CENTER FOR THE STUDY OF DEMOCRACY

TECHNOLOGICAL AND POLICY INNOVATION SCENARIOS FOR THE LOW-CARBON TRANSITION OF THE BULGARIAN ENERGY SECTOR

Policy Brief No.109, April 2022

Bulgaria still lacks clearly defined long-term goals and a transparent framework for decision-making regarding the country's energy and climate security policy. This increases the country's economic vulnerability and undermines the feasibility of its transition towards carbon neutrality by 2050. The ongoing energy crisis exacerbated by the Kremlin's war in Ukraine further raises the **need for an updated energy and climate security strategy** that would improve the country's energy independence and diminish the role of fossil fuels in the local economy[1]. Bulgaria will need to transform its energy sector over the next decade by gradually phasing out coal-fired power generation and making significant investments in renewable energy-based (RES) power plants. Bulgaria's goals for increasing the share of RES in final energy demand lack ambition, which have to change with the revision of the National Energy and Climate Plan (NECP) in 2023 and with the update of the draft Long-term Decarbonisation Strategy (LTS) by mid-2022[2].

Currently, the goal of 27% of RES in the final energy consumption by 2030 is not only low, but is actually based on the false premise that biomass (firewood) will increase its share in the heating and cooling segment from about 30% to 44%[3]. The planned investments in the renewable energy sector are insufficient for the transformation of the energy mix to reach carbon neutrality by 2050. There is also the need to **transition from a policy concentration on large-scale energy projects towards the decentralization of electricity production** with a leading role for households and small and me-

KEY POINTS

- The ongoing energy crisis exacerbated by the Russian war in Ukraine calls for a serious update of Bulgaria's **energy and climate security strategy**.
- Among others, the strategy needs to provide an effective policy response to the negative impact from the rising EU ETS and gas prices on the **structure of the electricity market and industrial competitiveness.**
- The fastest way to achieve the EU decarbonization goals in Southeast Europe is to **accelerate the coal phase out** and replace coal with renewables. A delay in the coal phase-out risks a prolonged **lock-in in stranded fossil fuel assets** and a crowd-out of renewable energy investments.
- Natural gas plays only a **marginal role in the energy transition** due to the structure of SEE electricity markets.
- Renewables can **drastically cut the increase of electricity prices** from over 50% in a delayed fossil fuel phase out by 2030 to only 13% in a stronger RES push.
- Battery and hydrogen storage are unlikely to be economically feasible **before 2030** as these technologies are yet to become **cost-effective**.
- Battery **storage capacity conditionality** for new renewables' investment in the adopted Bulgarian National Recovery and Resilience Plan increases **capital expenditures** and is impractical for industrial consumers and power companies alike.
- Unlocking the RES potential requires the **streamlining of regulatory and administrative processes**, preventing **discriminatory treatment** by the TSO and the DSOs against RES investors and the strengthening of **social acceptance of new technologies.**

[1] Center for the Study of Democracy, *EU Energy and Climate Security Strategy to Counter the Russian Aggression in Europe*, Policy Brief No. 108, March 2022.

[2] Rangelova, K. et al., *Switching the Gears of Decarbonisation: Policy Action for a Low-Carbon Transformation of the Bulgarian Economy*, Sofia: Center for the Study of Democracy, 2021.

[3] Center for the Study of Democracy, *Lost in transition: Bulgaria and the European Green Deal*, Policy Brief No. 92, May 2020.

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dium enterprises. In this respect, the excessive focus of the approved National Recovery and Resilience Plan (NRRP) [4] on expanding the power storage capacity is locking the country into two mega projects that do not have a clear economic feasibility among other potential governance and corruption risks.[5]

At the same time, Bulgaria needs to formulate an effective policy response to counter the negative impact from the rising EU ETS prices on the structure of the country's electricity market and on its industrial competitiveness. The impact of the war in Ukraine on the security of supply and the related more likely **long-term decoupling of the EU from Russia and China** further complicates the decarbonization path. Hence, the policy response to this tangled web of challenges needs to be firmly based on a solid and comprehensive data-driven assessment of alternative scenarios, which are closely coordinated with EU partners.

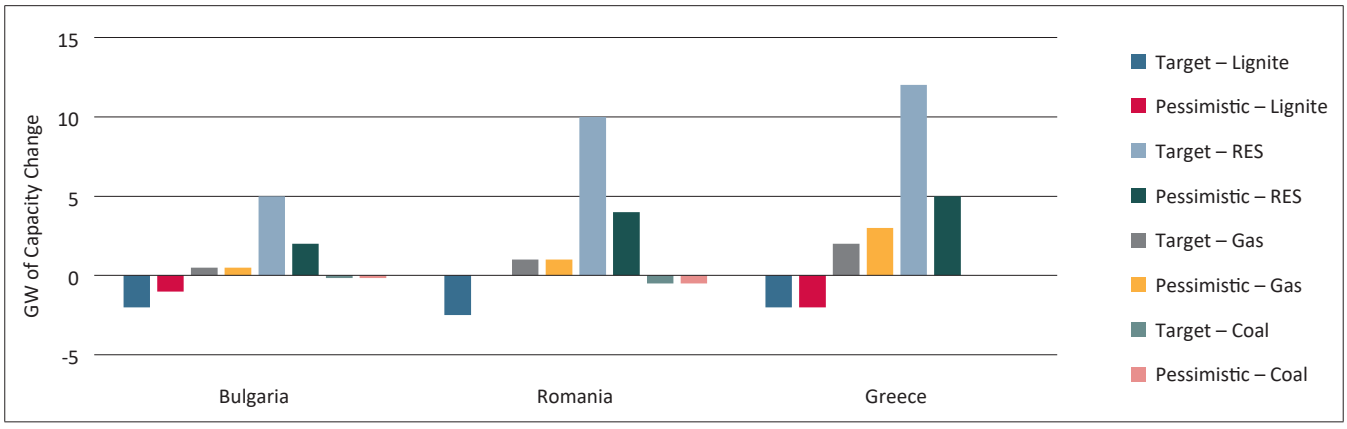
The following analysis summarizes the policy implications for Bulgaria from the insights from two studies based on independent modelling:

- One, focused on the **competitiveness of industry and energy** prices, sheds light on the main implications from the changing ETS price dynamics in Europe on the regional power sector in Romania, Bulgaria and Greece.[6]
- The other assesses the potential for the large-scale **uptake of storage technologies and hydrogen** as enablers of the low-carbon transition in alternative decarbonization pathways for countries in the Western Balkans and Southeast Europe.[7]

The Impact of the Coal Phase Out and the RES Uptake

A key policy takeaway from the modelling assessments is that the fastest way to achieve the EU decarbonization objectives by 2030 in SEE (Bulgaria, Greece, and Romania) is to **accelerate the coal phase out** and replace coal with the uptake of renewable energy-based (RES) power plants.[8] The modelling compares a *Pessimistic Scenario*, in which there are persistent regulatory barriers for RES deployment and a slow coal phase-out, with a *Target Scenario*, built upon a higher share of RES-based power generation in line with the 2030 RES Directive and the Fit for 55 targets. Imputed carbon prices in the *Target Scenario* are almost 80% higher than in the *Pessimistic Scenario*, and around 70% higher than the 2021 prices, which enables the higher uptake of renewables by the end of the decade due to the impact of ETS prices on wholesale power tariffs incentivizing investment in relatively more expensive RES technologies.

Figure 1. 2021-2030 Installed Capacity Change by Type of Power Generation Unit (Pessimistic and Target Scenarios)



Source: *Aurora Energy Research.*

[4] Council of Ministers, Национален план за възстановяване и устойчивост [National Recovery and Resilience Plan of Republic Bulgaria], Version 1.5, April 2022.

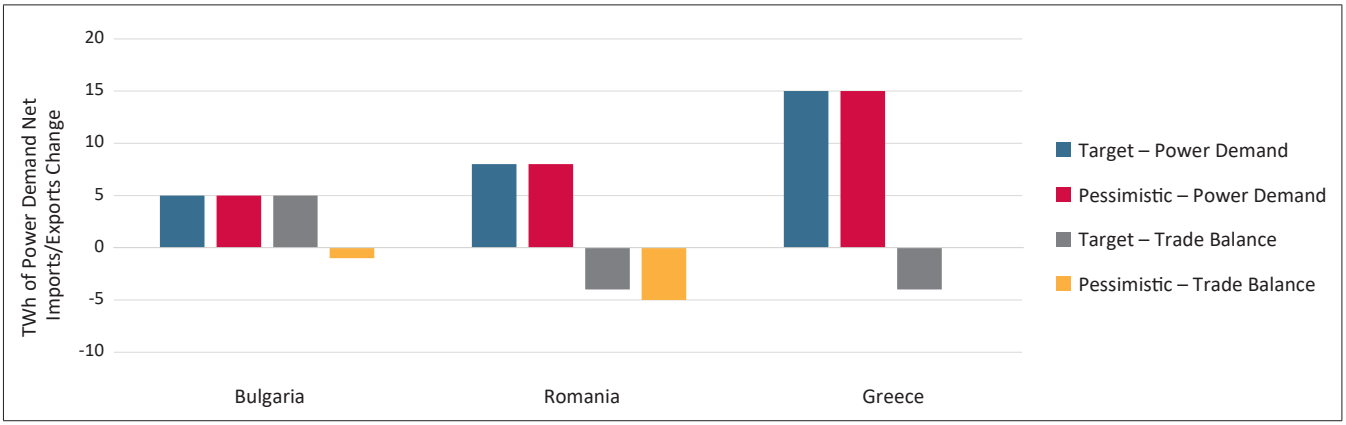
[5] Center for the Study of Democracy, *Now or never: will Bulgaria catch the Last Train to Green Economic Recovery?*, Policy Brief No. 95, December 2020.

[6] Aurora Energy Research, *Preserving the Competitiveness of European Industry & Power Prices*, 2021.

[7] Upcoming report on the modelling assessment of different power sector development scenarios in the Western Balkans and the four EU member states in the SEE region with a focus on the implementation of storage technologies.

[8] Aurora Energy Research, *Preserving the Competitiveness of European Industry & Power Prices*, 2021.

Figure 2. Change in Power Demand and Power Trade Balance (in TWh)



Source: *Aurora Energy Research.*

In the *Pessimistic Scenario* for Bulgaria, the government tries to protect the lignite industry under the argument of reducing security of supply risks, a growing internal power demand and the need for back-up capacity for intermittent renewables, resulting in a slow phase-out of just 1 GW of coal capacity by 2030. Renewable energy-based power generation capacity in this scenario increases by only 2 GW by 2030 due to the absence of a clear national decarbonization plan and a number of governance and regulatory bottlenecks slowing the development of the Bulgarian market. The need for additional natural gas capacity is capped at 500 MW in both scenarios, as the flexibility provided by hydro and pumped storage plants[9] make any further gas additions unnecessary. In the *Target Scenario*, however, the removal of barriers to the uptake of renewable energy sources contributes to a more-than-threefold increase in installed onshore wind and solar capacity by 2030. Additionally, coal capacity is slashed by 50% or 2 GW by 2030 due to a market-driven retirement of the loss-making lignite plants. This is in conformity with previous assessments on the economics of the lignite phase out in the SEE region, which show that **an earlier coal phase-out minimizes consumer welfare losses** and accelerates the RES-based transition of the electricity sector[10].

Cumulative greenhouse gas (GHG) emission reductions between 2021 and 2030 are almost identical in both scenarios. The lower emissions (by 2025) in the *Pessimistic Scenario* are the result of a natural gas switch in the power sector prompted by the higher ETS prices that incentivize the deployment of more gas-fired power plants. In the *Target Scenario,* there is a substantial catch-up process after 2025 when the speed of RES uptake accelerates in combination with lower capacity factors for coal and natural gas, which would be less competitive given the higher carbon prices predicted. The *Target Scenario* represents a more feasible and sustainable solution for the European electricity sector, as it would provide for a faster achievement of the EU low-carbon transition. Meanwhile, the *Pessimistic Scenario* risks locking the Bulgarian power sector in inefficient and carbon-intensive fossil fuel dependency.

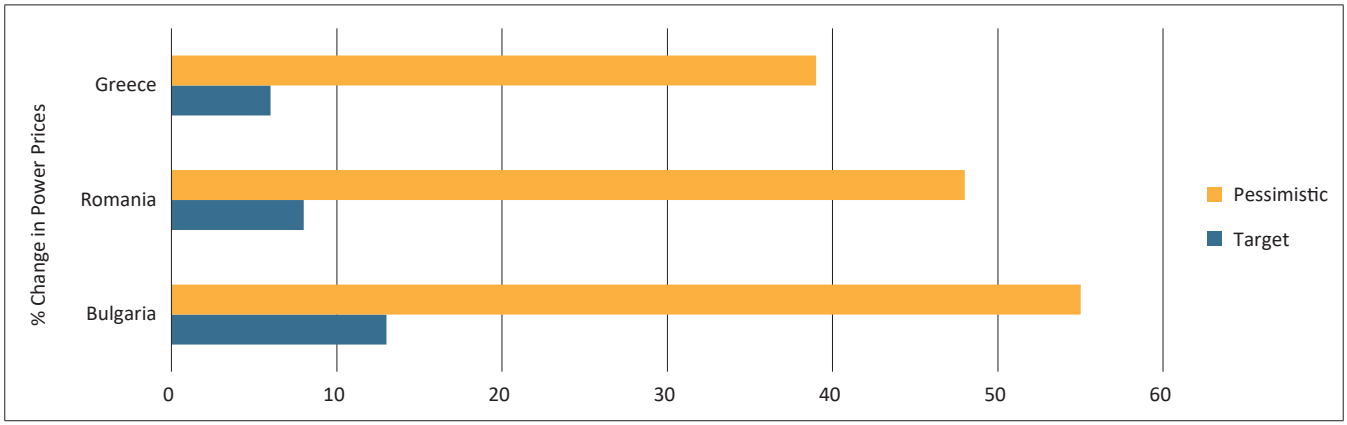
The modelling results show that in the *Pessimistic Scenario* Bulgaria would become a net importer of electricity, while in the *Target Scenario* it would continue to be a net exporter, although to a lesser extent compared to current levels due to the phase out of lignite and the higher domestic electricity demand. The utilization of natural gas capacity in the *Target Scenario* is significantly lower than in the *Pessimistic Scenario*, mainly due to the higher penetration of renewables, discrediting the argument for natural gas as a necessary transition fuel. Crucially, in the *Pessimistic Scenario*, wholesale electricity prices would be 36% higher than in the *Target Scenario*, and 55% higher compared to 2021 levels. With the high wholesale prices likely to filter through to end-users, this would increase **energy poverty**.

A strong push towards **a renewables' uptake in the 2020s clearly moderates the power price increase** caused by the rise in ETS prices (See Figure 3). At the same time, the *Target Scenario* in Bulgaria shows that the expansion of the renewables' capacity would alleviate the effects of the coal phase-out. Yet, as the

[9] The recent damage from April 2022 to the main pumped storage asset in the Bulgarian energy system (Chaira) is not taken into consideration. Assessments show it is likely to be long-term or even permanent.

[10] László, S. et al., *Accelerated lignite exit in Bulgaria, Romania and Greece*, Joint Report by REKK, TU Wien, CSD, EPG, FACETS, 2020.

Figure 3. Change in % of Power Prices in the Two Scenarios



Source: *Aurora Energy Research.*

dependence on lignite is largest in Bulgaria out of the three SEE countries analyzed, the electricity price increase is more than double the expected surge in Romania and Greece. In contrast, an even moderate delay in the phase-out of coal leads to skyrocketing electricity prices and at least a two-fold expansion of subsidies for lignite plants as these power generation facilities lose their competitiveness. It is worth noting that the *Pessimistic Scenario* presented in this model is more optimistic than Bulgaria's National Energy and Climate Plan (NECP) 2030 targets and the 40% reduction in GHG emissions envisioned by the National Recovery and Resilience Plan (NRRP). Nevertheless, due to the political pressure to avoid a sharp increase in wholesale electricity prices, the government will likely support a higher coal capacity than the one expected to remain in place by the model in 2030.

Gas in a Dead End

Besides the phase-out of coal-fired capacity, the modelling scenarios do not expect natural gas to be a viable alternative and a transition fuel source by 2030. In fact, **natural gas is likely to slow down the renewables' buildout**, increase Bulgaria's exposure to natural gas price fluctuations and significantly expand the country's dependence on Russia (which stood already at 94% in 2022). The abandonment of the project for the construction of a 1 GW natural gas power plant in the final version of the Bulgarian NRRP has somewhat reduced the security of supply risks related to the uptake of gas in the system. But the Bulgarian government has maintained that some of the GHG emission reductions by 2026 pledged by the strategic document would come from a coal to gas switch in the Maritsa East lignite basin where ¾ of the country's installed lignite-fired capacity is located. However, the decarbonization modelling has shown,[11] the increase in **natural gas-fired capacity in the electricity system is likely to remain capped at only 500 MW** by 2030 as Bulgaria benefits from large-scale hydro and pumped-storage capacity for its power balancing needs.

The second modelling exercise referenced here[12] corroborates the findings on the alternative decarbonization pathways for Southeast European countries. It compares a *Reference Scenario* reflecting national strategies and NECPs and **two policy scenarios**:

- in *Policy Scenario I*, **natural gas** is used to complement a faster uptake of renewables; and
- in *Policy Scenario II*, **storage technologies and hydrogen** are used instead as enablers of the low-carbon transition.[13]

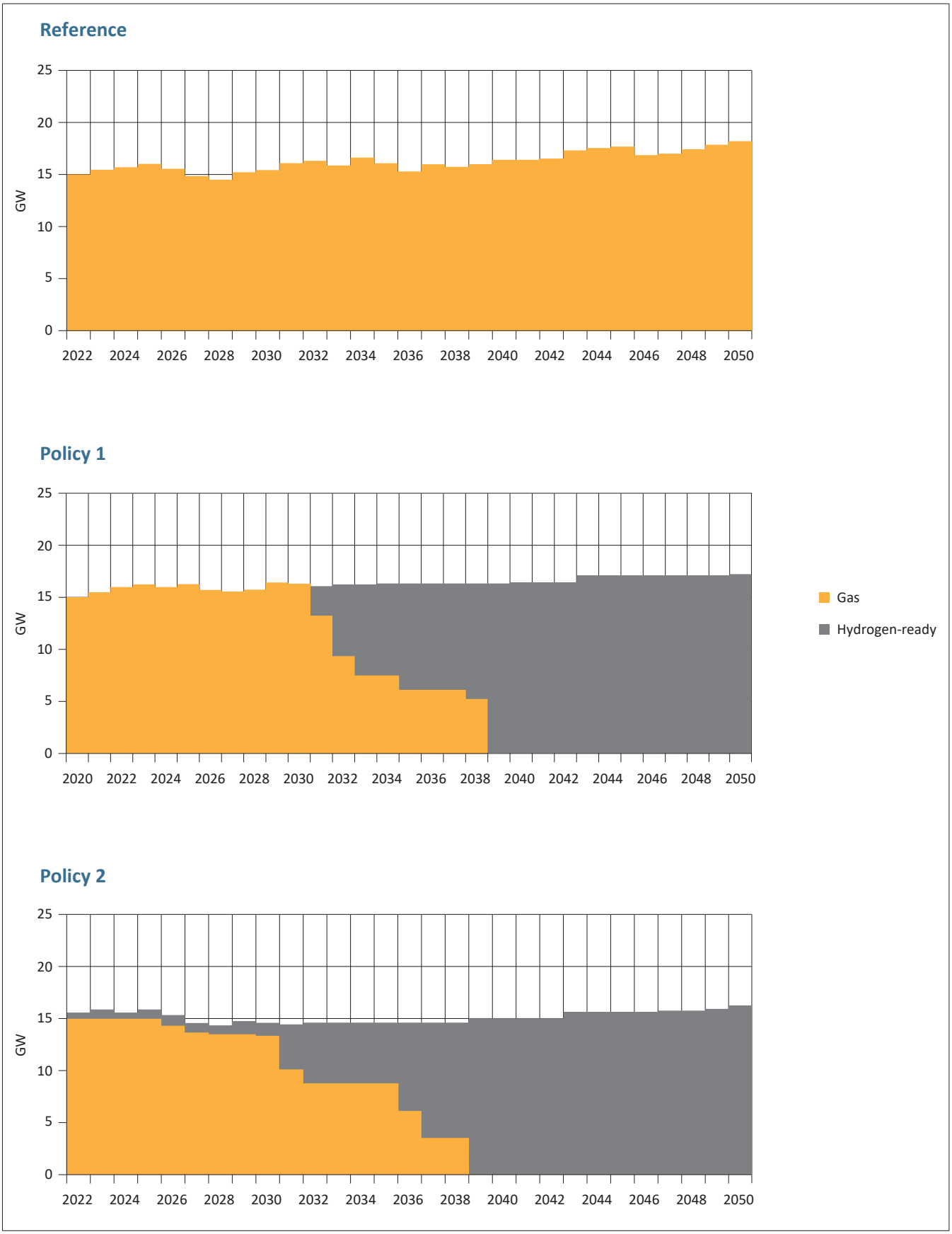
The major difference highlighted is that *Policy Scenario I* would bring higher initial emissions due to the cycle of fossil gas investment and presents a misalignment with EU decarbonization targets, as early emission-reducing natural gas capacities investments have to be decommissioned between 2030 and 2038 in order to be in line with 2040 emissions targets. On the other hand, *Policy Scenario II* presents a smoother transition with a moderate growth of storage technologies and quick fossil gas replacement, staying in line with 2040 decarbonization targets in the power market and achieving a more substantial reduction of CO2 emissions after

[11] Aurora Energy Research, *Preserving the Competitiveness of European Industry & Power Prices*, 2021.

[12] Upcoming report on the modelling assessment of different power sector development scenarios in the Western Balkans and the four EU member states in the SEE region with a focus on the implementation of storage technologies.

[13] Ibid, Enervis upcoming study.

Figure 4. Natural gas and Hydrogen Capacities in Bulgaria, Romania, Greece and Croatia in the three scenarios (GW of installed capacity)



Source: *Enervis.*

2030. Hence, the expectations are that a potential misalignment with the 2040 decarbonization targets would lead to costly investments into natural gas capacities which would then have to be decommissioned much earlier than the normal life cycle of gas plants would suggest.

The results across the modelled countries again point to fossil natural gas being a dead end in both the *Reference Scenario* and *Policy Scenario I*. Both scenarios reveal heavy investments into fossil gas capacity. But while in the *Reference Scenario* decarbonization targets are missed, in *Policy Scenario I* the gas assets would be decommissioned early making gas investments loss-making. The early investment in storage technologies, including hydrogen in *Policy Scenario II* proves as the most cost-efficient solution with greatest synergies between technologies. **Early investments (but not before 2030) into hydrogen-ready capacities** hedge against stranded natural gas assets.

Renewables and Storage: the Solution to the Transition Conundrum?

While the phase-out of coal-fired electricity generation is inevitable due to its emissions intensity and production inefficiency, and natural gas is not a sustainable transition option as it could bottleneck the deployment of renewables, the modelling suggests that an effective way to decarbonize the power sector could be a combination of RES and storage capacity technologies. The most ambitious scenarios point out that combining storage technologies and renewables generation could greatly benefit emission levels, security of supplies and end-consumer costs. The outcome would be a full decarbonization of the power sector by 2040.

The modelling assessment clearly shows that the decarbonization of the electricity sector is driven largely by the **uptake of PV and onshore wind** in all scenarios accounting for more than two-thirds of the total mix. Yet, what differentiates the *Policy Scenarios* from the *Reference* one, based on the NECPs of SEE EU member states, is the addition of roughly 50 GW of lithium-ion battery and hydrogen-based storage capacity (with almost 50/50 split) between 2030 and 2050, which enable a much greater **integration of RES-based power plants in the electricity system**. The difference in new RES capacity additions between the *Reference* and *Policy Scenarios* is more than 100 GW of renewables added to the grid. In the more ambitious *Policy Scenario II,* SEE governments will invest in hydrogen-ready capacities earlier, therefore allowing for a prompter uptake of photovoltaic and onshore wind generation later on, reaching a faster power market decarbonization and the achievement of the 2050 net-zero targets for the electricity sector.

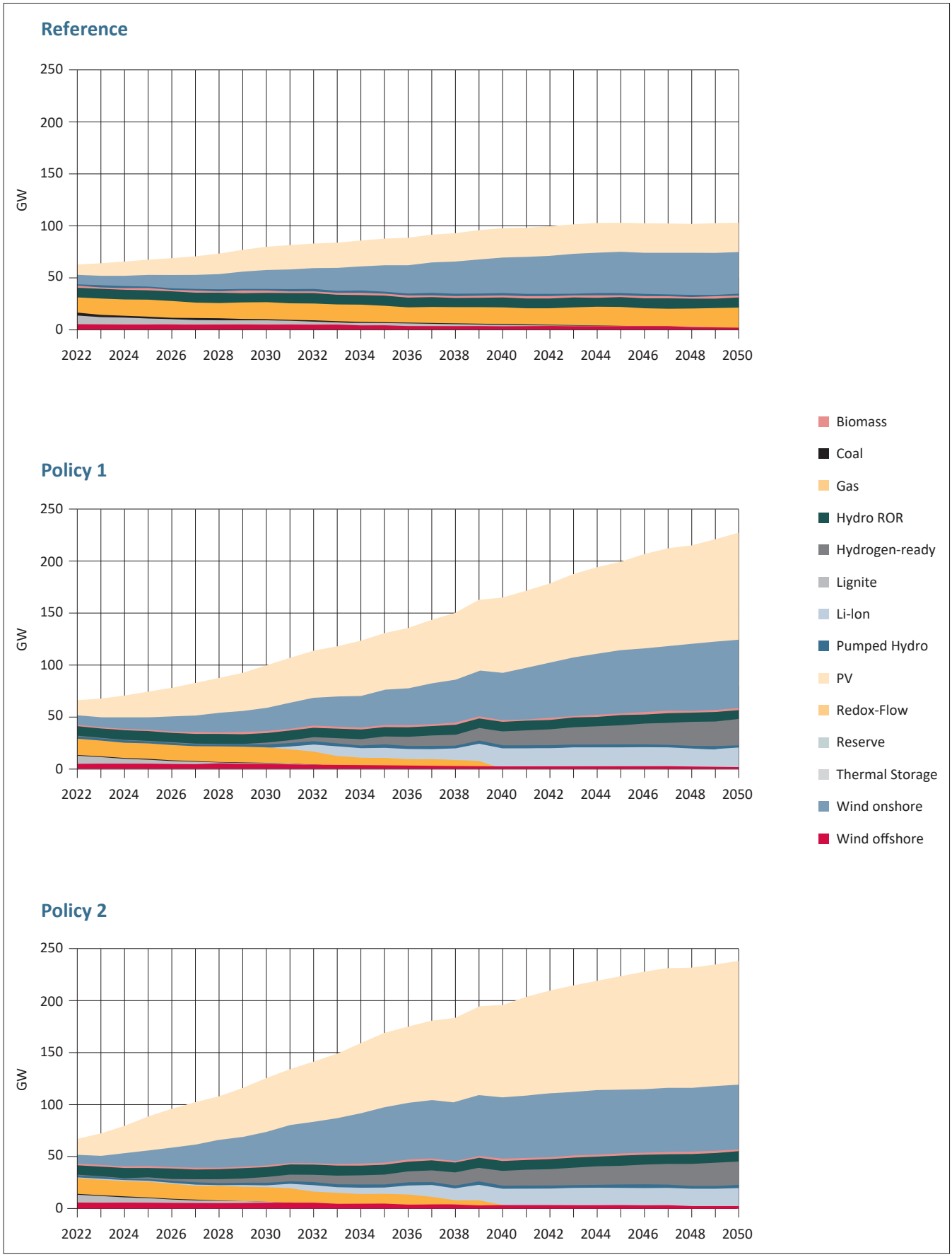
Pumped hydro and batteries dominate the storage optimization outcome. Flexibility of demand is strongly dominated by batteries, since pumped hydro facilities are limited in potential. However, a key policy takeaway from the modelling assessment is that **the entry of battery storage capacity in the system would best happen after 2030** when the technology costs decline rapidly and regulatory bottlenecks are removed. In the meantime, it would make much more sense for the Bulgarian government to improve the maintenance of the hydro power generation capacity in the country, which is only utilized at one-third of its installed capacity due to regular malfunctioning, inefficient operation and a lack of market-driven utilization. Bulgaria should **expand the capacity of the Chaira pumped storage facility** from the current 200 MW to 800 MW, a low-hanging fruit that would provide as much storage capacity in the electricity system as the construction of 6,000 MWh of utility-scale batteries in the transmission grid, the biggest project envisioned under the country's approved NRRP.

In particular, storage capacity conditionality for new RES investments as per the NRRP increases capital expenditures and is impractical for industrial consumers and power companies alike[14]. For instance, industrial consumers that would typically consume 100% of the output of their RES installation during working hours would see limited benefits from having storage capacity – gaining only limited additional energy produced and stored during non-working hours. For solar PV installations, which would be more practical for industry players with limited land availability, e.g. wind turbines, battery storage would only be able to recharge over the weekend for a single discharge during the working week. Such benefits would be far outweighed by the cost of storage.

Storage capacity investments would become extremely beneficial to cover the predicted 39% growth of electricity demand by 2050 on the back of the

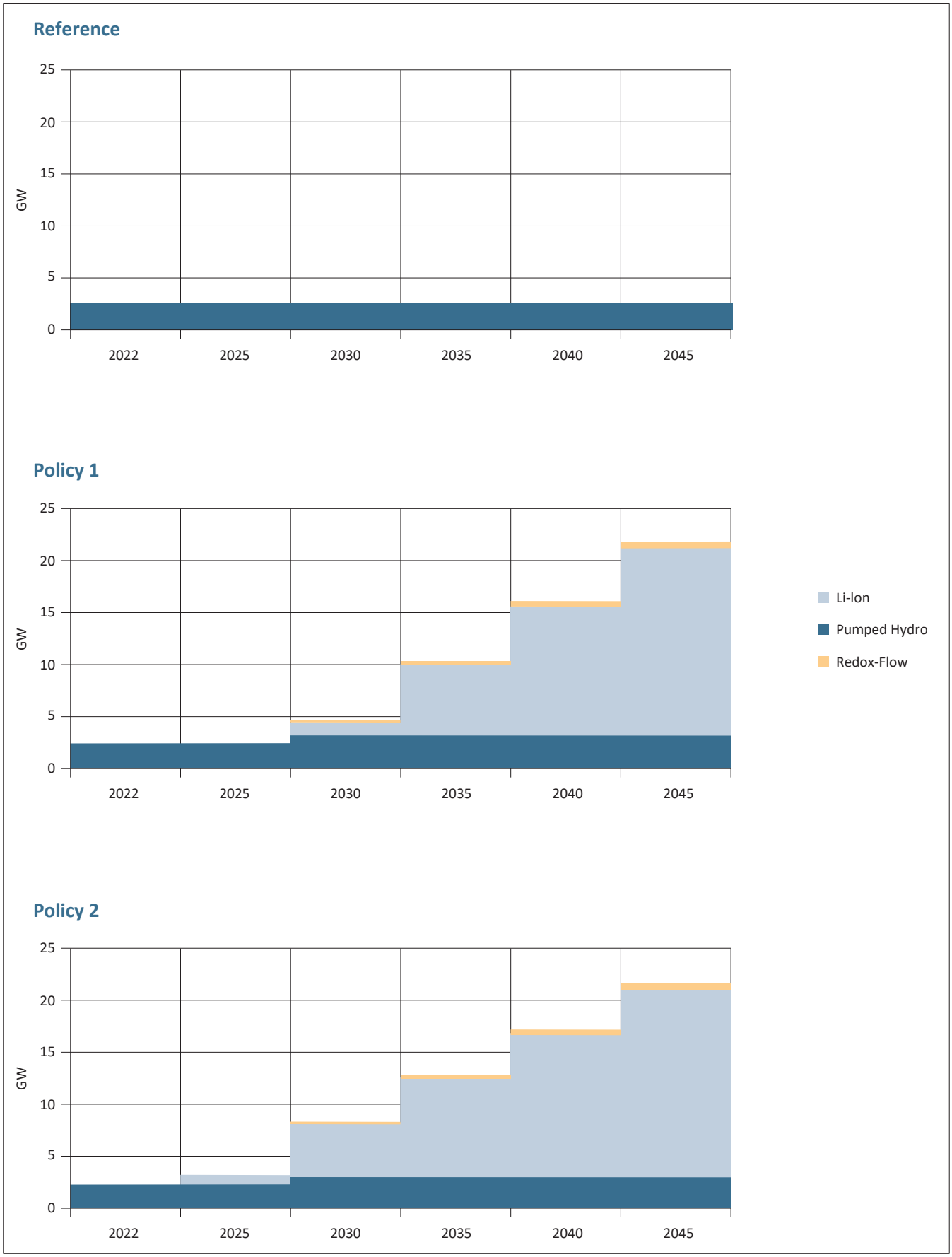
[14] Rangelova, K. et al., *Switching the Gears of Decarbonisation: Policy Action for a Low-Carbon Transformation of the Bulgarian Economy*, Sofia: Center for the Study of Democracy, 2021.

Figure 5. Bulgaria, Romania and Greece Power Capacity Mix in the three Scenarios



Source: *Enervis.*

Figure 6. Storage Capacities in Bulgaria, Romania, Greece and Croatia (GW Installed Capacity)



Source: *Enervis.*

massive electrification of most economic activities. Hence, the uptake of battery and hydrogen storage could ensure the security of supply when more than 40% of baseload capacity is phased out by the early 2030s. Previous modelling assessments have shown that **a 100% decarbonization of the power sector is feasible by 2050** due to the preservation of existing nuclear power plants in Romania and Bulgaria in combination of a ramp-up in natural gas-fired power plants in Greece before 2030. However, the Russian invasion in Ukraine and the growing need to reduce Europe's energy dependence on Russia means that the SEE region would best be able to guarantee its energy independence by **ramping up local RES generation** and balance it using storage technologies to guarantee positive regional electricity system adequacy.

Regulatory Barriers and Enablers to the Uptake of Renewables

A key prerequisite for the success of the large-scale deployment of RES capacity in Bulgaria and the SEE region over the next decade is the removal of regulatory and administrative bottlenecks. In this context, a recent EU-27 assessment sheds light on the biggest national barriers to renewables across Europe as a first key step for overcoming these barriers with targeted policy action[15]. The Database also provides insights about key enablers and good practices across European countries that can be adapted to the national context in Bulgaria.

Some of the key policy conclusions on EU level include:

- CEE and SEE countries perform worst in terms of support for RES-based transition.
- No European countries have fully adequate policies to provide for the necessary and significant deployment of renewables in the next decade.
- Administrative challenges – like gaining planning permission and permits – are the main block to renewables developments in Europe.
- Inconsistencies in the policy support frameworks undermine investment predictability and scare investors away.
- The European and international discourse and targets do not match member-state level activities.

Zooming in on Bulgaria, the investments in renewables suffer from **a multitude of policy and regulatory inconsistencies**. Bulgaria is rated 4th among the EU countries with the highest barriers to RES deployment trailing only Hungary, Romania and Lithuania. First and foremost, there is no clear national energy and climate transition strategy that defines decarbonization targets in line with EU ambitions and provides a detailed set of policy measures and targets for enabling the transition. Currently, a total of 19,000 MW worth of PV and onshore wind projects are awaiting an approval by the Bulgarian Transmission System Operator (TSO) on their connection to the grid. However, the actual number of RES plants commissioned each year is a fraction of the investment interest as the TSO has demanded that investors pay excessive costs for the upgrade of the existing infrastructure as a prerequisite to connect the new plants and has delayed grid upgrade projects.

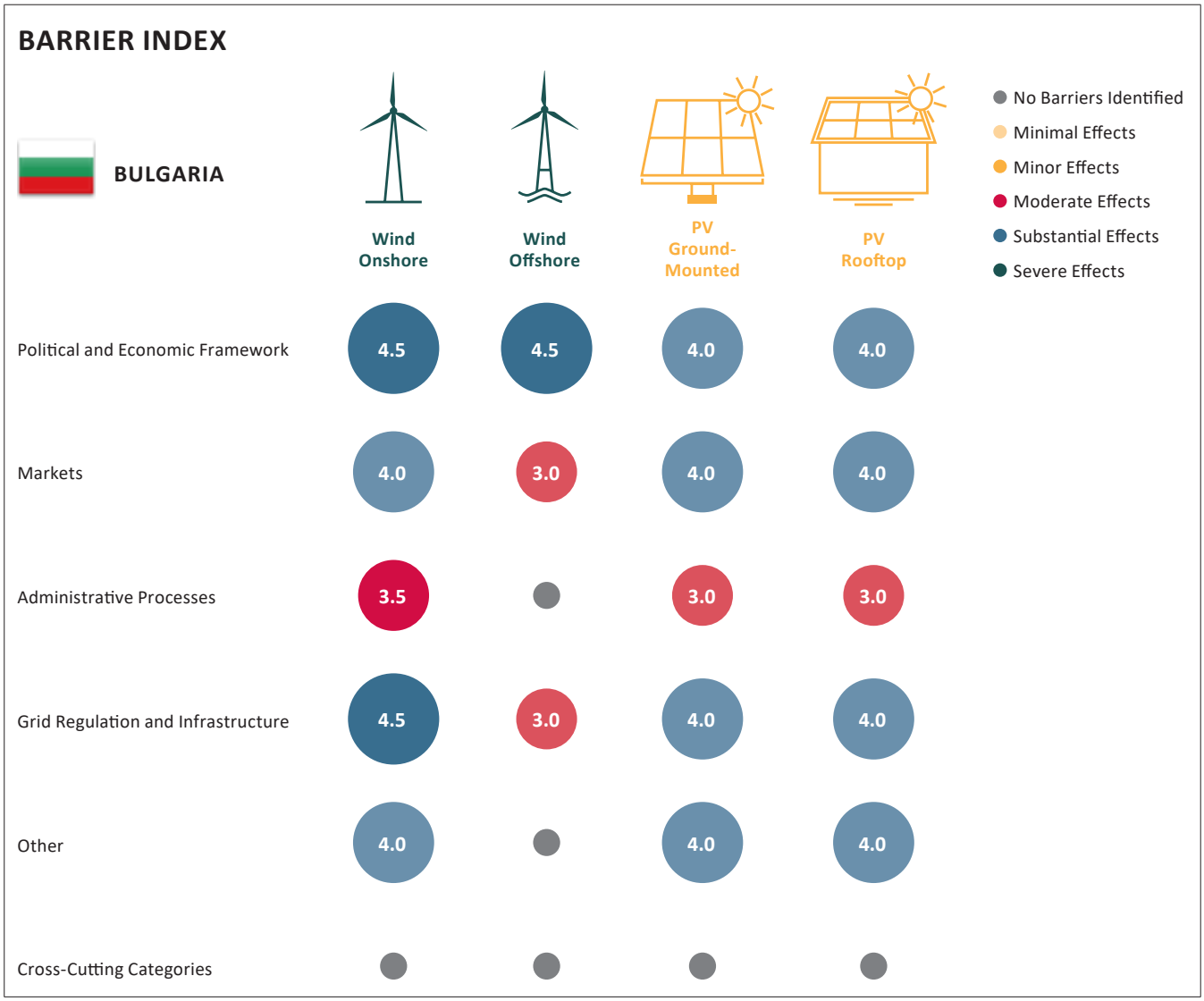
The **cost of RES grid access** in Bulgaria for solar and wind electricity producers is higher than conventional power plants, justified by the higher balancing needs for RES generation. The **grid connection procedure lacks predictability and transparency**, with unexpected delays, rejections, fees, and confusing contracts for grid connections, making the process lengthy and intimidating especially for smaller producers and increasing the **negative public perception of RES** projects in Bulgaria.

In addition, the integration of renewables in spatial and environmental planning represents a major challenge. Bulgarian investments in RES plants are constrained by the mismanagement of spatial and environmental planning related to protected natural areas, which affect wind, PV and hydro power installations. The projects are often the subject of delayed Environmental Impact Assessment approvals, as the regional environment inspectorates often fail to meet reporting deadlines.

Moreover, the investments in renewables are hampered by the unreliability of the support framework, either caused by frequent regulatory amendments or the lack of transparency in the support method. One problem concerns the **remuneration level for RES plants**, as the premium payments they receive on their long-term power purchase agreements (PPAs) depend entirely on the regulatory assessment of the future day-ahead market price. The use of a reference price to calculate the premium creates financial insecurity

[15] Banasiak, J. et al., *Barriers and Best Practices for Wind and Solar Electricity in the EU 27 and the UK*, Eclareon, 2022.

Figure 7. Regulatory and Administrative Barriers for RES Uptake in Bulgaria[16]



Source: *Eclareon.*

for investors, which could be vulnerable to inconsistent and sometimes outright populist decisions of the regulator under pressure from the central government. A case in point has been the decision of the Bulgarian energy regulator in January, 2022 to raise the reference price for renewables in the middle of the annual regulatory period shrinking the premium payments producers receive despite the existence of long-term power sales contracts they have with final consumers.

Bulgaria has to also develop its framework for **incentivizing prosumers and the overall decentralization of power generation**. This process needs to be based on an attractive legal and economic framework with financial aid schemes and simplified procedures for small-scale rooftop PV projects. The NRRP's energy pillar, which foresees the support of individual renewable energy measures for households, envisages the financing of solar PV installations of up to 4 kW or solar heating installations. While the Plan's documentation does not indicate a target for supported RES installations through this measure, it sets a target for supporting 60,580 households by 2025 or around 240 MW of new installed small-scale capacity. This is however only a fraction of the estimated 5 GW of solar rooftop potential that Bulgaria has[17]. To unlock this potential, the Bulgarian government needs to **adopt a better supportive regulatory framework** including for net-metering and power storage use

[16] Ibid

[17] Laszlo, S. et. al., 2017, *SEERMAP: South East Europe Electricity Roadmap South East Europe Bulgaria Report*, South East Europe Electricity Roadmap, Budapest, 2017.

to ensure that all consumers, including low-income households, can participate in renewable energy communities that are clearly defined by the national legislation[18]. Bulgaria needs to also overcome the lack of transparency about the RES development and deployment process, and to **increase the social acceptance** for the sector.[19]

What's Next: the Need for Better Renewable Energy Sector Governance

The government should begin to **incorporate some of the consensus and transparency strategies adopted by other EU countries**. For example, to avoid conflicts between different stakeholders and clarify the regulatory framework or the administrative process, Spain has implemented a regional system of "self-consumption roundtables" for PV rooftop investments. In terms of renewables' integration in spatial and environmental planning, Spain also introduced an **online environmental zoning tool**, which displays suitable areas for PV and wind projects, in order to avoid land use competition and social opposition.

Finland has created a wide consensus on the necessity for RES development across stakeholders, decision makers and civil society, thus facilitating the RES transition, a key factor for the negative perception of RES in Bulgaria. Meanwhile, Finland has led a **consistent process of stakeholder consultations** to form a consensus between decision-makers, national and local authorities, civil society and energy-sector actors on a fossil-fuel phase out and the integration of RES-based plants.

A number of countries including Denmark, Belgium and the Netherlands among others have instituted one-stop shops for streamlining and reducing the number of administrative procedures on the issuance of RES construction permits, the connection to the grid and the clearance of environmental checks on projects. These **integrated administrative offices** are also managing a participative process for the development of especially large-scale renewable projects to ultimately avoid strong opposition to the investments.

Regarding transparency, Bulgaria could benefit from the experience of Finland's TSO Fingrid, which explicitly supports the development of RES projects by collaborating directly with developers on accelerating the grid connection and by **ensuring transparency and consistency of network costs**. Austrian DSOs provide free access to large-scale (above 1 MW) renewable energy investors to review available grid capacities so as to ensure predictability of the necessary investment costs related to the connection of their plants and transparency on the most prospective areas for RES development. The current transparency platform maintained by the Bulgarian TSO is not updated regularly and indicates excessive grid connection costs in most available nodes for the integration of new RES plants. In that respect, the decentralization of the power grid cannot be possible without the integration of smart grid technologies, allowing for better monitoring and control of the energy system and further ensuring the security and efficiency of its supply.

Furthermore, the modernization of the power grid will ensure stronger resilience to some of the effects of climate change, such as extreme weather events, which is crucial for the future of Bulgaria's energy security. To speed up the connection of the hundreds of renewable projects announced by investors but not yet implemented due to grid bottlenecks, Bulgaria should **liberalize transmission and access fees** as to allow the TSO and the DSOs to effectively compensate their costs for grid expansion and modernization without transferring them to the renewable investors. The removal of the regulated model in power transmission and distribution should be the first step to the full liberalization of the electricity market as envisioned by the NRRP until 2025.

One important area, on which the Bulgarian government should focus, is **promoting incentives for households to join a local energy cooperative**. A large share of Bulgarian citizens would be motivated to invest in renewables for self-consumption if the government could provide more financial aid and technical assistance. Without targeted intervention and incentives, RES development in Bulgaria would still unfold slowly, undermining the whole energy transition of the Bulgarian economy. Not only comprehensive financial incentives and support but also wider information campaigns could play an important role in raising the social acceptance of renewable energy technologies.

[18] Center for the Study of Democracy, *Mapping policy options for renewable energy communities in Europe*, Policy Brief No. 93, November 2020.

[19] Center for the Study of Democracy, *Green Recovery Pathways to Bulgaria's Carbon Neutrality by 2050*, Policy Brief No. 101, June 2021.