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**Economic Commission for Europe**

Committee on Sustainable Energy

Group of Experts on Cleaner Electricity Systems

**Twentieth session**

Geneva, 16-17 September 2024

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

**AS OF 17 SEPTEMBER 2024, 18h00**

 I. Introduction

1. The twentieth session of the Group of Experts on Cleaner Electricity Systems (the Group of Experts) was held during two days from 16 to 17 September 2024.

2. This report summarizes the proceedings of the Group of Experts at its twentieth session. All the documents related to the session are available on the website of the United Nations Economic Commission for Europe (ECE).[[1]](#footnote-2)

 II. Attendance

3. The session of the Group of Experts was live streamed from the United Nations Office at Geneva and was attended in-person by […] participants.

4. Experts from the following ECE member States participated: […].

5. The following United Nations specialized agencies, funds and programmes were in attendance: […].

6. The meeting was also attended by representatives of […] and other international organizations, as well as major groups including non-governmental organizations, local authorities, business and industry, and scientific and technological community, and other stakeholders including independent experts […].

 III. Adoption of the agenda (agenda item 1)

*Documentation:* ECE/ENERGY/GE.5/2024/1 – Annotated provisional agenda

7. In accordance with Rule 7 of the Rules of Procedure of the Commission (E/ECE/778/Rev.5), the first item of the provisional agenda is the adoption of the agenda.

8. The Chair of the Group of Experts presented the annotated provisional agenda for the twentieth session of the Group of Experts as contained in ECE/ENERGY/GE.5/2024/1. The annotated provisional agenda was adopted.

 IV. Opening remarks (agenda item 2)

9. The Chair of the Group of Experts delivered opening remarks welcoming the participants and highlighted the approach to the organization of work for the session.

 V. Election of officers (agenda item 3)

10. The secretariat received the following nominations to stand for election at the twentieth session of the Group of Experts: Mr. Jim Robb (United States of America) as Chair, Mr. King Lee (World Nuclear Association), Mr. Antoine Herzog (Électricité de France) as Vice-Chairs.

11. The Bureau of the Group of Experts (the Bureau) invited Ms. Tatiana Vedeneva (Center for Renewable Energy and Energy Efficiency Development) to join the Bureau of the Group of Experts as Vice-Chair to strengthen its activities.

12. The Group of Experts has the following members to serve on the Bureau:

(a) Until the conclusion of its twenty-first session: Mr. Jon Gibbins (United Kingdom of Great Britain and Northern Ireland), Mr. Furugzod Usmonov (Tajikistan), Mr. Vladimir Budinsky (ZSDNP) and Mr. Sylvain Clermont (DigiTransfo Expertise) as Vice-Chairs.

(b) Until the conclusion of its twenty-second session: Mr. Jim Robb (United States of America) as Chair, Mr. King Lee (World Nuclear Association), Mr. Antoine Herzog (Électricité de France) and Ms. Tatiana Vedeneva (Center for Renewable Energy and Energy Efficiency Development) as Vice-Chairs.

13. The term of office for the elected members of the Bureau is two years.

14. The Chair of the Group of Experts serves as Vice-Chair *ex officio* on the Committee on Sustainable Energy.

 VI. Implementation of the Work Plan of the Group of Experts on Cleaner Electricity Systems for 2024–2025 and its contribution to the activities and priorities of the Committee on Sustainable Energy (agenda item 4)

15. The session was organized as a joint event of the Group of Experts on Cleaner Electricity Systems, the Group of Experts on Energy Efficiency, and the Group of Experts on Renewable Energy (hereinafter collectively referred to as the Groups of Experts).

16. The secretariat provided an update on the implementation of the Work Plan of the Group of Experts for 2024-2025 and an overview of recent activities of the Committee on Sustainable Energy following its thirty-second session, 13-15 September 2023.

17. The Chair of the Group of Experts mentioned specifically the activities undertaken by the Group of Experts that support the creation of favorable conditions for transformation of electricity systems, improve electricity system resilience, explore the impact of electric mobility integration on electric system design and operations, as well as assess the contribution of digitalization to designing cleaner electricity systems. The Chair highlighted the efforts to advance the policy agenda in support of the activities previewed in the Work Plan for 2024-2025 (ECE/ENERGY/2023/9).

18. The Chair also noted joint activities undertaken with other subsidiary bodies of the Committee on Sustainable Energy and cross-sectoral collaboration within the United Nations Economic Commission for Europe (ECE).

19. The following expert discussion addressed issues surrounding the acceleration of just and equitable energy transition, unlocking the potential of digitalization in enhancing the efficiency and resilience of energy systems, promoting renewable energy and energy efficiency through overcoming barriers, including regulatory barriers, investing in capacity building and regional cooperation, establishment of stronger links between energy policy and mechanisms for financing energy infrastructure, notably monetization of the positive externalities of increased efficiency, flexibility, and resilience of energy systems, thus valuing the benefits of decarbonization so that to link it to energy performance-based finance or other forms of financial innovation. The participants also took gender equality and intergenerational justice into consideration. 20. The Group of Experts:

Noted with appreciation the progress made to implement the work plan for 2024-2025.

Requested the Bureau, in cooperation with the secretariat, to oversee implementation of the work plan for 2024-2025 and explore opportunities to obtain extrabudgetary funds for more impactful activities and outputs in support of the implementation of its work plan.

Welcomed the efforts in promoting the respective policy agenda through effective cooperation, outreach, and capacity building taking note of the ongoing plans of the Group of Experts.

Encouraged member States to support activities through in-kind contributions and extrabudgetary funding for more impactful activities and outputs.

Welcomed the support provided to its work by the Regional Adviser.

 VII: Creating favourable conditions for effective transformation of electricity systems (agenda item 5)

*Documentation*: ECE/ENERGY/GE.5/2024/5 – Creating favourable conditions for effective transformation of electricity systems

21. The Group of Experts welcomed the work conducted on raising awareness and helping member States maintain reliability of the electricity system and create the favorable conditions for an effective transformation of the electricity systems.

22. The panel discussed what can be done to create favourable conditions for the transformation of the electricity systems to happen in an efficient, just and equitable realistic way and explored what are the main challenges for such transformation of electricity systems.

23. The Group of Experts:

 (a) Concluded that there is a need for market reforms, where appropriate accelerated project development, and comprehensive grid planning. It also stressed the importance of setting ambitious renewable energy targets, introducing regulatory incentives, and fostering competitive electricity markets through a holistic coordination of all stakeholders. Engaging stakeholders, sharing best practices, and implementing policies that prioritize the transformation of electricity systems is essential for achieving progress in clean energy.

(b) Highlighted the need for the mechanisms that ensure financing for grid upgrades, comprehensive grid planning and accelerated project development. These are the preconditions for effective transformation of electricity systems and successful transition to low and zero-carbon energy mix.

(c) Stressed the importance to continue working on supporting the creation of favourable power market design and financing conditions for the transformation of the electricity systems and agreed to deliver a regional dialogue on the topic and report on its findings at its twenty-first session.

 VIII. Maintaining future electricity supply reliability in the period of transition of five to ten years (agenda item 6)

*Documentation:* ECE/ENERGY/GE.5/2024/4 –Outline for a Roadmap for a Regionally Interconnected Energy System in Central Asia

24. The Group of Experts discussed how various energy assets contribute to maintaining and improving grid reliability, featuring examples from different countries to highlight effective strategies and solutions.

25. The panel concluded that utilities, regulators, and policymakers might prioritize reliability and resilience in the electricity system. It also highlighted that different energy resources impact supply reliability differently: renewable sources like solar, wind, hydro, and geothermal are sustainable and reduce emissions but pose challenges due to their variability. In contrast, fossil fuels and nuclear power provide stable, dispatchable electricity, crucial for baseload demand

26. The panel further concluded that energy storage technologies and smart grid solutions are vital in managing renewable energy variability, with batteries and pumped hydro storage balancing supply and demand. These technologies need continued advancement and supportive policies. It also concluded that demand-side management promotes efficient energy use, reduces peak demand, and integrates distributed resources.

27. The Group of Experts:

(a) Concluded that enhancing energy connectivity by enabling efficient energy exchange, integrating renewables, and enhancing grid flexibility is essential for future supply reliability and emergency response efforts.

(b) Agreed to continue supporting the Committee on Sustainable Energy, in cooperation with other subsidiary bodies, in helping member States attain resilient energy systems.

(c) Welcomed the progress made on building resilient energy systems through scaling renewable energy capacity and cross-regional energy connectivity in Central Asia and requested an update on the regional projects on “Energy connectivity in Central Asia” and the multi-regional project on “Supporting increased energy security and resilience through energy transition” at the twenty-first session.

(d) Recognized the need to prepare the background paper on the full system effects and cost of a resilient and carbon neutral electricity system. It highlighted the need to model the energy system impacts and shifting from the Levelized Cost of Energy (LCOE) which calculates the average cost of generating electricity over the entire lifetime of a power plant, taking into account construction, operation, integration, maintenance, decommissioning and fuel costs, towards understanding the Full Cost of Energy (FCOE) at the system level, which includes energy system costs, environmental costs, societal impact, and policy, regulatory and other enabling environment considerations.

 X. Inter-sectoral cooperation on cross-cutting issues (agenda item 7)

*Documentation:* ECE/ENERGY/GE.6/2024/3-ECE/ENERGY/GE.5/2024/3 – Impact of Artificial Intelligence on the digital and data transformation in the electricity sector

GECES-20/2024/INF.2-GEEE-11/2024/INF.2-GERE-11/2024/INF.2 – Integration of e-mobility into electricity system, and the impact that it has on the latter’s design and operations

GEEE-11/2024/INF.4 – Balancing the electricity supply and demand with Artificial Intelligence (case study)

ECE/ENERGY/154 – Compendium of case studies on digitalization in energy in the UNECE region (ECE Energy Series No.80; advanced version)

 X(a). Integrating energy efficiency and renewable energy in distributed power systems (agenda item 7(a))

28. Delegates discussed cross-cutting perspectives and actions that can be initiated to integrate energy efficiency and renewable energy in distributed power systems.

29. Delegates discussed how decentralized generation can help increasing resilience of energy systems, in particular in rural areas where infrastructure does not allow a higher integration of renewable energy and increase of energy efficiency. A future energy system could be decentralized at all levels – regional, state and local – with widely deployed capacities (including reserved capacities) for alternative energy generation and transmission.

30. The Group of Experts:

(a) Highlighted the need for an integrated approach and a multi-stakeholder dialogue for increasing resilience of energy systems through development and application of renewable and energy efficiency technologies.

(b) Requested member States to use an integrated approach in developing distributed power systems and increase strategic planning for matching needs and available resources to maximize benefits and end use efficiencies.

(c) Noted with appreciation the cooperation among the various Groups of Experts, subsidiary bodies of the Committee on Sustainable Energy, in particular between the Group of Experts on Renewable Energy, the Group of Experts on Energy Efficiency and the Group of Experts on Cleaner Energy Systems.

(d) Encouraged the cross-cutting perspective and action adopted by the three Groups of Experts in integrating energy efficiency and renewable energy in distributed power systems.

X(b). Electrification of mobility: development of infrastructure, integration with grid, resource planning (agenda item 7(b))

31. Delegates were presented with the results of thematic workshops held during 2024, including the inaugural meeting of the Informal Task Force on E-Mobility supported by the Sustainable Transport and Sustainable Energy subprogrammes.[[2]](#footnote-3) [[3]](#footnote-4)

32. Delegates discussed the needs of electrification of mobility on the related development of energy infrastructure, its integration into the electricity grid and required planning of resources for this, along with the issues of accessibility, land use, and location efficiency.  EVs present opportunities to act as assets through vehicle-to-grid (V2G) technology, but challenges such as interoperability, cybersecurity, and smart grid demand management must be addressed.

33. The Groups of Experts:

(a) highlighted the necessity for updates and enhancements to the electricity grid to manage the increased load from EVs and emphasized the importance of integrating smart grid technologies to efficiently handle the demand and distribution challenges posed by the rise in EV usage.

(b) took note on the potential of V2G technology, its benefits (such as providing grid services) but also hurdles (including technological, regulatory, and economic challenges).

(c) recognized the importance of electric mobility in the digital and green transformation and sought to promote cooperation among policymakers, stakeholders, and experts to realize these goals.

[(d) recognized the need to restore infrastructure, including renewable energy facilities, which are out of operation as a consequence of the aggression by the Russian Federation against Ukraine, including the effects of the war due to continuous attacks against critical infrastructure across Ukraine.]

(e) welcomed the establishment of the Informal Task Force on Electric Mobility and supported its initial phase of activities in 2024-2026.

(f) welcomed the implementation of the project by the Regular Programme of Technical Cooperation (RPTC) on “Supporting electric mobility as enabler of the digital and green transformations in the UNECE region” and requested to report on its findings at the next session of the Groups of Experts in 2025.

X(c). Session on Digital and data transformation in the energy sector (agenda item 7(c))

34. Delegates were presented with the assessment on the “Impact of Artificial Intelligence on the Digital and Data Transformation in the Electricity Sector” (ECE/ENERGY/GE.6/2024/3-ECE/ENERGY/GE.5/2024/3). Possible applications of Artificial Intelligence were outlined. An informed discussion on the related potential benefits and challenges followed.

35. As a practical implementation example, the underlying concept, the background information, and the identified industry practice of balancing the electricity supply and demand with Artificial Intelligence were presented in the case study “Balancing the electricity supply and demand with Artificial Intelligence” (GEEE-11/2024/INF.4).

36. Following that, the Task Force on Digitalization in Energy presented an advanced version of its publication entitled “Compendium of case studies on digitalization in energy in the UNECE region” (ECE Energy Series No. 80), leveraging findings and policy recommendations stemming from national case studies on digitalization in energy developed in 2023-2024. Possibilities and limitations for replication of identified good practices in ECE region and beyond were discussed, along with highlighting emerging initiatives in this regard.

37. The Groups of Experts:

(a) Took note of the significant body of work of the Task Force on Digitalization in Energy developed in the course of its research activities, adaptation of the content to national circumstances, and outreach efforts enabling broad promotion of the findings, conclusions, and policy recommendations.

(b) Recommended intensifying the efforts to utilize synergies with the other subsidiary bodies of the Committee on Sustainable Energy, as well as relevant entities globally to most effectively address cross-cutting sectoral issues.

 XI. Other business (agenda item 8)

38. No issues were raised under this agenda item.

 XII. Adoption of the report and close of the meeting (agenda item 9)

*Documentation:* GECES-20/2024/INF.1 – Draft conclusions and recommendations arising from the twentieth session of the Groups of Experts on Cleaner Electricity Systems

ECE/ENERGY/GE.5/2024/2 – Report of the Group of Experts on Cleaner Electricity Systems on its twentieth session

39. Draft conclusions and recommendations arising from the twentieth session of the Group of Experts on Cleaner Electricity Systems (GECES-20/2024/INF.1) were circulated to participants and Geneva Permanent Representations.

40. The Group of Experts adopted the conclusions and recommendations arising from its twentieth session, which are included under the relevant agenda items highlighted in this report.

41. The Chair of the Group of Experts, with the assistance of the secretariat, summarized the discussions in a report, reflecting in a concise and factual manner the views expressed by participants.

42. The report of the session was adopted subject to any necessary editing and formatting.

43. Following that, the Chair closed the session.

1. Official documents, room documents, and presentations delivered at the meeting, as well as other relevant materials are available on the ECE website (see: <https://unece.org/sustainable-energy/events/unece-sustainable-energy-week-2024>). Official documents of the session are also available at Official Document System of the United Nations (see <http://documents.un.org/>). [↑](#footnote-ref-2)
2. See more:[Workshop on Integration of E-Mobility into Energy Systems](https://unece.org/sustainable-energy/events/workshop-integration-e-mobility-energy-system) (11 April 2024); [↑](#footnote-ref-3)
3. The inaugural meeting of the Informal Task Force on E-Mobility (29 May 2024) identified the thematic clusters for the work plan of 2024-2026. This Informal Task Force was established in 2024 and supported by the Sustainable Transport and Sustainable Energy sub-programmes. [↑](#footnote-ref-4)