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Tracking progress in the uptake of renewable energy

Renewable Energy Status Report 2022 - key findings

Note by the secretariat

Summary

The United Nations Economic Commission for Europe (ECE) Renewable Energy Status Report 2022, prepared jointly with the Renewable Energy Policy Network for the 21st Century (REN21), provides a comprehensive, up-to-date overview of the status of renewable energy and energy efficiency markets, industry, policy and regulatory frameworks, and investment activities in: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Montenegro, Russian Federation, Serbia, Tajikistan, North Macedonia, Turkmenistan, Ukraine and Uzbekistan. It draws on information from national and regional sources to present the most up-to-date summary of sustainable energy in the region.

Between 2017 and 2021, cumulative added renewable electric power capacity in the focus countries accounted for more than 20 GW, resulting in a total installed capacity of more than 100 GW. Their expansion mainly took place in the power sector, whereas achievements in the transport sector as well as in the heating and cooling sector were slower.

Nearly all 17 focus countries have significant potential for the deployment of solar, wind, hydropower and/or bioenergy. Nevertheless, as of 2019, most countries were still heavily dependent on fossil fuels, with relatively smaller shares of renewables in their total final energy consumption. Although several countries show high renewable energy shares, these reflect either high shares of hydropower in electricity generation, the use of biomass in heating, or a combination of both – rather than extensive wind, solar or other renewable energy sources. Between 2017 and 2021, the focus countries had substantially increased the pace of adoption of renewable energy technologies.



I. Introduction

1. The United Nations Economic Commission for Europe (ECE) covers a large and diverse region, comprising 56 member states. The ECE Renewable Energy Status Report 2022, prepared together with the Renewable Energy Policy Network for the 21st Century (REN21) - covers 17 of the ECE member countries – grouped because of their specific needs to establish a data baseline and to track progress made in renewable energy and energy efficiency development. The ECE has been contributing actively to fulfilling the 17 countries' aspirations in renewable energy by providing a platform for them to collaborate with other ECE member countries. In 2014, the ECE Group of Experts on Renewable Energy was established to step up these efforts. Its mandate is to carry out action-oriented, practical activities to greatly increase the uptake of renewable energy, helping to meet the objectives of the Sustainable Energy for All (SEforALL) initiative. The ECE Renewable Energy Status Report 2022 strives to present an analysis of up-to-date data and information on the status of renewable energy and energy efficiency in the selected countries.

II. Regional overview

2. Most of the 17 countries continue to progress in the uptake of renewable energy and in improving energy efficiency. This progress includes creating the necessary regulatory frameworks and adopting targets, policies and regulations. Countries in the region have a lot of commonalities in both their energy systems and their challenges in deploying renewables, which could become drivers for renewable energy deployment as the countries embrace a more active approach through renewable energy policies.

3. The World Bank's Regulatory Indicators for Sustainable Energy (RISE) reflect multi-dimensional aspects of renewable energy and energy efficiency policies and regulations. All focus countries except Turkmenistan improved their renewable energy scores between 2015 and 2019. The RISE energy efficiency indicators measure progress in energy efficiency based on 12 dimensions of policies and regulations. Between 2015 and 2019, all countries except Tajikistan improved their scores.

4. Five countries – Azerbaijan, Kazakhstan, the Russian Federation, Turkmenistan and Uzbekistan – are net energy exporters, with high reserves of natural gas and oil. Six countries – Bosnia and Herzegovina, Kazakhstan, Montenegro, the Russian Federation, Serbia and Ukraine – have significant coal reserves.

5. Nearly all 17 focus countries have significant potential for the deployment of solar, wind, hydropower and/or bioenergy. Nevertheless, as of 2019, most countries were still heavily dependent on fossil fuels, with relatively smaller shares of renewables in their total final energy consumption. Although several countries show high renewable energy shares, these reflect either high shares of hydropower in electricity generation, the use of biomass in heating, rather than extensive wind, solar or other renewable energy sources.

6. In 2019, the average share of renewables in total final energy consumption (TFEC) in the focus countries was 18.2% (similar to the figure reported for 2014). Albania, Tajikistan, Bosnia and Herzegovina, and Montenegro have achieved high shares of renewable energy (above 30% of TFEC), whereas Turkmenistan, Kazakhstan, Azerbaijan and Uzbekistan have low shares (less than 3%). The Russian Federation, the region's largest energy system, had a 3.2% share of renewable energy in TFEC in 2019. The total final energy consumption and the renewable energy share for the focus countries are shown in Annex I.

7. Energy poverty is still an enduring issue in the region, due to a combination of low average household incomes, limited access to affordable energy, and low thermal performance of buildings and heating appliances.

8. Several initiatives and organizations have supported greater co-operation within the region in renewable energy and energy efficiency. As of early 2022, 9 of the 17 focus countries were contracting parties of the Energy Community Treaty (Albania, Bosnia and Herzegovina, Georgia, Kosovo, the Republic of North Macedonia, the Republic of Moldova, Montenegro, Serbia and Ukraine), and Armenia was an observer.

9. A key element of international energy co-operation in the focus countries has been the Energy Charter Treaty, a multilateral, legally binding framework that promotes energy security based on the principles of sustainable development and open, competitive markets. As of early 2022, most of the 17 countries were Energy Charter members, except for Belarus (which has not ratified the Treaty but applies it provisionally), the Russian Federation (which has not ratified the Treaty), and Serbia, which is an observer. SEforALL members from the focus countries include Armenia, Kyrgyzstan, Montenegro, the Republic of North Macedonia, the Russian Federation and Tajikistan.

III. Policy landscape

10. The countries in the region with renewable energy and energy efficiency policies have increased since 2017. Relevant policy measures help to remove barriers to development, attract investment, foster energy security and increase the flexibility of power systems.

11. In 2020, all countries started a process of updating and enhancing their Nationally Determined Contributions (NDCs) under the Paris Agreement. This work created an opportunity to align countries' national priorities for renewables and energy efficiency with their international commitments to reduce greenhouse gas emissions. In line with the Paris Agreement, several of the focus countries, including some of the region's largest emitters (Kazakhstan, Ukraine and Uzbekistan), announced net zero carbon commitments.

12. Despite the rising level of ambition to raise renewable energy and energy efficiency targets across the region, some countries are still lagging. In some cases, their NDCs have been suggested to lack ambition and are not in line with the Paris Agreement goal of limiting global warming to within 1.5 degrees Celsius by 2050.

13. By the end of 2021, at least 15 of the 17 focus countries had set national renewable energy targets, formulated either as the share of renewables in TFEC, or in total primary energy supply, or by sector (such as electricity and heat), or by technology.

14. Of the five countries with a renewable energy target in the transport sector, only Albania came close to meeting its targeted 10% share of biofuels, whereas the rest achieved only around a 1% share or less. In the heating sector, only Bosnia and Herzegovina and the Republic of North Macedonia reported on the successful achievement of their renewable energy targets. The remaining countries focused on the electricity sector.

15. Renewable energy auctions are increasingly popular and have been introduced in 9 of the 17 focus countries as of September 2021, as policy makers seek to procure renewable energy at competitive prices in line with the global trend. Despite the gradual shift to auctions, many support schemes still rely on Feed-in Tariffs (FITs), which as of September 2021 were present in 13 of the 17 focus countries, the same number as in 2016.

16. Another trend in the region, in line with international trends, is the emergence of dedicated net metering schemes for small-scale renewables. Net metering has gained popularity across the region, with 9 of the 17 focus countries introducing such schemes as of September 2021. For example, the Republic of Moldova's Law on the Promotion of the Use of Energy from Renewable Sources, adopted in 2016, emphasises promoting distributed energy generation and the development of small-scale decentralised renewable energy projects by households and small and medium-sized enterprises, accounting for the high share (65%) of these sectors in the country's total electricity consumption.

17. Fiscal incentives (tax exemptions, premiums, and others) to support the renewable energy uptake across the region were used in 11 of the 17 focus countries as of September 2021. In Albania and Kyrgyzstan, renewable energy equipment is exempted from customs duties, and Ukraine offers an additional value-added tax (VAT) exemption for renewable energy systems.

18. To improve energy efficiency, the 17 focus countries have adopted a range of policies across all sectors, including buildings, industry and transport. These policies are shaped largely by two regional entities, the European Commission and the Eurasian Economic Commission. Georgia, Moldova, Ukraine and the countries of South-East Europe, as

contracting parties of the Energy Community Treaty, have committed to transpose three key pieces of energy efficiency legislation: the Energy Efficiency Directive 2012/27/EU until 15 October 2017, the Energy Performance of Buildings Directive 2010/31/EC until 30 September 2012 and EU Regulation 2017/1369 setting a framework for energy labelling until 1 January 2020. Substantial progress in transposing the directives has occurred in the region, although with many challenges and delays. The member countries of the Eurasian Economic Union (EAEU) – Armenia, Belarus, Kazakhstan, Kyrgyzstan and the Russian Federation – have adopted common regulatory policies related to energy efficiency, including technical regulations such as minimum energy performance standards and labels for appliances and equipment.

IV. Renewable energy market and industry overview

19. Between 2017 and 2021, the focus countries substantially increased the rate of renewable energy adoption. Unlike the period between 2015 and 2016 covered by the previous REN21 ECE report, when most of the installed renewable capacity additions occurred in hydropower, between 2017 and 2021, the highest growth was achieved for solar power (58%) and wind power (25%). The installed renewable power capacities in the region of each renewable energy technology (hydro, wind, solar, solid biomass, biogas, and geothermal) in the year 2021 are summarised in Annex II.

20. Between 2017 and 2021, cumulative added renewable electric power capacity in the focus countries accounted for more than 20 GW, resulting in a total installed capacity of more than 100 GW. The top three countries in non-hydro capacity additions had remained the same with some changes between the countries: Ukraine became the leading country with 8.3 GW of solar and wind power capacities installed between 2017 and 2021, followed by the Russian Federation with 3.5 GW, and Kazakhstan with 3.7 GW. These countries had surpassed a threshold of 1 GW capacity in solar power and the same countries had surpassed a threshold of 1GW wind power capacity. For reference, the total installed capacity of hydropower was higher than 1 GW in twelve countries in the region. Significant growth in utility-scale projects and total installed capacity has been achieved in the region.

21. Progress mainly took place in the power sector, whereas in the transport, heating and cooling sectors progress was slower. Most of the renewable heating came from the combustion of renewable biofuels and (occasionally) biogases. Solar thermal capacities for hot water production had only increased in several countries, including Georgia, Armenia, and Albania. Geothermal energy used directly as heat, in most cases, remained at the same level.

22. Despite the increase in attention to wind and solar, hydropower remained the major renewable power source in the focus region, however its share has decreased. In 2016, it contributed 96% to the total renewable power capacity, decreasing to 80% in 2021. In the period between 2017 and 2021, the Russian Federation installed 29% of all new additions (amounting to 3.1 GW) with a capacity of 895 MW, followed by Georgia (523 MW), Albania (376 MW), and Kazakhstan (370 MW).

23. Between 2017 and 2021, solar power demonstrated remarkable growth in the focus region, in 2021 with a total capacity of 12.1 GW. This growth is based on capacity additions in Ukraine (7.1 GW), Kazakhstan (2.7 GW), the Russian Federation (1.6 GW), and, to a lesser extent, in Belarus (222 MW), Armenia (182 MW), and Uzbekistan (101 MW). In comparison, the 2015-2016 solar photovoltaic additions were less than 0.3 GW, according to the previous REN21 ECE report.

24. The wind power capacity of the focus region had grown more than a factor of 7 between 2016 and 2021. The Russian Federation added 1.9 GW and now has the highest wind installed capacity in the region; Ukraine added 1.2 GW and its total capacity was only slightly behind the Russian Federation in 2021 (lower by 10%); Kazakhstan added 1.1 GW. Less significant advancements were made in the same period in Serbia (381 MW), Kosovo¹

¹ All references to Kosovo are made in the context of UN Security Council Resolution 1244 (1999)

(136 MW), Bosnia and Herzegovina (135 MW), Montenegro (118 MW), Azerbaijan (51 MW), Belarus (50 MW), as well as the Republic of Moldova (49 MW).

25. Overall, the potential for bioenergy for power in the region remained untapped. Between 2016 and 2021, the Russian Federation, Belarus, and Ukraine were the main bioenergy market players, including solid biofuels and biogas.

26. The global installed geothermal power generation capacity increased from 11.8 GW in 2015 to 15.6 GW in 2021. The Russian Federation was the only country to have geothermal capacity installed in the region, amounting to 82 MW in 2021, mostly located on the Pacific coast of the Russian Federation, namely the Kamchatka peninsula and the Kuril Islands. This installed capacity had only slightly changed since 2015, which points to the very limited development of geothermal energy in the region despite its enormous potential.

27. The largest contribution to the renewable share in heating and cooling was provided by renewable energy sources in final energy consumption (mostly by bioenergy and very small shares of solar and geothermal heat). Few countries recorded a small share of renewable energy sources in derived heat, i.e., the heat produced in heat plants and combined heat and power plants, mostly from biomass. An even fewer number of countries reported heat delivered by heat pumps.

28. In the transport sector, the focus countries promoted electric vehicles and the use of biofuels. Whereas the production and use of biofuels, such as biodiesel, varied across the region, the transition to electric vehicles was generally more noticeable in the region. In Ukraine, about 50,000 electric vehicles (EVs), including battery electric vehicles and plug-in hybrids, were registered with 9,000 chargers supplying them with electricity. Three countries of the region, Ukraine, Armenia, and Belarus have benefitted from the GEF-UNEP “Global Programme to Support Countries with the Shift to Electric Mobility Child Projects”, which is enabling these countries to make their first steps in e-mobility development.

V. Distributed renewable energy and energy access

29. In 2019, nearly all focus countries reported a 100% electrification rate, up from an average of 99.5% in 2015. However, access to reliable and sustainable energy has remained a challenge in some countries, areas, and populations, with implications for food security, economic development, human health, and poverty reduction. Even in many areas connected to the electricity grid, insufficient generation capacity and deteriorating transmission infrastructure had implications for the link between grid access and reliable energy supply.

30. Some countries in the region were still lagging in adopting clean and sustainable fuels and technology as of 2019. In Bosnia and Herzegovina, only 17.6% of the population used clean fuels that year. Overall, the share of clean energy and technologies in Bosnia and Herzegovina, North Macedonia and Serbia declined between 2015 and 2019, falling from 19.2% to 17.6%, from 93% to 90.1%, and from 44.8% to 43.8%, respectively, in these countries. Especially in rural and mountainous regions and areas, a considerable share of the population relied on fuelwood for heat, cooking and water heating. In Bosnia and Herzegovina, surveys indicate that around 75% of households either partly or fully rely on traditional biomass for heating or cooking. In Georgia, an estimated 95.9% of rural households relied on fuelwood for heat supply in 2019, compared with only 25.7% of urban households. Even though Serbia had the largest share of households with central heating in the Western Balkans (38.4%) in 2019, the use of traditional stoves for heating was still predominant in the country. Around 32.3 million people (10.5% of the total population of the ECE region) lacked access to clean energy fuels and technologies in 2019.

31. Distributed renewable energy generation holds large potential across the focus countries. However, the sector has remained at a nascent stage. Distributed renewables have evolved mainly based on a “prosumer” model. To support self-consumption based on distributed renewables, several countries in the region have introduced dedicated net metering policies and regulations. In Georgia, where net metering has been in place since 2016, around 180 solar PV systems (totalling some 2.5 MW in capacity) were connected to the grid as of May 2020.

VI. Energy efficiency

32. In 2019, the energy intensity of all focus countries except Albania was higher than that of the EU-27, with the highest rates in Turkmenistan and the Russian Federation. Even so, the energy intensity of all countries has decreased dramatically over the last 30 years, on an average annual basis.

33. Although many of the focus countries have improved the energy efficiency of their electricity supply since 2010, some have continued to face challenges. For example, Albania's electricity transmission and distribution losses grew from 13% in 2010 to 20% in 2019, and losses in Kosovo, Kyrgyzstan, and North Macedonia reached 17% in 2019. Azerbaijan and Uzbekistan achieved the largest progress in reducing their transmission and distribution losses during this period, cutting them from 20% to 8% and from 17% to 7%, respectively.

34. District heating has been important in several ECE countries, including Belarus, Kazakhstan, Kyrgyzstan, Moldova, the Russian Federation, Serbia, Ukraine, Uzbekistan, Tajikistan, and Turkmenistan. The Russian Federation is the world's largest user of district heating systems. Across the region, reforming and upgrading existing district systems has become a priority during the last two decades, although many barriers remain.

35. In absolute numbers, the final energy consumption of buildings in most of the focus countries has grown over the past 20 years, except in Belarus, Ukraine, and Uzbekistan. On average, building energy consumption was 63% higher in 2010 than in 2000 and 52% higher in 2019 than in 2010. Among energy end-uses, space heating contributed the largest share to the sector's final energy consumption. In Belarus, Georgia, Moldova and Ukraine space heating was responsible for 55-70% of residential final energy consumption in 2018.

36. Lighting, appliances and equipment – including devices for cooking, water heating and space cooling – contributed a large share of the final energy consumption of the buildings sector. In Belarus, Georgia, Moldova and Ukraine, the share of these energy end-uses in residential energy consumption ranged between 30% and 45% in 2018. In general, analysis in both the focus countries and in other European countries shows that the share of energy used for cooking has been declining over time, whereas energy use for electrical appliances has been growing.

37. The final energy consumption of the industry sector increased during the last 20 years across all focus countries except for Armenia, Belarus, North Macedonia, Ukraine and Uzbekistan. Turkmenistan demonstrated the highest increase, where industrial energy consumption doubled between 2000 and 2010 and then grew by 49% between 2010 and 2019. Ukraine has seen the most dramatic decline (more than 50%) in its industrial energy consumption since 2000.

38. The final energy consumption of the transport sector in the ECE region has increased at unprecedented rates during the last 20 years. Overall, for the region, the final energy consumption of transport increased by 39% during the 2000-2019 period, compared to 11% in the EU-27. Road transport accounted for the largest share of final energy consumption, with a few countries having high shares of rail and/or domestic aviation.

VII. Investment flows

39. Worldwide investment in renewable power, heat and fuels (excluding hydropower projects larger than 50 MW) totalled USD 303.5 billion in 2020. This represents both public and private as well as international and domestic investment flows. The combined renewable energy investment of the 17 focus countries declined from 2013 levels, reaching USD 2.7 billion in 2016, and then returned to the 2013 level of USD 7.2 billion in 2018, contributing around 2.2% of the world total that year. None of the focus countries ranked among the world's top 10 countries in renewable energy investment; however, a few ranked among the top 30. In 2018, Ukraine ranked 18th, and the Russian Federation ranked 22nd among leading renewable energy investors.

40. Despite the positive impact of the COVID-19 pandemic on renewable energy investment in some parts of the world, this was not the case in the focus countries, where the pandemic delayed the implementation of some projects.

41. International development finance and dedicated international climate finance are important drivers of renewable energy investment flows in the region. These flows reflect bilateral and multilateral aid, aid from private providers, and other resource flows to developing countries, which are registered with the OECD as “official development assistance” (foreign aid). Multilateral support is provided by development agencies, multilateral development banks and international climate funds, whereas bilateral support typically is provided by ministries and development agencies of donor countries to the governments of recipient countries. Between 2000 and 2019, a total of USD 5.0 billion of foreign aid was committed to supporting renewable energy development in the focus countries. This accounted for 8.3% of the total foreign aid for renewables worldwide during this period. The volume and timing of the aid varied considerably across the focus countries. Nearly half of the total amount was registered between 2016 and 2019 (i.e., since the previous regional REN21 ECE report in 2017) to support more than 200 projects and initiatives, with the largest share for the countries of Central Asia. At the country level, the largest volumes of foreign aid in absolute terms between 2016 and 2019 were committed (in descending order) to Kazakhstan, Tajikistan, Ukraine, Serbia, and Belarus, with each country attracting more than USD 100 million.

42. Between 2016 and 2019, five multilateral development banks committed a total of USD 1,732 million in support for renewable energy projects in all of the focus countries except Armenia, Azerbaijan, Moldova and Montenegro (and the Russian Federation?). The European Bank for Reconstruction and Development (EBRD) committed the majority share (54%), followed by the World Bank (18%), the European Investment Bank (EIB) (12%), the Asian Development Bank (ADB) (9%) and the Asian Infrastructure Investment Bank (AIIB) (6%) (see Figure 6.6). Typically, multilateral development banks have provided foreign aid in the form of debt (both concessional and non-concessional) and sometimes equity, often accompanied by grants for technical assistance.

43. Climate funds provide finance for non-Annex I Parties under the United Nations Framework Convention on Climate Change (UNFCCC). This covers all focus countries except for Belarus, the Russian Federation and Ukraine. The Green Climate Fund (GCF) was the largest climate funder, followed by the CIF and GEF. Between 2016 and 2020, the GCF disbursed USD 208 million for renewable energy projects in the region, which also attracted co-financing of USD 888 million from other sources. The GCF’s largest renewable energy investment in the region was the Renewable Energy Finance Facility for Kazakhstan (KazREF), approved by the GCF and the EBRD in 2017.

44. Several other environmental funds provided support for renewable energy projects during 2017-2021. These included the Green for Growth Fund (GGF), a specialised fund for financing renewable energy, which covers South-East Europe and the Caucasus, as well as the Western Balkans Investment Framework (WBIF), an EU regional blending facility supporting EU enlargement and socio-economic development in South-East Europe. The GGF financed three projects in the region during 2017-2021. In 2021, it provided an equity investment of EUR 3.5 million (USD 3.98 million) to partially fund the construction and operations of a 36 MW wind farm near the village of Bogoslovec in North Macedonia.

45. As of early 2022, one of the 17 focus countries had introduced its own taxonomy, and three more had announced plans to do so. In September 2021, the government of the Russian Federation adopted the taxonomy for green projects developed by the country’s Ministry of Economic Development. The taxonomy was accompanied by standards for green financial instruments and a methodology to verify the conformity of such instruments.

VIII. Current thinking about the future of renewables

46. The region-specific drivers for the deployment of renewable energy are climate change, energy security, health and air quality and energy poverty:

- The decarbonization of the energy sector is central to achieving net-zero emissions by 2050, and renewable energy is going to play a key role. In Eastern Europe and Central Asia, electricity and heat generation were the largest source of greenhouse gases, accounting for almost 50% of all energy-related CO₂ emissions. Therefore, decarbonizing energy production via the transition to renewable power generation and heat production is critical for achieving their emission reduction targets
- Belarus, the Republic of Moldova, Georgia, and Armenia produced themselves less than a third of domestic total energy supply in 2019. In the same year, the entire natural gas used in Moldova was imported, with 99% from the Russian Federation. About 66% of this natural gas went to the energy sector to be converted into electricity and heat. Renewable energy could, therefore, provide a secure alternative to diversify their energy supply and protect against widely fluctuating natural gas and oil prices
- The focus region combines the most polluted spots in Europe, such as Central Balkans, Eastern Ukraine, and the southern part of Central Asia. Household and ambient air pollution both play an equal role in the suboptimal state of air quality in the region
- Health and air quality is one of the key drivers of renewable energy uptake. For example, around 70% of Kazakhstan's electricity is produced by coal-powered plants, combined with coal combustion for heating in winter, resulting in grey sky in cities and towns from air pollution and smog. Such high levels of ambient air pollution cause annually more than 10,000 premature deaths per year across Kazakhstan, resulting in costs of USD 10.5 billion
- Many countries in the region could only afford space heating for one room in the dwelling and only for very few hours per day. Even though all countries in the region have access to electricity, the power supply is not always reliable and sufficient to meet the demand.

47. Barriers to renewable energy uptake in the region include the low tariffs for fossil-based energy, the competition with other energy sources (such as nuclear power plants), public opposition, and the uncertainty associated with the long-term financial planning (following the expiration of the project purchase agreement).

48. Scaling up the deployment of renewable energy in the focus region requires providing sufficient capacity to balance the intermittent supply (from intermittent renewables) with demand, especially during peak hours, as well as sufficient capacity of the national power grids to integrate the increasing volume of variable renewable energy. Only a few countries in the region possess at least partial manufacturing or assembly capacity of renewable energy technologies, such as PV panels, wind turbines, efficient stoves, and others, which reduces the economic value for the country. To address this barrier, industrial and investment policy action should be taken to promote local producers of renewable energy equipment as well as renewable energy project developers to use this local equipment. The economic crisis associated with the COVID-19 pandemic offers an opportunity to include renewable energy development in national recovery plans. Such measures could bring numerous co-benefits, such as better health, new economic opportunities, additional jobs, and improved energy security. For instance, in Central Asia, the World Bank planned to proceed with a resilient recovery, which prioritizes investments that facilitates a green, climate-smart economic transition.

Annex I

Share of modern renewables in total final energy consumption (%) in the 17 focus countries, 2019

<i>Country</i>	<i>Total energy (Mtoe)</i>	<i>Renewable energy share (%)</i>
Albania	2.09	40%
Armenia	2.46	10%
Azerbaijan	10.8	1.6%
Belarus	19.11	7.8%
Bosnia and Herzegovina	4.29	37%
Georgia	4.59	25%
Kazakhstan	41.62	1.7%
Kosovo	1.57	26%
Kyrgyzstan	3.5	28%
Montenegro	0.8	39%
North Macedonia	1.98	16%
Republic of Moldova	3.07	22%
Russian Federation	521.44	3.2%
Serbia	9.05	22%
Tajikistan	3.19	39%
Turkmenistan	18.09	0.06%
Ukraine	49.66	7.4%
Uzbekistan	30	1.6%

Annex II**Installed renewable power capacity, 2021**

<i>Country/area</i>	<i>Hydro (MW)</i>	<i>Marine (MW)</i>	<i>Wind (MW)</i>	<i>Solar (MW)</i>	<i>Bioenergy (MW)</i>	<i>Geothermal (MW)</i>	<i>Total (MW)</i>
Albania	2289			22	1		2312
Armenia	1336		3	183	0		1522
Azerbaijan	1152		67	43	45		1308
Belarus	96		112	269	124		601
Bosnia Herzgovina	1786		135	53	3		1977
Georgia	3439		21	1			3461
Kazakhstan	3066		1170	2834	16		7086
Kosovo	95		137	10			242
Kyrgyzstan	3684						3684
Moldova Rep	64		51	8	6		130
Montenegro	697		118	7			821
North Macedonia	822		37	94	10		963
Russian Fed	51145	2	1955	1661	1373	81	56217
Serbia	2483		398	52	31		2964
Tajikistan	5274						5274
Turkmenistan	2						2
Ukraine	4823		1761	8062	275		14921
Uzbekistan	2043		1	104			2147