
Climate (Un)ambition in South East Europe

A Critical Assessment of the Draft National
Energy and Climate Plans

ANALYSIS

Agora
Energiewende



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IMPRINT

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A Critical Assessment of the Draft National Energy and Climate Plans

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Executive Summary

July 2019 was the hottest month the world has experienced since record-keeping began, underscoring once again that global warming is already changing the planet. At the moment, the EU is in the process of planning its long-term energy and climate targets. The goal is to achieve near-zero emissions by 2050 through strong increases in renewables, improved energy efficiency and the phase-out of fossil fuels. The first step toward a climate neutral economy involves the creation of National Energy and Climate Plans (NECPs), which cover the period from 2021 to 2030. By the end of 2019, each EU member state must submit a final version of their NECP to the European Commission.

It is crucial that the NECP proposals be critically evaluated before going into effect to ensure that they are in line with the EU's 2050 goal. This paper assesses the recent draft NECPs of the Member States of South East Europe (SEE): Bulgaria, Croatia, Greece and Romania. We assess the ambitiousness and credibility of each plan in terms of effective decarbonisation. To this end, we analyse the countries' assumptions regarding power system development, their final energy consumption trends and their emission reduction efforts in non-ETS sectors (buildings and transport). We then make concrete recommendations for the Commission and for national governments on how to improve their NECPs before final submission.

Our major conclusion is that these four countries have essentially failed thus far to adopt an ambitious integrated approach to energy and climate planning. All four countries display insufficient ambition in terms of setting targets for developing renewables and for improving energy efficiency. The measures set forth for achieving declared targets also appear to be inadequate. The European Commission

has already advised governments to raise their targets and adopt additional measures.

One problem of these draft NECPs is that they make contradictory assumptions in their energy system planning **and do not project significant reductions in coal use during the 2020–2030 period.** Compared with the SEERMAP model (Figure ES 1),¹ which derived least-cost pathways for a decarbonised power system, three of the four countries envisage significant amounts of coal and lignite capacities in 2030. This strongly questions a serious and integrated approach to climate and energy planning.

The countries also make strongly divergent assumptions regarding CO₂ prices. This suggests very limited regional consultation and coordination. Greece and Croatia assume an ETS price of around 34 EUR/t CO₂ in 2030; Bulgaria assumes a carbon price of 60 EUR/t CO₂; and Romania ignores this issue altogether. **This inconsistent approach to carbon pricing casts doubt on the validity of the estimates presented by the four countries, particularly with regard to the future of their fossil generation capacity.**

The countries also failed to engage in regional collaboration for elaborating joint strategies to decarbonise and modernise national energy systems. **All four countries worked on their NECPs without taking into account the planning of their neighbours. This is regrettable, because regional cooperation holds tremendous potential when it comes to making the energy transition cheaper and more resilient.**²

Bulgaria and Romania did not use energy system modelling when developing their NECPs. This produced conflicting results: Romania projects significant increases in energy consumption while Bulgaria plans decreases. Without a clear assessment of

¹ Southeast Europe Electricity Roadmap – SEERMAP, https://rekk.hu/analysis-details/238/south_east_europe_electricity_roadmap_-_seermap, last accessed on 6.06.2019.

² For more on the benefits of regional cooperation, see REKK Foundation (2019): The Southeast European power system in 2030: Flexibility challenges and benefits from regional integration. Analysis for Agora Energiewende.

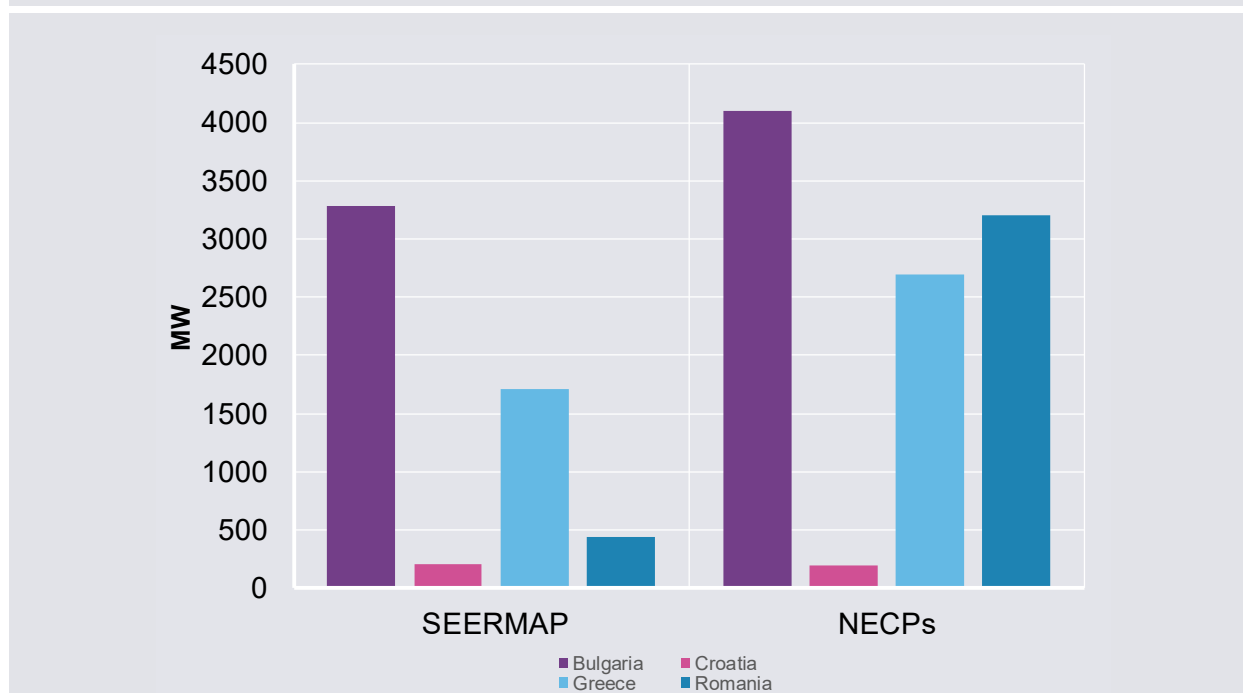
the role of energy efficiency policies, it is unclear how either one of these trends would materialise. Notably, the NECPs of Greece and Croatia do not show any de-coupling of economic growth and domestic final energy consumption.

In the buildings sector, SEE Member States plan to continue to use biomass for heating, with Bulgaria and Greece even projecting increased consumption, while their potential for emission reductions though increased energy efficiency varies considerably.

All SEE countries analysed **plans for significant increases in passenger and freight transport.** While there will be almost no change in the carbon intensity of transport (as expressed in tCO₂/toe) between 2020 and 2030, the countries assume a significant improvement in the energy intensity of transport, resulting in mostly constant levels of transport emissions.

In conclusion, the region of Southeast Europe lacks an integrated approach to climate and energy planning. Such an approach would consider both international and inter-sectoral relationships, and in doing so would help identify opportunities for augmenting the economic efficiency of the energy transition. It would also help bolster energy security and maximise climate change mitigation. An appropriate consideration of integrated climate and energy planning in the NECPs would allow policymakers to avoid stranded fossil assets, decrease reliance on imported fossil fuels and lower investment needs in fossil-fuel infrastructure. **Finally, boosting regional cooperation as part of NECP preparation would maximise energy security and help ensure least-cost energy and climate planning.**

Figure ES 1: Installed coal and lignite capacities in 2030: NECPs & SEERMAP decarbonisation scenarios



REKK 2017, NECPs 2019

Introduction

The Integrated National Energy and Climate Plans (NECPs) required by the new EU Regulation on the Governance of the Energy Union and Climate Action is an instrument that aims to assist the EU in reaching net-zero emissions by 2050. Over the course of 2018 and 2019, Member States (MS) of the European Union must develop NECPs while conferring with their neighbours and the European Commission. The NECPs cover a detailed ten-year planning period starting from 2021 to 2030, while the period up to 2050 is covered by long-term strategies developed at the EU and national levels.³ In addition, integrated reporting on the progress of implementation will take place every two years. The NECPs are not to take the form of a tentative wish list, but rather a concrete plan on how to achieve the goals set for 2030: specifically, to usher in an energy system that minimises consumer cost, maximises security of supply and minimises negative environmental impacts. Collectively, the NECPs are a vehicle for realising the EU's binding climate and energy targets for 2030. These targets are

- At least a 40% reduction in greenhouse gas emissions (from 1990 levels);
- At least a 32% share of renewable energy in final energy consumption;
- At least a 32.5% improvement in energy efficiency (compared to a 2007 baseline).

It is expected that by 2030, an average of 57% of electricity in Europe's power grids will come from renewable energy sources.^{4,5} In South East Europe (SEE) this will mean an RES-E share of 50% in 2030.⁶ Roughly 50% of the region's existing coal and lignite generation capacity will have to be decommissioned

by 2030 due to age and noncompliance with emission standards. At the same time, the hardware cost of renewable energy sources (RES) is steadily decreasing. In coming years, this will further enhance the competitiveness of renewables in relation to conventional energy, accelerating the global update of RES. Renewable energy is already cheaper than new coal capacity, even in SEE, where higher investment risks, and, by extension, higher cost of capital rates, currently translate into higher electricity prices for end consumers.

Nonetheless, there are significant barriers to moving forward with the energy transition in the SEE region:

- Significant investment is currently planned in fossil-based generation, particularly in lignite, as the region has large lignite reserves. Lignite plants are seen by decision makers as the most economical option due to low fuel prices and hidden subsidies to the coal sector. At the same time, the effects of the EU CO₂ emission trading scheme on the operating costs for coal plants have been and are still partially being neglected;
- Long-term energy and climate planning practices are weak in SEE countries. Lack of capacity to conduct evidence-based, analytic planning and associated policy work means that such work is often of low quality (or entirely absent);
- Power markets are excessively limited in scope; there is a lack of cross-border cooperation; and incumbent utilities have a strong focus on lignite. In many cases the energy sector is still heavily regulated, which can hinder modernisation and a fuel switch to RES;

³ Even though the long-term strategies are separate documents, the NECPs should show how they are consistent with these, although the strategies are submitted later than the NECPs.

⁴ See Agora Energiewende (2019): European Energy Transition 2030: The Big Picture: Ten Priorities for the next European Commission to meet the EU's 2030 targets and accelerate towards 2050."

⁵ In its 2050 Roadmap, Global Energy Transition, IRENA states that by 2050 the share of renewable energy in

the power sector would increase from 25% in 2017 to 85%, mostly through growth in solar and wind power generation. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf, p. 10, accessed 29.07.2019.

⁶ REKK Foundation (2019): The Southeast European power system in 2030: Flexibility challenges and benefits from regional integration. Analysis on behalf of Agora Energiewende.

- There are significant barriers in the regulatory, policy and market framework for renewable energy investment;
- Investors face relatively higher risk levels when compared to investment in countries like Germany or France, which leads to higher cost of capital rates and, ultimately, higher consumer prices.

The inability of national governments to develop a coherent energy strategy is having adverse effects on the attractiveness of sustainable energy solutions, which are 'late bloomers' in a region that has great potential for RES deployment. As a consequence, several SEE countries still plan to build new lignite power plants. At present, some politicians in SEE countries are excessively concerned with EU intrusion into 'energy sovereignty', and seem to overlook the opportunities offered by a more integrative and holistic approach to climate and energy policy. A key finding of research conducted by our think-tank network⁷ is that SEE actors suffer from a persistent lack of ambition in the face of an aging fossil-fuel fleet. The region's NECPs have a limited vision for the clean energy transition; there is a marked reluctance to begin planning for a 'post coal era' or to formulate a 'just transition' for affected mining regions.

In June 2019, the European Commission published its first comments on the National Energy and Climate Plans submitted by EU Member States. With a view to the four countries at the centre of our analysis, we concur with the conclusions of the Commission. In the case of **Bulgaria**, the Commission recommends raising the level of ambition for 2030 to a renewable share of at least 27%. For **Greece**, the

recommendation is to enable a timely and cost-effective achievement of its 31% contribution to the EU's 2030 target for RES. To this end, the Commission calls upon Greece to include in its final plan an indicative trajectory that reaches all reference points, among other amendments. In the case of **Croatia**, which has an ambitious 2030 RES target of 36.4%, the EC has asked for the submission of detailed and quantified policies and measures that are in line with the obligations laid down in the new Renewables Directive (Directive EU 2018/2001). And with regard to **Romania**, the Commission has announced that a significant increase in ambition is needed, concluding that Romania should aim for a RES share of at least 34% by 2030 (as suggested by the formula in Annex II of the governance regulation).

Furthermore, the Commission has advised all four countries to substantially increase their ambition for reducing both final and primary energy consumption by 2030; to intensify regional cooperative arrangements; to catalogue all energy subsidies, including in particular those for fossil fuels; and to enumerate past and future actions for phasing out subsidies.⁸ However, the Commission makes no direct remarks regarding the lack of ambition shown by some countries to phase-out coal-fired power plants, or regarding the 'masked' achievement of RES targets with increased biomass for heating. Further, the Commission does not specifically address divergence between individual NECPs, nor does it consider broader regional circumstances. Accordingly, our analysis, which compares the NECPs of SEE countries, can help to inform the second round of the process before the final documents are adopted.

⁷ Four regional NECPs assessments were conducted that served as the basis of this paper by the think tank and research institutions working together on the project Southeast Europe Energy Transition Dialogue: Centre for Studying of Democracy (CSD), Bulgaria; University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture (UniZag), Croatia; The National Observatory of Athens (NOA)/Institute for Environmental Research and Sustainable Development (IERSD),

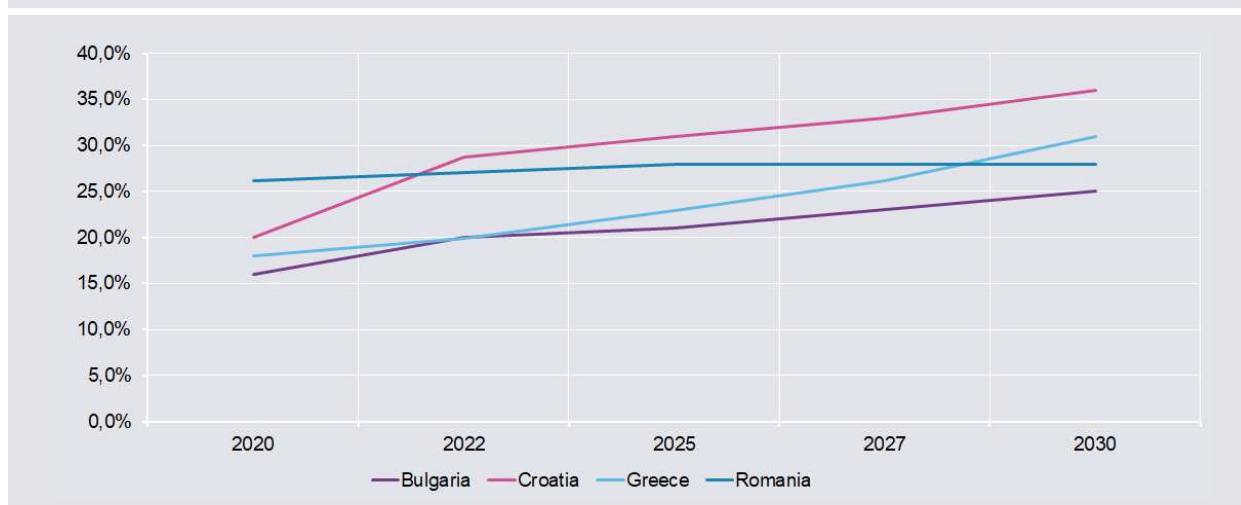
Greece; Energy Policy Group (EPG), Romania. Together with Agora Energiewende, they are part of the network SE3T.net.

⁸ All comments from the EC on the draft NECPs can be found here: <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union/national-energy-climate-plans>. Last accessed: 17.06.2019

On the whole, the first NECP drafts sent to the Commission fail to reflect the significant economic, health and energy security benefits of developing the renewable energy potential in those countries. In this context, our paper compares the draft NECPs of Bulgaria, Croatia, Greece and Romania while focus-

Power system developments in the NECPs of Bulgaria, Croatia, Greece and Romania: no coal phase-out, mixed targets with unclear policies and measures, and limited regional coordination

Figure 1: Renewables as a share of total final energy consumption in Bulgaria, Croatia, Greece and Romania



BUL., GR, HR and RO NECPs

ing on their assumptions and associated sectoral developments up to 2030 (power sector, buildings, transport). We compare and analyse the challenges faced by SEE countries in setting renewables and energy efficiency targets; greenhouse gas (GHG) emission reductions in ETS and non-ETS sectors; trends in coal and nuclear power; reliance on natural gas and biomass; and gross final energy consumption in buildings and transport. Our findings are then placed in relation to EU targets, pledges by the Member States, and current developments. Furthermore, the paper compares the procedures used by the governments to prepare their NECP drafts, and provides a number of recommendations to national governments as well as the European Commission for the 2nd stage of their work on the NECPs, which is to occur by the end of 2019.

With regard to RES targets and the electricity power mix, Bulgaria and Romania miss the minimum national contributions to EU target achievement, while Croatia displays the greatest level of ambition in the SEE region.

The EU-level targets to which the Member States have jointly agreed are the ultimate touchstone of the individual NECP targets. To be sure, not all countries are expected to adopt the same targets, as their socio-economic development and resource potentials vary. Nonetheless, the overarching goal is to ensure the sum of national efforts is consistent with the EU-level target of 32% RES. Taking a closer look at declared contributions, we find considerable divergence in 2030 targets between SEE countries:

- Croatia has by far the most ambitious RES target: 36.4%
- Greece almost reaches the overall EU target with its 31% share
- Romania foresees 27.9% RES
- Bulgaria plans for a low RES share of 25%⁹

Figure 1 shows the envisaged development of RES in SEE-EU. The difference between the countries is quite striking,¹⁰ particularly when one considers that, according to IRENA, all the countries have very

good cost-competitive potential for adding RES capacity. **Croatia**, for instance, has significant additional cost-competitive wind potential, ranging from 1.9 to 11.8 GW, depending on the cost of capital. Solar PV could provide up to 3.2 GW in the low cost of capital scenario.¹¹ In the case of **Bulgaria**, the potential is even greater, as up to 18 GW of wind could be developed, according to IRENA's analysis. Solar PV could provide slightly over 6 GW of capacity, which is six times today's installed capacity.¹²

Table 1. Comparison of the 2030 electricity mix generation in different SEERMAP scenarios (in GWh)

Countries	Consumption	Total net electricity generation	Coal and Lignite	Natural Gas	Nuclear	Hydro	Wind	PV	Other RES	Imports
BG	36,656	39,202	12,829	1,356	14,303	3,962	2,327	2,225	2,201	-2,546
GR	50,128	53,337	5,621	23,279	0	4,668	5,575	13,225	969	-3,209
HR	17,782	17,773	1,504	194	2,789	7,973	3,734	555	832	8
RO	58,806	59,034	1,450	3,051	20,776	17,881	8,942	2,334	4,600	-228

Source: SEERMAP

Greece has seen a recent uptick in RES projects, as demonstrated by the latest technology neutral

auction (April 2019). The winning bids ranged from 53 EUR/MWh to 64 EUR/MWh for PV. For wind, the

⁹ Croatia will exceed its binding 2020 target and reach some 29% RES in 2020. Bulgaria will achieve its 2020 target of 16%; so will Romania with a 24% RES share. Greece is described as not been able to meet its 2020 target of 18% RES but rather to reach only 15.4%. In 2017 RES is already at 16.32% (EUROSTAT) and all indications are that it will reach the 18% but not the self-imposed enhanced target of 20%. Source: <https://balkan-greenenergynews.com/bulgaria-croatia-monte-negro-romania-reach-eu-2020-renewable-energy-goals/>, last accessed on 6.06.2019.

¹⁰ However, it has to be noted that the countries are in different size and with different development needs and we compare only the relative numbers and targets without detailed socio-economic analysis.

¹¹ IRENA, Cost-Competitive Renewable Power Generation: Potential across South East Europe https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/IRENA_Cost-competitive_power_potential_SEE_2017.pdf, January 2017

¹² This is one analysis of the potentials of the region. Some other like the Green-X model of the SEERMAP study show for Bulgaria long-term physical potential of about 20 TWh for wind and around 10 TWh for both hydro and PV. However, the share of cost-efficient potential depends on circumstances and at best is around 9.5 TWh in the decarbonisation scenario. This increases to 11 TWh in the delayed scenario but that does not represent the cost-optimal pathway.

accepted bid was 60 EUR/MWh for a 66 MW wind park. Currently, the Cost of Equity (CoE) for Greek onshore wind projects stands at 14.5 per cent and the Cost of Debt (CoD)¹³ at 5 per cent. These costs have fallen rapidly in the last 2–3 years. The CoD for onshore wind parks has decreased considerably since 2016, when it was around 7 to 11 per cent.¹⁴ Financial and political de-risking instruments would have a considerable influence on financing costs for renewables. In the Greek case, the Levelised Cost of Electricity (LCOE) produced by onshore wind energy could fall some 20 per cent. Accordingly, Greece appears to be on its way to fulfilling its target. Even current investment in Greece in RES is cheaper than new lignite capacity. The incentives for RES investment would be even more favourable if Greece were to mitigate the counterproductive risks faced by RES investors due to flaws in its existing market and policy environment.

Romania's RES potential is also heavily untapped, as it has the largest additional potential for cost-competitive solar PV in SEE (up to 16.9 GW), according to IRENA. The country also possesses enormous technical wind potential (84 GW); in the low cost of capital scenario, up to 50 GW could be developed economically.¹⁵ According to modelling carried out within the framework of the SEERMAP project, a reasonable growth path for Romanian RES would lead to 19% share of wind and PV in 2030; when combined with hydro and biomass, ca. 57% RES-E mix should be attainable (Table 1). The Deloitte Calculation based on the Energy Strategy of Romania 2019–2030, with perspective of 2050, follows a similar trajectory foreseeing hydro as the largest source of renewable energy (comprising 51% of all RES electricity production in 2030), followed by

wind and solar. Similar to the SEERMAP modelling, non-hydro RES (wind and solar) comprises some 19% of the electricity mix.¹⁶ However, it is unclear whether the Romanian government ultimately will use this scenario as the basis for its long-term energy sector planning.

South East Europe Electricity Roadmap – SEERMAP was a one-year project that focused on two crucial policy areas in the electricity sector of South East Europe in its long-term energy planning, one: the potential of long-term renewables deployment in the target countries and two: the infrastructure with a focus on the necessary transmission network developments. These areas were examined in detail with the application of state-of-the-art energy sector models by the participating consortia partners (electricity and gas sector market models done by REKK Budapest, renewables deployment model by TU Wien and regional electricity network model by EKC) with a 2050 outlook. The main findings of the project were that deployment of RES does not result in higher wholesale prices, avoids stranded assets in fossil fuel power plants, decreases reliance on imported fossil fuels resulting in improved external balances and lowers investment needs in fossil fuel energy infrastructure.

Modelling approaches and transparency: Romania conducts no modelling, while Bulgaria ignores its own modelling in NECP17

Romania's and Bulgaria's NECPs suffer from a lack of transparency, appear to cherry-pick data from different studies, and fail to present integrated modelling. During the first phase of NECP preparation, **Romania** held no public consultations with experts and stakeholders. Furthermore, its NECP is not based on a new, targeted methodology. Considering fluctuating fuel prices and technological developments,

electricity generation from renewable sources, by categories of sources: https://ec.europa.eu/energy/sites/ener/files/documents/romania_draft_necp_en.pdf, p. 64–66.

¹³ Cost of Equity describes the required return an investor needs to make on an investment, and Cost of Debt, i.e. interest, is when the investment is financed through borrowed capital.

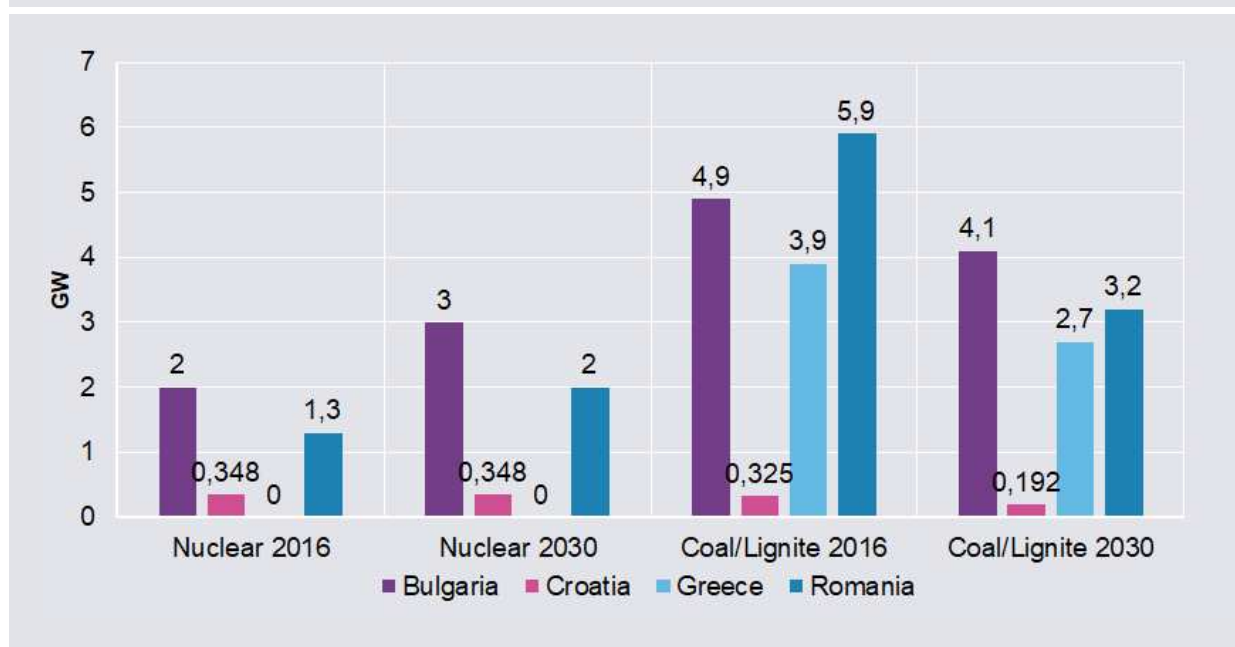
¹⁴ NewClimate Institute (2019): De-risking Onshore Wind Investment – Case Study: South East Europe., study on behalf of Agora Energiewende, forthcoming.

¹⁵ IRENA, 2017

¹⁶ NECP of Romania, Expected development with existing policies of the gross final consumption and of the

¹⁷ In the case of Croatia and Greece, specific modelling for the requirements of the NECPs was conducted, hence the focus was only on the cases of Bulgaria and Romania where the NECPs do not rely on one (prepared or not).

Figure 2: Total lignite/coal and nuclear capacity in BUL, GR, HR and RO in 2016 and 2030



ENTSO-E, NECP drafts

as well as rising CO₂ prices, it remains unclear why the decision-makers did not commission new modelling.¹⁸ **Bulgaria**, for its part, prepared and adopted its NECP while ignoring the results of modelling work that had been commissioned by the government^{19,20} and which incorporated the SEERMAP scenarios. The Bulgarian government shows a limited commitment to evidence-based policy development. There is also a lack of adequate cost/benefit assessment in strategic long-term decision-making. This has led to a focus on small targets mostly fulfilled by expanding biomass.

The role of coal, nuclear and CO₂ pricing: all four member states take a different approach to

¹⁸ Based on EPG (2018), The Draft of the Romanian National Energy-Climate Plan 2021-2030, December 2018.

¹⁹ The prepared modelling study was not made public, and the government has not officially embraced it despite commissioning.

²⁰ Based on CSD (2019), Stifled Decarbonisation: assessing the Bulgarian National Energy and Climate Plan, April 2019.

²¹ In the officially submitted NECP of Bulgaria https://ec.europa.eu/energy/sites/ener/files/documents/ec_courtesy_translation_bg_necp.pdf, it states

emissions prices, from no CO₂ price in Romania to 60 EUR/tCO₂ in Bulgaria

Bulgaria²¹ and Romania²² both plan to build new nuclear (Figure 2), and all four countries plan to keep coal-fired power plants online up to 2030 and beyond. Out of the 15 GW of coal and lignite capacity that was operational in 2016, only 4.7 GW will be shut down by 2030, leaving approximately 10 GW in operation.

Yet it is not entirely clear how **Bulgaria, Romania** and **Greece** plan to keep their existing coal and lignite capacity online. In its NECP, **Greece** assumes ETS

possible building of new 2000 MW capacity in the next decade. However, the probability for that to happen is small. Hence, we went with the less ambitious scenario of adding additional 1000 MW to the current 2000 MW by 2030.

²² As a note for Romania, even though the 2016 figures are the official ones, the 2019 figures are closer to reality (approx. 4.1 GW) as no major new capacity has been installed between 2016 and 2019 and what happened in passing is that some capacities entered refurbishment works, some are in conservation, and a few have expired environmental authorizations.

Table 2: GHG reduction targets for 2030

	Non-ETS sectors emission reduction	ETS sector emission reduction
BUL	0%	No contribution to the EU target of -43%
GR	National target -16% w.r.t 2005 but NECP claims -31% with additional measures in 2030	-63% w.r.t 2005 ²³
HR	-7% (w.r.t 2005)	-30.1 to -35.8% (w.r.t. 2005)
RO	-2%	-43.9%
EU-28	-30% (w.r.t. 2005)	-43% (w.r.t. 2005)

NECPs of BUL, GR, HR, RO

price of 34.66 EUR/tCO₂, while **Croatia** assumes a price of 34 EUR/tCO₂, based on the EU's 2016 Reference Scenario and EIHP analysis.²⁴ **Bulgaria**, for its part, assumes a carbon price of 60 EUR/tCO₂ in its NECP calculations.²⁵ As this would clearly price coal and lignite capacities out of the market, it is difficult to understand why coal-based generation is expected to exceed 4 GW in 2030. **Romania**²⁶ does not mention any CO₂ price developments in its NECP thus making it difficult to analyse the proposed energy mix for 2030.

The countries' divergent assumptions regarding CO₂ prices suggest limited regional consultation and coordination. This divergence, in combination with a failure to consider the implications of carbon pricing,

cast doubt on the validity of the estimates presented by these countries, particularly with regard to future fossil generation capacity.

GHG emission reduction targets: SEE countries continue to underperform – with the exception of Greece, which adheres to the overall EU target

The GHG emission reductions proposed by SEE-EU Member States (Table 2) are at odds with the CO₂ price assumptions contained in their NECPs. In particular, all four SEE countries propose significant GHG reductions that are difficult to reconcile with their plans to preserve significant conventional capacity up to 2030.

²³ It should be noted though that 2005 was the year with the absolute peak in GR emissions (of which ETS was 70.6Mt vs. 47.1Mt in 2018)

²⁴ Croatia however is the only country that plans to shut down its remaining coal plant in the period 2035-2040. According to the Energy strategy, shut down of the nuclear power plant is expected in the period between 2040 and 2045.

²⁵ National Energy and Climate Plan of Bulgaria, 2019, https://ec.europa.eu/energy/sites/ener/files/documents/ec_courtesy_translation_bg_necp.pdf, p. 113.

²⁶ Romania's lignite industry is at the time of writing this paper going through a crisis resulting from the high price of ETS. There is no way for the Government to

directed further state aid to Complexul Energetic Oltenia, without collision with the Commission. The company's management and the Energy Ministry, which is the main shareholder, agreed to an emergency coal-to-gas switch for a large part of the current lignite-fired plants, to be financed through the Modernisation Fund. Therefore, the NECP's projections are not current any longer. However, even with this partial lignite-to-coal switch, which is not achievable earlier than in three years' time, the question is, how will the Oltenia Complex be kept alive in the meantime, given its still critical (though diminishing) role in the Romanian electricity mix.

Table 3: RES-E production in Greece according to its NECP in GWh 2020-2030

Electricity generation	2020	2022	2025	2027	2030
Biomass and biogas	269	383	518	1122	1736
Hydro	5152	5789	5983	6207	6269
Wind	6575	7450	9491	12094	15508
PV	5655	6916	8319	9020	10342
Greek NECP					

For example, the **Greek** NECP, which foresees a carbon price of more than 30 EUR t/CO₂ in 2030, seems to contradict the government's plans to complete the Ptolemaida V lignite plant, which would have LCOE rates significantly higher than that of wind or solar PV. The Meliti II lignite plant, slated for completion in 2025, would be similarly priced out of the market. In this context, it must be recalled, that subsidizing new unabated coal-capacity for security of supply reasons will become illegal under EU law as of 1 January 2020. Furthermore, the Greek NECP assumes both generation units of the Amyntaio lignite plant will remain in operation up to 2028, although this would constitute a direct violation of EU air pollution legislation (but not of Greek law).²⁷

In **Romania** and **Bulgaria**, decision-makers justify keeping all lignite and coal capacity online by appealing to inflated power demand projections or outdated definitions of security of supply that fail to consider the contribution made by RES-E. These countries also employ definitions of energy poverty that fail to consider the economic benefits of RES-E deployment for consumers. Yet a third justification offered by both countries for the preservation of conventional capacity is the desire to remain significant power exporters. In the case of Romania, however, this avowal directly contradicts its NECP,

which foresees net power imports. To be sure, the actual balance of trade in electricity will depend strongly on the overall development of European and regional power systems. Integrated modelling would help both countries to optimise the planned composition of their domestic power plant fleets – however, as mentioned previously, such modelling has not been performed.

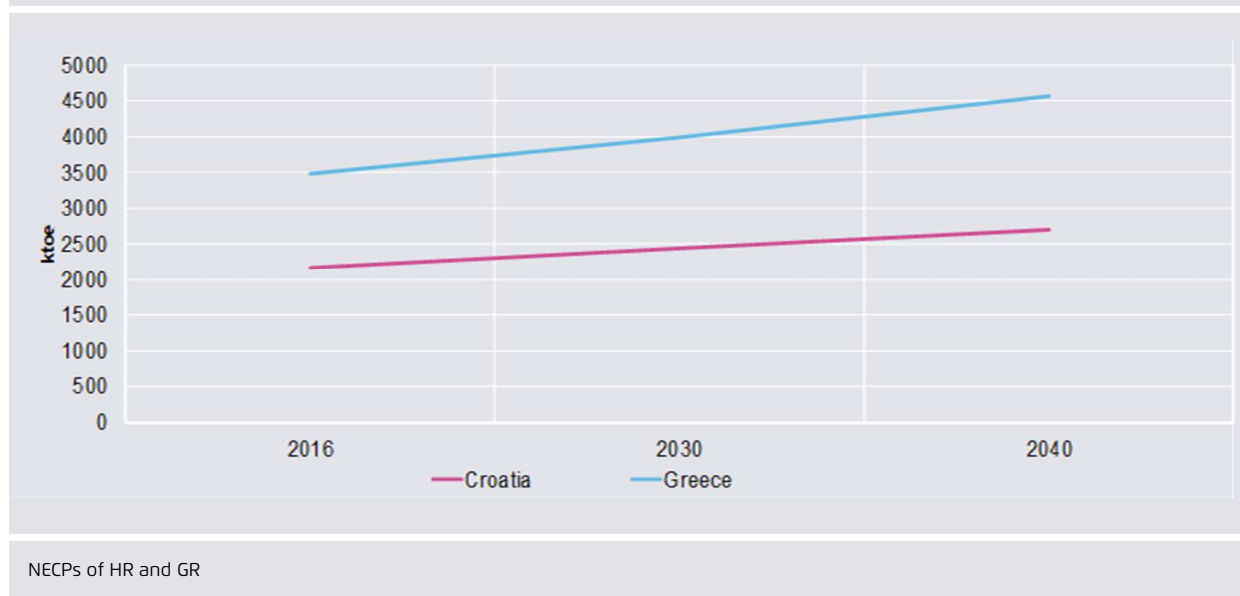
We thus find numerous inconsistencies in the planning presented by SEE countries. This casts doubt on reliability of their carbon abatement projections.

The role of natural gas and biomass: Increased reliance in all four member states

While **Croatia** and **Greece** plan to substantially increase RES as a share of electricity generation and final energy consumption, both countries also plan to expand the share of natural gas in final consumption.

²⁷ Based on Institute of Environmental Research & Sustainable Development (2018): Comments on the draft National Energy and Climate Plan.

Figure 3: Gross domestic natural gas consumption in Croatia and Greece



In **Greece**, at the time of writing this analysis, six enterprises have outstanding permit applications for natural gas (NG) power plants totalling over 3650 MW, even though it is clear from Greece's draft NECP that there is room for less than 500 MW of new capacity. In the case of **Croatia**, natural gas production and consumption²⁸ is projected to rise consistently up to 2040. It appears this expansion will serve to cover lost generation from coal, as Croatia's last coal-fired plant will be taken offline in 2035 (Figure 3).

Furthermore, Croatia's NECP envisages that all existing heating and oil power plants will be shut down by 2028 and mostly replaced with plants fired by natural gas. Some of this natural gas capacity will take the form of combined heat and power plants, which can be used to operate district heating grids. If Croatia plans to integrate new variable RES in the

power system, this could present a critical economic problem for the newly built gas power plants, as thermal power plant load factors are depressed by higher RES generation, given the zero-marginal cost of wind and solar.²⁹

Bulgaria, by contrast, has limited plans to develop its gas sector.³⁰ The Bulgarian NECP foresees heavy utilisation of biomass, particularly for household consumption. (Further details are provided in the section on Buildings). Given Bulgaria's limited wind and solar development up to 2030, biomass is considered a 'gap filler'. However, as biomass-based power generation is forecasted to increase by less than 200 GWh/annum to around 426 GWh, it is unclear how Bulgaria will meet its pledge to expand renewables in the heating and cooling sector. A stronger reliance on the non-sustainable use of wood for heating could arise as a result.

²⁸ Steady rise is more obvious in consumption. Natural gas primary energy production is decreasing: 1369-1183-1047 ktce for 2016-2030-2040. That is in line with natural gas production estimation from the new production capacities (Figure 3-8 in HR NECP).

²⁹ Based on University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, (2019): Analysis of Croatian National Energy and Climate Plan 2019.

³⁰ According to the Bulgarian NECP, the projection for the electricity sector is based on the following assumptions: preserving the role of indigenous coal as a main source of electricity generation by thermal power plants; preserving the role of nuclear energy; and generation from renewable sources without new support schemes, under market conditions and with a focus on captive consumption.

Table 4: Energy production and consumption in Romania in 2030

Year 2030	Energy Strategy 2016-2030 (PRIMES 2016)	Year 2030	Energy Strategy 2016-2030 (PRIMES 2016)
Total electrical energy production (TWh)	73	77	77
Final energy consumption (TWh)	269	300	341
Final electricity consumption (TWh)	51	n/a	86.6
Capacity sources RES-E (MW)			
Wind	4,500	4,300	4,300
PV	3,200	3,100	3,100
Romanian NECP			

In **Greece**, growth in electricity generation from biomass between 2020 to 2030 is around 4 times higher than the increase in wind generation and more than 6 times higher than the increase in solar production over the same period. Nevertheless, in absolute terms, wind is and will remain the dominant source of renewable electricity production (Table 3).³¹ However, biomass expansion in the heating sector should be limited unless specifically dedicated to district heating; demand should instead be met by heat pumps (for more, see the section on Buildings). Only in Romania does aggregate natural gas capacity trend sideways. However, **Romania** projects energy consumption to rise to 341 TWh in 2030, which is an inflated projection compared to other studies (cf. PRIMES 2016: 269 TWh; Romanian Energy Strategy

2019-2030: 300 TWh; see Table 432).³³ As a result, Romania plans to expand its nuclear capacity and retain most of its coal and lignite capacity. However, the expansion of nuclear and RES will not be sufficient to meet 2030 demand according to the NECP, necessitating annual imports of almost 10 TWh. It is not clear whether addressing this shortfall would represent a strategic priority of the country.³⁴

³¹ NECP of Greece, https://ec.europa.eu/energy/sites/ener/files/documents/ec_courtesy_translation_el_necp.pdf, p. 107-108.

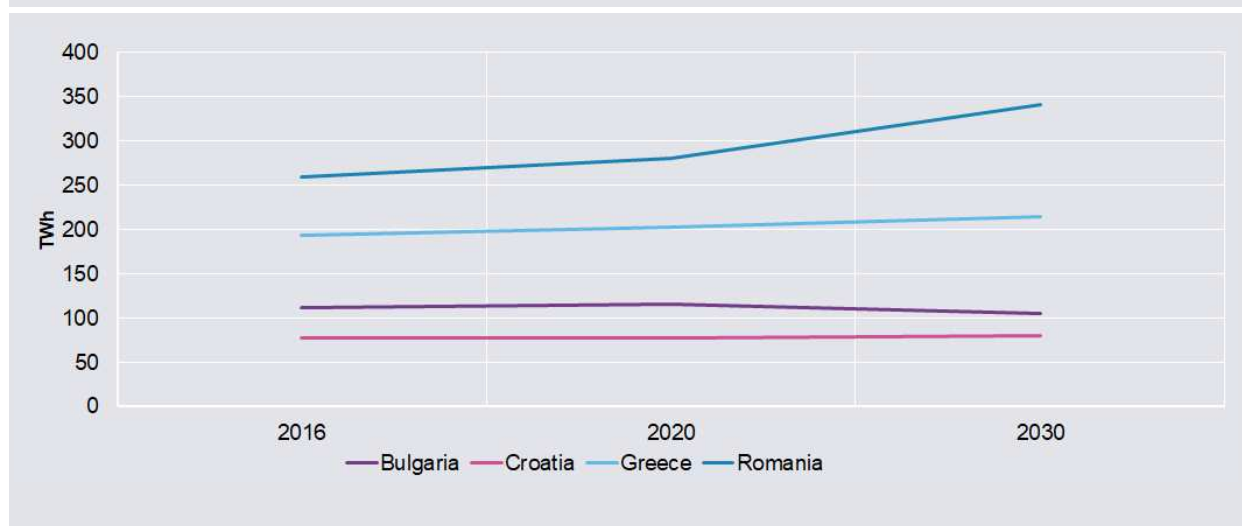
³² The NECP authors have repeatedly added the expression „based on PRIMES 2016 and Deloitte calculation”, but

they never presented these calculations to the public or to the European Commission, as clearly indicated in the recent NECPs report by the Commission.

³³ EPG, 2018.

³⁴ Based on the analysis by EPG, 2018.

Figure 4: Gross final energy consumption in TWh in Bulgaria, Croatia, Greece and Romania in 2016 and 2030 projections.



Eurostat 2016 and the NECPs of BUL, GR, HR and RO

Gross final energy consumption trends in the NECPs: growing demand in Romania and Greece and underperformance in Croatia on energy savings

With a view to future energy consumption, projected demand growth varies considerably between SEE countries. **Bulgaria** plans to lower its final energy consumption, as its NECP foresees demand of 106 TWh in 2030, down from 112 TWh in 2016. Furthermore, **Bulgaria** expects to achieve total cumulative energy savings in 2021-2030 of 3185.81 ktoe, with annual savings increasing from 76 to 760 ktoe during this period. The Bulgarian NECP also sees a much steeper fall in energy intensity, which is expected to shrink 30% over the 2020s and by half up to 2050. To achieve these targets and move toward zero emissions, Bulgaria plans to prepare a long-term strategy for the refurbishment of public and residential buildings.³⁵

The Greek NECP envisages final energy consumption increasing to 215 TWh in 2030, up from 194

TWh in 2016. This increase will be mainly driven by higher economic growth and associated rises in household income, according to planning estimations. However, thanks to energy-saving measures and policies, final energy consumption will not increase significantly between 2020 and 2030. Nevertheless, this will necessitate substantial investment (on the order of €500M/annum).

As mentioned, the final gross energy consumption forecasted by Romania is not based on integrated energy system model. Final domestic consumption in 2016 was 259 TWh, and, according to the Romanian NECP, will reach 341 TWh in 2030. The NECPs of other SEE countries envision much lower growth in final energy consumption. However, this growth must be placed in proper context, as Romania plans to keep its coal and expand its nuclear capacity.

³⁵ Based on the analysis by CSD, 2019

Croatia's energy efficiency target for 2020 is to keep final energy consumption to 78 TWh. Based on current trends, which are still marked by the after-effects of the 2008 financial crisis and lower industrial consumption, this target will be achieved.

In order to assess whether the level of ambition in the non-ETS sector is sufficient, we compare the NECP reduction targets with the PRIMES 2016 Reference Scenario modelling results for the buildings and transport sectors. This comparison is shown in

Table 5. NECP emission reduction targets compared with the PRIMES 2016 Reference Scenario

Country	NECP non-ETS sectors reduction target	PRIMES* emission change, residential sector (buildings)	PRIMES* emission change, tertiary sector (buildings)	PRIMES* emission change, transport
BG	0 %	-30.8 %	-11.7 %	2.7 %
GR	-16 % w.r.t. 2005 but NECP claims -31 % WAM and -28 % in WEM in 2030 ³⁶	-15.2 %	-25.2 %	-7.9 %
HR	-7 % (w.r.t. 2005)	3.5 %	-0.8 %	-0.5 %
RO	-2 %	7.7 %	-6.1 %	10.4 %

*EU Reference Scenario, change over period 2020-2030 indicated in table

Croatia's 2030 target is to keep consumption to 79.69 TWh, which must be described as fairly non-ambitious (Figure 4).³⁷

Emission reduction efforts in the non-ETS sector: Underperformance in the buildings sector and limited energy efficiency measures

While the NECPs contain GHG emission reduction targets for the non-ETS sector, targets for buildings and transport are not separately specified. The non-ETS targets are based on the reduction levels called for by the Climate Action Regulation, with the exception of Greece, which has adopted a more ambitious target.

Table 5. The PRIMES 2016 Reference Scenario energy consumption figures are considered to be an upper bound for future energy consumption levels, as the Reference Scenario only takes account of policies and measures adopted at EU level and in the Member States up to December 2014. This means that under this scenario, EU-level renewable capacity expansion, energy efficiency and GHG emission reduction targets up to 2030 are not considered, nor are national policies and measures adopted after 2014. This results in an overestimation of energy consumption levels and GHG emissions compared with scenarios that take the 2030 EU targets into account, as the NECP scenarios should. It can be safely assumed, therefore, that if energy consumption and CO₂ levels projected in the NECPs are

³⁶ WAM: With Additional Measures; WEM: With Existing Measures

³⁷ The EE target isn't provided in the terms of percentage, but in terms of energy. From 356.18 PJ (primary) and

281.66 PJ (final) in 2020, up to 367.75 PJ (primary) and 286.91 PJ (final) in 2030.

higher than the PRIMES 2016 Reference scenario levels, then these are likely overestimated and not sufficient for meeting the 2030 targets.

As illustrated in Table 5, the non-ETS target for Romania is relatively ambitious, considering the expected significant increase in emissions from transport, which is a significant non-ETS sector. By contrast, Bulgaria's non-ETS sector emission reductions are decidedly unambitious, given the upper-bound reductions predicted by the PRIMES modelling. Indeed, between 2020 and 2030, Bulgaria does not plan for any reduction in non-ETS emissions.

Buildings: mixed targets, ambiguous measures and milestones, heavy reliance on biomass

In their NECPs, member states are expected to provide information regarding indicative milestones for 2030, 2040 and 2050; domestically formulated progress indicators; and their contributions to the Union's energy efficiency targets. In accordance with Article 2a of Directive 2010/31/EU, member states

are also required to provide this information in their roadmaps for the long-term refurbishment of residential and non-residential buildings. None of the four NECPs analysed contain quantitative targets or milestones related to the building stock as a whole.

Table 6. Selected indicators for the buildings sector

Country	Specific energy consumption, new residential buildings (kWh/m ² a)	RES share, new residential buildings (%)	Annual renovation rate, public buildings (%)
BG	n.a.	15 %	5 %
GR	18-88 kWh/m ² a depending on climate zone	n.a. 60 % for water heating at least 30% for heating and cooling nationally, including existing buildings	3 %
HR	34 kWh/m ² a	n.a.	3 % ³⁸
RO	By 2030: 70-100kWh/m ² a in BaU scenario	By 2030: 0 % in BaU scenario 40-50% in Transformation scenario	n.a

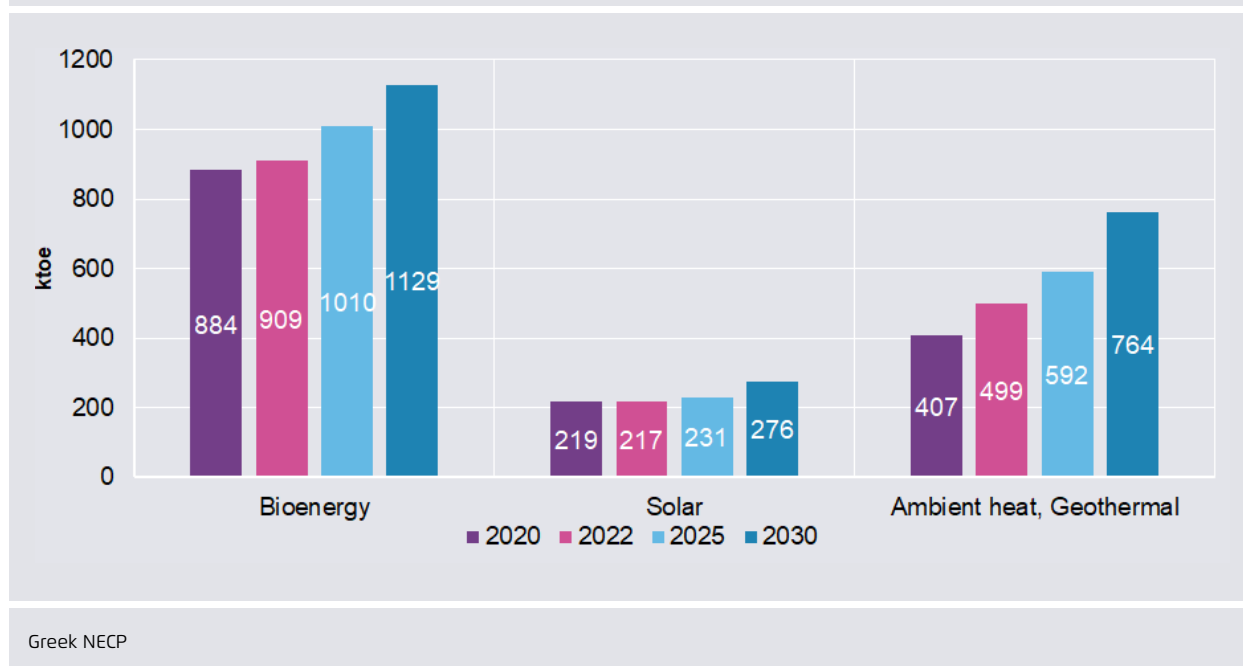
NECPs of BUL, GR, HR and RO

³⁸ This is already binding.

Our assessment of the potential for emissions reductions in the buildings sector varies considerably by member state (see Table 6). While **Bulgaria** shows a

regional levels by installing steam turbines that be run on biomass and waste. Looking across sectors, Bulgaria’s 25% RES target for 2030 is based largely

Figure 5: Greek RES share in final thermal consumption of residential sector, 2020 to 2030³⁹



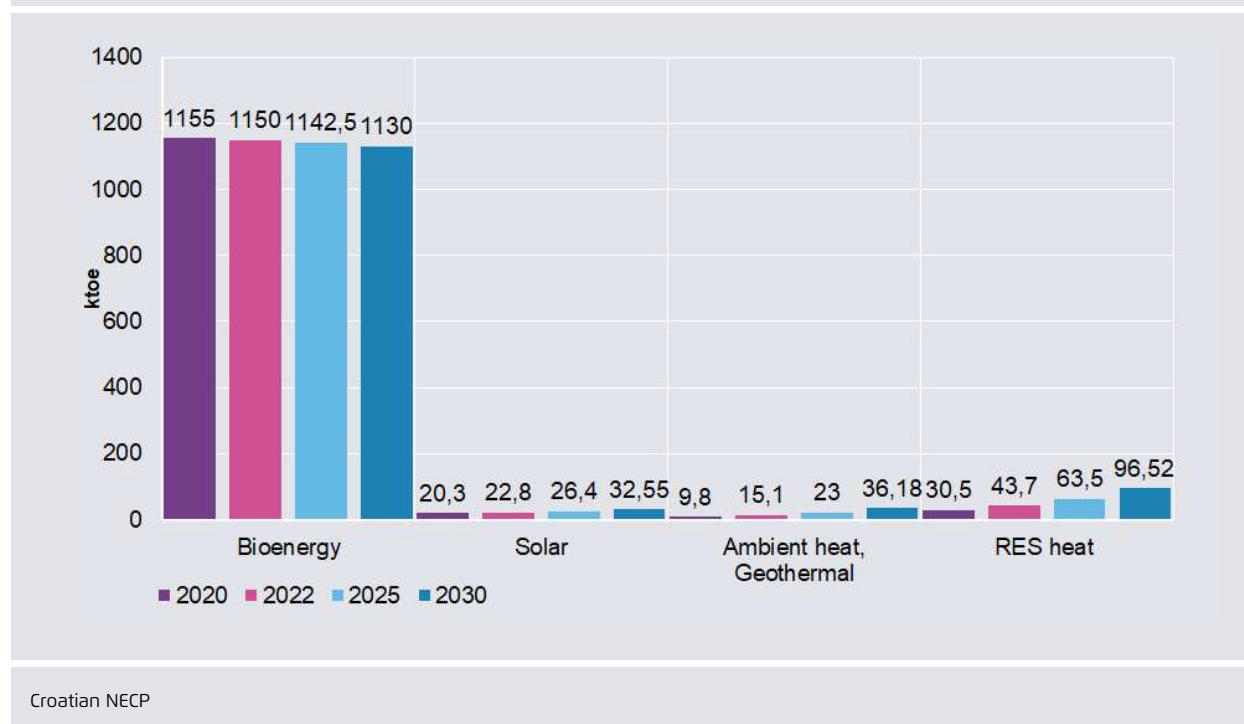
high level of ambition with respect to renovating public buildings, projecting a 5% renovation rate per year, the country shows a low level of ambition for new buildings compared with **Greece**. **Romania** confirms large nascent potential to reduce energy usage and expand renewables in the buildings sector, but has not committed itself to implementing the Transformation scenario set forth by the Romanian NECP, which would significantly reduce specific energy consumption levels in new buildings and raise the share of renewables compared to the BaU scenario.

The government of **Bulgaria** has placed biomass as the cornerstone of its renewable energy strategy by expanding not only its use in heating (wood and pellets) but also in waste and biogas production. In this connection, the Bulgarian NECP underlines the need to refurbish existing heating plants at the local and

on the expansion of biomass in heating from 35% (in 2021) to 44% in 2030. Currently the biomass share in heating and cooling is 31%, and makes up around 7-8% of the total RES share (current RES share: 18-19%). The PRIMES modelling results and the government-commissioned modelling studies for the long-term planning of the energy balance do not foresee any increase of wood consumption in Bulgaria. In the former case, the primary energy consumption of wood and solid fuels shrinks by half up to 2030, and in the latter, remains flat. Realistic expectations put the use of wood in the residential sector at 33% by 2030, unchanged from current levels. Accordingly, this expansion of biomass in heating and cooling would appear motivated by the desire to reduce pressure on the government to adopt much more aggressive RES-related policy support mechanisms.

³⁹ There was no breakdown by source available for Bulgaria.

Figure 6: Croatian RES share in final heating and cooling demand, 2020 to 2030



In the case of Greece, the government's plan is to promote the efficient use of biomass, predominantly for district heating. The Greek NECP calls attention to an existing programme aimed at increasing the efficiency of district heating systems by promoting their integration. With regard to the contribution made by biomass in relation to other RES options in the heating sector, the government plans to increase usage by 245 ktOE, from 884 in 2020 to 1129 ktOE in 2030. In contrast, solar heating will increase only by 66 ktOE, from 210 in 2020 to 276 ktOE in 2030. On a side note, the entire Greek territory is characterised by high solar irradiance, with the annual solar energy at horizontal plane varying between 1450 kWh/m² and 1800 kWh/m², signalling that considerable potential is left underutilised within the NECP (Figure 5).

Croatia has rather different breakdown of RES sources. The most utilised and constant source is

biomass; other forms of RES remain underexploited over the next decade (Figure 6).

Transport: Increased transport activities in all four Member States, no significant increase of CO₂

The PRIMES Reference Scenario 2016 results show that a significant increase in transport activity is expected in all four countries, both in passenger and freight transport. While there will be almost no change in the carbon intensity of transport (as expressed in tCO₂/toe) between 2020 and 2030, there will be a significant improvement in the energy intensity of transport (as expressed in toe/Mpkm)⁴⁰ which will largely offset the increase in activity levels in most countries, with the exception of Romania. Additional policies and measures, going beyond those considered in the reference scenario, could further decrease emissions. The 2016 Reference Scenario considers only three policies and measures for the transport sector: CO₂ standards for cars and vans, implementation of the Directive on alternative

⁴⁰ Million passenger kilometers.

fuels infrastructure, and the implementation of policies and measures to meet the RES-T target. Beyond this, countries can further reduce their emissions with measures such as financial incentives to reduce transport demand, investment in sustainable transport infrastructure, and subsidies for electric vehicle purchase.

When figures are available, national projections confirm the findings of the PRIMES model – that is, that emissions in the transport sector are not expected to increase significantly up to 2030 (Table 7).⁴¹

four countries worked on their NECPs without taking the planning of neighbouring countries into account. A second important finding is that all four countries display **insufficient ambition in terms of setting targets for developing renewables and improving energy efficiency**. The measures set forth for achieving declared targets also appear insufficient. All four countries plan to maintain coal and lignite power plants up to 2030 and beyond. Two countries, Bulgaria and Romania, did not conduct modelling, nor did they avail themselves of relevant modelling calculations performed by others while drafting their NECPs. In numerous cases, they drew

Table 7: Total GHG emissions in the transport sector, mtCO_{2e}

Country	2016	2020	2025	2030
Bulgaria	9.4	10.4	9.6	10.0
Greece	17.1	17.0	17.0	15.7

NECPs of BUL and GR

Our analysis of buildings and transport indicates that overall, SEE member states enjoy freedom of action to adopt a higher level of ambition than the targets indicated in the Effort Sharing Regulation for the non-ETS sector. Whereas emissions from transport can generally be held constant or decreased, emissions from the buildings sector are generally expected by the European Commission to decrease significantly.

Conclusions and recommendations

Based on our analysis, a key missing element in the NECPs of Bulgaria, Croatia, Greece and Romania is the conspicuous **failure to engage in regional collaboration** in order to elaborate strategies for decarbonising and modernising national energy systems. All

on divergent studies for different parts of their NECPs, sometimes generating discrepancies between targets and measures. The more ambitious countries, Greece and Croatia, plan to expand reliance on natural gas, which raises its own unique challenges. Bulgaria plans to increase the utilization of biomass as a means of achieving its RES targets without substantially expanding wind and solar. Both Bulgaria and Romania plan to build additional nuclear capacity in the next decade as a way of ensuring security of supply.

Closely associated with this lack of coordination and divergence in the modelling tools applied is a need to improve the manner with which stakeholders are involved in the NECP process. Bulgaria and Romania exhibit particularly strong deficits in this area. Stakeholder consultation would offer an important

⁴¹ The rather slow decrease of emissions in the transport sector in Greece is mostly due to the fact that electric vehicles will not significantly penetrate the market up to 2030 due to long usage times of the existing car

stock. NOA/Facets modelling shows only small improvement in the Greek transport intensity in toe/Mpkm (from 24.5 in 2020 to 23.5 in 2030 and 22.5 in 2040).

means to identify and discuss inconsistencies in the NECP drafts. In point of fact, Romania plans to significantly increase consumption while Bulgaria plans to significantly decrease it. Furthermore, it is unclear whether the tough policies needed to achieve the ends will actually be implementable. Despite inconsistencies in assumptions and trends, all four countries project significant emission reductions, mostly in the ETS sectors. Yet it remains unclear how these reductions will be achieved, given inconsistent scenarios for the evolution of domestic power generation as well as unclear policies for achieving energy efficiency improvements.

In this way, the countries at the centre of this analysis have failed thus far to take advantage of the opportunities offered by adopting an integrated approach to energy and climate planning. An integrated approach that considers both international and inter-sectoral relationships would help to identify opportunities for augmenting the economic efficiency of the energy transition, for bolstering energy security, and for maximising climate protection. It would allow policymakers to eliminate barriers to RES development while also ensuring that RES growth does not increase the overall cost of the energy system or endanger the long-term competitiveness of the energy sector. If properly integrated climate and energy planning were given due consideration in the NECP development process, this would allow policymakers to avoid stranded fossil assets, decrease reliance on imported fossil fuels and lower investment needs in fossil-fuel infrastructure. Finally, boosting regional cooperation as part of NECP preparation would help to ensure least-cost energy and climate planning.

Recommendations for the Commission:

- In final discussions on the NECPs, EC should go more into depth as regards the underlying economic assumptions and related inconsistencies in the draft NECPs of Bulgaria, Croatia, Greece and Romania. In particular, all countries miss a strategic approach to the unavoidable phasing-

out of coal and raise many questions how aged coal-capacity exiting the system will be replaced. Plans to not retire coal or even build new coal are not consistent with EU legal requirements or expected ETS allowance prices, while plans for building gas or new nuclear raise questions on the economic viability in a context of continuously falling costs for wind and solar projects.

- The Commission should ask SEE countries to do a thorough review of their data and methodologies used for the NECP development, and explicitly highlight where assumptions seem unrealistic and/ or inconsistent.
- The Commission should stipulate the importance of transparency and accountability in the preparation of the NECPs and should stress the need for governments developing a NECP to consult the public and also their neighbouring countries. It should also ask governments to explain how feedback received has been considered in the NECP development.
- While taking into account divergent levels of socio-economic development in the countries of SEE as well as their differing needs, size, population growth etc., the Commission should continue to insist that SEE countries adhere to the targets set for the European Union in terms of RES, GHG reduction (both ETS and non-ETS) and energy efficiency.
- The Commission should insist that SEE-EU countries as well as all the other Member States show in their NECPs how they will use the available EU funding to achieve decarbonisation and a just transition in affected regions.

Recommendations for national governments:

- SEE countries should prepare for the phasing-out of coal and ensure a 'just transition'. The results of this work should flow into their NECPs and long-term energy plans up to 2050. It is essential to identify sound methodologies, undertake integrated modelling, and elaborate suitable policies and measures while considering security of supply, energy affordability, and equitable

conditions for coal mining regions and regions reliant on energy intensive industries. Only countries and regions that have done their "homework" on how they concretely plan to transition from "coal to clean" - energy will be able to present convincing asks for receiving financial support from the new EU Budget that will apply from 2021-2027.

- An ambitious review of all targets (GHG emissions, RES and EE) is an essential precondition for a serious commitment to significantly lowering GHG emissions and furthering the clean energy transition in all sectors (energy, transport, buildings, industry).
- SEE countries need to augment the transparency of the data, assumptions, and models that inform their NECPs.
- To ensure the NECP document is accepted by society as a whole, it is essential to seek broad-based consensus and engage in trusting dialog with neighbouring countries regarding the challenges posed by climate change and how to address them.
- In their NECPs, all SEE countries need to set forth a new regulatory framework that reduces to a minimum the number of administrative steps for permitting and regulatory compliance in order to enable the easy integration of decentralised power generation facilities.
- In the transport sector, all four countries should primarily focus on reducing demand for road transport while encouraging alternative modes of transport, investing in sustainable transport infrastructure, and encouraging the electrification of both passenger and freight vehicles.
- All four countries should focus on setting more ambitious reduction targets for the non-ETS sector.

Bulgaria:

- In the case of **Bulgaria**, the identification of consistent and reliable methods and data should be

the primary concern in the second stage of NECP preparation.

- Without a significant review of the current draft NECP targets, **Bulgaria** will not be on track to becoming carbon neutral by 2050. Currently available renewable energy generation technologies, together with today's new energy storage, energy efficiency measures and demand response tools, can make a 100% renewable energy system fully reliable – without having to rely on any 'backup' nuclear or 'dispatchable' fossil fuel energy and without the need to curtail renewable energy generation.
- The **Bulgarian** NECP should present a vision on how to transform coal-dependent regions into renewable energy sites and innovation hubs. The competitive advantages and the solar potential of these regions should not be overlooked but strategically tapped to make them success stories.
- **Bulgaria** should reexamine its long-standing political decision to keep the old and build new nuclear units and redirect associated funding and loans to more sustainable alternatives such as wind and solar.
- As long as biomass use is incentivised, the **Bulgaria's** NECP needs to set forth a specific financing facility that is not limited to replacing outdated wood-based stoves but targets the building of medium-scale biomass-based centralised heating systems in rural areas and small towns. This would have the enormous added-value effect of diminishing energy poverty and the lowering the financial burden on the national budget.

Croatia:

- From a regional perspective, **Croatia** has relatively low cost of capital rates for RES investment. Croatia should leverage this advantage and utilise falling wind and solar prices to achieve its targets even sooner.
- Natural gas in **Croatia** should be predominantly viewed as a source of flexibility while

possibilities are explored for decreasing projected demand and deploying available RES.

- Croatia should place additional emphasis on energy savings and efficiency, elaborating policies for lowering consumption while maintaining growth and development.

Greece:

- As **Greece** has abundant wind and solar potential, there is a crucial need for flexibility options, including additional storage. The potential and costs for pumped storage (beyond existing hydro plants) should be examined carefully and developed to provide system stability as an alternative to the current reliance on natural gas-fired power plants;
- **Greece** should also re-evaluate, keeping in mind air pollution emissions limits and legal requirements, as well as the ongoing and planned construction of lignite plants (which are already financially non-viable), or risk acquiring additional stranded assets;
- **Greek** decision-makers should focus less on natural gas and more on utilising the falling prices of RES in order to reach GHG reduction targets, as natural gas has a clearly lower GHG emission factor than lignite and diesel; however, it is still a fossil fuel and non-renewable source of energy. Its use in the final demand sectors should be tolerated only when the potential offered by renewable energy and energy savings has been exhausted (and given appropriate supplementary policies and measures).
- As the transport sector becomes the dominant source of emissions after 2030 in **Greece**, the country should revisit measures for fleet electrification while considering knock-on effects to power demand. **Romania:**

- In **Romania**, the renewed calculation of final energy and electricity consumption is a prerequisite for creating a document that can have a real impact in reducing emissions and decarbonising the country.
- The RES target set by **Romania** must reflect the RES potential of the country more realistically. This revision should take place following the renewed calculation of final energy consumption.
- **Romania** should reconsider the long-standing political decision to build new nuclear units and redirect associated funding and loans to more sustainable alternatives such as wind and solar. They should also work to adopt flexibility measures, expand flexible capacity, and enhance regional power market integration.
- **Romania** should decouple its desired economic growth from the unfeasibly high projected consumption and add additional emphasis on energy savings and efficiency.

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Annex

Table 8. SEE targets for 2030, as presented in National Energy and Climate Plans

Count-ries	RES Target 2030	ETS sector emission reduction	Non-ETS sectors emission re-duction	EE Target 2030	Lignite and coal capacities remaining in 2030	Nuclear capacities remaining in 2030	Gross final energy con-sumption in 2030
BG	25 %	No contri-bution to the EU target of -43 %	0 %	27 %	4.1 GW	3 GW	
GR	31 %	-48.1 %	-16 % wrt 2005 but NECP claims -31 % WAM in 2030	33 %	2.7 GW	n/a	215 TWh
HR	36.4 %	-43 % (EU target)	-7 % (EU Target is -30 %)	n/a	192 MW (which will be shut down 2035-2040)	348 MW	79.7 TWh
RO	27.9 %	-43.9 %	-2%	37.5 %	3.2 GW	2 GW	341 TWh

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