ERRA ENERGY TRANSITION NEWSLETTER

ENERGY REGULATORS REGIONAL ASSOCIATION (ERRA)

2023/1

ERRA is excited to present the first digital energy transition newsletter. We wish you an enjoyable and insightful read!

1 INTERVIEW WITH MR. LUCA LO SCHIAVO Deputy Director of the Infrastructure Regulation Department at the Italian Regulatory Authority for Energy (ARERA)

In the first issue of energy transition newsletter, we speak to Mr. Lo Schiavo who is an expert of quality of service and innovation in the power system, with a special focus on output-based incentive regulation, regulatory sandboxes and pilot regulation. He has been directly involved in many of the cases of regulatory experiments led by ARERA, described in the two ISGAN Casebooks.

He is member of the ACER Infrastructure Task Force and CEER Distribution Systems Working Group. Within the CEER DS WG, he has acted as drafting lead of the CEER paper "Regulatory sandboxes and incentive regulation".

His most recent publication, co-authored with Filippo Bovera (Politecnico di Milano), is about regulatory sandboxes and other tools of dynamic regulation.

He is co-author of a book on service quality regulation (Springer, 2007) and co-author of many regulatory papers, including "Changing the regulation for regulating the change", winner of the ICER Award (2012), "Smart metering: an evolutionary perspective", recognised as Highly Acknowledged Paper at the ERRA Award (2017).

Mr. Luca Lo Schiavo, Deputy Director of the Infrastructure Regulation Department at the Italian Regulatory Authority for Energy (ARERA)

❖ **What regulatory measures has the Italian government put in place to promote the development of smart distribution grids and enable the integration of renewable energy resources into the grid?**

Over the last 10 years, Italy's power system has been going through a deep transformation. The most important driving force is decarbonisation. Intermittent renewable energy sources (RES) have grown a lot: the RES-related targets set at European level resulted in wind and solar generation capacity to increase from less than 4 GW in 2009 to more than 30 GW in 2019. To compare, the system peak in Italy is 60 GW in summer weekdays, but only around 30 GW on low-load days: for instance, during the month of April 2020, due to pandemic-related loss of consumption and thanks to a very sunny spring, the amount of RES-produced electricity reached 52% of the total electricity consumption on a monthly basis – this fraction typically fluctuated between 35% and 40% on yearly basis in recent years, but every year reaches a peak around 80% on hourly basis at nation-wide level, and of course much higher at market bidding zone level.

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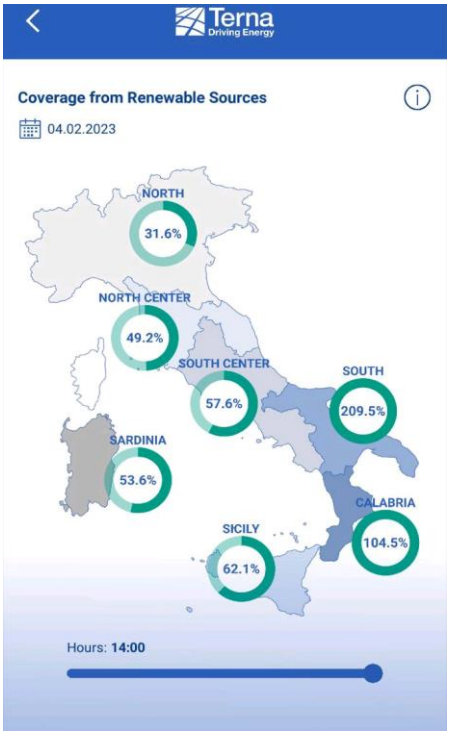
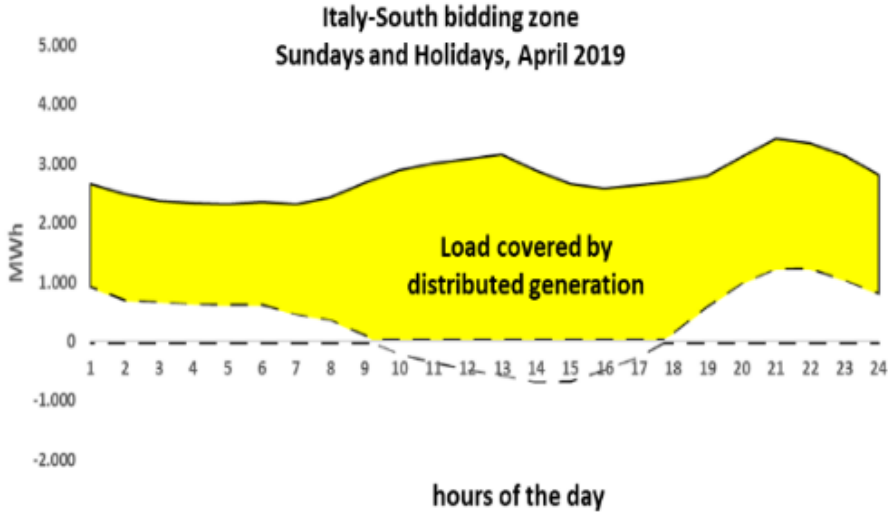
RES penetration in Italy



Source: Terna (www.terna.it)

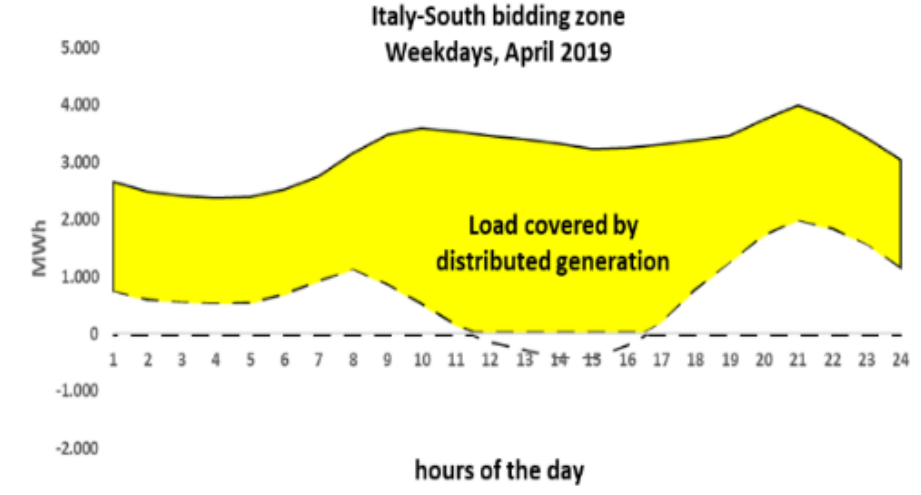


Source: ARERA, Yearly report on renewables (www.arera.it)

The integration of RES deriving from energy decarbonisation policies has a huge impact on the power system, both at transmission and distribution levels. Just to give an idea, the whole Southern market zone behaves as an equivalent generator in many daylight hours of low-load days, for instance in spring.

The "duck curve" in Italy

At transmission level, this means that high-voltage power flows are completely inverted in comparison to ten years ago. Most of RES-sourced electricity must therefore be transferred, at extra-high voltage level, from Southern regions (where sun and wind are more available) to Northern ones, where the biggest part of consumption is located. The new power flows from South to North along the Italian peninsula, together with electrical links with two major islands (Sardinia and Sicily), both rich of RES, imply the development of new transmission lines and submarine cables. Furthermore, decarbonisation is strictly linked to decentralisation: so far, around ¼ of RES-sourced installed generation capacity is connected at distribution level. Thanks to strict connection requirements in place in Italy, since 2005, we have not experienced congestions in local grids yet, as huge network developments have accompanied the "first wave" of RES development (2010-15). Nevertheless, further penetration that is expected for distributed generation in the next years shall be properly managed.



As Italian regulatory authority for electricity and gas, we started very early to cope with the issue of smart distribution grids in years 2011-15. The Regulatory Authority funded the first pilot projects of smart grids on a small scale, focused on the integration of RES in electricity distribution grids. Each pilot project had the dimension of a primary substation (HV/MV transformation) and allowed to test in real operation conditions all needed devices as well as new, "active" network management schemes. Afterwards, the first limited-scale trials have been scaled up to an entire region (Puglia) with around 3 million customers affected. Puglia, a South-eastern region, is a territory among the most impacted in Italy by intermittent RES penetration. Thanks to the European funds (NER 300 program), the whole distribution grid in Puglia region has been already fully made smart in years 2016-18. Nowadays, the model of smart grid used in Puglia is going to be replicated in many other regions of Italy, thanks to a programme funded by the EU Next Generation Fund, within the context of Recovery and Resilience National Plan designed by the Italian

Government and approved by the European Commission. Furthermore, digitalisation helps: the Regulator is pushing for reaching the target of ensuring real-time observability of all resources connected at medium-voltage distribution level; a very important issue for the system security in a power system subject to a complete "upside-down" transformation.

❖ **What are the key objectives of Italy's regulatory experiments in the energy sector, and can you give us any additional examples of experiments that have been put into practice?**

ARERA, the Italian regulatory authority, is keenly engaged in accompanying the power system transition and promoting innovation in network and system management. Aside the above-mentioned pilot projects for smart distribution grids, since 2012 ARERA also promoted pilot projects for testing storage and Dynamic Thermal Rating (DTR), in order to avoid curtailment of wind generation units. DTR, especially, proved to be very effective in improving transmission network capacity and keeping the system in full security (and far more efficient than storage). As a result of that experiment, the Italian TSO (Terna) nowadays uses largely DTR. Thanks to that innovation, together with many other capital-light interventions, Terna has been awarded by the regulator with a significant performance-based incentive in 2021, having reached an increase of around 400 MW on each of the four sections between market bidding zones from South to North.

DTR is a first successful example of impact of regulatory experimentation; however, the most important case for regulation promoting innovation is about flexibility services. In 2017-18, ARERA launched a pilot regulation with the aim of allowing small resources, even RES and any active demand unit, to participate actively in the balancing market. Even more than day-ahead market, in the context of huge intermittent RES penetration, the balancing market can be the key to unlock all flexible resources needed to ensure system stability. Ordinary regulation of dispatching traditionally allows only for large, thermal or hydro units, with basin generators to bid in the balancing markets. From the regulatory perspective, the idea of "pilot regulation" is different from pilot projects on a small scale. Pilot regulation is an ex-ante regulatory framework defining a provisional regime to cope with a novel issue; participation to pilot regulation is open to all market players on a voluntary basis, but is not limited to small areas in which pilot projects and sandboxes are typically confined.

The Dynamic Regulation Toolkit

	GRID OPERATORS ONLY	***GRID AND MARKET OPERATORS JOINTLY***
LARGE SCALE	**REGULATORY EXPERIMENTS**	**PILOT REGULATIONS**
SMALL SCALE	**PILOT PROJECTS**	**REGULATORY SANDBOXES**

Source: CEER paper "Regulatory Sandboxes in Incentive Regulation" (Ref: C21-DS-74-04) May 2022 (www.ceer.eu)

A pilot regulation is inherently learning-oriented and requires continuous regulatory oversight and fine-tuning. It is conceived to stay aside the "ordinary regulatory regime" for a temporary, transitional phase. At the end of this period, the ordinary regulation is ultimately changed taking into account results and lessons learned (both positive and negative) of the pilot regulation. The main idea of pilot regulation for flexibility services is that any discrimination among different resources shall be avoided, whether on the supply- or demand-side. This is implemented through aggregation of small resources, both on supply-side and on demand-side, and decoupling upward services from downward services. The role of independent aggregator is therefore tested in real market conditions. So far, around 1.3 GW of aggregated resources have been made available through the pilot regulation (and their actual readiness has been verified by TSO with proper tests); moreover, new "products" of the balancing market have been introduced through pilot regulation as well (such as fast response). In its recent consultation paper for the new discipline of dispatching in Italy (that should start from 2024), the Regulator has taken largely into account the results of pilot regulation to design the dispatching rules for the future.

❖ **As Italy is a front-runner in the adoption of smart meters, what were the main advantages and challenges associated with the deployment of smart meters in Italy for enabling real time energy services for consumers?**

Smart metering, together with smart grid, is the most visible way in which digitalisation impacts the energy sector. In Italy, the first transition from traditional metering technologies to automatic meter management was

initially due to a voluntary decision of the major DSO (2001-2006), essentially for revenue protection and efficiency reasons. In a second phase (2007-2011), the regulator compelled all DSOs to adopt smart metering and to avoid on-site operations for faster contractual management (e.g. new supply activation, de-activation, contractual changes of rated capacity, etc.) and for improving competition in retail – all thanks to remote readings aligned with switching procedures. Another advantage of smart metering systems is the capability to couple the measurements with the corresponding timestamps, allowing the introduction of new tariff mechanisms based on Time of Use (ToU) that fits the variability of energy prices in a closer manner than flat electricity prices. The so-called "first generation" of smart metering was able to record electricity withdrawal and injection even for the smallest consumer or producer (around 35 million), but only in a framework of three pre-defined (static) time-bands, being hourly metering limited to around 1 million customers with rated capacity higher than 55 kW. However, this capability allowed ARERA to introduce Time-of-Use energy prices in the mass market: in Italy, ToU energy prices are mandatory in the default regime, whilst free market suppliers can of course offer either flat or ToU prices. Further important benefits for customers, reaped thanks to first generation smart metering, have been the possibility of setting the capacity to "minimum vital services" for a period before disconnecting customers with difficulties to pay the bill, and the reduction in real terms of metering tariff, due to huge efficiency in operating costs that outweighed the capital cost of the investment. Efficiency gains have been passed through to final customers by the Regulator, via the price-cap formula.

The "second generation" smart metering has been launched in Italy in 2017 and is going to be completed by 2024 (the program has been lightly slowed down due to pandemic in 2020-21). With the second generation, hourly metering is empowered for all final customers, independent of the rated capacity. This is of paramount importance for self-consumption, and allowed ARERA to introduce in 2020 an advanced regulation of collective self-consumption schemes (including renewable energy communities). Further innovation is related to the second generation, in particular the capability of the smart meter to send direct messages to In-Home Devices (without any control of the DSO), in order to enable innovative service like home automation and to develop customer awareness of their consumption pattern in close to real-time.

❖ **What are key technical and economic benefits of integrating battery energy storage systems (BESS) into distribution grids, and what are some challenges related to their deployment and operation?**

So far, in Italy we do not see any significant investment in storage connected at distribution level yet. This can be also due to rather adequate hosting capacity margins available so far (on average) in the distribution grids. In theory, flexibility of both demand and distributed generation could be the key to avoid massive infrastructural investments for network reinforcement and avoid to put in jeopardy the system stability and the security of supply.

Battery Energy Storage Systems (BESS), for their inherent operational characteristics, may favour the transition towards more flexible and smarter distribution systems. BESS, behaving as a four-quadrant generator, can provide several services to the DSOs, related to voltage regulation, energy losses reduction, continuity and power quality improvement, etc. The efficiency of BESS technology is progressively increasing but BESS cost is still high even though constantly reducing. The identification of BESS use cases is crucial for assessing the benefits from their usage. The advance definition of the amount of each service provided impacts on BESS size, location and optimal scheduling.

Thus, for evaluating the socio-economical welfare of investments in BESS owned and managed by DSOs, ARERA commissioned in 2017 a research study to the Department of Electric Engineering of the Cagliari University, in order to quantify the total benefit of these services and finally to compare the benefits with the costs. Results of this research have been published in scientific journals. Techniques of Multi-Objective optimization combined with a Cost/Benefit Analysis approach have been applied, in order to calculate the probability that the installation of a BESS could be economically-efficient, taking into account a variety of distribution network topology schemes and different load and generation profiles. The calculation has been made considering several types of benefits that BESS could offer to the distribution system and comparing the investment in BESS with investment cost for ordinary network development at medium voltage as well as at low voltage level. In the end, the Cagliari University study proved that current BESS prices reduce the economic efficiency of their installation in most of the cases, both at MV and LV level. According to the result of this study; at the relative cost levels so far considered, the usage of BESS seems to be efficient only when limited to critical cases with very long distance covered by overhead lines and significant shares of distributed generation.

❖ **What are the key regulatory challenges and opportunities that**

impact the development and adoption of e-mobility, and how can regulators effectively balance the interests of different stakeholders such as consumers, utilities, aggregators?

The development of electric mobility is one of the most evident changes among those that pursue decarbonisation targets. Both the new European obligations binding on car manufacturers and the more restrictive urban mobility policies dictated by environmental necessity will contribute to supporting this transition. The diffusion of electric vehicles (EVs) implies the need to develop an infrastructure for recharging. Most EV charging is operated in private places (parking lots and garages close to houses), but even when carried out in places accessible to the public, the recharging service is not a service subject to the tariff regulation of the Regulatory Authority. For ARERA, it is essential to harmonise the development of electric mobility with the need of a contextual efficient development of the electricity grids: new electrification should take place at an efficient level of cost for the development, operations and maintenance of the networks, as these costs are charged by the Regulator to all system users (including those not using EVs) through the application of tariffs for network services.

With the progressive growth of the fleet of electric vehicles on the road, in the absence of adequate measures, a widespread diffusion of fast and ultra-fast charging points and/or simultaneous use of domestic charging, especially in the late afternoon and evening hours (when a significant increase in load occurs), could create congestion on the electrical networks. To prevent this from resulting in a deterioration of the quality of service (interruptions, voltage drops, etc.), there is a growing need to invest in the development of adequate electricity infrastructure and in generation plants capable of satisfying peak loads. The development of electric mobility will have inevitable and important impacts on the evolution of the power system. Three issues are the most important ones:

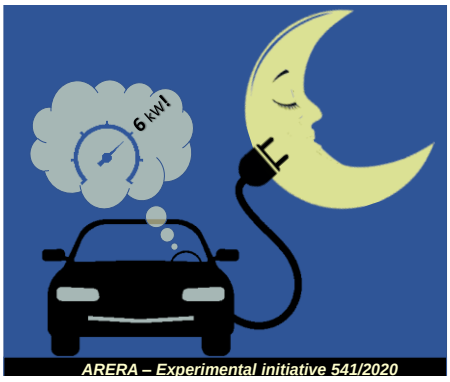
a. Electrifying individual transportation, hitherto powered by liquid fuels, will accompany and be able to support the continuous development of electricity generation from renewable sources, which has already been particularly intense in Italy over the last fifteen years; the electrification of transport will have clear advantages in terms of sustainability, especially in electrical systems such as the Italian one, characterized by a high share of renewables in the national fuel mix;

b. Electric vehicles - when they are not in circulation - can become a potential resource for the stability of the electricity system, helping to manage one of the perhaps least investigated effects of the development of renewable sources, i.e., the progressive loss of rotating inertia of the system with consequent lower capacity response to fast frequency perturbations; this service, which in the past was provided by thermoelectric generation units, will gradually have to be replaced by fast response services provided by storage systems, including car batteries connected to the network via vehicle-to-grid technology (V2G);

c. However, the most immediate and potentially significant impacts will be those on low and medium voltage electricity distribution networks, due to the need to recharge (increasingly faster) the batteries installed on vehicles; in this regard it is important to highlight how these impacts do not mainly depend on the volume of energy withdrawn, but rather on the power instantaneously withdrawn from the network, from the precise moment when, and in the exact point of the grid where, this occurs.

One of the most innovative regulatory interventions of ARERA in the field of electric mobility has been the introduction of an experimental initiative for promoting smart charging at home. In Italy, the limit is typically very low: 3.3 kW for more than 90% of residential customers, and distribution network tariff is in euro/kW. Thanks to smart meters, the capacity of grid connection for resident households is modulated up to 6 kW only during night hours (from 23.00 to 7.00) and Sundays/holidays without extra charge because networks are not congested in such hours.

Pilot regulation for smart charging at home in Italy



Source: ARERA (www.arera.it/it/elettricita/veicoli_ele.htm)

To opt-in this pilot regulation, customers shall demonstrate not only to own electric car, but also to install a smart wallbox to charge it at home, in order to be able in the future to receive automatic signals from aggregators (for flexibility services) or from DSOs in case of emergency (network congestions). A standardisation work is undergoing with the Italian committee for electrotechnical standards (CEI) to ensure interoperability with

aggregators in the communication with smart wallboxes.

❖ **How do technological and demand uncertainty jeopardise electricity distribution networks? What should regulators do regarding these problems?**

Electrification is a driving force of energy transition. We must expect that more and more end use energy will be progressively converted to electricity. This is the case of electric vehicles, but not only: think for instance of "cold ironing" i.e., electricity supply to passenger or freight ships when they stop in ports, substituting thermal self-generation of electricity by the ships, hence eliminating dirt fuels. Most of this new electricity usages have – at least in the initial phase – low or very low usage factors (ratio energy/rated capacity, i.e., equivalent hours at peak capacity). In ARERA we are convinced that the most effective way to induce efficient development of the power system is to set cost reflective network tariffs. Capacity being the true driver of network investments, cost reflectivity brings capacity-based network tariffs, which can be an obstacle to the development of electrification. This is a sort of regulatory dilemma that NRAs have to cope with. The best way is to avoid distorted regulatory decisions: aid to transport electrification can be reached with separate aid instruments, like tax credit or obligations on vehicles, other than tariff regulation. It is very important that public policy and regulation have a continuous and intense dialogue, in mutual consideration of each other.

❖ **In your personal view, which innovations and technologies will mostly shape global energy sector in near future which regulators need to closely follow/pay special attention to (within 10 years)?**

There are many trends, and all are relevant. Most are technologically based, like electrochemical storage, or "green" hydrogen technologies for long duration storage. Nonetheless, I believe that one of most important trends in energy sector is "energy democratisation", through the development of new investors in generation that involve citizens and local municipalities, like renewable energy communities. Energy was typically a sector with a limited number of large players, but now renewables are changing this pattern and new actors are entering the market. Energy communities can bring a new "flavour" in this sector, as the concept of "shared energy" demonstrates. The emergence of non-profit oriented players could have very relevant implications in the coming years, that are not completely clear. It's interesting to note that this process of energy democratisation happens because of and thanks to the liberalisation, and not the contrary. It's absolutely unlikely that energy communities could emerge in the old monopolistic and integrated system.

I conclude with a fully personal consideration. As the film "Dunkirk" by Christopher Nolan tells and impressively shows, the British Expeditionary Force, sent to help defend France from Nazi invasion and trapped on the beach of this Northern French town under the bombs of Luftwaffe, was rescued not by the large ships the prestigious Royal Navy but, indeed, by the mobilization of hundreds of small-size civilian vessels including pleasure crafts and yachts, fishing boats and lifeboats. Afterwards, the code-named "Operations Dynamo" was recognized by Sir Winston Churchill as a "miracle of deliverance". Could renewable energy communities provide, a similar "miracle" effect, in the very near future, that could sustain the national energy security, threatened by the energy (especially natural gas) crisis, related to the Russian invasion of Ukraine? ■

MEMBERS' ENERGY TRANSITION UPDATES

2 MEMBERS' ENERGY TRANSITION UPDATES

Armenia

The Second Policy Dialogue of the joint GREEN Armenia Platform & EU4Energy Project-Promoting the Clean Energy Transition-Empowering Consumers through Better Regulation

In December 2022, the Government of Armenia and international partners continue their high-level policy dialogue aimed at supporting Armenia's sustainable green recovery and growth that can deliver jobs, tackle poverty and inequalities, protect nature and build resilience of the country. The main objective of the event was to present and discuss conceptual foundations of green economy and sustainable development and its implications for Armenia – risks, challenges, and opportunities, as well as Armenia's proposed green economy policy, strategic planning and execution frameworks.

In 2021, the Government of Armenia renewed its commitment to green recovery and growth by introducing green economy and sustainable development policy priorities in its new five-year (2021 – 2026) program.

The EU-supported project "Promoting the Clean Energy Transition in the Eastern Partnership Countries Council of European Energy Regulators (CEER), is part of the wider EU4Energy Phase II (2021-2024) programme, which aims to foster the low carbon and clean energy transition in the six Eastern Partner countries including Armenia. the CEER will assist s to further develop strategic thinking, planning and adoption of EU best practices, support the implementation of the Comprehensive and Enhanced Partnership Agreement (CEPA) in Armenia, as well as promote regional cooperation and raise the visibility of the EU4Energy programme's actions and impact in all the six Eastern Partner countries.[1] ■

Azerbaijan

The first Green Energy Advisory Council

The 9th Ministerial meeting of the Southern Gas Corridor Advisory Council and the first Green Energy Advisory Council meeting held on 3 February in Baku reiterated the strategic energy partnership between the Republic of Azerbaijan and the European Union. The event set common goals such as long-term energy security, sustainability, diversification of supply, and expanding cooperation on the energy transition agenda.

The Green Energy Advisory Council Ministerial meeting will create international green energy linkages and transform Azerbaijan into a green energy supplier for European markets.[2] ■

Bosnia and Herzegovina

New Laws to come into force & Municipality of Lopare on energy transition cooperation with RESET

New Law on Electricity in FBIH, the Law on Energy and the Regulation of Energy Activities and the Law on the Use of Renewable Energy Sources and Efficient Cogeneration were submitted to the parliamentary procedure by Government of the Federation of Bosnia and Herzegovina on 8 December 2022. These laws are still in parliamentary procedure.

In 2023, Regional Center for Sustainable Energy Transition – RESET signed an agreement with the Municipality of Lopare on cooperation in the implementation of the energy transition. It is the first such deal in Bosnia and Herzegovina and probably the entire Western Balkans. The agreement on cooperation in the implementation of the energy transition envisages activities to increase the use of solar energy, introduce energy communities and develop the concept of citizen energy.[3] ■

Czech Republic

Concept of linking the new electricity market design with price control principles

The concept of linking the new market design in the electricity sector with the requirements for changes in price control principles and tariffs is the result of a project aimed at evaluating the current tariff system in the electricity sector, defining the basic principles and objectives of innovation in the area of the tariff system and specifying the measures that will lead to the fulfilment of the set objectives.

[1] *UNDP, Green Growth and Recovery High on Armenia's Development Agenda, 2022.*
EU4Armenia, EU4Energy-Promoting the Clean Energy Transition-Empowering Consumers through Better Regulation.
[2] *European Commission, The Southern Gas Corridor Advisory Council 9th Ministerial Meeting and the Green Energy Advisory Council 1st Ministerial Meeting, 2023.*
[3] *Balkan Green Energy News, Municipality of Lopare to develop first local energy transition strategy in BiH, 2023.*

Among the main objectives of the innovation of the price control principles are:

– A price for customers that is appropriate to the costs and benefits it generates and brings to the system;

– The long-term predictability of the tariff system and its orientation towards the new energy sector;

– Higher utilization and efficiency of the operation and development of the electricity system.

The above objectives of system innovation will be reflected in progressively introduced measures, including:

– Enabling electricity sharing within residential buildings from 2023 implemented in the amendment to the Decree on Electricity Market Rules;

– The streamlining of regulated distribution tariff settings at medium and high voltage levels planned from 2024;

– Verification of new distribution tariffs at the low voltage level planned from 2025. ■

France

Confirmation of the electricity interconnection projects with Ireland and Spain despite higher costs

The soaring price of materials substantially increased the cost of both projects. Still, their expected benefits have also been significantly rising due to changes in the energy mix and electricity consumption forecasts in European countries. In November 2022, CRE and the Irish regulatory authority (CRU) confirmed the cost-sharing agreement they had reached in 2019 for the "Celtic" project. Its ultimate goal is to contribute to the European goals regarding the energy transition and climate change by facilitating the progress towards a low carbon electricity mix.

In March 2023, CRE and the Spanish regulatory authority (CNMC) agreed on a revised cost allocation for the "Bay of Biscay" project. The new interconnection will double the exchange capacity between France and Spain, bolstering both electricity systems and helping to advance the integration of renewables in line with the energy transition objectives. The commissioning of these two projects is expected in 2027 and 2028 respectively.[4] ■

Georgia

New rule for connection to the electricity distribution network for small power plants up to 15 megawatts

GNERC has approved a new rule for connection to the electricity distribution network for small power plants up to 15 megawatts.

The new regulation provides a non-discriminatory approach to investors and also allows investors to predetermine the costs and terms of connection to the distribution network. Transparent and fair principles of connection of small capacity power plants to the distribution network, conditions of connection to the network and relevant fees were determined.

According to the new regulation, the operator of the distribution system is obliged to ensure the readiness of the distribution network for the connection of a small power plant within the period stipulated by the contract (no more than 18 months). ■

Hungary

Regulatory sandbox and energy storage developments

Regulatory sandbox

In December 2022, the general legislative framework for operating regulatory sandbox projects was enacted in the Gas Law (following the adoption of rules on electricity earlier in 2022). In June, MEKH launched a public consultation on innovation, expecting to receive innovative ideas proposed for regulatory sandbox testing.

Electricity storage

Since December 2022, both the TSO and DSOs are enabled by law to establish and operate storage facilities of electricity in line with the applicable rules laid down in the "Clean Energy for All Europeans" legislative package (CEP) of the EU. In March 2023, the Ministry of Energy announced that a new support program is planned to encourage the establishment and operation of grid-scale batteries. The program plans to provide non-refundable investment aid and income support, while it is expected that the storage facilities are operated for at least ten years. ■

Kyrgyz Republic

EBRD finances largest hydropower project in the Kyrgyz Republic

The European Bank for Reconstruction and Development (EBRD) is working to improve the energy security of Bishkek, the capital of the Kyrgyz Republic, and the resilience of the national energy

[4] *European Commission, CEF Energy and the Celtic Interconnector: towards a carbon-free Europe by 2030, 2022.*
Red Eléctrica, The electricity interconnection with France across the Bay of Biscay starts the last phase of its administrative permitting process, 2022.

system to climate change through its largest investment in the country's hydropower sector in 20 years.

Chakan HPP, the state-owned operator of nine small hydropower plants (HPPs), will receive a €13.8 million financing package that includes an EBRD sovereign loan of €8.8 million and an investment grant of €5 million. Financing will be used to restore and modernize the Lebedinovskaya HPP, which has an installed capacity of 7.6 MW.

Lebedinovskaya HPP, put into operation in 1943-48, provides electricity to the suburban areas of Bishkek, but its equipment is outdated, inefficient and needs urgent replacement.

The proposed performance improvements will help increase the station's capacity to 9.2 MW, as well as increase annual electricity generation by 56 percent to 50,300 MWh. The new efficiency and safety measures will help the HPP improve the plant's reliability.

Lebedinovskaya HPP supplies energy to the capital city of Bishkek

The bank, which is fully aligned with the Paris Agreement in 2022, is helping the Kyrgyz Republic plan its transition to a green economy. The project will contribute to a more efficient use of hydro resources. This will contribute to national efforts to address the long-term problems of operating the country's outdated and inefficient hydropower infrastructure. Technical cooperation funding from Austria under the High Impact Climate Action Partnership (HIPCA) will complement the Bank's investment and support to HPP Chakan in the management and implementation of the rehabilitation project.[5] ■

Latvia

Amendments to the Energy Efficiency Law, Electricity Market Law & Energy Law

The Energy Law, the Law on Energy Efficiency, and the Electricity Market Law were amended in summer 2022. Energy efficiency first* principle is added to Law on Energy Efficiency which comprises measures for improving energy efficiency in state authorities, municipalities, public companies, as well as in large companies and large energy consumers.

Amendments to the Electricity Market Law included transition from the so-called net metering system to the net billing system. This involves recording electricity produced, consumed and released to the grid by the consumer. The net billing system will not only record the amount of electricity generated and consumed from renewable sources, but will also determine the value of the electricity. Surplus energy will be monetized and credited for the next billing period. It is also envisaged that electricity generated at one user's site can be used at other sites belonging to the same user.

With the amendments to the Energy Law, an electronic certificate of gas origin will also be introduced, which producers of natural gas, bio-methane or synthetic gas from renewable energies can apply for. The certificate will be issued for one megawatt hour. These changes will come into force on July 1, 2023.

*The "energy efficiency first" principle states that planning or financing decisions must consider how energy efficiency can be improved, such as through energy savings by the end user, use of demand- response-initiatives, or through more efficient energy conversion, transmission, and distribution. This means that it is imperative for the state and large companies to take the issue of energy efficiency into account in their decisions.[6] ■

Lithuania

Accelerating Permitting for Renewable Energy project and "Flexibility" developments

NERC together with three Lithuanian ministries won the TSI 2023 Flagship technical support project on "Accelerating Permitting for Renewable Energy". The project aims to reduce the administrative burden in permitting process, contribute to the improvement of the investment climate and the implementation of RES development goals.

On December 29, 2022, NERC approved the Description of the Procedure for Trading Flexibility Services prepared by AB "Energijos skirstymo operatorius" (hereinafter – ESO), according to which the ESO shall be entitled to purchase and use flexibility services from January 1, 2023. The Description will for the first time regulate the procedure for the ESO's purchase of flexibility services in implementing the requirements of the Clean Energy Package of the European Union. The flexibility of the electric energy system makes it possible to adjust the volume of electricity production and consumption in response to expected or unforeseen external factors, including changes in the demand and supply of electricity and price changes in the electricity market, with the aim

[5] *EBRD, EBRD finances largest hydropower project in the Kyrgyz Republic, 2023.*
[6] *BNT Attorneys in CEE, "Energy efficiency first!", origin of natural gas and more: new energy package in Latvia, 2022.*

of uninterrupted and efficient provision of services in the electric energy system. ■

Moldova

Ministry of Energy is established

In 2023, the government approved the regulation of the Ministry of Energy, the organizational chart, the structure of the central apparatus and other documents establishing the new institution. The ministry's areas of activity include energy security and efficiency, renewable energy sources, electricity and thermal energy, natural gas and petroleum products, digitization and energy transition. The government's medium-term vision is to have a safe, sustainable and competitive energy sector, with the goal of decarbonizing the economy before 2050.

Among the priorities of the Ministry of Energy in the medium term are the prevention and mitigation of potential energy crises, by ensuring the purchase and strategic stocks of natural gas and the diversification of electricity supply sources. It also aims to increase energy security by strengthening the power system and the degree of interconnection with Romania, the creation of the Energy Efficiency Fund, as well as the facilitation of investments in energy storage technologies and balancing units. A priority remains the development of the competitive electricity market and the preparation for integration into the internal market of the European Union.[7] ■

North Macedonia

Bogdanci Wind Park and new energy support package from EU

North Macedonia has advanced significantly in the energy transition in recent years. The country is conducting renewable energy auctions, replacing coal with solar power and gas at full speed, and is signing strategic investment deals for large wind parks and photovoltaic plants. The electricity produced by renewable energy power plants increased by 15% last year compared to 2020, while the output of coal-fired power plants decreased by 17%. The share of renewable energy in the country's total electricity production also increased from 29% to 31%.

One of the flagship green energy projects that increased the amount of renewable energy for power supply in North Macedonia is the Bogdanci Wind Park which has a considerable impact on the energy supply in the region. The average annual production of the park is expected to be around 112 GWh. It would cover the annual energy consumption of about 16,000 families, equal to the annual energy consumption of households in the neighbouring towns of Gevgelija, Bogdanci, Valandovo and Dojran.

Bogdanci Wind Park

EU disburses €80 million to North Macedonia as part of energy support package. The €80 million comes as subsidies for household electricity bills, support for small and medium-sized companies to maintain business continuity, as well as state investments for energy transition, renewable energy sources and energy efficiency.[8] ■

Poland

Effective Transformation Charter

On 6 October 2021, the President of ERO inaugurated the Project Team to work out a Common Agreement of the Sectoral Regulator and the Distribution Sector known as the "Charter for the Efficient Transformation of Poland's Power Distribution Networks". On 7 November 2022 a Sector Agreement was signed between the regulator and 5 Distribution System Operators - Polish Electricity Distribution Grids - Effective Transformation Charter, which is an open initiative - any DSO, regardless of the scale of its distribution operations, can join it at any time. The signatories of the Charter have agreed that their intention is to incorporate the provisions of the document already in the distribution tariffs for 2023, to the maximum possible extent.

The main objective of this collaboration was to implement transparent and predictable regulatory policy for long-term investments in distribution grids that would be acceptable by government, enterprises and society.

The beneficial effects of this document would be:

- Network development and adaptation to connect new sources, energy storages, EV and to increase installed capacity of RES.
- Achievement of an approximately 50% share of electricity from RES in the domestic energy mix already in 2030.

[7] *Government of Republic of Moldova, Moldovan Government Approves Documents Setting up Ministry of Energy, 2023*.
[8] *WBIF, North Macedonia stirring towards a greener future, 2023*.
WBIF, EU disburses €80 million to North Macedonia as part of energy support package, 2023.

– Number of customers connected to the grid is expected to increase by more than 2 million.

– Digitalisation and automation of networks and services.

– Smart meters deployment - 100% by the end of 2030.

It also identified an investments need at the level of PLN 130 billion by 2030. ■

Serbia

Prosumer concept introduced, connection duration shortened

In 2022, prosumers become a new category of participants in the electricity market which was for the first time introduced in the Republic of Serbia under the Law on the Use of Renewable Energy Sources (RES). By introducing this Law and amendments to secondary legislation, the procedure for acquiring the prosumer status has been significantly simplified. Instead of having to carry out 20 steps that would require more than a year, nowadays it takes about 20 days to connect the solar panels on the grid, with the correct documentation and based on prior properly implemented connection. The Ministry of Mining and Energy will continue to work on further narrowing this timeframe by the end of the year, with the goal that the entire procedure can be completed within five days, electronically. Changing the law will contribute to solving an issue that is causing great concern for system operators, the statement adds. Namely, there is a high number of requests for connecting wind parks and solar power plants. The law will more adequately regulate the responsibilities of commercial projects toward the electricity system, the ministry said.

In 2023, the Government of Serbia passed the amendments to the Law on the Use of Renewable Energy Sources which will enable further development in the sector including holding auctions for new capacities from renewable sources. Installed power to be limited for prosumers. The capacity limits need to be set in a way to make them acceptable with regard to the safety of operation of the electricity system, while enabling greater participation of citizens and small firms in the energy transition.

In summary this amendment to the Law prescribed that the installed capacity of a production facility of a prosumer cannot exceed:

1) 10A, unless the connection is a three-phase one

2) 10.8 kW in case the prosumer is a household

3) 150 kW in case of prosumers other than households (companies, etc.)

This Law also prescribes that the prescribed limit of installed capacity for households of 10.8 kW (see item 2) is applicable as of 01/01/2024 (other limitations are applicable as of the day of this Law enters into force (07/05/2023).[9] ■

Slovakia

EU Cohesion Policy: €459 million for a just climate transition in Slovakia

The European Commission has adopted the Territorial Just Transition Plan (TJTP) for Slovakia setting the strategy for the investment of €459 million allocated to the country from the Just Transition Fund (JTF). These funds will support a fair transition towards climate neutrality in Slovakia's most vulnerable regions.

The Fund will help Slovakia's phasing out from coal extraction as well as coal-fired electric power generation by 2023.[10] ■

Türkiye

Hydrogen Technologies Strategy and Roadmap of Türkiye and Charging Service Regulation are published, Digital Transformation Group is established

Hydrogen

Hydrogen Technologies Strategy and Roadmap of Türkiye is published in January 2023. According to the Roadmap, Türkiye has adopted targets to reduce the cost of green hydrogen production below 2.4 US/kgH_2 by 2035 and below 1.2 US/kgH_2 by 2053 and for the electrolyser capacity to reach 2 GW by 2030, 5 GW by 2035, and 70 GW by 2053. Moreover, detailed studies blending different hydrogen contents (2-20%) into natural gas pipelines will be carried out within the context of this Roadmap. Besides, targets focusing on setting up a hydrogen backbone to carry hydrogen have also been set. In order to create a hydrogen backbone until 2053, it is stated that the existing natural gas pipelines should be planned by considering the regions where the industry is clustered, the areas where the renewable energy sources are concentrated and the locations where the nuclear power plants are deployed.

EV Charging Services

EMRA has been working on electric vehicle charging service for a long time and held meetings with relevant Institutions and sector representatives. With the Law

[9] *EKAPIJA, Power of Solar Power Plants in Serbia for Households and Companies to Be Limited, 2023*.
[10] *European Commission, EU Cohesion Policy: €459 million for a just climate transition in Slovakia, 2022*.

amendment, the first legal regulations were implemented and EMRA has been authorized to make secondary regulations in this area.

In this direction, EMRA has published the Charging Service Regulation for the establishment of EV charging stations, the development of the charging infrastructure, and the creation of an integrated country-wide charging network. Incentives were provided in order to increase the number of fast charging stations. With the regulations, it is aimed to provide high quality, continuous, and uninterrupted charging service to all-electric vehicle users. Companies will be able to operate a charging network with a charging network operator license obtained from EMRA. These companies can operate charging stations themselves, or they can have third parties operate charging stations with the certificates they will issue. Companies should serve all-electric vehicle models at charging stations and determine the price of the charging service as per unit energy (kWh). Charging service prices will be monitored by EMRA.

Investors show great interest in this area. As of March 2023, 122 companies have been granted charging network operator licenses. Efforts to develop this new sector and the market will continue with all stakeholders.

In addition, electric vehicle users will be able to view the geographical locations of public charging stations, the number of charging units and sockets, types and powers, payment methods, and availability via a mobile application developed by EMRA, and thus, they will have the opportunity to travel more comfortably and economically with their electric vehicles.

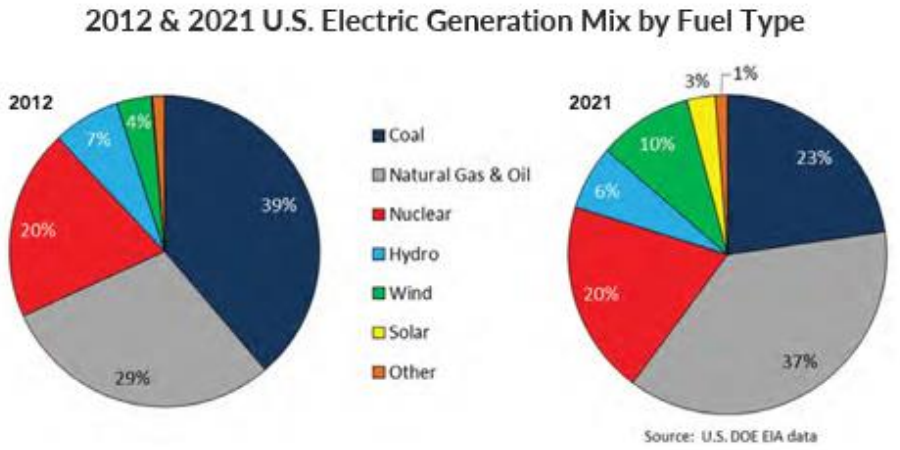
Digital Transformation

EMRA is giving special importance to digitalization, which plays a facilitating role in energy transformation. A dedicated group called the Digital Transformation Group, was established within the Energy Transition Department. Global developments and best practices in the area are closely followed by this group. Developments are reported in a monthly bulletin (14 issues have been released since the beginning of 2022) and other departments are informed in this way. EMRA provides incentives for digital transformation and new technologies to take place, especially in regulated energy companies. EMRA believes that the increase in digitalisation in electricity and natural gas transmission and distribution companies will contribute to higher quality and cheaper access to energy for consumers. ■

USA

The Role of Nuclear Generation in the Clean Energy Transition Explored in New White Paper

In 2022, NARUC announced the release of a new white paper on the role of nuclear energy as a keystone clean energy resource. Authored by Energy Ventures Analysis (EVA), Inc. under subcontract to the NARUC Center for Partnerships and Innovation, Nuclear Energy as a Keystone Clean Energy Resource explores nuclear energy's role in providing carbon-free electricity and highlights key considerations for regulators to keep in mind as decarbonisation efforts continue across many states and utilities.



Source: NARUC's Nuclear Energy as a Keystone Clean Energy Resource White Paper

The paper includes a discussion of the reliability and cost attributes of nuclear energy. EVA finds that retaining and expanding the nuclear energy resource base will be of critical importance to achieve ambitious state and national decarbonisation goals. However, barriers to a faster and more significant deployment of new nuclear energy resources persist, and many existing nuclear plants face economic pressure and competition from other resources. The paper reviews the state of the nuclear industry and the impacts of planned retirements and identifies opportunities for decision makers to support future nuclear expansion efforts aligned with the public interest.[11] ■

3 ENERGY TRANSITION ACTIVITIES OF ERRA

Energy Transition Expert

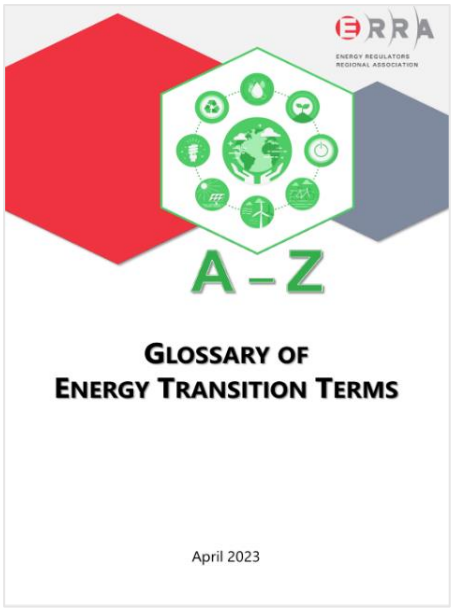
An energy transition expert joined ERRA to manage the energy transition workstream. This expert's main job is to coordinate the Energy Transition Task Force (ETTF) as well as to provide the necessary coordination of energy transition related topics within the framework of the ERRA Standing Committees and facilitate the creation of the Energy Transition Knowledge Hub on the ERRA website.

Energy Transition Task Force (ETTF)

The ETTF was established in February 2023 and has a 2-year mandate. The ETTF falls under the supervision of the ERRA Presidium. The task force consists of the ERRA Energy Transition Expert and 6 ERRA member regulators from the following organizations; Albanian Energy Regulatory Authority (Albania), Public Services Regulatory Commission (Armenia), Energy Regulatory Office (Czechia), National Energy Regulatory Council (Lithuania), Energy Market Regulatory Authority (Türkiye), and ECOWAS Regional Electricity Regulatory Authority (ERERA). ETTF focuses on assisting member regulators with energy transition related responsibilities in terms of mapping development in the topic, informing and educating about applied solutions and approaches, and developing internal expertise, guidance and best-practice on topics of interest. The Task Force will also indirectly attempt to influence member regulators to accelerate energy transition through their actions and engagements.

→ *For more information, please visit ERRA Energy Transition Task Force (ETTF) website at the following link: https://erranet.org/member-activities/energy-transition-task-force/.*

Glossary



ERRA has published a glossary of terms related to energy transition. The glossary, which is available online, defines over 150 terms, including climate change, renewable energy, and energy efficiency. The glossary is designed to help policymakers, businesses, and the public to understand the key concepts and terminology in the context of energy transition.

→ *For more information, please view the Glossary of Energy Transition Terms published by ETTF at the following link: https://erranet.org/glossary-of-energy-transition-terms-published/.*

Training

In collaboration with the Regulatory Energy Transition Accelerator (RETA), ERRA has developed a hybrid 5 day-training program on regulation in energy transition, which took place on May 22-26, 2023. The program aims to provide an in-depth understanding of regulatory roles focusing on the fundamentals, features, new developments, main drivers and outstanding challenges of energy transition, international policies and regulations culminating in a meaningful path to low carbon economy. It is designed primarily for the energy regulators to contribute to their understanding of the challenges and opportunities of the energy transition as well as to develop the skills and knowledge necessary to regulate the transition effectively.

Speakers included distinguished names from IEA, OFGEM, IRENA and Regulatory Assistance Project, who delivered top-notch technical presentations.

The program covered a wide range of topics: Main concepts and drivers of the energy transition, renewables, flexibility, energy storage, active consumers, hydrogen, and renewable gases.

The benefits of the regulation in energy transition training program are:

- Gaining a deeper understanding of the energy transition

[11] *National Association of Regulatory Utility Commissioners (NARUC).*

- Developing the skills and knowledge necessary to regulate the transition effectively
- Networking with other energy regulators from around the world
- Sharing experiences and perspectives on the energy transition

→ *For more information, please visit the Regulation in Energy Transition Course Website at the following link: https://erranet.org/energy-transition-training/.*

Knowledge-hub

ERRA has developed an online platform called "Knowledge hub" that pools together sector news as well as ERRA and non-ERRA publications related to energy transition. Hot topics, recent developments and key literature in energy transition can easily be followed through this new feature. The knowledge hub is a one-stop shop for information and a valuable source for anyone who wants to stay up-to-date on the latest developments in the energy transition.

→ *To view the latest news and reports on energy transition please visit the Energy Transition Knowledge Hub website at the following link: https://erranet.org/energy-transition-knowledge-hub/.* ■