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Committee on Sustainable Energy

Group of Experts on Cleaner Electricity Systems

Eighteenth session

Geneva, 19-20 September 2022

Item 12 of the provisional agenda

Adoption of the report and close of the meeting

Report of the Group of Experts on Cleaner Electricity Systems on its eighteenth session

I. Introduction

1. The eighteenth session of the Group of Experts on Cleaner Electricity Systems was held on 19-20 September 2022.
2. This report summarizes the discussions of the Group of Experts at its eighteenth session. All the documents and presentations of the session are available on the United Nations Economic Commission for Europe (ECE) website.*

II. Attendance

3. The session was attended by more than 150 experts from the following ECE member States: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, Czechia, Estonia, Finland, France, Georgia, Germany, Hungary, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Luxembourg, Malta, Monaco, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, Serbia, Slovakia, Spain, Tajikistan, United Kingdom of Great Britain and Northern Ireland, United States of America and Uzbekistan.
4. Experts from Argentina, Bangladesh, Brazil, China, Egypt, India, Mongolia and Nigeria participated under Article 11 of the Commission's Terms of Reference.
5. From the United Nations system, Specialized Agencies, intergovernmental organizations and International Financing Institutions, representatives of the Asian Development Bank, Asian Infrastructure Investment Bank, Economic and Social Commission for Asia and the Pacific, Economic Commission for Latin America and the Caribbean, International Atomic Energy Agency, European Bank for Reconstruction and Development, International Renewable Energy Agency, and the United Nations Development Programme, also participated. The European Union was represented.

* <https://unece.org/info/Sustainable-Energy/events/368534>



6. The meeting also was attended by representatives of non-governmental organizations, academia and the private sector, as well as by independent experts.

III. Adoption of the agenda

Documentation: ECE/ENERGY/GE.5/2022/1 – Annotated provisional agenda.

7. The Group of Experts adopted the Agenda as contained in ECE/ENERGY/GE.5/2022/1.

IV. Opening remarks

8. In his opening remarks, the Chair, Mr. Jim Robb, shared his reflections on the challenging situation in the ECE region resulting from a range of issues, including the COVID-19 pandemic, the current geopolitical crisis, supply chain disruptions, and climate change. The Chair noted that this year's meeting was delivered in cooperation with other Groups of Experts, in particular with the Group of Experts on Energy Efficiency and the Expert Group on Resource Management. The Chair observed that it would be beneficial to establish such close cooperation with all the Groups of Experts reporting to the Committee on Sustainable Energy. He noted that all have the same goal to help member States attain the 2030 Agenda for Sustainable Development and the Paris Agreement. The Group's session preceded the thirty-first session of the Committee on Sustainable Energy (Geneva, 21-23 September 2022) and was part of the ECE Sustainable Energy Week 2022.

V. Election of officers

9. The Group of Experts elected Mr. Jim Robb as Chair with effect from the close of the eighteenth session until the close of the twentieth session. The Chair of the Group of Experts is *ex officio* also a Vice-Chair of the Committee on Sustainable Energy.

10. The Group of Experts elected Mr. Baurzhan Umirzakov (Kazakhstan), Mr. Antoine Herzog (Électricité de France), Mr. Andrew Minchener (The International Centre for Sustainable Carbon) and Mr. King Lee (World Nuclear Association) as Vice-Chairs with effect from the close of the eighteenth session until the close of the twentieth session.

11. The Group of Experts was informed that the Vice-Chairs Mr. Vladimir Budinsky (Czechia), Ms. Djamila Aitmatova (Kyrgyzstan), Mr. Furugzod Usmonov (Tajikistan), Mr. Jonathan Gibbins (United Kingdom) and Mr. Sylvain Clermont (Hydro-Québec Canada) will continue serving in the Bureau until the close of the nineteenth session.

12. For the sake of ensuring continuity of the Bureau, the Group of Experts decided to continue with the current practice of not electing all the officers at the same meeting.

VI. Activities and priorities of the Committee on Sustainable Energy and matters for consideration by the Group of Experts

13. The Secretary of the Committee on Sustainable Energy provided an overview of the thirtieth session of the Committee on Sustainable Energy, 22-24 September 2021, and the activities that followed. The Group of Experts was also informed about the collaborative work on cross-cutting activities of Groups of Experts under the Committee on Sustainable Energy that is based on the following pillars: (a) reducing the environmental footprint of the energy sector, (b) deep transformation of the energy system, and (c) sustainable resource management.

VII. Attaining carbon neutrality in the United Nations Economic Commission for Europe region

Documentation: ECE/ENERGY/GE.5/2022/3 – Attaining carbon neutrality in the ECE region: project update

14. Since 2020, the Group of Experts has been implementing a project on enhancing the understanding of the implications and opportunities for moving to carbon neutrality in the ECE region across the power and energy intensive industries by 2050 (Carbon Neutrality project¹). This Project, which was initiated in May 2020 with a kick-off workshop led by the ECE Task Force on Carbon Neutrality (Task Force), has followed the recommendations made by the Group of Experts at its fifteenth session.

15. The Group of Experts reported that under the scope of the Carbon Neutrality Project, the Task Force delivered fourteen capacity-building workshops and multi-stakeholder dialogues to raise awareness about the potential of low- and zero-carbon technologies and their interplay to attain carbon neutral energy systems in the ECE region; three technology briefs on carbon capture, use and storage (CCUS), hydrogen, and nuclear power, as well as a brief on carbon neutral energy intensive industries; three publications on the Technology Interplay under the Carbon Neutral Concept, the Life Cycle Assessment of Electricity Generation Options, and the Geologic storage of CO₂ in Eastern Europe, the Caucasus and Central Asia. The Group of Experts proactively participated in developing and disseminating the Carbon Neutrality project's findings at high level international events, such as the UN High Level Dialogue on Energy in New York, COP26 in Glasgow, the Almaty Energy Forum, etc.

16. The panel on building a resilient energy system in the ECE region through low- and zero-carbon technology interplay discussed how the interplay between flexible clean coal, natural gas and renewable energy, CCUS, advanced fossil fuels technologies for power generation, including high-efficiency, low-emissions (HELE) technologies, nuclear power and hydrogen could be improved. The panellists concluded that the region needs to design and implement a resilient energy system that ensures that energy makes an optimal contribution to a country's social, economic, and environmental development, and that is built on the following three pillars: (a) energy security; (b) affordability; and (c) environmental sustainability.

17. The panel on deep electrification of the energy system in the ECE region discussed the implications of the electrification of the transport and buildings sectors on the electricity system and the ways in which inter-sectoral cooperation can be improved. The panelists also discussed the challenges that grid operators will face as the deep electrification of the energy system progresses. The experts concluded that the current grid networks are not ready for deep energy system electrification and that policy support and investments are needed to increase the energy storage capacity, deploy distributed energy sources, and scale-up smart grids. They also highlighted that a strategic approach would enable resilient energy systems capable of meeting the expected electricity demand and of supporting the trend of deep electrification of the transport and buildings sectors.

18. The Group of Experts:

(a) Welcomed the work under the scope of the Project on “Enhancing understanding of the implications and opportunities of moving to carbon neutrality in the ECE region across the power and energy intensive industries by 2050” (Carbon Neutrality Project) and expressed gratitude to the Task Force on Carbon Neutrality (“Task Force”) for its comprehensive work in developing the ECE Carbon Neutrality Toolkit that supports policymakers across the ECE region in making informed decisions towards implementation of the 2030 Agenda and the Paris Agreement;

(b) Requested the Task Force to adopt a subregional and a national approach in disseminating the findings and recommendations from the Carbon Neutrality Project. The Group of Experts welcomed the preliminary subregional work on exploring what is needed

¹ Carbon Neutrality Toolkit, visit website: <https://carbonneutrality.unece.org/>

to attain carbon neutral energy systems in Central Asia. The Group of Experts also expressed its interest in helping Ukraine to rebuild its energy system in accordance with the carbon neutrality concept.

(c) Took note of the Committee on Sustainable Energy's recommendation to lead on the issue of energy system transformations, in cooperation with the other Groups of Experts reporting to the Committee and to explore technology interplay, including technical and societal nexus areas for the range of technologies including low-carbon technologies (coal with CCUS, gas with CCUS), zero-carbon technologies (renewable energy, nuclear power), negative-carbon technologies (bioenergy with carbon capture and storage (BECCS), direct air capture with carbon storage (DACCS)), as well as innovative solutions (hydrogen);

(d) Concluded that electricity continues to be a key for transformation of the energy systems. Forecasts indicate that demand for electricity will grow substantially, making it the most important source of energy in the 21st Century. Electricity demand is projected to triple by 2050 as sectors such as transport and buildings continue to electrify. The round table on "Deep electrification of the energy system in the ECE region. Can grid impede electrification?" discussed the implications of the increasing electrification of the transport and buildings sectors on the electricity system and proposed the next steps in designing more resilient electricity systems. The Group of Experts recommended to policymakers to: (a) invest in reliable low- and zero-carbon electricity capacity; (b) promote deployment of distributed energy sources and smart grids; and (c) develop and deploy energy storage solutions, etc;

(e) Agreed to launch a cross-sector activity and to cooperate with the ECE Group of Experts on Energy Efficiency, the ECE Sustainable Transport Division and the ECE Housing and Land Management Division, as well as with analytical institutions such as the Electric Power Research Institute (EPRI), to help countries enhance their understanding of the implications of the electrification of the transport and buildings sectors on their electricity systems;

(f) Welcomed the proposal to launch the ECE Platform on Resilient Energy Systems (to be considered by the Committee on Sustainable Energy at its thirty-first session (CSE-31/2022/INF.2)). The Group of Experts expressed appreciation to the Bureau of the Group of Experts for joining forces with the Bureaux of the other Groups of Experts operating under the Committee to draft the report on Building Resilient Energy Systems: Technical Considerations and Actions for Achieving Greater Energy Security, Affordability and Net-zero in the ECE Region (CSE-31/2022/INF.2). The Group of Experts noted with appreciation that the technical recommendations on how to design and implement resilient energy systems in the ECE region were provided in the report;

(g) Decided to support activities under the proposed ECE Platform on Resilient Energy Systems and collaborate closely with the other Groups of Experts to advance this timely and important topic.

VIII. Round table on financing clean energy technologies

Documentation: ECE/ENERGY/2022/5 – Financing clean energy infrastructure

19. The findings from the Carbon Neutrality Project show that all low- and zero-carbon technologies will be needed to attain carbon neutrality by 2050 and to limit global warming to 1.5-2°C. The dialogue was launched between the ECE expert community and the global financial community on developing an investment framework to facilitate the development and deployment of all low- and zero-carbon technologies (including fossil fuels with carbon capture, use and storage (CCUS), capture and use or conversion of methane released during fossil fuel extraction, low-carbon and renewable hydrogen production, nuclear power, and renewable energy). Representatives of the Asian Infrastructure Investment Bank, the Asian Development Bank, the European Bank of Reconstruction and Development and the Green Climate Fund discussed findings from the analysis on the current pattern in the distribution of climate finance with a focus on Kazakhstan and discussed their perspectives and strategies when financing clean energy technologies. Recommendations from that technical dialogue

will feed into the ECE Regional Forum “Towards COP27: UNECE Regional Forum on Climate Initiatives to Finance Climate Action and the Sustainable Development Goals – Regional cooperation on enhancing sustainable management and financing for the critical raw materials required for low-carbon transitions² that will take place on 17 October 2022.

The Group of Experts:

(a) Discussed the findings from the activity on technology interplay under the carbon neutral energy system concept and concluded that deployment of all low- and zero-carbon technologies will be needed to attain carbon neutrality by 2050. The Group of Experts and the Task Force highlighted that the energy transition in the ECE region will require both policy support and private and public sector financing for low- and zero-carbon technologies, including CCUS, hydrogen, and advanced nuclear power;

(b) Concluded that strengthened international cooperation is necessary to facilitate access to clean energy research and technologies, including renewable energy, energy efficiency, nuclear power, and advanced and more environmentally friendly fossil fuel technologies, and to promote investments in modernization of energy infrastructure and low- and zero-carbon technologies. Joint and well-balanced national power systems could be enhanced through strategic partnerships and cross-border energy cooperation, which would take into account the specificity of national power sectors;

(c) Encouraged continued cooperation with the Expert Group on Resource Management to facilitate a dialogue with international financial institutions and other relevant stakeholders on financing low- and zero-carbon technologies and the critical raw materials required for low-carbon energy transitions. The Group of experts deemed such cooperation necessary to be in a position to adequately advise the Committee on Sustainable Energy on potential future work in this area;

(d) Encouraged multi-stakeholder dialogue on the potential role of ECE in setting standards for financing guidelines for low- and zero-carbon technologies and critical raw materials aiming to help unlock climate financing for all low- and zero-carbon technologies and deliver on the climate targets of the Paris Agreement.

IX. Round table on digitalizing electricity systems

Documentation: ECE/ENERGY/GE.6/2022/4-ECE/ENERGY/GE.5/2022/4 – Digitalization: Accelerating the Electricity System Transformation. Joint Paper by the Task Force on Digitalization in Energy of the Group of Experts on Energy Efficiency and the Group of Experts on Cleaner Electricity Systems

20. Digital solutions enable advances in connectivity, data, and analytics, and offer the potential to accelerate implementation of the 2030 Agenda. Digital technologies, as a means to coordinate, analyze, and interpret increasing quantities of energy system data, user preferences, and system requirements, may facilitate the complex system-level optimization of a decentralized energy sector. They will be at the core of multi-sector electrification as the world moves towards electrification of the transport and buildings sectors, grid edge technology solutions, electrification of industrial processes, etc.

21. The Group of Experts on Energy Efficiency and the Group of Experts on Cleaner Electricity Systems joined forces under the Task Force on Digitalization in Energy of the Group of Experts on Energy Efficiency to explore the opportunities and side effects of digitalizing electricity systems, with a focus on increased system efficiency, innovative business models, and effective policymaking. The session discussed the opportunities and benefits of digitalizing electricity systems, mapped the stakeholders involved, and outlined challenges for consideration by the public authorities, private sector actors, and customers. It also offered recommendations on policies for accelerating transformation of the electricity

² <https://unece.org/info/Sustainable-Energy/events/368377>

system through digitalization, indicating that they should aim to achieve higher levels of efficiency while ensuring security and sustainability of the system.

The Group of Experts:

(a) Expressed appreciation for the close and fruitful collaboration with the Group of Experts on Energy Efficiency and its Task Force on Digitalization in Energy on advancing the digitalization of electricity systems and took note of the document “Digitalization: Accelerating the Electricity System Transformation. Joint Paper by the Task Force on Digitalization in Energy of the Group of Experts on Energy Efficiency and the Group of Experts on Cleaner Electricity Systems” (ECE/ENERGY/GE.6/2022/4, ECE/ENERGY/GE.5/2022/4);

(b) Noted the discussions during the round table on digitalizing electricity systems on the opportunities and challenges of digitalizing electricity systems, with a focus on effective policymaking to increase energy system efficiency. The Group of Experts concluded that digitalization is making energy systems more connected, efficient, reliable, and sustainable, and that the electricity sector being an early adopter of digital technologies has a great potential to contribute to energy system resiliency by applying a portfolio of available digital solutions;

(c) Discussed opportunities and challenges for cybersecurity and privacy and concluded that collaboration between governments, energy sector companies, international organizations, civil society, and academia is essential. The Group of Experts noted the work of the Task Force on Digitalization in Energy, namely the documents on “Digitalization: enabling the new phase of energy efficiency” (GEEE-7/2020/INF.3) and “Policy discussion – Challenges of big data and analytics-driven demand-side management” (GEEE-9/2022/INF.3);

(d) Encouraged continued cooperation with the Task Force on Digitalization in Energy and the Group of Experts on Energy Efficiency and proposed to join forces in conducting research on funding models for the areas in greatest need of attention, such as: big data technology advancement (e.g., natural language processing, digital twin modelling, demand/load forecasting, optimized machine learning, progression of artificial intelligence capabilities), grid resiliency, and infrastructure investment, particularly as it relates to data access, storage, management, and real-time analytics;

(e) Agreed, in line with its mandate, to initiate in-depth work on electricity system resilience and the importance of transmission and distribution grid modernization and digitalization to mitigate the impacts of climate change and adapt to the changing climate. The Group of Experts agreed to also look to identify more large-scale opportunities for load shaping enhancing digitalization.

X. Update on work plan 2022-2023 implementation

Documentation: ECE/ENERGY/2021/8 – Work Plan of the Group of Experts on Cleaner Electricity Systems for 2022-2023.

22. The Chair provided an update on the progress in implementation of the work plan for 2022-2023. The main thematic areas that form the basis for the Group of Experts’ work in the 2022-2023 period include: (a) electricity as a driver for achieving deep transformation of the energy system, (b) technology interplay under a carbon neutral energy system, (c) modernization and decarbonization of electric power systems in ECE subregions, and (d) digitalizing electricity systems.

The Group of Experts:

(a) Noted with appreciation the progress made to implement the work plan for 2022-2023;

(b) Requested the Bureau, in cooperation with the secretariat, to oversee implementation of the work plan for 2022-2023 and explore opportunities to obtain extrabudgetary funds for specific projects, focused on activities related to (a) electricity as a

driver for achieving deep transformation of the energy system, (b) technology interplay under a carbon neutral energy system, (c) modernization and decarbonization of electric power systems in ECE subregions, and (d) digitalizing electricity systems;

(c) Noted the request by the Committee on Sustainable Energy to explore the opportunities and barriers to reforming energy market design towards greater sustainability, including by conducting research on the full cycle of electricity systems in transportation, industry and building management. The Group of Experts concluded that it would consider looking closely in these activities in the next work cycle subject to identification of extrabudgetary resources.

XI. Preparations for the nineteenth session of the Group of Experts

23. The nineteenth session of the Group of Experts on Cleaner Electricity systems will be held on 3-4 October 2023 in Geneva, unless the Group of Experts decides otherwise.

XII. Other business

24. No issues have been signalled to be raised under this item.

XIII. Adoption of the report and close of the meeting

25. The report of the meeting was adopted, including the conclusions and recommendations, subject to any necessary editing and formatting
