

REVIEW OF THE REQUIRED LEGISLATIVE CHANGES TO FACILITATE N. MACEDONIA'S TRANSITION TO RENEWABLES

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A b s t r a c t: North Macedonia's recent steps towards clean energy have mirrored the country's ambitions to join the European Union and have included a significant revamp of its 2030 energy development strategy putting a lot of emphasis on the liberalization of the energy sector and an increase in the share of renewables in energy production. However, facilitating this energy transition that seeks to embody the postulates of the European Green Deal, as predicted in the newly adopted, 2040 energy strategy would encompass the combined efforts by existing and newly created entities (both government and private) that form the energy sector in the country. This in turn requires the unification of their efforts through the creation of a legislative framework that will include major regulation changes to ensure that the focused actions of the energy sector entities are controlled, and do not overload the grid, or endanger its stability. Analyzing the successful outcomes provided by regulation advancement in the last 5 years, while relying on the lessons learned principle, will provide the backdrop against which these new regulation changes can be proposed.

Key words: legislation; renewable energy sources; grid stability; energy liberalization; energy transition

ОСВРТ НА ПРОМЕНИТЕ ПОТРЕБТЕ ВО ПРАВНАТА РЕГУЛАТИВА НА С. МАКЕДОНИЈА ЗА ДА СЕ ОЛЕСНУВАЊЕ НА ТРАНЗИЦИЈАТА КОН ОБНОВЛИВИ ИЗВОРИ НА ЕНЕРГИЈА

А п с т р а к т: Чекорите на С. Македонија кон почиста енергија совршено ги отсликуваат амбициите на земјата да стане дел од Европската Унија и подразбираат обновување на целите од Стратегијата за развој на енергетскиот сектор до 2030 година, ставајќи акцент на либерализацијата на енергетскиот сектор и значителното зголемување на уделот на обновливите извори на енергија во производството на електрична енергија. Меѓутоа, остварувањето на енергетската транзиција која цели да ги отелотвори постулатите на Европскиот зелен договор, вметнати во новата Стратегија за развој на енергетскиот сектор до 2040 година, ги опфаќа здружените напори на сите постојни и новосоздадени правни ентитети (од владиниот, но и од приватниот сектор) кои го сочинуваат енергетскиот сектор во државата. Ова повлекува потреба од унифицирање на нивните напори преку создавање правна рамка со значителни регулативни промени кои ќе служат како контролен механизам за обединетите активности на енергетските ентитети, со чија помош би се избегнало оптоварување на мрежата за пренос на електричната енергија и би се осигурила нејзината стабилност. Потпирајќи се на принципот за научени лекции, анализирањето на позитивните практики од изминатите 5 години, кои произлегле од промените во правната регулатива, е добра основа врз која би се предложило новите регулативни промени.

Клучни зборови: легислатива; обновливи извори на енергија; стабилност на електро-енергетската мрежа; енергетска либерализација; енергетска транзиција

1. INTRODUCTION

The geopolitical turmoil of the last few years has made Europe's excessive energy dependence

painfully obvious. However, a geopolitically influential, stable and secure European Union (EU) can do nothing less than ensure its energy security in a manner compatible with its climate objectives. For-

tunately, in the medium and long-term, the goals of the European Green Deal (EGD) coincide with the goals related to the EU's energy security, as European policymakers find the EU's climate agenda a vital part of the response to Russian aggression. In fact, it seems that the war in Ukraine has acted as a catalyst for the EU. It has accelerated its transition to using more renewable energy [1]. Renewable energy sources (RES) are clean and potentially endless, and they produce no emissions during operation. Subsequently, the rise in renewable energy use for electricity generation is key in helping the EU reach its European Green Deal (EGD) goals. This shift, along with increased use of biofuels and green hydrogen, has helped reduce fossil fuel reliance.

Almost in the same timeframe (2020–2023) the Republic of North Macedonia, a candidate country for accession and membership in the EU for the better part of the last two decades, that gets around 280 sunny days per year, was said to have “pioneered the energy transition towards renewables in the Western Balkans” [2]. Recently, the country has seen an exponential growth of its photovoltaic (PV) electricity generation capacities, with figures stating a 140% rise in installed capacity for the 2022–2023 period alone [3]. This might be the only positive aspect in an otherwise challenging energy landscape. The country's 2030 energy development strategy stresses the need for greater energy security. This requires diversifying energy resources by type, source, and supplier. To achieve this, the country must maximize the use of domestic resources [4]. However, the strategy faces several challenges. These include outdated technologies and insufficient investments in maintenance, modernization, and expansion. There are also high electricity losses, both technical and commercial. The current energy mix is unfavourably structured from an environmental and economic standpoint, and the country remains heavily dependent on energy imports. Finally, there is incomplete harmonization of legislation with European standards.

As a direct consequence, the spike in electric energy production due to the newly installed PV capacities has resulted in a heightened risk of grid overload without no immediate solution to the intermittent nature of renewables since the current energy needs rarely correlate with the disposability of the generated energy [5]. However, this challenge has already been addressed in the more recent – 2040 energy development strategy, but it seems a legislative framework that would coordinate and unify the efforts of all energy sector entities is still

lacking [6]. In summary, this paper aims to examine the steps North Macedonia is taking to draft and adopt the necessary policy changes. These changes are intended to support a smooth transition to renewable energy, reduce energy dependency, and enhance energy security. The goal is to achieve this transition at a pace that does not jeopardize the country's electricity distribution grid or existing generation capacities.

2. REGULATION WITH REGARDS TO THE USE OF RES

Regulation development basis

The energy development strategy of the Republic of North Macedonia is created by a working group composed of academics, researchers, and experts from diverse fields. This group operates under the Research Centre for Energy and Sustainable Development (RCESD), a body of the Macedonian Academy of Arts and Sciences, which conducts both fundamental and applied research in the energy sector. Due to the interdisciplinary nature of the research involved, the strategy addresses a broad range of issues, including the energy, economic, organizational, institutional, legislative, and educational dimensions of energy sector development. It focuses on key areas such as energy production, distribution, and utilization. The primary objective of the strategy is to outline the most favourable long-term path for the sector's development, while identifying potential challenges and proposing solutions to mitigate them.

Once formulated and adopted by the government, the Strategy serves as a critical framework for the country's sustainable development and its integration into broader European processes. To date, the RCESD has drafted two Strategies: one covering the period 2010–2030 and another for 2020–2040 (Figure 1).

While the Strategies provide valuable foresight, they should be regarded as dynamic documents, with varying degrees of precision in their projections. As such, the Strategy must be regularly updated to reflect new developments in both the national and global energy landscape. Nonetheless, the Strategy offers a robust foundation for the proactive engagement of all stakeholders in the Macedonian energy sector. It ensures that relevant authorities and entities collaborate towards a common goal, guided by a shared vision.

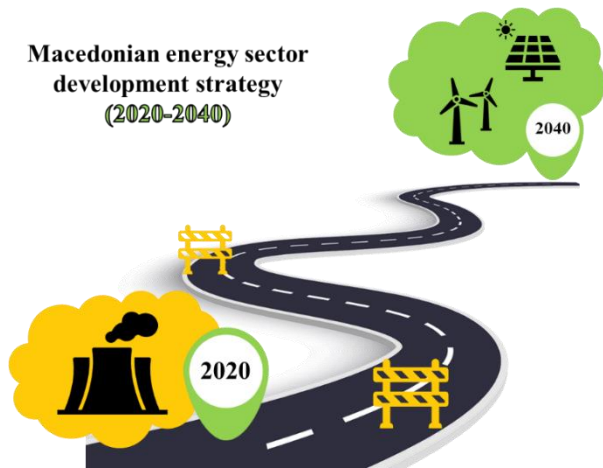


Fig. 1. Energy sector development strategy 2020–2040

Institutional framework

The institutional framework of North Macedonia's energy sector begins with the government, which is responsible for proposing policy measures and overseeing their implementation. At the other end, municipal councils at the local level are tasked with proposing and enacting measures aligned with the goals of the energy development strategy. Between these two levels, numerous entities exist, with overlapping and often interchangeable roles in the energy sector.

At the government level, the ministry responsible for the energy sector up to 2024 was the Ministry of Economy. It had a dedicated Energy Department whose main tasks were the strategic planning and development of the legislation in the energy sector, implementation of the energy policy including the policies for energy efficiency and renewable energy sources, and the use of new technologies. The government, through this department, also encouraged the development of the private sector in the area of energy and supported the scientific and technological development, particularly in the utilization of renewable energy sources. At the same level, however, part of the responsibilities related to energy used to belong to the Ministry of Environment and Physical Planning and the Ministry of Transport and Communications.

To assist the government in implementing energy policy, the Energy Agency (EA) was established in 2006. The EA was responsible for preparing strategies, development plans, and programs related to energy efficiency and renewable energy utilization. It also coordinated regional projects, prepared proposals for energy-related laws and technical regulations, and supported the implementation of investment projects.

Following the general elections in North Macedonia, however, in the second half of 2024, amid a major government restructuring, a new Ministry of Energy, Mining and Mineral Resources was established. The new ministry complements the existing governmental structure by consolidating and streamlining energy-related responsibilities under one dedicated authority. This move aims to enhance coordination, policy development, and implementation within the energy sector. The Ministry of Energy is expected to play a central role in managing the country's energy transition, ensuring the alignment of national energy policies with European Union standards, and overseeing key areas such as renewable energy, energy efficiency, and infrastructure development. By focusing specifically on energy issues, it allows for more focused leadership and better alignment of strategies, while also improving the oversight and integration of energy-related projects across various sectors of government.

The Energy Regulatory Commission (ERC), an independent body, plays a crucial role in regulating energy activities. Operating under the Law on Energy, the ERC is tasked with overseeing specific energy sector issues and making decisions within its defined legal framework.

Finally, at the municipal level, the mayor and municipal councils propose actions on implementing specific segments of the energy policy, based on public interest and local significance. They determine the need and sources of funding for new and the reconstruction and upgrade of existing facilities, propose measures and activities for increasing energy efficiency and support the production of energy from RES. These proposals had to be approved by the Ministry of Economy (now the new Ministry of Energy), upon which they are enacted in the form of a municipal energy development program for a period of five years.

Standing regulation

North Macedonia has historically signed and ratified the Agreement of the Energy Charter, the Energy Community (EnC) Treaty, the United Nations Framework Convention on Climate Change and the Kyoto Protocol. According to the Energy Community Treaty, a major part of the country's successful energy transition is the full compliance and harmonization with the EU's energy community core legislation on energy, environment, RES, energy efficiency and oil reserves.

Consequently, North Macedonia's strategic commitments in the energy sector have been incorporated in the Law on Energy, first drafted in 2008 and adopted in 2011, albeit heavily revised in 2018. The revised Law on Energy in 2018 transposed the EU's Third Energy Package in the electricity sector, as well as their RES Directive with regards to greater implementation of renewables in the heating, electricity production, and transport sectors.

The Law on Energy includes a dedicated chapter on renewable energy sources (RES). It proposes a 10-year action plan aimed at further developing the electric power system. This plan focuses on introducing smart grids and energy storage systems to ensure reliable operation as the share of RES increases. The law also offers financial incentives for renewable energy producers, in line with Directive 2009/28/EC. These incentives include feed-in premiums to support "preferred producers" and encourage greater market integration of renewables. The law stipulates that the electricity distribution system operator must prioritize access and distribution for RES-generated electricity. This must be done in an objective, transparent, and non-discriminatory manner, considering the operational limits of the power system. Additionally, the law states that no license is required for producing electricity from RES for personal use. Surplus energy can be supplied to the distribution network under conditions set by secondary rules and regulations. To protect the environment, RES electricity generation plants are considered public interest projects.

The use of RES in electricity generation is also addressed in the Law on Energy Efficiency, adopted in 2022. This law aims to regulate energy use and draft policies to increase efficiency in production, transmission, distribution, and supply. It also seeks to support higher shares of renewables in the energy mix. The Law on Energy Efficiency introduces the concept of an "energy aggregate." This refers to a service provider that combines load curves from multiple consumers to sell or auction energy on organized markets. The goal is to reduce peak loads, balance energy from renewable sources, and enhance supply security. However, the law places more emphasis on using RES for heating rather than electricity generation. A key provision focuses on building design and major renovations. It requires a mandatory energy analysis by a building inspector to assess the potential for decentralized RES systems, combined energy production systems, heat pump systems, or centralized heating and cooling systems supplied by RES.

While RES application is not immediately attributed to any remaining legislative acts, the existing Law on Concessions and Public-private Partnerships, as well as the Law on Environment and the Law on the Protection of Nature, have indirectly facilitated the accelerated implementation of RES in electricity production. Similarly, the Law on Waste Management and the Law on Battery Waste Management, in line with circular economy agendas to prolong a product's life and recycling could potentially stimulate the creation of battery energy storage systems (BESS) by repurposing old electric vehicle batteries [7].

Proposed regulation

In recent years, North Macedonia has made consistent efforts to harmonize its energy legislation with that of the EU. The guidelines outlined in the energy sector development strategies, alongside the passage of the Law on Energy, have led to the drafting of numerous primary and secondary regulations. However, the process of passing and implementing these laws has been slow and with varying degrees of success. The previous application of the renewable energy provisions within the Law on Energy revealed gaps that need to be addressed to better align with new trends and emerging needs in both the global and domestic energy sectors. In many neighbouring countries, renewable energy is governed by dedicated laws separate from general energy policy. Recognizing this, North Macedonia has moved toward adopting a distinct Law on Renewable Energy Sources [8].

This new law seeks to fill the gaps left by the Law on Energy, focusing on encouraging greater consumer adoption of renewable energy, promoting the production of RES to meet local demand, and reducing long-term energy import dependency. It aims to decrease reliance on fossil fuels, protect the environment, and help mitigate climate change. As of late 2023, the Draft Law on RES proposes a series of support measures to help achieve the objectives of the 2040 Energy Development Strategy and the National Energy and Climate Plans. These focus on increasing the share of RES in gross final energy consumption. The draft law also calls for the development of the electric power system, incorporating smart grids, smart metering systems, and electricity storage solutions to ensure reliable system operation as the share of RES grows. Furthermore, it advocates for the integration of RES into the electricity

market, while avoiding market distortions and considering the costs of system integration and network stability. Additionally, the draft law emphasizes the need for urban planning documents to align with the construction of RES production facilities, ensuring proper approval processes for building or reconstructing such facilities.

Moreover, this newly drafted law details the conditions of becoming a preferred electricity producer and the responsibilities towards the country's electricity production and distribution system ensured by the application of higher technical standards of the installed systems and the licensing of both the production plant and the installers. All RES electricity producers will have to meet the technical-technological conditions, and the connection requirements set out in the Network Rules for Electricity Distribution [9, 10] and must be recorded within the country's registry by their production capacity.

Households and small consumers could be self-sustained by building their own photovoltaic system or small wind farm with 4 kW of installed capacity for households, and 20 kW of installed capacity for small consumers. According to the Draft Law on RES [8], the produced electricity surplus from these units would be handed over to the electricity distribution network at a price calculated as:

$$C = PCE \cdot 0.9, \text{ if } E_i \geq E_p$$

or

$$C = PCE \cdot 0.9 \cdot E_i / E_p, \text{ if } E_i < E_p$$

where:

E_i = the total electricity delivered by the supplier and taken by the consumer-producer within a calculation period and expressed in kWh,

E_p = the total electrical energy delivered to the electrical distribution network from the consumer-producer within a calculation period and expressed in kWh,

PCE = average price of electricity that the consumer-producer pays to the supplier for the purchased electricity, without compensation for using the network (net fee) and other fees and taxes, within a calculation period and expressed in MKD/kWh.

Finally, the issue of energy storage is briefly addressed. The draft law allows a preferred electricity producer to establish an energy storage facility, which can be used to store the electricity generated by their own power plant – specifically, the

plant that receives financial support (such as a premium) for its energy production, which is then supplied to the distribution network. At the same time, the law prohibits the preferred producer from using the storage facility to store electricity drawn from the network.

In summary, despite being an important piece of legislature, in this draft stage, some points of the law seem too vague, while others are deliberately left loosely defined. However, the proposed Law on RES is currently open to suggestions and public debate over its contents [11] and will likely see some future additions made by representatives from the expert community, academia and both the private and public sectors.

Of the remaining proposed legislation, North Macedonia ratified the Paris Agreement as a non-Annex I Party to UNFCCC, with the next most important strategic measures being the adoption of a Long-Term Climate Action Strategy and a Law on Climate Action. The country is in the process of adopting both in order to establish a strong and sustainable framework for coordinating climate action through the development of a national strategic and legal framework harmonized with the EU and supported by the financing mechanism of the EU Instrument for Pre-Accession Assistance (IPA II). Drafting of the Climate Action Law (including the transposition of Regulation (EU) No. 525/2013 on monitoring mechanisms) has begun, and the first draft was prepared in April 2020.

Work on the Long-Term Climate Action Strategy began in March 2019 and was finalized with its publication in May 2021. The strategy aims to significantly reduce greenhouse gas emissions and enhance the resilience of society, the economy, and ecosystems to the impacts of climate change. It focuses on establishing a highly efficient energy system that is predominantly powered by renewable energy sources (RES). The goals of the strategy are embedded in the Law on Climate Action. This includes proposing measures to promote the production of renewable or CO₂-free energy, together with measures to improve energy conservation and efficiency across all sectors of the economy. The strategy also emphasizes the need to foster investments in climate-friendly projects, support research, and encourage best practices in key areas, such as renewable energy production, energy distribution and management, energy storage, smart grid technologies, and data centers for utilizing renewable energy.

3. ANALYSIS OF THE 2018–2023 TIMEFRAME: RES IN ELECTRICITY PRODUCTION

The electricity production capability of North Macedonia, historically, has relied on coal-fired thermal power plants and hydro power plants as the main electricity generation capacities. The main electricity production entity in the country is a state-owned company – Elektrani na Makedonija (ELEM), which accounts for ~70% of the total installed capacity, as the owner of two large coal-fired thermal power plants, Bitola and Oslomej. The total installed electricity production capacity of the country is 2.06 GW with ~48% belonging to thermal power plants, ~34% to both large and small hydro power plants, ~15% to combined natural gas fired plants, and only ~3% to other RES [12].

In recent years electricity generation from coal in North Macedonia has been decreasing steadily and has amounted to ~60% in 2017. On the other hand, overall, RES generation capacity has been increasing (from 2010 until 2018) amounting to 37% (including hydro power), which has led to the increase of RES generation up to almost 25% in the overall generation in 2017 and 2018 [12]. It should also be noted, that in 2018, RES accounted for 18.1% of the gross energy consumption in the country, which is almost identical to the quantities reported by EU-28 countries for the same time period. At the end of 2017, with regards to RES there were 170 eligible producers with 128 MW installed capacity that have been using financial incentives in the form of feed-in premium tariffs with 67.5 MW hydro, 16.8 MW solar PV, 36.8 MW wind and 7 MW of biogas, respectively. The overall

paid incentives to eligible producers of electricity have been rising steeply and added up to 35.7 mil EUR in 2017. Back then, the government revealed its plans to continue with the feed-in tariff mechanism, to introduce market-based premiums and provide the legal backdrop against which these changes can be performed in the form of the revised Law on Energy.

North Macedonia has a theoretical ~7.3 GW potential for exploiting RES for electricity production, especially solar and wind RES [13]. The highest share of this potential comes from wind of up to 4.9 GW, followed by solar PV up to 1.4 GW, and hydro up to 0.67 GW. The largest cost-competitive solar PV potential is on a utility scale, while large-scale hydro potential is mainly located on the Vardar river and to a lesser extent on the Black Drim river. Due to the major revisions and additions to the Law on Energy in 2018, in the field of RES, the ERC announced that during 2022 it issued 267 new RES power plant licenses with a total installed capacity of 152.2 MW [14]. With that, the total installed capacity (Figure 2) for electricity production in the country increased by 7%. Most investments were made in PV power plants – 106.5 MW, followed by 36 MW in wind power plants, 7.2 MW in small hydropower plants and, 2.5 MW in biogas thermal power plants [14]. With the introduction of a Program for the promotion on the use of RES in 2022 [15] that details and eases the application conditions for feed-in premiums for large RES plants and subsidies for households and small consumers, this investment trend was expected to continue in 2023, with another 250–300 MW, however factual reports if this was the case are still not published.

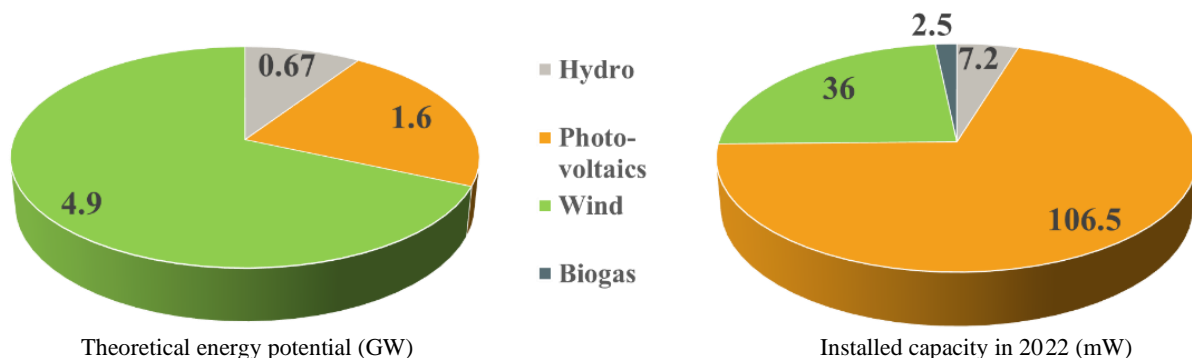


Fig. 2. Theoretical energy potential and installed capacity in 2022

Until recently, North Macedonia used the cheapest electricity in the region, which is why most industrial facilities as well as its citizens were comfortable on the issue of energy. But, following the

energy crisis brought by Covid 19, significantly exacerbated by the war in Ukraine, with energy prices increasing by 400–500% [16], it became obvious paying the new tariffs will likely take a

major financial toll. In 2021, the prices of all energy sources reached a historical peak, with electricity prices reaching 450 EUR per MW/h, in contrast to pre-crisis prices of 55–65 EUR per MW/h [16]. From today's perspective, energy prices are not likely to drop to their pre-crisis rates, and investment into RES has been seen as a potential energy sector stabilization measure, with investments in PV power plants being the only faster option through which industrial facilities, companies and even homes can reach a lower electricity bill.

It is clear that renewable energy sources, and particularly PV electricity production systems, have the potential to lower electricity costs, especially for businesses. Their hurried introduction in North Macedonia, however, coupled with their intermittent nature have led to infrastructural and transmission challenges. This was identified in 2022 by the ERC, as new PV capacities strained the stability and even threatened to overload the distribution network. A potential solution currently considered by the ERC is the introduction of battery energy storage systems capable of balancing electricity production with the actual needs and the peaks and lows of electricity demand. Official studies by the ERC are reportedly ongoing, but experience has shown that the BESS should be able to store 10–20% of the installed capacity of the PV power plant. A legislative obligation to install BESS along with larger PV plants is also considered although this will increase the price of the investment by 20–30%, which might have to be alleviated through BESS subsidies to reduce the difference [16].

4. DISCUSSION

According to the 2040 Energy Development Strategy [6] RES share in the gross final energy consumption increases over all three proposed development scenarios as part of the strategy, landing in the range of 35–45% in 2040. The utilization level of

the renewables as an important factor for decarbonization of the energy sector, has been considered relevant even in the most unfavorable – the Reference scenario, where 33% RES share is projected after 2030, and by taking into account heat pumps, the RES share in gross final energy consumption would become even higher, reaching almost 40% in the more favorable Moderate transition scenario and 45% in the Green scenario. All three scenarios (Figure 3) envisage a steep growth of electricity generated from RES (~7 times more in 2040 vs. 2017) with hydro maintaining its largest share in electricity generation, but PV and wind being the fastest growing technologies.

According to the 2040 Energy Development Strategy [6], the share of Renewable Energy Sources (RES) in gross final energy consumption is projected to increase across all three proposed development scenarios, reaching between 35% and 45% by 2040. The role of renewables in decarbonizing the energy sector remains critical, even under the most challenging scenario – the Reference scenario – which forecasts a 33% RES share post-2030. When factoring in the use of heat pumps, the RES share would rise further, reaching nearly 40% under the Moderate transition scenario and 45% under the Green scenario. All three scenarios (Figure 3) predict a significant rise in electricity generated from RES, with a projected sevenfold increase by 2040 compared to 2017. Hydropower will continue to contribute the largest share of electricity generation, while PV and wind energy technologies are expected to grow the most rapidly.

However, North Macedonia still faces relatively high levels of electricity supply interruptions in its distribution network compared to regional averages. As such, there is considerable potential for improving the reliability of the country's power supply. To integrate more RES, the country will need to invest in further developing its distribution network and continuously enhance its overall reliability.

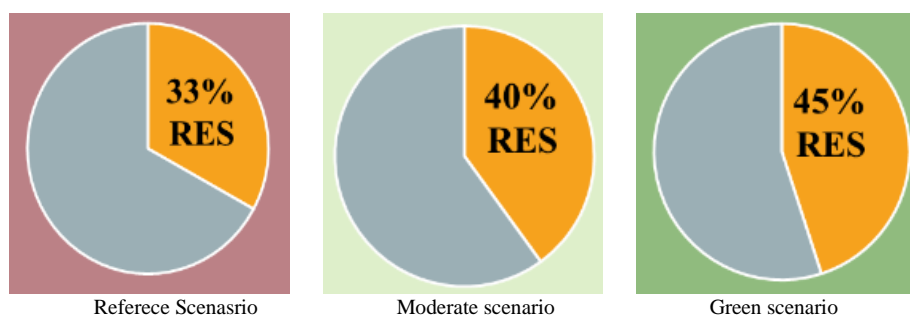


Fig. 3. RES share in gross final energy consumption over three proposed scenarios following 2030 [6]

Additionally, to integrate more variable RES necessitates to manage system flexibility. Besides the huge amount of solar PVs (up to 1,400 MW), the scenarios envisage up to 750 MW of wind, which are less predictable in terms of hourly generation. This will add to the complexity of daily operations for grid management, and some of the likely solutions include:

- Implementation of viable demand response options, including vehicle-to-grid, power-to-heat and battery storage. Although the average available capacity is similar in Reference and Green scenarios, the differences in spread between peak demand and maximum theoretical available capacity (–23% for Green scenario vs. –8% for Reference scenario) emphasizes the critical need for investments in flexibility in the Green scenario.

- Implementing a balancing mechanism as a short-term step (including system services for secondary and fast tertiary regulation). In this direction, cross-border balancing could enable a cost-effective solution, while in the mid and long-term, the steps include use of existing and construction of new power plants such as pumped-storage hydropower plants or gas fired power plants (including combined heat and power). Additional flexibility could be gained from biomass and biogas small-scale plants.

5. CONCLUSIONS

Efficient use of energy and renewables are the cornerstone of the EU's energy transition as set out in the EGD and the most immediate response to its energy dependency on Russian gas. Therefore, although zero carbon fuels are expected to have a much more significant role in the future primary energy consumption, RES should be the ones winning the growth race. North Macedonia, being an accession candidate to the EU has been dedicated to harmonizing its legislation with that of the EU's energy community while also trying to lessen the effects of the 2021 global energy crisis. These efforts have translated into major revisions of its Law on Energy and the subsequent creation of multiple national action plans (on energy efficiency, on energy and climate, and on the use of RES) which along with the financial incentives derived from them have led to significant penetration of renewables, and particularly PV systems have increased the electricity production capacity and the total gross consumption of electricity derived from RES in North Macedonia.

However, in spite of the detailed scenarios developed as part of the 2030 and 2040 Energy Development Strategies, North Macedonia is lacking an overall proactive approach in the legislative segment, since most regulations are being passed reactively or rather once a challenge for the energy sector is exposed. The current policies offer limited guidance on several key issues, including the reliable integration of new electricity generation infrastructure, the ongoing improvement of the grid through soft measures, and plans for new investments and upgrades to the distribution network. They also lack provisions for advanced concepts such as smart grids, energy storage systems, and vehicle-to-grid technologies. Drafting the new Law on RES is a step in the right direction, but even it, with all its strong suits, might be arriving a little too late. While this law offers potential solutions and incentives for new users it does little to protect the grid of potential overloads and balancing out the peaks and lows of electricity production and demand. To effectively implement the new energy sector policies, which introduce numerous obligations, it is essential to strengthen the capacity of North Macedonia's energy institutions. At present, institutional capacity is limited, and intergovernmental coordination is almost nonexistent. The establishment of the new Ministry of Energy, Mining, and Mineral Resources, however, offers a glimmer of hope, as it presents itself as a vital step toward addressing these challenges.

In summary, North Macedonia's energy sector sentiments are in the right place looking to increase RES penetration in electricity production but lack the legislative framework that would allow this to happen without endangering future electricity production and grid integrity.

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