



MEDREG – ECRB joint workshop

Support mechanisms for RES integration

Flexibility mechanisms and innovative technologies

MEDREG- ECRB JOINT WORKSHOP report – October 2022

*Empowering Mediterranean regulators for a common
energy future MEDREG- ECRB*



Renewables
Working Group
(RES WG)



Co-funded by
the European Union

ABSTRACT

As part of the partnership between MEDREG and ECRB, a workshop on the integration of renewable energy sources and flexibility mechanisms was organized in Lisbon, Portugal at the premises of the Portuguese regulator ERSE.

This report summarizes the outcomes of the discussions during the workshop and provides the main conclusions of the events.

ACKNOWLEDGMENTS

MEDREG's RES WG action plan included an annual mini-workshop to deepen the analysis of the RES WG deliverables and to enhance the cooperation, and knowledge and experience sharing among its members and MEDREG's external partners.

MEDREG and ECRB would like to give a special thanks to Professor Dr. Pedro Verdelho and the ERSE colleagues for their warm welcome and for hosting the event in their premises.

DISCLAIMER

This publication was produced with financial support from the European Union. The contents are the sole responsibility of MEDREG and do not necessarily reflect the views of the European Union.

ABOUT MEDREG

MEDREG is the Association of Mediterranean Energy Regulators, bringing together 27 regulators from 22 countries, spanning the European Union, the Balkans, and the MENA region.

Mediterranean regulators work together to promote greater harmonization of the regional energy markets and legislations, seeking progressive market integration in the Euro-Mediterranean basin. Through constant cooperation and information exchange among members, MEDREG aims at fostering consumers rights, energy efficiency, infrastructure investment and development, based on secure, safe, cost-effective, and environmentally sustainable energy systems. MEDREG acts as a platform providing information exchange and assistance to its members as well as capacity development activities through webinars, training sessions and workshops. The MEDREG Secretariat is located in Milan, Italy.

MEDREG wishes to thank in particular all the experts for their work in preparing the training and for sharing their knowledge.

For more information, visit www.medreg-regulators.org

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ABOUT ECRB

The Energy Community Regulatory Board (ECRB) has nine Contracting Parties - Albania, Bosnia and Herzegovina, Kosovo* , North Macedonia, Georgia, Moldova, Montenegro, Serbia and Ukraine. ECRB is the independent regional body of energy regulators in the Energy Community and beyond. ECRB activities build on three pillars: providing coordinated regulatory positions to energy policy debates, harmonising regulatory rules across borders and sharing regulatory knowledge and experience. ECRB is an institution of the Energy Community. The Energy Community is a union of nine members from South East Europe and the Black Sea region and the European Union. ECRB promotes the development of a competitive, efficient and sustainable regional energy market that works in public interest. See www.energy-community.org.

¹ This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Advisory Opinion on the Kosovo declaration of independence.

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Foreword

The energy sector is witnessing unprecedented events that are significantly impacting the global electricity market, in terms of functionality and dynamics. In 2020, the COVID-19 pandemic did not only cause a health emergency, but it has been a turbulent period for all sectors, including the energy sector. In that regard, operation and maintenance of the electric systems was difficult, and all the energy sector stakeholders had to take measures and actions to mitigate the impact of the COVID-19.

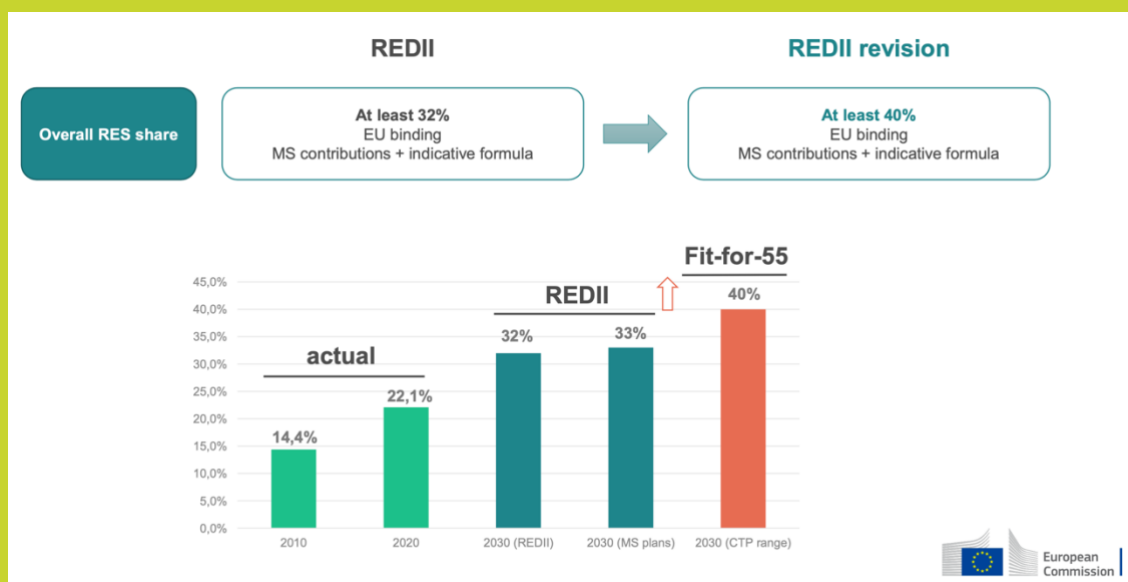
As soon as the pandemics' spread slowed down, the demand for energy increased and things appeared to be going back to normal, only to find the situation to worsen in 2021, with the beginning of the price surge, and in 2022, with the current political situation in Ukraine. Due to the disturbances in the gas flow in Europe, energy prices increased to an all-time high, which showed the vulnerability of the electricity and gas markets in Europe and their impact on the global energy market.

To reduce their dependency on fossil fuels as a main source of energy, Europe had already set a strategy to for energy transition and decarbonization in its electricity sector. Due to the recent events, the EU commission decided to accelerate the energy transition and to revise its energy strategy to cope with the energy price surge.

During the joint workshop, members had a better view on the revision of the Renewable Energy Directive (REDII) and the REPowerEU Plan, presented by the keynote speaker Ms. Claire Levavasseur.

The revision of the REDII increased the overall share of RES (Renewable Energy Sources) from at least 32% to 40% to meet with the Fit for 55 objectives as shown in the figure below.

Figure 1. Overall ambition – the EU-level target



RES INTEGRATION AND SUPPORT MECHANISMS

To achieve its objective, the EU aims to facilitate energy system integration through enhancing the integration of EVs, providing stronger incentives for RES development and use in transport, and tackling the remaining barriers to attain a high level of RES supply.

Targets have also been set for sectors like transport, and heating & cooling. In addition, the revision of the RED II includes two new objectives in the buildings (49% RES share in building indicative) and in the industry (1.1%-point annual increase in industry RES share “indicative” and 50% sub-target for RFNBOs²)

Furthermore, the EU targets to take measures to enable cost-effective RES deployment, including facilitating the permitting processes, planning of offshore RES generation, additional facilitative elements in the PPA and cross-border pilot projects (including the use of RES financing mechanisms).

In addition, the EU commission has elaborated a strategy to reduce the EU’s dependence on Russian natural gas by 2027. Several measures have been brought to light, and they include the following:

- Increasing of imports of liquefied natural gas (LNG) by 50 bcm.
- Increasing pipeline gas imports by 10 bcm.
- Increasing biomethane production by 3,5 bcm.
- EU-wide energy saving to cut gas demand by 14 bcm.
- Installing rooftop solar panels to reduce gas demand by 2,5 bcm.
- Using heat pumps to reduce gas demand by 1,5 bcm.
- Reducing gas demand in the power sector by 20 bcm by deployment of wind and solar.

For the future steps, the EU is planning to continue the RED revision, present the permitting process for vote of the European Parliament, and finally confirm the electricity market design white paper by the end of the year.

² *Renewable Fuels of Non-Biological Origin*

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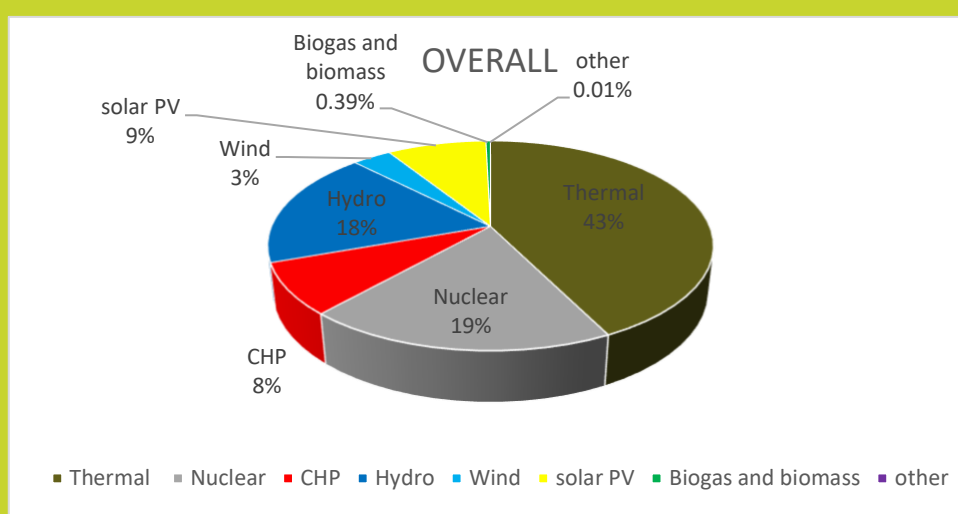
**RES INTEGRATION AND SUPPORT
MECHANISMS**

The joint workshop was divided in two panels, the first of which was dedicated to the RES integration and support mechanisms, while the second panel, was mainly focused on the flexibility of the electricity market and its ability to aid RES integration.

1.1. ECRB Report on Renewable Integration

The installed capacity in the Energy community Contracting Parties (CP) is dominated by the fossil fuels, nuclear and hydro power plants as shown in the figure below. However, it is important to highlight that the share of the other RES, other than hydro has increased over the years reaching to a of 12,39% of the total installed capacity.

Figure 2. Installed capacity in the Energy Community



The role of the energy regulators regarding the RES integration differs from one country to another, with a significant difference between the CPs.

In Bosnia and Herzegovina, Kosovo* and Ukraine, the energy regulators are deeply involved in the integration of the RES process. For example, the NRAs are responsible for setting the criteria and procedures in the support scheme, issuing privileged status, and establishing tariffs.

While in rest of the CPs, the energy regulators have a very limited responsibility, where they are mainly responsible for issuing the privileged status to RES producers only.

In terms of support schemes, the feed-in-tariff (Fit) and premium models are commonly used for the eligible RES producer, and in some cases, extended to high-efficiency cogeneration and self-consumption.

This designation is without prejudice to positions on status and is in line with UNSCR 1244 and the ICJ Advisory Opinion on the Kosovo declaration of independence.

However, in some cases there is a debate and discussion on the most efficient support scheme for the RES taking into consideration the required funds to support RES that would in turn attract investments.

In most cases, RES producers are not excluded from the balancing mechanism. As an exception, for some groups of RES producers under the Feed-in or Premium model, the balancing cost is mostly covered by the off-taker, market operator or other entity, as assigned by the law.

Bosnia and Herzegovina is the only CP where all RES producers are responsible for balancing. Many of the CPs are considering imitating Bosnia and Herzegovina in that regard, where they are considering switching to a model of full balancing responsibility of RES producers, such as Kosovo.

Though, even if the RES producers are balancing responsible, additional flexibility mechanisms are necessary to increase the RES share in the energy mix. Flexibility in the power system allows the electricity system to include large capacities of intermittent energy sources, such as those originating from solar and wind. Moreover, flexibility measures reduce the impact of the error between the forecasted and the actual output. Among the flexibility solutions that can be adopted, flexible generation, energy storage, and flexible demand can be considered. Nevertheless, in the Energy community CPs, there is a shortage in legislation to introduce flexibility mechanisms in the electricity system.



Igor Malidzan

REGAGEN

“There is a considerable improvement in the RES integration in the energy community contracting parties, with possibility to integrate more.

The support mechanisms require to be well designed to first reduce the fund needed to incentivize the RES production and to increase the attractiveness for investors.

Energy regulators should start to think about the elaboration of the regulatory framework that governs the use of flexibility mechanisms to allow large volume of RES in the electricity system.”

1.2. RES Alternatives and E-mobility

Most of the countries in the Mediterranean region have expressed their willingness to achieve a smooth energy transition towards a decarbonized energy sector. The process has started many years ago and is currently projected to remain over the next 30 years.

During the workshop, the Portuguese case study was presented to illustrate the roadmap set by the government and the role of the regulator in promoting and incentivizing RES alternatives and e-mobility.

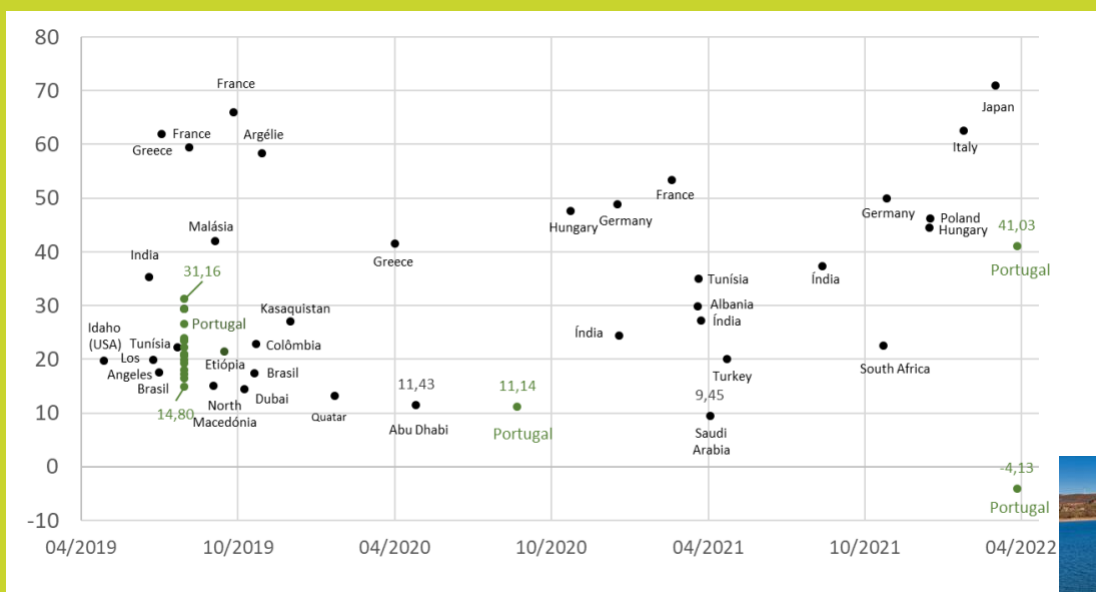
RES INTEGRATION AND SUPPORT MECHANISMS

Portugal succeeded to phase out coal from the energy mix in 2021, while RES has been on a constant increase within the energy mix, where it is expected to continue increasing from 31% to 85% in 2050. Besides RES, Portugal is working on an increase of 40% in energy efficiency will reducing the overall primary energy consumption from 240 to 145 TWh/year by 2050.

The energy transition cannot be achieved only by deploying large capacities of RES in the energy systems, but it will also require an increase in energy efficiency, alternative RES solutions and the implementation of e-mobility. Electricity will need to act as a platform for the energy system integration for e-mobility, waste management, demand participation, district heating and cooling, and electricity generation.

The Portuguese experience in solar PV auctions is one of the most successful in the world, with the lowest prices in the world as shown in the figure below. During the current year, a floating solar PV auction was launched for 7 locations with an available capacity of 263 MVA. The auction was a success with an allocation of 183 MVA with competitive prices varying from 57,26€/MWh to -4,13€/MWh.

Figure 3. Results from worldwide Solar PV Auctions 2019-2022.



Besides the RES experience, Portugal has a significant experience in the deployment of e-mobility. Indeed, the electric mobility sector is considered as separate sector from the electricity sector, however, there exists a strong bond between both sectors. More precisely, the electric sector supplies the charging points and electric mobility providers. On the other hand, distribution grid operator relates to the charging points as well and the electric mobility network managing entity.

The public chargers in Portugal reached 5 633 in 2022, with an annual increase in new purchasing and registrations of electric vehicles. Last year, 28 989 new electric vehicles have been registered, with 55% of them being PHEV (Plug-in hybrid electric vehicles).



Jorge Esteves

ERSE

“The energetic transition is a long process that started 30 years ago, and now is projected for the next 30 years. A liberalized and competitive market will speed-up and facilitate the integration of RES and other alternative sources. However, the market model needs to have better energy and more active consumers; and that can only be achieved by having a carbon neutral society.”

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ELECTRICITY MARKET FLEXIBILITY MECHANISMS TO SUPPORT RES INTEGRATION

ELECTRICITY MARKET FLEXIBILITY MECHANISMS TO SUPPORT RES INTEGRATION

Besides to RES integration, electric systems require the inclusion of flexibility mechanisms that will maintain the stability of the system and facilitate the management of the RES production once it reaches a large share of the energy mix.

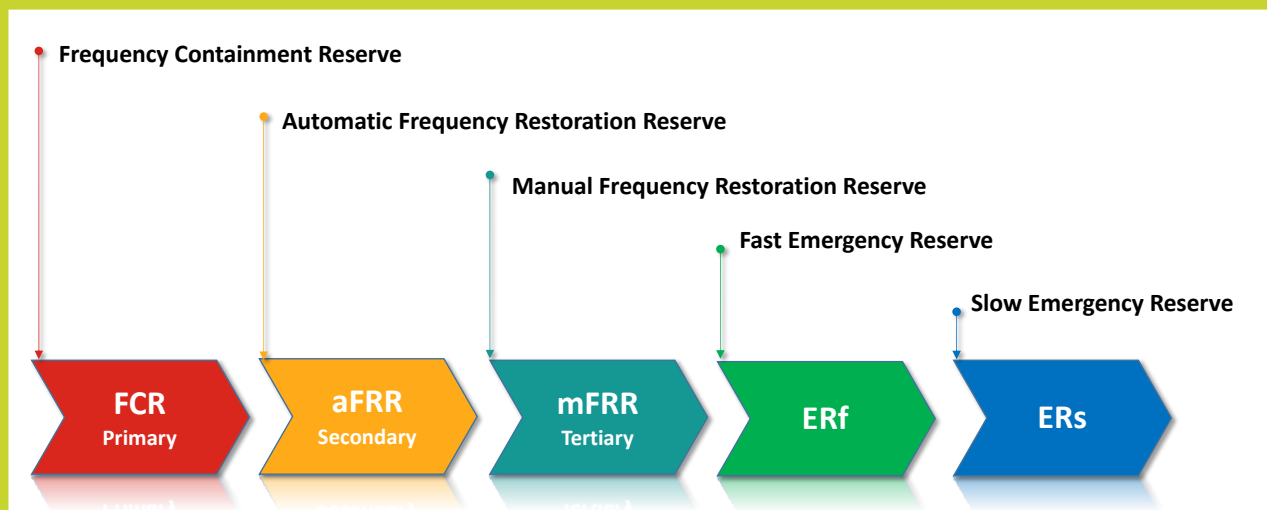
2.1. Market design as a platform for flexibility

During the workshop, the Georgian case study was detailed in terms of market design toward a platform for flexibility.

The balancing mechanisms are various and can be applied through several levels of the market and different contract types. For instance, at the wholesale market prior to the delivery day, the balancing can be ensured through a long bilateral contract that can last from 1 to 10 years with a fixed price or physical contract in the intraday by controlling BRP⁴ balance. On the other hand, the TSO (Transmission System Operator) monitors the balance in real time during the delivery day and can maintain the balance through ancillary services to control the frequency. The TSO also have the key role to settle imbalances in case of the presence of a deviation, that is under the responsibility of the BRPs; in that case, the financial balance would be done in the following month.

In terms of balance products, the following figure provides the commonly used mechanism used in Georgia. In addition, the SCADA/AGC scheme switch to market model to improve the balancing in the system. In that regard, the Balancing Service Provider (BSP) can enhance their appliances to meet the requirements to the new basepoint free scheme and participate on aFRR balancing product.

Figure 4. Balancing Products



⁴ Balance Responsible Party (BRPs)

ELECTRICITY MARKET FLEXIBILITY MECHANISMS TO SUPPORT RES INTEGRATION

Moreover, the balance service can be extended to the consumers; however, that would require the development of mechanisms that will motivate the big consumers, such as industrial consumers, to contribute to the balancing service. In that perspective, several industrial consumers are already participating in maintaining the balance of the system and some others are considering following the same process. Lastly, a pilot project of storage is under development, with the incentive from perspectives of launching balancing market.



Zviad Gachechiladze

GSE

“The market design should include the flexibility and balancing mechanisms to improve the quality of the service and the robustness of the system

Nowadays, the available technologies provide many mechanisms and options, starting at the market operators to the end-consumers

Regulators will have to develop the proper regulatory framework that will allow the use of all available technologies and incentives the new technologies.”

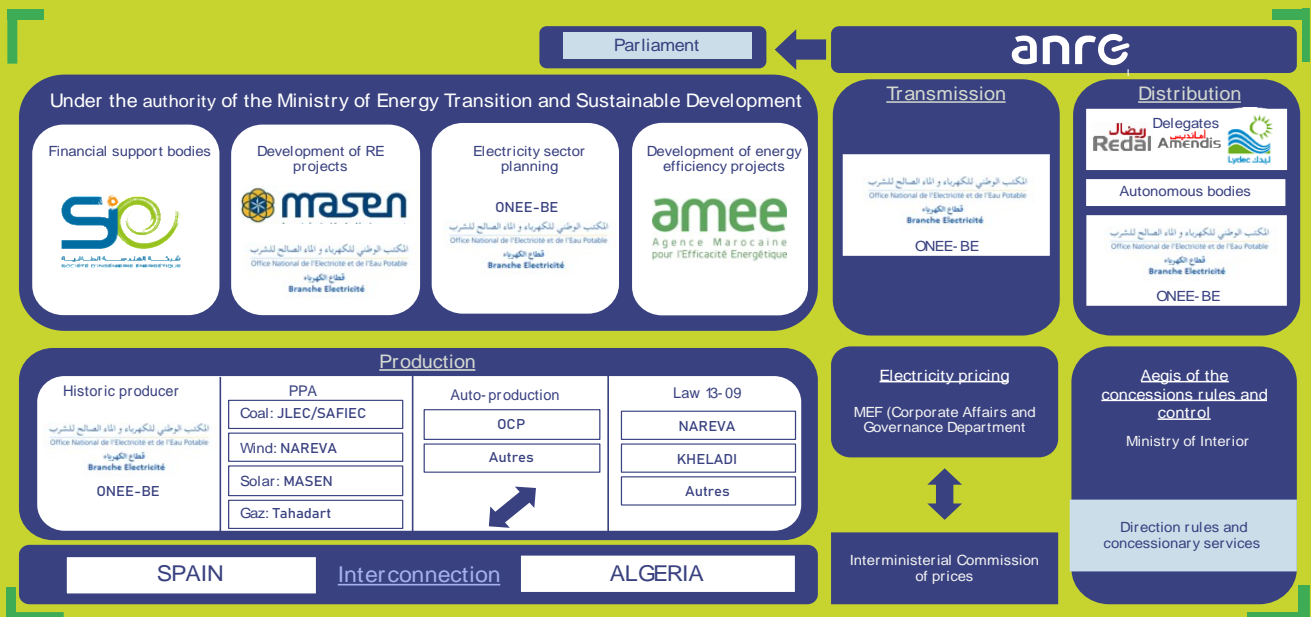
2.2. Regulatory mechanisms for the Deployment of RES – Morocco case study

The workshop was also an opportunity to present the successful Moroccan experience in achieving an important milestone in their energy strategy. Indeed, the strategy set a bold objective of reaching 52% RES capacity of the total installed capacity by 2030. By the end of last year, Morocco has already reached 37%, making it one of the leading countries in Africa in terms of wind and solar capacities installed.

Moreover, during the same year the energy regulator (ANRE) has become fully operational and already started the unbundling of the electricity market, hence facilitating further integration of the RES in the electricity market. Figure 5 below provides the current institutional landscape of the Moroccan electricity sector.

ELECTRICITY MARKET FLEXIBILITY MECHANISMS TO SUPPORT RES INTEGRATION

Figure 5. The current institutional landscape of the Moroccan electricity sector



To achieve their objectives, the national transmission network will be extended and developed in the future for the massive integration of wind farms in the South of Morocco. In addition, Morocco is planning to reinforce their cross-border interconnection to improve the RES integration and security of supply.

In terms of flexibility, Morocco is developing pumped storage hydropower (PSH), where they plan to reach 1 410 MW by 2030.



Noura Hajri

ANRE

“The Morocco experience has shown that the RES integration requires a clear national energy strategy with ambitious objectives for the deployment of RES. In addition, the legal and institutional framework will require to provide an appropriate investment environment.

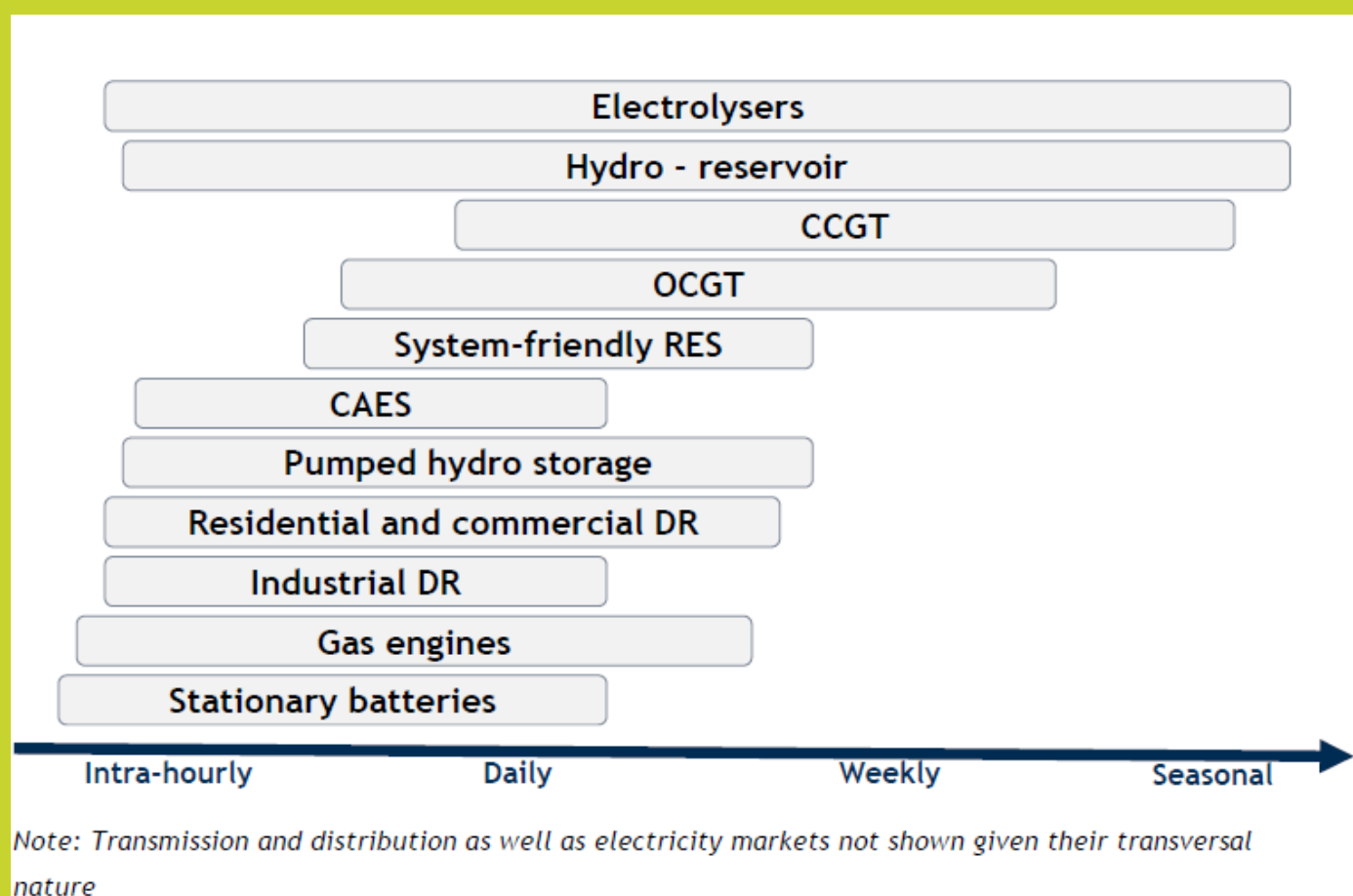
Lastly, flexibility mechanisms and innovative technologies will be crucial soon to include large volumes of RES production.”

2.3. Study of the Energy Community Secretariat on flexibility

ECRB elaborated a study to identify and analyse technical and non-technical sources of flexibility in the contracting parties. Moreover, the study evaluated their existing and future potential in different scenarios.

Technical sources are related to the assets and operational flexibility. On the other hand, the non-technical sources are linked to policy and measures that incentivise efficient use of technical sources. The assessment was focused on 5 types: Supply-side, Storage, Conversion, Demand-side, and Transversal. Each of these types have a different time frame, technical characteristics, and costs. The figure below presents the different types of flexibility sources with their respective time frame.

Figure 6 - Flexibility Sources and their Timeframe



Furthermore, the study includes a simulation to assess the flexibility needs and optimize the investments and operation for a given scenario using an hourly resolution. The key results provided an optimal portfolio of flexibility solutions and associated costs per contracting party, including 3 RES levels and for 2 integration approaches (moderate and high-RES deployment) the simulation was made for 2030 and 2040. In addition,

it provides an operation management of the power system as well with hourly dispatch, CO2 emission and curtailments⁵.



Arben Kllokoqi

Energy Community Secretariat

“The flexibility solutions will be facing many challenges in the future since there are still uncertainties regarding the RES deployment and coal phase-out.

The lack of liquid, integrated spot and balancing markets hinders cost-efficient use of flexibility sources. Furthermore, the regulated prices and network tariffs do not provide adequate incentives for development of distributed flexibility (still no demand response mechanisms are in place).

Other barriers, particularly coal subsidies and administratively-set (i.e., not market-based) renewables support further reduce the competitiveness of flexibility sources”

⁵ The full report can be found here : [Link](#)

CONCLUSIONS

The workshop showcases the potential of the Mediterranean and ECRB region in terms of abundance of using renewable energy sources. However, there is a need to unlock this potential and work on concrete projects such as interconnections between Morocco and Portugal and bringing forward the projects that have been suspended for a long period of time, such as the interconnection between Tunisia and Italy.

In recent events, the interconnection “EuroAsia” between Greece, Cyprus and Israel is a significant milestone for the region as it will fortify the countries’ security of supply and development of the respective markets. These projects show the potential in electricity trade between both shores which could be a crucial factor in the future.

The role of renewable energy sources has never been as crucial as it is nowadays. The energy market’s dependence on fossil fuels and the subsequent impacts due to the energy price surge as well as the climate changes objectives have empowered the integration of RES in the energy systems, where we currently seeing more incentivization and ease for newcomers into the renewables market.

Regarding dependence from fossil fuels, the role of RES is undeniable. However, the National Regulatory Authorities (NRAs) need to protect the customers and ensure affordable energy for the consumers. RES can be part of the solution, as it can act as a shield, since the costs of related to RES production are low compared to fossil fuel-based production and hence would reduce the both the impact caused by the surge in the energy prices and our demand on key fossil fuels like natural gas.

Furthermore, RES can support countries in achieving their climate objectives, by providing a clean energy source, not only in the electricity generation, but also in other sectors such as transportation, industry and heating and cooling.

Still, to achieve the role of the RES in the topics listed above, the cooperation between policy makers, energy regulators, and investors is important to develop a common and appropriate regulatory framework that is needed to streamline the procedure necessary to realize projects and ensure the bankability of investment, and to reduce the investment risks with a stable and forecastable framework. For instance, the permitting process and licensing administrative procedure should be optimized to avoid any delay which would evade technical and economic impacts.

At a second stage, this regulatory framework should be extended to the other alternative RES technologies and innovative solutions, that would further support the energy system to incorporate large volumes of RES into the system.

Digitalization and flexibility solutions are diverse and mature enough to be part of the market design. Nevertheless, the NRAs and government will face many challenges in adapting the market and designing new mechanisms and framework while ensuring the balance between the current model and its benefits for the actual market actors and the new model with its incentives for the new market actors.

Lastly, the workshop has shown that energy regulators from both associations, MEDREG & ECRB, need to continue collaborating and further reinforce their cooperation to increase the knowledge and share more experiences to improve the region’s regulatory framework and, hence, it’s energy sector stability.



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