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Exchange of experiences on how to increase the uptake of renewable energy

Status and perspectives for renewable energy in the ECE region

Note by the secretariat

Summary

The United Nations Economic Commission for Europe (ECE) Group of Experts on Renewable Energy (GERE) is mandated to focus on activities directed toward the achievement of the energy related Sustainable Development Goal - SDG7, including substantially increasing the share of renewable energy in the global energy mix.

Despite the great potential for renewable energy deployment in the ECE region, many countries face challenges to uptake renewable energy. ECE countries with well-established renewable energy markets can serve as examples for the other countries in the region with unexploited renewable energy markets.

This paper is an abstract of a report prepared by dena (the German Energy Agency) on the Status and perspectives of renewable energy development in the ECE region. Its recent update provides an overview of renewable energy deployment and policymaking in the ECE region. It points out recent trends and developments in both the deployment of different renewable energy technologies as well as supporting policies in ECE member States. This is a basis for discussion and exchange of experiences on renewable energy among ECE member countries and informs policymakers on the key role of renewable energy in the transition to a more sustainable energy supply. In turn, this will help to achieve the United Nations Sustainable Development Goals (SDGs).



I. Overview

1. The United Nations Economic Commission for Europe (ECE) region comprises 56 countries in Europe, North America and Asia with a total population of 1.3 billion. It accounts for 42% of global GDP¹ and 35% of global carbon emissions from fossil fuel use. The region is geographically, economically and culturally highly diverse. This is also true for the energy systems in the ECE region, which are characterised by differences in resource availability, market design, regulatory and policy framework as well as infrastructure.

2. Renewable energy sources include hydropower, wind, solar photovoltaic (PV), solar thermal, geothermal, ocean energy (tide/wave), renewable municipal waste, solid biofuels, liquid biofuels and biogas,² which can be utilised for various applications including electricity generation, heating/cooling, as well as mobility. Renewable electricity generation plays a particularly prominent role as it provides the basis for the dissemination of renewable energy in the other sectors of energy use (sector coupling). The presented analysis, therefore, emphasises the status quo of electricity generation from renewable energy sources. Within this context, the report takes an in-depth look at PV and wind energy, as they have been the most rapidly expanding technologies in recent years. This has created a particularly dynamic market and policy development.

II. Status quo of renewable energy deployment

3. Various drivers lead to a country's decision to take up renewable energy. In their efforts to combat climate change, countries, regions, and institutions in the ECE region came forward with pledges to reach climate neutrality or at least substantially reduce their carbon emissions in the years leading up to 2050. Consequently, the interest in renewable energy sources is stronger than ever. In addition to climate change mitigation, renewable energy also holds other environmental benefits, such as the reduction of air pollution, which has been an important driver as well.

4. Within the last decade, economies of scale have also driven down the costs of various renewable energy technologies, drastically improving their economics. In particular, costs for solar and wind power technologies have declined rapidly. Today, "more than half of the renewable capacity added achieves lower power costs than the cheapest new coal plants".³ In fact, "for projects with low-cost financing that tap high-quality resources, solar PV is now the cheapest source of electricity in history".⁴ Aligning environmental benefits with economic realities, this development is another major driver for the deployment of wind and PV assets for electricity generation.

5. In the aftermath of the COVID19-pandemic, economic recovery has also been high on the agenda of political decision-makers. In an effort to connect recovery programs with necessary infrastructure investments, renewable energy projects have gained even more interest. Frequently, this is coupled with intentions to enable long-term economic growth through the establishment of new, future-proof industries and value chains.

6. In addition to environmental and economic arguments, the role of renewable energy in improving the security of energy supply has become more important. As generating energy from renewable sources is local and largely independent from global fuel markets, it reduces dependencies on energy imports, increasing a country's energy security. By diversifying the national energy mix, it further increases energy security.

7. PV and wind energy markets have expanded dynamically between 2017 and 2020, with noticeably higher relative growth than other renewable energy sources.

¹ GDP, PPP (constant 2017 international USD).

² In line with the Tracking SDG7 The Energy Progress Report 2021 (IEA, IRENA, UNSD, World Bank, WHO 2021)

³ IRENA 2020

⁴ IEA 2020

8. Looking at PV deployment in the ECE region, the median market growth rate between 2017 and 2020 reached 17.9%. The share of total electricity generation capacity remained relatively low, at 8.3%. Among the ECE member States, Poland, Ukraine, Hungary, Spain, Cyprus, and the Netherlands show high growth rates with significant market penetration, therefore qualifying as booming PV markets. ECE countries with emerging PV markets include Kazakhstan, Armenia, Estonia, North Macedonia, Finland and Sweden. Israel, Slovakia, Slovenia, Croatia, Canada and Belarus have underdeveloped PV markets. The United Kingdom, Greece, Italy, Belgium, Germany and Malta constitute as saturating PV markets in the ECE region. All have high market penetration but relatively low market growth rates.⁵

9. Looking at wind energy deployment in the ECE region between 2017 and 2020, the median annual market growth rate was lower than that of PV (7.3%). However, in 2020, wind power had a higher median market share in the ECE region (11.3%) than PV (8.3%). Belgium, Greece, Sweden, the Netherlands, Croatia, Montenegro, France, Ireland as well as the United Kingdom show above-median growth rates in combination with above-median market shares. Within the ECE region, these countries represent thriving wind power markets. Denmark qualifies as a saturated wind power market, alongside Germany, Portugal, Spain, Lithuania, Romania, Poland, Finland, Austria and Estonia. On the other side of the spectrum, several ECE member States qualify as underdeveloped wind power markets with below-median market shares and below-median growth rates. Italy, Canada, Czech Republic, North Macedonia, Bulgaria, Cyprus, Latvia and Hungary fall into this category. Countries with emerging wind power markets are beginning to tap into their wind resources with a still below-median market share but above-median growth rate. Bosnia and Herzegovina, Serbia, Kazakhstan, Ukraine and Norway, Belarus, Luxembourg, Türkiye and the United States belong to this group.

III. Barriers and hindrances to the uptake of renewable energy

10. As mentioned in section II, renewable energy is gaining traction in the ECE region. However, deployment figures are still not in line with the required speed to reach a carbon-neutral energy system by 2050, a prerequisite to achieving the global climate targets. Various barriers hinder the market penetration of renewable energy throughout the region.

11. A vision, clear political commitment and a roadmap outlining the pathway to a new energy system are prerequisites for successful and sustainable deployment of renewable energy. Many countries in the ECE region have not yet devised and implemented a comprehensive renewable energy strategy, hampering the confidence of potential investors and inhibiting truly system-wide planning.

12. The economic viability of renewable energy projects has improved vastly over the last years. Despite this competitiveness, renewable energy is not economically attractive throughout the ECE region. A range of factors impedes the economic attractiveness of renewable energy projects. Market-distorting subsidies (particularly for fossil fuels), misaligned taxes and levies as well as instable revenue flows hamper the economic viability. Currency and political risks lead to high interest rates, compromised project bankability and, subsequently, the unavailability of investment capital.

13. Another prevailing challenge to achieving further market penetration of renewable energy technologies is the capability of heating and power grids to integrate fluctuating renewable energy.

14. A lack of awareness, up-to-date knowledge and capacities is still far spread among energy sector stakeholders in the ECE region. Unawareness of the importance and viability

⁵ This qualification of market status is relative to the other ECE member States, thus does not follow a definition that is constant over time. It also needs to be understood as a snapshot that does not say anything about the fulfilment of renewable energy potential. Resource availability has not been considered in this analysis. Rather, the categorisation is a result of member States market design.

of renewable energy sources can create a lack of public acceptance of renewable technologies.

IV. Renewable energy policymaking in the ECE region

15. Specific policy schemes are required to address the barriers and hindrances listed in section III and ultimately facilitate market entry, system integration and market growth of renewable energy. Annex I contains a list of the application of renewable energy promotion schemes in the electricity sector in the ECE region. Evidently, the ECE member States have introduced a variety of promotion schemes throughout the years.

16. Annex II gives an overview of ECE countries that have introduced policy and regulatory measures as well as financial support schemes for promoting renewable energy in the heat market. Out of 52 analysed ECE countries, 47 promote renewable heating at the political and financial levels. This includes binding demand-side regulations such as application quotas or installation requirements as well as supply-side measures (subsidies, low interest loans, tax regulations) or a combination thereof. Overall, solar thermal energy receives the most support.

V. Policy implementation in progress: 2021/2022 Hard Talks

17. In order to support the development of sound renewable energy policies throughout the region, a series of four ECE Renewable Energy Hard Talks (Hard Talks) were held in the framework of the ECE Re-Uptake Project with selected ECE member States (Albania, Georgia, Serbia and Moldova) in 2021 and 2022.

18. The Renewable Energy “Hard Talk” is a discussion format on current topics of renewable energy held with relevant stakeholders of the participating member States of the ECE and organized by the ECE secretariat and partner organizations. The goal of the Hard Talk is to identify the best methods for realizing the potential of renewable energy by identifying key barriers that block private sector investment, as well as creating a well-functioning and stable system for the development of renewable energy. Hard Talks involve all interested government agencies, parliament, private investors, energy producers and consumers, financial and research institutions, NGOs, and international organizations. Key players in the field of energy discuss key issues, determine priorities and offer concrete policy recommendations to overcome political, legal, regulatory, and technical barriers and to tap the untapped potential of renewable energy.

19. Within this new round, a first Hard Talk dedicated to Albania was held remotely on 6-7 July 2021. The Hard Talk focused on the uptake, integration and harmonization of renewable energy with the electricity network in Albania. Key issues, challenges, solutions and recommendations regarding network integration, renewable policy support and bankability of renewable projects were discussed and refined. The Hard Talk is intended to speed up existing processes to further progress renewable energy deployment, diversification and security of supply and the development of an attractive market for renewable energy in Albania.

20. A second Hard Talk dedicated to Georgia was held virtually on 12-13 October 2021. The Hard Talk focused on building support for investments in renewable energy in Georgia. The Hard Talk focused on ways to increase support and attractiveness for investments in renewable energy in Georgia by looking into the policy landscape, market structure and public support for the sector. The aim was to (1) mobilize stakeholders (local and external) to discuss concrete actions and increase their individual and collective impact and (2) provide recommendations to actors in and outside Georgia, which could help bolster investment in renewable energy. For this, key bottlenecks, drivers to change, solutions and recommendations were explored.

21. A third Renewable Energy Hard Talk dedicated to Serbia was held remotely on 16-17 November 2021. The Hard Talk Serbia: The Path Ahead, Net Metering and Auctions focussed on renewable energy support mechanisms in Serbia with a specific focus on the

recent net metering scheme and the upcoming renewable energy auctions. Key issues, challenges, solutions and recommendations regarding renewable energy support schemes (including the net-metering scheme) as well as renewable energy auctions were discussed and refined. The Hard Talk was intended to speed up existing processes to further progress renewable energy deployment, diversification and security of supply and the development of an attractive market for renewable energy in Serbia.

22. A fourth and final Hard Talk titled “Renewables, Resilience and Flexibility Options in the Republic of Moldova” was held in Chisinau, Moldova, on 14 June 2022. It discussed known and potential options and challenges to increase system flexibility, with the immediate diversification of energy supply and expansion of domestic renewable energy production as an underlying objective. The aim was to identify and discuss potential flexibility measures and options that can help alleviate immediate issues with grid control and balancing with an outlook to prepare the energy network for increased shares of variable renewable energy. The event provided information on available options, identified and discussed challenges and presented and refined potential solutions.

23. The country-specific concept notes, policy recommendations as well as lists of participating parties are available for download on the ECE website.⁶

⁶ <https://unece.org/sustainable-energy/renewable-energy/unece-renewable-energy-hard-talks-unece-countries>

Annex I

Renewable energy promotion schemes and measures in the electricity sector in ECE member states⁷

Country	Official expansion goals	Grid access	Grid access with capacity limits	Priority feed-in for renewable energy	Feed-in tariff or premium	Renewable portfolio standard / quota system	Green certificates	Auctions	Tenders	Net metering / net billing	Investment incentives / tax benefits / subsidies
Albania											
Armenia											
Austria											
Azerbaijan											
Belarus											
Belgium											
Bosnia & Herzegovina											
Bulgaria											
Canada											
Croatia											
Cyprus											
Czech Republic											
Denmark											
Estonia											
Finland											
France											
Georgia											
Germany											
Greece											
Hungary											
Iceland											
Ireland											
Israel											
Italy											
Kazakhstan											
Kyrgyzstan											
Latvia											
Lithuania											
Luxembourg											
Macedonia											
Malta											
Moldova											
Montenegro											
Netherlands											
Norway											
Poland											
Portugal											
Romania											
Russia											
Serbia											
Slovakia											
Slovenia											
Spain											
Sweden											
Switzerland											
Tajikistan											
Türkiye											
Turkmenistan											
Ukraine											
United Kingdom											
United States											
Uzbekistan											
52	45	33	15	25	43	13	8	14	18	14	44

⁷ Source: Status and perspectives of renewable energy development in the ECE region, Dena, 2022

Annex II

Renewable energy promotion schemes and measures in the heat sector in ECE member states⁸

Country	policies and/or regulatory measures (independent of financial schemes)	Financial support scheme(s) in place	Biogas/Bio mass	Solar thermal	Geothermal /heat pumps
Albania	✗	✗	✗	✗	✗
Armenia	✓	✗	✗	✗	✗
Austria	✓	✓	✓	✓	✓
Azerbaijan	✗	✗	✗	✗	✗
Belarus	✗	✗	✗	✗	✗
Belgium	✓	✓	✓	✓	✓
Bosnia and Herzegovina	✓	✗	✗	✗	✗
Bulgaria	✓	✓	✓	✓	✓
Canada	✓	✓	✓	✓	✓
Croatia	✓	✓	✗	✗	✗
Cyprus	n/a	✗	✗	✗	✗
Czech Republic	✓	✓	✓	✗	✓
Denmark	✓	✓	✓	✓	✓
Estonia	n/a	✓	✗	✓	✓
Finland	✗	✓	✓	✓	✓
France	✓	✓	✓	✓	✓
Georgia	n/a	✗	✗	✗	✗
Germany	✓	✓	✓	✓	✓
Greece	✓	✓	✓	✓	✓
Hungary	✓	✓	✓	✓	✓
Iceland	n/a	✗	✗	✗	✗
Ireland	✓	✓	✓	✓	✓
Israel	✓	✗	✗	✗	✗
Italy	✓	✓	✓	✓	✓
Kazakhstan	✗	✓	✗	✗	✗
Kyrgyzstan	✗	✗	✗	✗	✗
Latvia	n/a	✓	✓	✗	✗
Lithuania	n/a	✓	✓	✓	✓
Luxembourg	n/a	✓	✓	✓	✓
Malta	n/a	✓	✗	✓	✓
Moldova	n/a	✗	✗	✗	✗
Montenegro	✗	✓	✓	✓	✗
Netherlands	✓	✓	✓	✓	✓
North Macedonia	✗	✗	✗	✓	✗
Norway	✓	✓	✓	✓	✓
Poland	✓	✓	✓	✓	✓
Portugal	✓	✗	✗	✗	✗
Romania	✓	✓	✓	✓	✓
Russian Federation	✗	✗	✗	✗	✗
Serbia	✓	✓	✗	✓	✗
Slovakia	✓	✓	✓	✓	✓
Slovenia	n/a	✓	✓	✓	✓
Spain	✓	✓	✓	✓	✓
Sweden	✓	✓	✓	✓	✓
Switzerland	✓	✓	✓	✓	✓
Tajikistan	✓	✗	✗	✗	✗
Turkey	✗	✗	✗	✗	✗
Turkmenistan	✗	✗	✗	✗	✗
Ukraine	✓	✓	✓	✓	✓
United Kingdom	✓	✓	✓	✓	✓
United States of America	✓	✓	✓	✓	✓
Uzbekistan	✓	✗	✗	✗	✗

⁸ Source: Status and perspectives of renewable energy development in the ECE region, Dena, 2022