approval by the regulatory authority, have not been awarded a right to own, develop, manage or operate such facilities, or could not deliver those services at a reasonable cost and in a timely manner;
 - (b) such facilities are necessary for the DSOs/TSOs to fulfil their obligations under this Directive for the efficient, reliable and secure operation of the distribution system and the facilities are not used to buy or sell electricity in the electricity markets; and
 - (c) the regulatory authority has assessed the necessity of such a derogation and has carried out an assessment of the tendering procedure, including the conditions of the tendering procedure, and has granted its approval.

Moreover, the regulatory authorities shall perform, at regular intervals or at least every five years, a public consultation on the existing energy storage facilities in order to assess the potential availability and interest in investing in such facilities. Where the public consultation, as assessed by the regulatory authority, indicates that third parties are able to own, develop, operate or manage such facilities in a cost-effective manner, the regulatory authority shall ensure that the DSOs/TSOs' activities in this regard are phased out within 18 months. As part of the conditions

¹ Network components that are integrated in the transmission or distribution system, including storage facilities, and that are used for the sole purpose of ensuring a secure and reliable operation of the transmission or distribution system, and not for balancing or congestion management.

of that procedure, regulatory authorities may allow the DSOs/TSOs to receive reasonable compensation, in particular to recover the residual value of their investment in the energy storage facilities.

Summarizing, according to the IEM directive, DSOs/TSOs in any case cannot own, develop, manage or operate energy storage facilities for balancing or congestion management or, more in general, if they are not fully integrated network components, to buy or sell electricity in the electricity markets. This means that storage systems cannot be directly used by DSOs/TSOs as one of the most effective ways to integrate intermittent renewable sources.

We have also to take into account Article 66 – Derogations of the IEM directive, that states that *Member States which can demonstrate that there are substantial problems for the operation of their small connected systems and small isolated systems, may apply to the Commission for derogations from the relevant provisions of Articles 7 and 8 and of Chapters IV, V and VI².*

‘Small isolated system’ is defined as any system that had consumption of less than 3000 GWh in the year 1996, where less than 5% of annual consumption is obtained through interconnection with other systems.

‘Small connected system’ is defined as any system that had consumption of less than 3000 GWh in the year 1996, where more than 5% of annual consumption is obtained through interconnection with other systems.

Since in 1996 in Cyprus electricity generation was 2609 GWh (source: IEA) and, just like today, it was isolated, it could apply for a derogation from Articles 36 and 54 of the IEM directive, provided that it demonstrates that there are substantial problems for the operation of its power system.

In this regard, in the previous RSE report *Timetable for applying proposed amendments to the new Trade and Settlement electricity market Rules in Cyprus* (contract SRSS/S2017/048) issued in 2019, the following statement by the Cyprus DSO was reported: *The DSO should have the possibility of controlling distributed storage systems in case of network security issues. After 2020, due to the increasing penetration of renewable sources, it will be necessary to install storage systems at specific network locations and the DSO must be enabled to decide on the locations, sizes and types (e.g. response time) of the storage systems in order to satisfy specific network requirements/constraints.*

We are not aware of the position of TSOC in this regard but, as a general recommendation, we suggest to comply with the provisions of Article 36 and 54 of the IEM directive, leaving to the market the development and operation of storage systems to maximize the integration of intermittent renewable sources, also in view of the future interconnection with the European power system through the EuroAsia interconnector. Of course, through the ancillary services market, possibly extended to new services like

² Articles 36 and 54 of the IEM Directive belong, respectively, to Chapter IV and VI.

fast reserve or synthetic inertia³, storage systems will be able to provide a fundamental contribution to the secure operation of the networks. Should the market fail in providing a sufficient amount of storage, as a last resort a derogation might be asked to entrust TSOC/DSO with the task of developing and operating storage systems with the abovementioned targets. In such a case, the participation of TSOC/DSO to the electricity markets with their own storage systems should be strictly regulated by CERA.

Moreover, as mentioned in Output 1.1, the participation of storage systems to the electricity market can also take place in an aggregated way through a “Storage Representative” with a portfolio of 1 to 20 MW with a capacity of at least 2 MWh/MW. In this regard, the same recommendations concerning aggregation provided in chapter 2 should be taken into account. In particular, the impossibility of building an aggregate of storage systems together with RES and flexible demand resources is a severe limitation to the possibility of exploiting the full flexibility potential and benefits of the storage systems themselves.

³ See also *Output 2.1 - Report on a new policy framework to support and promote flexibility in the electricity system and market.*

5 INTRADAY MARKET

Taking into account the analysis reported in Output 1.1 regarding the Intraday Market, we suggest the following recommendations:

- According to the abovementioned timeline, the expected dates for starting operation of the day-ahead market and of the EuroAsia Interconnector are, respectively, October 2022 and first half of 2026. Moreover, in CERA's Regulatory Decision no. 1/2015 it is stated that an Intraday Market should be implemented at *"the latest within 24 months from the date the market starts operation under the new arrangements"*, that would be in 2024.
- When the EuroAsia interconnector will be in operation, Cyprus could join the Europe-wide Single Intra Day Coupling continuous trading market (i.e. Cross-Border Intra-Day project – XBID). In contrast to an auction-based market, in such project, energy bids and offers are progressively accepted until the gate closure on the basis of the time of submission, regardless of the economic merit order (i.e. in continuous trading markets an offer is coupled with the first compatible bid, even if later on a cheaper bid will be submitted). The gate closure is one hour before delivery in the XBID project. In addition, in line with the European framework, the continuous trading is interspersed with 3 complementary regional auctions:
 - 1) the first auction closes at 15:00 D-1 for hours 0 ÷ 24 D;
 - 2) the second auction closes at 22:00 D-1 for hours 0 ÷ 24 D;
 - 3) the third auction closes at 10:00 D for hours 12 ÷ 24 D;

For the above-mentioned auctions, the continuous trading is interrupted from 20 minutes before to 30 minutes after the gate closure of the auctions. Moreover, complementary auctions aims to provide price signals about the value of cross-zonal transmission capacity in the intra-day time frame, as well as to extract the congestion rent deriving from capacity allocation.

It is worth emphasizing that, considering the experiences of the market players which already operate on the XBID market:

- a larger market increases liquidity, namely the possibility of completing a transaction;
- XBID proved particularly beneficial for renewable producers, that, in order to exploit the possibility of correcting their production programs until one hour before delivery, adopted new short-term generation forecast tools.

However, as in the Italian case, Cyprus is a central dispatch system; therefore, an issue could be expected on the coordination between the Integrated Scheduling Process (ISP) and the Single Intra Day Coupling continuous trading market, since, after the ISP gate closure, market players would have the possibility of making further trades in the intraday market until h-1, thus changing the dispatching defined by the ISP and possibly eroding the reserve margins. In such a case, the TSO

could have no sufficient time (less than one hour) to restore the reserve margins and, moreover, gaming opportunities for the involved generation units might arise.

In the Trading and Settlement Rules – TSRs version 2.0.0 issued by the Cyprus Transmission System Operator (TSOC), it is in fact specified that:

- **Integrated Scheduling Process** is a dispatch arrangement where the Transmission System Operator determines the Generating Units' commitment decisions, reserve awards for the Balancing Service Providers and an indicative scheduling, based on Balancing Energy and Reserve Offer prices and technical parameters provided by the Participants, in order to minimize the System imbalance covering cost and the procurement cost of FCR, aFRR and mFRR, while meeting Generating Units' technical constraints and System operational constraints.
- **Integrated Scheduling Process Gate Closure** (ISP Gate Closure) is the time *in day D-1 (for Trading Day D)*, namely 16:00 EET in D-1, after which no Balancing Energy Offers or Reserve Offers can be submitted by the Participants in the Integrated Scheduling Process.

In Italy, even if there are 6 ISP sessions both in day D-1 and in day D, the issue of the coordination between the Dispatching Services Market (i.e. the Integrated Scheduling Process) and the Single Intra Day Coupling continuous trading market (i.e. after the gate closure of every Dispatching Services Market session, XBID is still running), had to be managed.

The implementation solution to this problem consists of constraining each generation unit enabled to provide ancillary services to keep its production program within a specific interval defined by the TSO in the Dispatching Services Market, even after possible trades carried out in the continuous intra-day market until h-1. This solution increases the complexity and could reduce the liquidity in the intra-day market and in principle would require the remuneration to the units enabled to provide ancillary services of the opportunity cost related to the constraint that limit their possibility of trading in the intra-day market, but provides to the TSO a solution that respects the constraints on the necessary reserve requirements.

On the other hand, despite these issues, the main positive effect of the introduction of an intra-day continuous trading market with gate closure at h-1 should prevail, namely the better definition of production programs by renewable sources on the basis of generation forecasts carried out nearer the delivery time. This would reduce their exposure to imbalances, as well as the uncertainty level of the TSO, thus allowing it to reduce the quantity of reserve margins needed, with a consequent reduction of system costs.

- Thus, we recommend entering the XBID cross-border continuous trading intra-day market as soon as the EuroAsia interconnector will be in operation, adjusting the regulatory framework also

in order to allow an adequate coordination with the Integrated Scheduling Process, by constraining each generation unit enabled to provide ancillary services to keep its production program within a specific interval defined by the TSO in the Integrated Scheduling Process, even after possible trades carried out in the continuous intra-day market until h-1. As for the opportunity of implementing a national intra-day market in 2024 and keeping it in operation for just one year before joining XBID, this should be assessed taking into account the results of the first period of the day-ahead market operation, the development of renewable sources, the expected liquidity of this possible national intra-day market and the related burden of its implementation.

6 IMBALANCE SETTLEMENT PERIOD

Taking into account the analysis reported in Output 1.1 regarding the imbalance settlement period (ISP), we suggest the following recommendations:

- According to Article 64 – Derogations of the IEM Regulation, Article 8, containing the 15 minutes ISP requirement, shall not apply to Cyprus until its transmission system is connected to other Member States' transmission systems via interconnections. Therefore, assuming that this will happen in the first half of 2026 with the commissioning of the EuroAsia Interconnector, until then a 30 minutes imbalance settlement period may continue to apply.
- After the interconnection of Cyprus with Europe in 2026, Article 8 of the IEM Regulation will apply. It states that derogations may be granted by regulatory authorities only until 31 December 2024, that is before the 2026 expected commissioning date of the EuroAsia Interconnector, therefore in this case derogations are not relevant for Cyprus.
- Nevertheless, Article 8 states that, besides derogations, regulatory authorities may also grant exemptions and that *“from 1 January 2025, the imbalance settlement period shall not exceed 30 minutes where an exemption has been granted by all the regulatory authorities within a synchronous area”*. Since Cyprus will be interconnected only with HVDC links, it will not be synchronous with the continental Europe and it will remain a synchronous area by itself, therefore CERA will have the possibility of granting an exemption and keeping the 30 minutes ISP.
- In the previous RSE report *Timetable for applying proposed amendments to the new Trade and Settlement electricity market Rules in Cyprus* (contract SRSS/S2017/048) issued in 2019, it was suggested to define the specifications for all the components of the Advanced Metering Infrastructure (including the MDMS and the DMS) and for the smart meters to be deployed so that they could easily support a switch from a 30 minute to a 15 minute measurement time interval. In this regard, CERA informed us that the MDMS supports the transition from a 30 to a 15 minute time interval, but no information have been provided on the capabilities of smart meters.
- So, it is suggested to keep the 30 minutes ISP until the interconnection of Cyprus with Europe and, after that, to carry out a cost-benefit analysis of moving to a 15 minutes ISP taking into account in particular:
 - the readiness of the available infrastructure (MDMS, smart meters, DMS and other relevant systems) to move to a 15 minute ISP and the costs and the burden to make them compliant;
 - the benefits of a full harmonization with the Internal Electricity Market, with the possibility of accessing trading products with the same delivery windows and the

opportunity to participate to the cross-border European balancing platforms foreseen by the Balancing Regulation 2017/2195.

As far as the costs are concerned, it is worth recalling the opinion of TSOC reported in the previous RSE report *Timetable for applying proposed amendments to the new Trade and Settlement electricity market Rules in Cyprus* (Contract SRSS/S2017/048) issued in 2019:

1. TSOC software systems have 30 minute set “information channels” assigned for every electricity meter that is installed in the boundaries of the Transmission System. Therefore:
 - a. All electricity meters have to be reprogrammed by the Transmission System Owner.
 - b. All “information channels” have to be recreated by TSOC. This includes buying additional channel capacity at an additional monetary cost and substantial human efforts.
 - c. All formulas calculating results for the existing reports have to be redesigned.
 - d. All interfaces of the TSOC RMR system with other systems have to be readjusted at additional cost.
 - e. The database will be split into two sections of 30 and 15 minute time series. This will bring significant distortion on historic retrieval of data for future system studies.
2. The electricity meter storage will be reduced. This may affect negatively the reading collection procedure of TSOC with the possibility of losing market data.
3. TDRs have to be amended to accommodate the above changes.

As far as the benefits are concerned, it is worth mentioning that in the Single Intraday Coupling in several market areas 15 minute products are still available (see Figure 2) and they will further expand in other areas in the future.

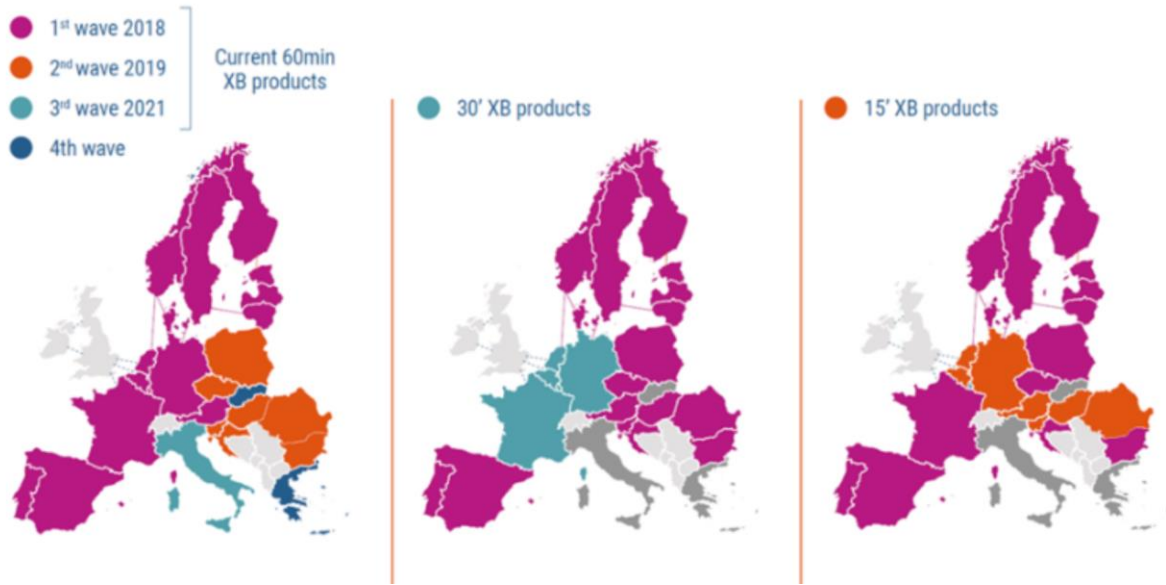


Figure 2 – Availability of hourly, half-hourly and 15 minute products in the Single Intraday Coupling (source: NEMO Committee)

7 BALANCING MARKET DATA PUBLICATION

Taking into account the analysis reported in Output 1.1 regarding the balancing market data publication, we suggest the following recommendations:

- According to Article 64 – Derogations of the IEM Regulation, Article 6, requiring that *“Transmission system operators or their delegated operators shall publish, as close to real time as possible but with a delay after delivery of no more than 30 minutes, the current system balance of their scheduling areas, the estimated imbalance prices and the estimated balancing energy prices”*, shall not apply to Cyprus until its transmission system is connected to other Member States' transmission systems via interconnections, that is until the first half of 2026, according to the time schedule of Figure 1.
- Within this context, it is worth recalling that, as mentioned in the previous RSE report *Timetable for applying proposed amendments to the new Trade and Settlement electricity market Rules in Cyprus* (contract SRSS/S2017/048) issued in 2019, TSOC provided the following opinion on this topic: *“TSRs provide for the publication of the cleared balancing energy prices at 12:00 on D+1. At the current state of the market this is considered sufficient, and thus, TSOC disagrees with the earlier publication of balancing market prices. This term will be re-evaluated in due course as the market evolves. When the system becomes interconnected the relevant provisions of the regulation will be applied”*.
- Provided that the provision of the IEM Regulation becomes binding after the interconnection of Cyprus with Greece, it is advisable that CERA, as market evolves and as a result of its market monitoring activity, assesses the opportunity of anticipating the enforcement of the provision to foster market transparency and efficiency. RSE’s opinion is that the sooner, the better.

8 TECHNICAL BIDDING LIMITS

Taking into account the analysis reported in Output 1.1 regarding the technical bidding limits, we suggest the following recommendations:

- According to Article 64 – Derogations of the IEM Regulation, Article 10 on technical bidding limits and Article 11 on the Value Of Lost Load shall not apply to Cyprus until its transmission system is connected to other Member States' transmission systems via interconnections, that is until the first half of 2026, according to the time schedule of Figure 1.
- After the interconnection of Cyprus with Europe, Article 10 and 11 of the IEM Regulation will apply to Cyprus, requiring that limits on clearing prices for day-ahead and intra-day markets are defined taking into account the maximum Value of Lost Load. As an example, in view of the start of the capacity market auctions for 2024/2025 in Italy, the TSO TERNA prepared a document⁴ on the adequacy standard required for the electricity system. The document, prepared in compliance with the regulatory authority ARERA Resolution 507/2020/R/eel, illustrates the analysis carried out by the TSO in application of the European methodologies contained in the ACER Decision no. 23/2020 with regard to the Value of Lost Load (VOLL), the Cost of New Entry (CONE) and the Reliability Standard (RS). TERNA specifies that the study is to be considered valid for the next 5 years, without prejudice to the possibility of updating it in advance in case of significant changes to the estimate of the VOLL and CONE.

The "Value Of Lost Load" is defined as the economic value of energy not supplied due to an interruption in the electricity supply. To define it, the Italian TSO also carried out a survey.

Starting from the residential sector, the survey confirmed that the WTP (Willingness To Pay, i.e. the maximum price the customer is willing to pay to avoid suffering an interruption in the supply) is systematically lower than the WTA (Willingness to Accept, i.e. the minimum compensation the customer expects to receive to accept an interruption in the supply of electricity).

The WTP is equal to 7.5 k€/MWh, while the WTA is equal to 67.9 k€/MWh. This confirms that the customer interviewed considers continuity of supply an intrinsic feature of their contract, with little or no willingness to pay a further 'premium' to avoid possible interruptions. By making a simple average of the two results, a value of 37.7 k€/MWh is returned.

Also, for the tertiary sector, in line with the residential sector, the WTP, equal to 3.5 k€/MWh, is systematically lower than the WTA (54.0 k€/MWh). The average value is 28.7 k€/MWh.

⁴ Terna, *Proposal regarding the adequacy standard of the Italian electricity system* (Proposta in merito allo standard di adeguatezza del sistema elettrico italiano), 2021,

https://download.terna.it/terna/proposta_standard_adequatezza_sistema_8d9277fde7d3b7b.pdf

With regard to the industrial sector, a higher range can be seen between the VOLL for 2 and 60 minutes of interruption, with values equal to 249 k€/MWh and to 23.4 k€/MWh, respectively. TERNA proposes to use as a reference value the average of the responses for 60 minutes of interruption.

In conclusion, the VOLL valid for the whole system is obtained as a weighted average between sectoral values and is equal to 28.4 k€/MWh.

For the sake of completeness, the Reliability Standard (i.e. RS) represents the system adequacy standard, defined as the target number of hours/year of load disconnection (i.e. Loss of Load Expectation, LOLE). Currently, the RS for the Italian electricity system corresponds to 3 LOLE hours/year according to the Ministerial Decree issued on the 28th of June 2019.

Following the consultation carried out by TERNA, on the 7th of September 2021 ARERA published the Resolution no. 370/2021/R/eel containing the proposal to the Ministry of Ecological Transition to establish a single VOLL at the national level equal to 20,000 €/MWh.

- As above mentioned, before the interconnection of Cyprus with Europe, the provisions of the IEM regulation about technical bidding limits do not apply. However, it would be advisable for CERA to carry out a study to estimate the VOLL in Cyprus providing results before the interconnection of Cyprus with Greece. The sooner such a study is completed and the sooner its results are taken into account to set the Administratively Defined Energy Offer Cap or a possible technical clearing price cap, the better.

9 CAPACITY MECHANISMS

Taking into account the analysis reported in Output 1.1 regarding capacity mechanisms, we suggest the following recommendations:

- According to Article 64 – Derogations of the IEM Regulation, Article 20 on resource adequacy in the internal market for electricity and Article 21 (except paragraph 3) on general principles for capacity mechanisms shall not apply to Cyprus until its transmission system is connected to other Member States' transmission systems via interconnections, that is until the first half of 2026, according to the time schedule of Figure 1. On the contrary, Article 21 paragraph 3 already applies to Cyprus; it states that *“Member States shall assess whether a capacity mechanism in the form of strategic reserve is capable of addressing the resource adequacy concerns. Where this is not the case, Member States may implement a different type of capacity mechanism.”*
- In the Cyprus TSRs, “contingency reserve” has been defined as follows: capacity which is contracted or may be contracted by the TSO, and is activated in accordance with terms and conditions of the Integrated Scheduling Process, so that the system load and the ancillary services requirements are covered during extreme conditions⁵. Contingency reserve is provided by contracted units. By means of the Contingency Reserve Contracts, a Participant reserves the whole generation capability of a Contracted Unit for the provision of Contingency Reserve, in accordance with the provisions of the relevant Contract. The generation capability of a Contracted Unit cannot be used for participation in any market process offering Energy, Balancing Energy and/or Ancillary Services. Therefore, it is reasonable to assume that such contingency reserves are the same as the “strategic reserve”, therefore the current Cyprus framework is to be considered compliant with Article 21 paragraph 3 of the IEM Regulation.
- After the interconnection of Cyprus with Europe, Article 20 of the IEM Regulation applies to Cyprus, specifying that Member States with identified resource adequacy concerns shall develop and publish an implementation plan with a timeline for adopting measures to eliminate any identified regulatory distortions or market failures as a part of the State aid⁶ process. With reference to such process, Member State is to submit the implementation plan to the European

⁵ As reported in the TSRs, extreme condition is any foreseen situation in the solution of the Integrated Scheduling Process which may lead to the expectation of insufficient generation and/or balancing resources to cover the System Load and/or the upward FCR, aFRR and/or mFRR requirements for any reason. In Extreme Conditions, the solution of the Integrated Scheduling Process results in deficit(s) in covering the System Load and/or the upward FCR, aFRR and/or mFRR requirements.

⁶ A state aid is an economic measure devoted to a specific target that is able to influence the market and the cross-border exchanges.

Commission (EC) for review. Consequently, the EC – within 4 months – releases an opinion on whether the planned measures are sufficient to eliminate the regulatory distortions or market failures that were identified as causing or contributing to the resource adequacy concern. The European Commission’s opinion may include an invitation to Member States to revise their implementation plans. In addition, the Member State shall supervise the application of its implementation plan and shall publish the results of the supervision in the annual report submitted to the EC. After the identified resource adequacy problem is resolved, the Member State is also required to continue to comply with the implementation plan. It is worth noting that, before implementing capacity mechanisms, in line with the European regulatory framework, the implementation plan is required to consider:

- removing regulatory distortions;
- removing price caps;
- introducing a shortage pricing function;
- increasing interconnection and internal grid capacity;
- enabling self-generation, energy storage, demand side measures and energy efficiency;
- ensuring cost-efficient and market-based procurement of ancillary services;
- removing regulated prices.

In case the implementation plan proves to be not sufficient, Member States shall assess whether a capacity mechanism in the form of strategic reserve is capable of addressing the resource adequacy concerns, that Cyprus already implemented. Where this is not the case, Member States may implement a different type of capacity mechanism.

Therefore, after the interconnection of Cyprus with Europe, it will be necessary to set up an implementation plan and make an assessment of the need for strategic reserve in case the implementation plan proves to be not sufficient⁷.

⁷ MECI stated that the capacity mechanism proposed within the TSRs (type: contingency reserve) is currently being examined by DG Competition, Case SA. 53729 (2019/PN).

10 PRIORITY DISPATCH

Taking into account the analysis reported in Output 1.1 regarding priority dispatch, we suggest the following recommendations:

- According to Article 64 – Derogations of the IEM Regulation, Article 12 on dispatching of generation and demand response shall not apply to Cyprus until its transmission system is connected to other Member States' transmission systems via interconnections, that is until the first half of 2026, according to the time schedule of Figure 1.
- As far as the current Cyprus framework is concerned, in the previous RSE report *Timetable for applying proposed amendments to the new Trade and Settlement electricity market Rules in Cyprus* (contract SRSS/S2017/048) issued in 2019 it was highlighted that TSRs should have been amended to take into account that:
 - day-ahead and upward balancing offers by RES and CHP should be cleared before offers of other sources with the same price; thus, RES and CHP have priority only if they offer the same price as other sources;
 - downward energy balancing bids from RES and CHP units should not be taken into account only if system constraints cannot be satisfied, but from the beginning, provided that the Administratively Defined Balancing Energy Offer Lower Limit is not limiting their possibility to make profit (i.e. negative prices should be allowed).

Concerning these issues, CERA stated that *“the above recommendations are yet to be implemented. The only provisions related to priority dispatch can be found in Article 102⁸ of the Law and concern load dispatch and demand response in general and not exclusively to day-ahead market. The downward energy balancing offer does not take into account the bids of RES and CHP as part of the priority dispatch which means that they are considered only in cases of technical constraints to the system as the Administratively Defined Balancing Energy Offer Lower Limit is currently non negative. This limit applies also to conventional generation⁹”*.

⁸ Article 102 of the Law for the Regulation of the Electricity Market states that when dispatching power generation and demand response facilities the TSO and the DSO shall give priority to generating installations using renewable energy sources or high-efficiency cogeneration, provided that the safe operation of the national electricity system allows it. Priority dispatch is granted to all RES and HECHP generating installations if in operation before 4 July 2019, only to RES and HECHP installations with a capacity of less than 400 kW if in operation before 1 January 2026 and only to RES and HECHP installations with a capacity of less than 200 kW if in operation from 1 January 2026.

⁹ Since a RES generator has basically no variable costs, a downward balancing accepted bid at zero €/MWh does not change its profit obtained in the day-ahead market. Moreover, if the RES generator operates under an incentive scheme (for example a feed-in tariff) a downward balancing accepted bid at zero €/MWh causes a loss of the incentive due to the reduced production. Thus, negative prices are necessary to make profitable for RES generators to provide downward balancing services. On the other hand, thermal generators have fuel costs, therefore a downward balancing accepted bid at zero €/MWh increases their profits obtained in the day-ahead market by the saved fuel cost, therefore negative prices are not necessary to make profitable for them to provide downward

- After the interconnection of Cyprus with Europe, Article 12 of the IEM Regulation fully applies to Cyprus. It is worth noting that when dispatching electricity generating installations, system operators shall give priority to generating installations:
 - that use renewable energy sources and have an installed electricity capacity of less than 400 kW (200 kW for those commissioned from 1 January 2026);
 - demonstration projects for innovative technologies, subject to approval by the regulatory authority, provided that such priority is limited to the time and extent necessary for achieving the demonstration purposes;
 - power-generating facilities using high-efficiency cogeneration with an installed electricity capacity of less than 400 kW.

Without prejudice to contracts concluded before 4 July 2019, power-generating facilities that use renewable energy sources or high-efficiency cogeneration and were commissioned before 4 July 2019 and, when commissioned, were subject to priority dispatch under Article 15(5) of Directive 2012/27/EU or Article 16(2) of Directive 2009/28/EC of the European Parliament and of the Council shall continue to benefit from priority dispatch. Priority dispatch shall no longer apply to such power-generating facilities from the date on which the power-generating facility becomes subject to significant modifications, which shall be deemed to be the case at least where a new connection agreement is required or where the generation capacity of the power-generating facility is increased.

Therefore, the Cyprus framework will have to be made compliant with such provisions.

balancing services. Therefore, in a competitive balancing market, downward bids by thermal generators will be higher in the merit order and will be selected before the bids of RES generators, as it is also advisable for environmental reasons. As for the opportunity of allowing also thermal generators to bid at negative prices, it depends on the level of competitiveness of the market, since this possibility increases their capability of exercising market power.