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Renewable energy financing and investment in selected United Nations Economic Commission for Europe member States

Note by the secretariat

Summary

Member States of the United Nations Economic Commission for Europe (ECE) have defined quantitative targets to achieve Sustainable Development Goal 7 and reduce greenhouse gas emissions. However, many countries lag behind in terms of reaching specific targets, including those for renewable energy, within the agreed timeframes. In particular, attracting investment is difficult for many countries of the region, even with the existence of support schemes and policies aimed at the advancement of renewable energy and promoting low carbon technologies.

The overall objective of the study "Renewable Energy Financing and Investment in Albania, Georgia, Kazakhstan, and Serbia" is to give a general picture of renewable energy financing mechanisms and key actors as well as a status of investments in these selected ECE countries.

The document provides an overview on national targets, status, policies and programmes that support renewable energy investments aiming to enable cost-effective deployment of renewable energy within future energy systems.

The study also supports the countries of the region as they work to attain the objectives of the 2030 Agenda for Sustainable Development and identify innovative directions for a sustainable recovery from the current pandemic crisis and the creation of new job opportunities. The finding of the study also contributes to the work of the ECE Group of Experts on Renewable Energy (GERE).

I. Introduction

1. ECE study on "Renewable Energy Financing and Investment in Albania, Georgia, Kazakhstan, and Serbia" provides a comprehensive, up-to-date overview of financing mechanisms and investment activities in these four ECE member States. It draws on information from national and regional sources to present the most up-to-date summary of renewable energy in the region, covering the status of renewable energy markets, industry, policy and regulatory frameworks.

2. Attracting investments represents a major challenge in these countries, even with numerous advanced support schemes and polices for renewable energy. The four countries lag in global development both technically and financially despite significant untapped renewable energy resources.

3. This paper is pointing out these and other key findings, issues and opportunities raised by the study, which helps in setting forth the vision for renewable energy playing a key role in the region.

II. Overview of the selected countries

4. All four countries continue to progress in increasing renewable energy use. This progress includes creating the necessary regulatory framework and adopting targets, policies and regulations. Governments within the four countries share a variety of energy challenges, which could become drivers for renewable energy deployment as the countries embrace a more active approach through renewable energy policies.

5. Except for Kazakhstan, which is a net energy exporter, energy import dependency dominates in the other three countries. Energy intensity in the countries is high in the global context with continuing improvements, e.g., for Kazakhstan the energy intensity of Gross Domestic Product (GDP) dropped from 0.49 ktoe/thousand USD to 0.34 ktoe/ thousand USD (in 2010 prices of GDP). Awareness and lack of understanding of renewable energy are additional obstacles to further development of renewables in the region. In May 2021, the union of mineworkers in Serbia organized numerous strikes against the government that halted the construction of the 350 MW thermal power plant Kolubara B and plans to shut down the remaining thermal power plants in the country until 2050 because of the Clean Energy for all Europeans package. Policy debates and cooperation between all the relevant stakeholders, including the state, companies, unions, and employees, are needed. Overall, it remains a challenge to build sustainable and resilient energy systems that offer reliable and affordable energy to fuel the region's future economic growth.

6. The share of renewable energy in total final energy consumption (SDG 7, Target 7.2) varies widely across the four countries. In 2019, Albania had the highest share with 33% of energy from renewable sources, it is followed by Georgia with 28% and Serbia with 20% and Kazakhstan with slightly more than 2% of renewable energy in the total final energy consumption.

7. All four countries are actively participating within various regional co-operation programmes. For example, the EU4Energy Phase II is an energy programme funded by the European Union and focused on the countries of the Eastern Partnership (EaP) and Central Asia including two countries covered by the study: Georgia and Kazakhstan. The EU4Energy Programme brings together the Energy Community Secretariat (EnCS), the Council of European Energy Regulators (CEER) and the International Energy Agency (IEA) to set up collaboration activities and aims to improve the quality of energy data and statistics, shapes regional policy-making discussions, strengthens legislative and regulatory frameworks and improves access to information in the partner countries. Albania, Georgia and Serbia, as the Contracting Party to the Energy Community Treaty, are part of the Renewable Energy Coordination Group (RECG) which continues to organize biannual meetings, and which at the end of 2020 outlined the key six activities for the following period: implementation of the Renewable Energy Directive 2009/28/EC, setting 2030 targets, introduction of market-based support scheme, guarantees of origin, citizen's participation in the development of the projects and horizontal and cross-cutting issues. ECE and the International Renewable Energy Agency (IRENA) are ramping up their activities to increase the renewable energy uptake by exploiting the untapped potential in these countries. Other donors and development banks are also implementing projects relevant to renewable energy, such as the United States Agency for International Development (USAID), KfW Development Bank (KfW), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), United Nations Development Programme (UNDP), United Nations

Industrial Development Organization (UNIDO), Swiss State Secretariat for Economic Affairs (SECO), Danish International Development Agency (DANIDA) and many others.

8. In all four selected countries the private sector investors developed most of the newly installed utility-scale renewable energy sources power plants. Most of these developers are foreign companies (Belgium Elicio built Malibunar – 8 MW and Alibunar - 42 MW wind power plants in Serbia, Italian Finterl Energia Group built Košava - 69 MW, Kula - 9.9 MW and La Pikolina - 6.6 MW wind power plants in Serbia, French company Voltalia recently won two auctions for 100 MW Spitalle and 140 MW Karavasta solar power plants in Albania) and only rarely local companies (such as Serbian company Naftna Industrija Srbije that developed the 102 MW wind power plant Pladinšte 1). National governments, international donors, and multilateral development banks typically back these public sector investments. Banks usually cooperate with international donors to provide the financing necessary for projects, often in the form of fiscal incentives or public financing (i.e., the Košava wind power plant developed in 2019 was co-financed by the group of foreign banks: Erste Group, Erste Bank Serbia, Unicredit Serbia, Zagrebačka Banka and the Development Bank of Austria). The EBRD very often promotes the scale-up of diversified energy sources through policy dialogue, technical assistance and investment. Funding institutions such as the SECO frequently provide grant funding to support the renewable energy auctions.

III. Renewable energy market and industry overview

9. During the recent years, the four countries continued to build on its substantial renewable energy resources, however new developments arising in the heating and cooling as along with transport sector lags behind. The most prominent growth was in the renewable power sector where solar and wind technologies are being implemented. All four countries with their emerging renewable energy markets continue to mature and commission utility-scale (mostly solar and wind) projects. Challenges to uptake renewable energy technologies remain, the targets are mostly not achieved because of various reasons. Serbia for example, will not reach the 2020 targets because three hydro-power plants that were planned to be built (Srednja Drina river with about 100 MW, Ibar river with about 100 MW and Velika Morava river with about 150 MW) are delayed. The official statistics might also provide an incomplete picture: it is probable that more biomass is being used than what is presented in Serbian energy balance and there are numerous buildings using geothermal energy which is statistically not recognized (reliable statistical data for heat pumps using geothermal energy, solar heating or biomass consumption in households is not available). When it comes to heating and cooling as well as transport sector, these are still lagging far behind.

10. By the end of 2019 (official statistics for 2020 is not yet available), the total installed renewable power capacity in the four selected countries was more than 10.5 GW of installed capacities (where Serbia leads with 3,491 MW, followed by Georgia with 3,337 MW, Albania with 2,591 MW and Kazakhstan with 1,050 MW of installed renewable energy capacity). The biggest growth happened in Kazakhstan where in 2014 there were only 26 facilities with 178 MW of installed capacity, and in 2019 the number increased to 90 renewable energy facilities with 1,050 MW. Kazakhstan also plans to have more than 3,000 MW installed capacity by 2025.

11. Hydropower continues to generate a large share of electricity in the four selected countries, most of these facilities were built before 1990. Both Albania and Georgia traditionally depend almost exclusively on hydropower for its electricity generation which makes both countries highly vulnerable to variable and unfavourable hydrological conditions, especially during the summer season. Results of the successful renewable energy auctions held in Kazakhstan in 2018 and 2019 are that nine small-scale hydropower plans will be built with the total capacity of nearly 90 MW ranging from 2 MW to 26 MW with the average auction price of 30 EUR/MWh.

12. Solar photovoltaic (PV) power plants were showing a slow growth in Albania, from 0 to 15 MW in 2017-2019. As for Serbia and Georgia, the growth was even smaller with only 3 MW installed in Georgia and 11 MW in Serbia. In Kazakhstan, however, the PV capacity increased significantly within the 2014-2019 period: from 5 MW to 542 MW with major solar power plant projects such as Burnoye SPP, Saran SPP and Nurgisa SPP (each of the three with 100 MW of installed capacity). The analysis of the prices proposed during auctions in 2018-2019 for solar power generation shows a significant reduction from the auction ceiling prices in Kazakhstan where the average auction price

dropped from 43 EUR/MWh in 2018 to 26 EUR/MWh in 2019. Kazakhstan is also the only country with local capacity for producing solar PV modules.

13. A sizable wind resource potential is present in all four countries, with the largest resource in Kazakhstan. Serbia led in new capacity installations with a bit less than 500 MW of installed capacity from 2014 to 2019 and is followed by Kazakhstan with the growth from 53 MW in 2014 to 284 MW in 2019. Georgia has only one wind power plant (WPP) with the installed capacity of 21 MW and Albania just recently started developing the WPP sector.

14. Geothermal energy has great potential in all four countries and is gaining increased attention from international developers. In the renewable heating sector, there is a possibility of using geothermal energy that could contribute to improving efficiency and introducing renewables in the district heating sector. The assessment of cost-effective potential for geothermal district heating requires a detailed mapping of resource data which is not yet done for the considered countries. None of the four countries uses geothermal energy for electricity generation even though there might be a certain potential. All analysed countries are deploying renewable heating and cooling technologies only modestly even though the potential is high. Albania is the most developed market for solar water heating in South-Eastern Europe.

15. Selected countries have not done much regarding renewable energy in the transport sector. Electric mobility promotion programmes are emerging; however, this is still negligible. In Serbia, for example, the share of renewable energy sources in the transport sector remains low with only 1.16% in 2018 while the target for 2020 was 10%.

IV. Policy landscape

16. All countries analysed in the report developed its primary legislation related to renewable energy sources and are slowly adopting the necessary secondary legislation (detailing legal, regulatory and financial mechanisms and technical rules) that will ensure the full implementation of renewable energy sources. Albania, Georgia and Serbia, as members of the Energy Community, are still aligning its legislation with the legal framework of the EU, and their governments aim to establish clear and transparent responsibilities for the implementation of the EU *acquis*. The selected countries continue to adopt new policy measures that help to remove barriers for development, attract investment, foster energy security and increase the flexibility of power systems.

17. All four countries have submitted their first Nationally Determined Contributions (NDC) in 2016 and 2017, soon after the Paris Agreement. In 2020, UNDP Kazakhstan started the project that supports the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan to improve its system of measuring, reporting and verification of greenhouse gases, include climate change adaptation measures in NDCs and raise awareness about the climate change issues.

18. The region still has room to improve policy making on renewable energy. For example, renewable energy technologies could address some of the trade-offs between water, energy and food production, bringing substantial benefits in all three sectors. The selected countries have the potential to leverage opportunities across several sectors (water, energy and food production) by developing its renewable energy potential, provided that adequate policies are in place. Overall, increasing the renewable energy share can reduce water requirements in power generation; boost water security by improving accessibility, affordability and safety, and contribute to food security objectives.

19. Official targets for renewable energy were defined in Albania, Serbia and Kazakhstan. Renewable energy targets for 2020 representing the participation of renewables in the energy mix were defined in Albania (38%) and Serbia (27%). In Kazakhstan, the target is defined as a share of the renewable energy system in total electricity production by 2020 which is 3%. Due to its late accession to the Energy Community, Georgia adopted the National Renewable Energy Action Plan (NREAP) only at the end of 2019. The document contains a set of measures to promote energy, however, there are no obligatory 2020 targets. Within the framework of the NDC, Georgia became fully committed to an unconditional limiting target of 35% below 1990 level of its domestic total greenhouse gas emissions by 2030.

20. Policy makers in the selected countries continued to focus mainly on renewable power generation technologies. The support scheme for renewable energy in Albania is based on administratively set feed-in tariffs and contracts for difference, which are still to be introduced upon

the establishment of the day-ahead market. In Serbia, the only existing support mechanism for renewable energy consists of administratively set feed-in tariffs. So far Serbia supported the construction of around 500 MW in various renewable energy capacities with additional 300 MW in the pipeline. A market-based support scheme is still not applied as in Kazakhstan where the auction mechanism was introduced at the end of 2017 to replace feed-in tariff measures. The successful 2018-2019 auction results show the effectiveness and timeliness of the transition from feed-in tariffs to the auction mechanism, following international best practice.

21. Licensing and permitting procedures need to be simplified and streamlined. There is no single administrative body established in any of the four selected countries. An electronic system for issuing, transfer and cancellation of Guarantees of Origin is being planned in Georgia; however, it is not yet in place. Serbia had several simplification rounds for administrative procedures including a few updates of the investor's guide for renewable energy projects even though the licensing remains lengthy, and the single administrative body is not established. USAID recently funded the development of the Investor's guide to renewable energy projects in Kazakhstan which presents the step-by-step guidance for investors planning to develop renewable energy projects in Kazakhstan.

22. Policy support for renewable heating and cooling continues to lag support in the power sector. None of the four selected countries had an obligation for a percentage of share of renewable energy in the heating and cooling sector by 2020.

23. Policies to stimulate renewable energy in the transport sector are still missing, and the support remains far below other sectors. Albania and Serbia have the renewable energy target for the transport sector where Albania defined it within the National Energy Strategy as the biofuel target which represents a share of biofuels versus total fuel consumption in the transport sector which is 10% until the year 2020. In the Energy Community member states - Albania, Georgia and Serbia - provisions related to the sustainability of biofuels are still not transposed, and the legal framework remains not fully compliant with Directive 2009/28/EC.

24. At all stages of energy policy implementation, engagement with stakeholders is crucial. It is important to clearly communicate the direct benefits of renewable energy technologies, both for the country as a whole and for individual actors. High upfront investment costs of renewable energy technology, as well as a lack of understanding of the payback periods of such investments, discourage stakeholders from participating and driving the uptake of the renewable energy sector. Successful transition to the green economy also requires sufficient human resources and expertise, including relevant training of technical and management personnel. All four countries implemented a number of such promotional activities in support of the renewable energy sector. The scope of measures ranged from awareness-raising and visibility campaigns (UNDP Albania Programme on Solar Water Heating, EU Instrument for Pre-accession Assistance in Serbia; EU4Energy Communication & Visibility project in Georgia; Derisking Renewable Energy Investment in Kazakhstan) to developing dedicated training courses and educational materials (i.e., Design Manual of the Solar Water Heating systems prepared in cooperation with the Tirana Polytechnic University, Albania; Training activities highlighted in the Concept for the transition of the Republic of Kazakhstan to Green Economy).

V. Investment flows

25. International donors and development banks continue to be an important source of debt financing and grants for renewable energy projects in all four countries. In recent years, the four selected countries also managed to attract foreign investments for renewable energy projects, and this was mostly visible in Serbia with newly built wind power plants and Kazakhstan with both solar and wind power plants. Albania attracted foreign capital recently with the first two auction bidding rounds in 2018 and 2020 - after which the construction of two utility-scale solar power plants developed by the French company Voltalia will start in 2021. The successful 2018-2019 auction results in Kazakhstan have made it possible to create competitive conditions, hereby attracting international renewable energy investors, and reduce the cost of renewable energy generations.

26. The Green for Growth Fund (GGF) which is the first specialized fund for advancing renewable energy in South-Eastern Europe and the Caucasus provides refinancing to Financial Institutions to enhance their participation in the renewable energy sector. The GGF was initiated as a public-private partnership by KfW and EIB in 2009. In 2020, the GGF approved a EUR 20 million loan to ProCredit Bank Georgia that will aim to help businesses and households' access to the

dedicated financing for sustainable energy activities, especially during the COVID-19 crisis. Serbia's largest wind farm project worth EUR 300 million, Čibuk 1 (158 MW), was supported by the GGF as a B lender to the EBRD and IFC with debt financing of EUR 18.35 million. The European Bank for Reconstruction and Development (EBRD) provided for the same wind farm project a senior loan of up to EUR 60 million with the remaining funding being provided by the IFC, other financial institutions and the sponsors.

27. The EBRD will provide financing of up to USD 120 million for medium-sized renewable energy projects in Georgia. The projects under the Framework will encompass development, construction and operation of renewable energy generation projects in Georgia. The projects under the Framework will be instrumental to support the Government Strategy to foster low carbon generation, for covering the country's seasonal winter demand and for supporting private ownership in the energy sector. In 2020 EBRD backed the USD 140 million wind power plant project in Kazakhstan, Zhantas Wind-Power Station LLP with a senior loan of up to USD 25.28 million. The project involves the construction and operation of a 100 MW wind farm, including 8.6 km of 110kV single circuit line connecting to the existing substation in south Kazakhstan.

28. The Asian Development Bank (ADB) also started supporting the renewable energy sector. In 2020 the ADB funded the technical assistance to support Kazakhstan in achieving renewable energy generation (wind and solar) and greenhouse gas reduction targets by establishing the capacity of the transmission system operator Kazakhstan Electricity Grid Operating Company (KEGOC), for planning and modelling the integration of variable power generation sources into the Kazakh power system. In 2019 the ADB has signed an agreement for USD 30.5 million loan to M-KAT Green, a special purpose vehicle created for the project, to build and operate a 100 MW solar power plant in the south-east of the country near the town of Shu in the Jambyl Region. ADB also expects to provide USD 3 billion in assistance to Kazakhstan in 2017-2021 to support the country's ambition to be the top 30 global economies by 2050.

29. USAID contributes extensively to the activities in all four countries. The USAID Energy Program in Georgia is aimed at supporting the country's energy market development per Georgia's obligations under the Energy Community Treaty. The goal of this programme is to enhance Georgia's energy security through the improved legal and regulatory framework and increased investments in the energy sector. Based on the regulations of the Republic of Kazakhstan, a step-by-step guidance for investors planning to develop renewable energy projects in Kazakhstan has been developed by the USAID Power the Future Regional Programme in 2020.

30. Several other funding and development organisations and institutions such as DANIDA, SECO, German Corporation for International Cooperation GmbH (GIZ) are also important players are actively promoting the implementation of sustainable energy systems in Albania, Georgia, Serbia and Kazakhstan.

31. In South-Eastern Europe, the Western Balkans Investment Framework (WBIF) continues to channel investment from several international donors and multilateral banks, including the European Commission Instrument for Pre-Accession (IPA), the Council of Europe Development Bank (CEB), the EBRD, the EIB, KfW, World Bank and The French Development Agency (AFD). The WBIF provides EUR 600 million support to socio-economic development and the EU accession across the Western Balkans through the provision of finance and technical assistance for strategic investments, particularly in infrastructure, renewable energy, energy efficiency and private sector development.

32. The Climate Investment Fund (CIF) is a climate finance source that can be leveraged for renewable energy investments within the four countries. The Global Environment Facility (GEF) with the USD 4.5 million grant supported the promotion of the private-sector investment in large and small-scale renewable energy to achieve Kazakhstan's 2030 renewable energy targets already in 2016. The Green Climate Fund (GCF) which supports the developing countries to raise and realize their NDC ambitions towards low-emissions, climate-resilient pathways also support various projects across the four countries. GCF-EBRD Kazakhstan Renewable Framework project is one of the successful examples where the EBRD proposes to the GCF to implement an investment framework programme with a 5-year duration leading to the total investments of USD 550 million from the EBRD, private sector investors, other financial institutions along with the proposed investment from the GCF.

VI. Conclusions

33. The four selected countries are gradually moving towards more sustainable energy systems. Even though the official statistics for 2020 is not yet available, most probably none of the four countries has reached its 2020 targets. In the power sector, there is certain progress with the focus on hydro, wind and solar energy systems, however, still, a lot needs to be done to boost renewable energy investments. In South-Eastern Europe, Albania and Serbia have the potential for cost-competitive deployment of solar and wind power generation. However, renewable energy is being challenged politically and financially, especially having in mind the cost of government support policies. In the heating sector, both Albania and Serbia could expand the usage of solar water heating system, geothermal energy as well as deployment of efficient biomass systems. Integrating renewable energy into the design of projects with multiple benefits could expand the opportunities for financing from different sectors (e.g. water, agriculture) and from cross-cutting sources, e.g. related to climate financing. Furthermore, cross-border cooperation may provide opportunities for regional projects and upscaling. In Serbia and Albania such opportunities have emerged in nexus (cross-sectoral) projects, linking also to water cooperation, and have been highlighted as possible nexus investments. In the Caucasus, Georgia is moving slowly from hydropower to other renewable energy sources with only one 21 MW wind power plant running and few minor solar power plants. In Central Asia, Kazakhstan, a country with by far the largest potential for renewable energy deployment due to its size, there are plans to install numerous renewable utility-scale power generation projects, based on government support combined with financial mechanisms of various development banks. Most of the investments in all four countries are still driven by international donors and development banks which are, jointly with foreign private companies, developing and installing new renewable energy capacity.

Annex I

Basic energy statistics and 2020 targets comparison table

	Total primary energy supply [ktoe]	*Final energy consumption [ktoe]*	*Baseline Year (2009)*	*Share of Energy from Renewable Sources (2019)*	*Target share of energy from RES in 2020*	*Total Capacities of Renewable Energy [MW](2019)*
Albania	2,340.0	2,067.1	31%	36.7% (Eurostat)	38%	2,591
Georgia	5,101.0	4,176.4	n.a.	28% (Geostat)	n.a.	3,337
Kazakhstan	73,148.0	45,510.0	n.a.	2.3% (stat.gov.kz)	3%	1,050
Serbia	15,277.9	8,361.0	21%	21.4% (Eurostat)	27%	3,491

Annex II

Key bottlenecks and recommendations on financing renewable energy investments

1. To reach the 2020 targets for renewable energy (RE), massive reallocation of capital toward renewables was required as well as mobilisation of all available capital sources. The study assumes that none of the selected countries managed to achieve this objective in full.

List of possible recommendations on the financing of renewable energy investments based on the key issues and bottlenecks - the possible impediments to attaining the 2020 objectives.

Recommendations	*Short description*	*Relevant stakeholders*
Strategic planning and ambitious renewable energy targets at the national level	All four countries lack strategic planning documents that would outline the energy sector's long-term development path and that would account for new socio-economic realities, interests of related industries, the opportunities for technological and innovative energy sector development, as well as energy security and environmental policy goals. The policy makers and energy sector regulators should have a clear and realistic long-term energy development programme. Strategic planning needs to look ahead to a time when renewable energy deployment is already found everywhere and design the markets and systems around such a future. Setting ambitious renewable energy targets consistent with the long-term national energy strategy and action plans sends a strong signal to investors and can help attract additional capital.	Policy makers at the national level, local and regional public authority, sectoral agencies, infrastructure and utility companies, higher education and research, large enterprises and citizens
Strategic planning and ambitious renewable energy targets at the regional level	Besides the national strategy and action plans, it is important to develop strategic documents at the regional level because regions should be the hub for a radical rethink of public fund use and energy planning approach in a more decentralised and smarter way. The capacities should be boosted at the regional level to mobilise investments addressed to reach 2030 energy targets more efficiently. The energy planning should have a holistic view of the energy system, considering supply, demand and distribution opportunities provided by smart networks and storage for each technology investigated. A participative consultation of relevant stakeholders and regional public support is also important and can drive the selection of the key technologies' priorities.	Local and regional authority, local energy agencies, local infrastructure and utility companies, higher education and research and citizens
Renewable energy spatial planning	The development of renewable energy has both positive and negative effects on biodiversity. The transition from fossil-fuel based energy generation to renewable energy generation will require a greater land footprint, leading to trade-offs on land use and potentially exacerbating land use conflicts. This footprint can impact on critical habitat for biodiversity and destroy carbon sinks that if	Policy makers at the national level, local and regional public authority, sectoral agencies, infrastructure and utility companies, higher education and research,

Recommendations	*Short description*	*Relevant stakeholders*
	remained intact, help curb the impacts of climate change. All four analysed countries have a rich biodiversity and large areas designated for its protection which impacts on RE siting and possible conflicts with nature preservation. The first step is guiding production onto previously converted or degraded lands so that the impact on high value ecosystems can be avoided. Access to data on biodiversity and social and cultural values is critical and the governments should develop platforms to make such data available. The spatial modelling can offer different energy siting scenarios based on viable solar and wind resource availability, overlaid with the potential environmental and societal impacts that may result from RE development. To accelerate the build-out of renewable technologies, all four analysed countries should map the priority areas for solar and wind farms with the lowest environmental and social conflict potential and the highest resource potential as well as assess the current hydropower generation and storage capacities to support the wind and solar power expansion.	business support organizations and citizens
Support schemes based on feed-in premium	A feed-in premium for the operational support is most suitable to replace the existing feed-in tariffs granted on the first-come, first-served basis. The premium that is granted through a tendering process is compatible with the internal market principles and will lead to a phase-out of the subsidies needed overtime while several technologies will reach market parity.	Policy makers at the national level, sectoral agencies, various professionals in the energy industry and higher education and research
Establishment of the renewable energy operator	The appointment of an institution to manage the support scheme for renewable energy producers is instrumental in ensuring the viability of the scheme. Such central counterparty role can be entrusted to either the market operator, transmission system operator (TSO) or to an institution legally separated from the TSO. The electricity market operator should have a specific role in the electricity market and for market coupling or in managing the access to the grids (in the case of TSO).	Policy makers at the national level and transmission system operator
Renewable energy heating and cooling	District energy systems should be included in the national energy strategies and climate plans as well as renewable energy action plans. Governments should also end subsidies for fossil fuels, such as replacing gas boilers with more efficient ones as they are not compatible with the climate targets. The local heating and cooling plans at the cities level should have a clear picture on available local sources, challenges and opportunities as well as project implementation support. Such heating and colling sector planning should also be obligatory for all the cities over 50 thousand inhabitants as well as aggregated planning at the regional level so that multiple cities with similar technical possibilities	Policy makers at the national level, local and regional public authority, sectoral agencies, infrastructure and utility companies, higher education and research, business support organizations, Small and Medium-size Enterprises (SMEs) and other energy professionals, large enterprises and citizens

Recommendations	*Short description*	*Relevant stakeholders*
	would be bundled. The data critical for heating and cooling planning should be available to cities by the utilities that are serving the city. It is also very important to include citizens as well as other relevant stakeholders from planning onwards all the way through the implementation of the project. The renewable energy supply for such heating and cooling systems can come from various renewable energy sources such as geothermal or solar but also waste heat could be considered.	
Green bonds	Green bonds represent the major opportunity to attract the private capital of various investors in the renewable energy sector. To further increase green bond issuances and strengthen their credibility among market participants a coordinated actions is need among policymakers, capital markets, issuers, and investors. The first step is to standardise green bonds to lower the risk of providing misleading information regarding the environmental friendliness of such services. Second step is that government should support the green bond market development via technical assistance and economic incentives and should assure the long-term sustainability. The final step is to create bankable project pipelines via de-risking renewable energy assets	Policy makers at the national level, financial institutions and banks, sectoral agencies and higher education and research
New technologies - energy storage	To increase the share of renewables in the electricity mix, to contribute to climate change mitigation and the security of supply it is important also to foster private investments in the electricity sector and this includes implementation of new technologies such as energy storage. The first step is to assess the opportunity of energy storage in the context of the power system by analysing technical, environmental, economic, fiscal, and financial standpoints on the electricity market. The second step would be to develop the guidance and tools for the authorities for the sustainable implementation of an energy storage strategy. This would include the regulatory framework, pricing of grid services and many other technical, legal, and financial aspects. The energy storage roadmap would be based on several scenarios to be agreed upon with the key stakeholders with timeline horizons of 2030 and 2040. The outcome of such a thorough analysis would be the list of locations and the technical characteristics of suitable energy storage facilities that are economically justified and identified so that the private investors would be able to invest in such facilities.	Higher education and research, sectoral agencies, interest groups, business support organizations, SMEs and professionals in the power sector industry, large enterprises
Post COVID-19 crisis	The recovery from the COVID-19 crisis presents governments and investors with an opportunity to accelerate the deployment of renewable energy technologies. Renewable energy investments	Policy makers at the national level, local and regional public authority,

Recommendations	*Short description*	*Relevant stakeholders*
	undertaken as a short-term response to the crisis impacts can have the effect of supporting increasingly ambitious long-term targets for renewables, strengthen climate commitments, creating employment and stimulating economic growth. The COVID-19 crisis however set additional constraints on public resources so the limited public capital should primarily be used with the specific purpose of crowding in additional private finance.	SMEs, large enterprises and citizens