

weighed against the benefits of natural gas based electricity generation (also considering other uses of natural gas in sectors such as industry and buildings).

- Regional cooperation can significantly lower support costs and results in slightly lower investment needs for meeting RES targets. A regional target for renewables is therefore recommended, but in order to reach a win-win situation for all involved countries, corresponding regional support mechanisms could also be explored. In parallel to implementing a regional support mechanism, issues such as differences in permitting, grid connection rules, financing, taxation, site restrictions, depreciation rules, etc. should be eliminated in order to avoid market distortions. The EU is already moving to strengthen regional RES cooperation, most recently with the 2016 Winter Package which proposes partial opening of support schemes, already being tested in some countries. Best practices established in this process will help the SEE region and improve regional cooperation in RES support schemes to ultimately increase their economic efficiency.
- Policy-makers need to address the gap in distribution network investment, which is crucial to the expansion of the decentralised RES-based power production. Transmission network development in the SEE region also needs to be accelerated, and current instruments (e.g. PEI selection process) need to be strengthened and backed by financial instruments to move selected projects from pre-feasibility to commissioning.
- In order to achieve a large-scale energy transition in the region, there is a need to increase administrative capacity, improve governance practices in the sector and ensure participation and engagement of stakeholders in decision making. While the electricity sector modelling results show least cost investment pathways, the model operates in an ideal world; imperfect implementation of energy policies can significantly increase costs in the real world compared with modelled results. In order to ensure that the modelled minimum cost energy system can be translated into reality, it is necessary to base renewable energy policies on sound analysis, take into account the interests of consumers and avoid institutional capture. This is particularly important as the vulnerability of consumers in the region is high, and ineffective implementation of RES policies may result in significant price increases, producing a backlash against renewable energy.

2 | Introduction

2.1 Policy context

Over the past decades EU energy policy has focused on a number of shifting priorities. Beginning in the 1990s, the EU started a process of market liberalisation in order to ensure that the energy market is competitive, providing cleaner and cheaper energy to consumers. Three so-called energy packages were adopted between 1996 and 2009 addressing market access, transparency, regulation, consumer protection, interconnection, and adequate levels of supply. The integration of the EU electricity market was linked to the goal of increasing competitiveness by opening up national electricity markets to competition from other EU countries. Market integration also contributes to energy security, which had always been a priority but gained renewed importance again during the first decade of the 2000s due to gas supply interruptions from the dominant supplier, Russia.

Energy security policy addresses short and long term security of supply challenges and promotes the strengthening of solidarity between Member States, completing the internal market, diversification of energy sources, and energy efficiency.

The Energy Community Treaty and the related legal framework translates EU commitments on internal energy market rules and principles into commitments for the candidate and potential candidate countries. Other regional processes and initiatives, such as CESEC and the Western Balkan 6 initiative, also known as the Berlin Process, also have implications for regional energy policy and legislation, infrastructure and markets.

Climate mitigation policy is inextricably linked to EU energy policy. Climate and energy were first addressed jointly via the so-called '2020 Climate and energy package' initially proposed by the European Commission in 2008. This was followed by the '2030 Climate and energy framework', and more recently by the new package of proposed rules for a consumer centred clean energy transition, referred to as the 'winter package' or 'Clean energy for all Europeans'. The EU has repeatedly stated that it is in line with the EU objective, in the context of necessary reductions according to the IPCC by developed countries as a group, to reduce its emissions by 80-95% by 2050 compared to 1990, in order to contribute to keeping global average temperature rise below 2°C compared with pre-industrial levels. The EU formally committed to this target in the 'INDC of the European Union and its 28 Member States'. The 2050 Low Carbon and Energy Roadmaps reflect this economy-wide target. The impact assessment of the Low Carbon Roadmap shows that the cost-effective sectoral distribution of the economy-wide emission reduction target translates into a 93-99% emission reduction target for the electricity sector (EC 2011a). The European Commission is in the process of updating the 2050 roadmap to match the objectives of the Paris Agreement, possibly reflecting a higher level of ambition than the roadmap published in 2011.

2.2 The SEERMAP project at a glance

The South East Europe Electricity Roadmap (SEERMAP) project develops electricity sector scenarios until 2050 for the South East Europe region. Geographically the SEERMAP project focuses on 9 countries in the region: Albania, Bosnia and Herzegovina, Kosovo* (in line with UNSCR 1244 and the ICJ Opinion on the Kosovo* declaration of independence), former Yugoslav Republic of Macedonia (Macedonia), Montenegro and Serbia (WB6) and Bulgaria, Greece and Romania (EU3). The SEERMAP region consists of EU member states, as well as candidate and potential candidate countries. For non-member states some elements of EU energy policy are translated into obligations via the Energy Community Treaty, while member states must transpose and implement the full spectrum of commitments under the EU climate and energy acquis.

Despite the different legislative contexts, the countries in the region have a number of shared challenges. These include an aged electricity generation fleet in need of investment to ensure replacement capacity, consumers sensitive to high end user prices, and challenging fiscal conditions. At the same time, the region shares opportunity in the form of large potential for renewables, large potential of hydro generation which can be a valuable asset for system balancing, a high level of interconnectivity, and high fossil fuel reserves, in particular lignite, which is an important asset in securing electricity supply.

Taking into account the above policy and socio-economic context, and assuming that the candidate and potential candidate countries will eventually become Member States, the SEERMAP project provides an assessment of what the joint processes of market liberalisation, market integration and decarbonisation mean for the electricity sector of the

South East Europe region. The project looks at the implications of different investment strategies in the electricity sector for affordability, sustainability and security of supply.

The aim of the analysis is to show the challenges and opportunities ahead and the trade-offs between different policy goals. The project can also contribute to a better understanding of the benefits that regional cooperation can provide for all involved countries. Although ultimately energy policy decisions will need to be taken by national policy makers, these decisions must recognise the interdependence of investment and regulatory decisions of neighbouring countries. Rather than outline specific policy advice in such a complex and important topic, our aim is to support an informed dialogue at the national and regional level so that policymakers can work together to find optimal solutions.

2.3 Scope of this report

This report summarises the contribution of the SEERMAP project to the ongoing policy debate on how to enhance the decarbonisation of the electricity sector in South East Europe. We inform on the work undertaken, present key results gained and offer a summary of key findings and recommendations on the way forward.

Geographically we focus in this report on the whole South East Europe region, including the EU member states Bulgaria, Greece and Romania as well as the candidate and potential candidate countries Albania, Bosnia and Herzegovina, Kosovo*, Macedonia, Montenegro and Serbia. Please note that further information on the analysis conducted at country level can be found in the individual SEERMAP country reports.

3 | Methodology

Electricity sector futures are explored using a set of five high resolution models incorporating the crucial factors which influence electricity policy and investment decisions. The European Electricity Market Model (EEMM) and the Green-X model together assess the impact of different scenario assumptions on power generation investment and dispatch decisions. The EEMM is a partial equilibrium microeconomic model. It assumes that the electricity market is fully liberalised and perfectly competitive. In the model, electricity generation as well as cross border capacities are allocated on a market basis without gaming or withholding capacity: the cheapest available generation will be used, and if imports are cheaper than producing electricity domestically demand will be satisfied with imports. Both production and trade are constrained by the available installed capacity and net transfer capacity (NTC) of cross border transmission networks respectively. Due to these capacity constraints, prices across borders are not always equalised. Investment in new generation capacity is either exogenous in the model (based on official policy documents), or endogenous. Endogenous investment is market-driven, whereby power plant operators anticipate costs over the upcoming 10 years and make investment decisions based exclusively on profitability. If framework conditions (e.g. fuel prices, carbon price, available generation capacities) change beyond this timeframe then the utilisation of these capacities may change and profitability is not guaranteed.