



Economic Commission for Europe**Committee on Sustainable Energy****Group of Experts on Cleaner Electricity Systems****Seventeenth session**

Geneva, 6-8 October 2021

Item 11 of the provisional agenda

Report of the Group of Experts on Cleaner Electricity Systems Seventeenth Session¹**The Group of Experts on Cleaner Electricity Systems:****I. Introduction**

1. The seventeenth session of the Group of Experts on Cleaner Electricity Systems (the Group of Experts) was held from 6 until 8 October 2021 amid circumstances caused by COVID-19, including travel restrictions.
2. This report summarizes the proceedings of the Group of Experts at its seventeenth session. All the documents related to the session are available on the website of the United Nations Economic Commission for Europe (ECE).²

II. Attendance

3. The meeting of the Group of Experts was attended by 290 participants. Of these, 245 were participating virtually and 45 in-person.
4. Experts from the following ECE member States participated: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Finland, France, Georgia, Germany, Greece, Hungary, Italy, Kazakhstan, Kyrgyzstan, Latvia, Luxembourg, Moldova, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Spain, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, and Uzbekistan.
5. Representatives of the European Bank for Reconstruction and Development (EBRD), United Nations Economic Commission for Latin America and the Caribbean (ECLAC), International Atomic Energy Agency (IAEA), United Nations Development Programme

¹ The draft conclusions and recommendations will be reviewed and agreed by the Group of Experts after each agenda item and updated as needed

² Official documents, room documents, and presentations delivered at the meeting are available on the ECE website (see <https://www.unece.org/index.php?id=54636>). Official documents of the session are also available at Official Document System of the United Nations (see <http://documents.un.org/>).

(UNDP), United Nations Economic and Social Commission for Western Asia (ESCWA), United Nations Environment Programme (UN Environment), International Renewable Energy Agency (IRENA), Islamic Development Bank (IDB), World Trade Organization (WTO) and World Meteorological Organization (WMO) attended the meeting. The European Union was represented.

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

III. Adoption of the agenda (agenda item 1)

Documentation: ECE/ENERGY/GE.5/2021/1 – Annotated provisional agenda

7. In accordance with the 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. The provisional agenda as contained in ECE/ENERGY/GE.6/2021/1 was adopted.

IV. Opening remarks (agenda item 2)

8. In his opening remarks, the Chair, Mr. James Robb, shared his reflections on the challenging situation caused by the COVID-19 pandemic and the impact on the activities of the Group of Experts on Cleaner Electricity Systems (Group of Experts). This session of the Group of Experts was delivered jointly with the Group of Experts on Renewable Energy and was co-Chaired by the Chair of the Group of Experts on Renewable Energy. The joint session was part of the 11th International Forum on Energy for Sustainable Development.

9. The Chair noted that this year's meeting was held in cooperation with a number of other groups of experts, in particular with the Group of Experts on Renewable Energy, the Group of Experts on Gas, the Group of Experts on Energy Efficiency and the Expert Group on Resource Management. The Chair observed that it would be valuable for such close cooperation to continue with all of the Groups of Experts reporting to the Committee on Sustainable Energy and advancing on Agenda 2030 for Sustainable Development and Paris Agreement targets.

V. Roundtable on financing decarbonization of energy systems in the United Nations Economic Commission for Europe region (agenda item 3)

Documentation: ECE/ENERGY/GE.7/2021/3 – Renewable Energy Financing and Investment in selected United Nations Economic Commission for Europe member States

10. The discussion was delivered by the Group of Experts on Renewable Energy and the Group of Experts on Cleaner Electricity Systems, and with the support of the Group of Experts on Resource Management. The roundtable focused on barriers and enablers for financing of carbon capture, use and storage (CCUS) projects, nuclear power projects as well as renewable energy projects.

11. The panel discussed energy transitions in the ECE region and highlighted that financing needs to be scaled up for all low-carbon (i.e., coal with CCUS, gas with CCUS) and non-fossil technologies (i.e., renewable energy, nuclear power) at unprecedented levels. Examples on private and public partnership initiatives and projects were shared, and it was concluded that these could be replicated for large infrastructure financing projects across the region in order to meet energy demand. The socio-economic context and public acceptance were mentioned by all panellists as a barrier for newly added capacity for all technologies.

12. It was discussed that most advanced fossil fuel technologies, such as coal with high-efficiency and low-emission (HELE), coal with CCUS or gas with CCUS can be a viable and an economic choice for many countries in the ECE region. Action plans for deployment of

new renewable projects need to be localized taking a bottom-up approach. Securing affordable financing for new nuclear power projects is key, for countries that decide to deploy nuclear power projects. The participants concluded that government support is essential for all technologies. Sustainable taxonomy classification can provide evidence-based scientific support and help attract private financing to all clean energy projects.

13. The discussion also highlighted that further technological advances can have a positive spillover effect on energy intensive industries across the ECE region, namely production of cement, steel and iron or chemicals. Issues related to financing advanced fossil fuel-based electric power generation infrastructure remain a controversial but necessary topic that must be resolved to avoid stranded assets, to support further economic development in countries in transition, and to help countries to attain carbon neutrality.

The Group of Experts:

(a) Pointed out 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 environmental-friendly fossil-fuel technologies, and promote investments into modernization of energy infrastructure and clean energy technologies. Joint and well-balanced national power systems could be enhanced through strategic partnerships, cross-border energy cooperation and development of green energy clusters which would take into account the specificity of national power sectors;

(b) Requested to start the process that would lead to drafting of generic guidelines on financing more accessible, reliable and sustainable energy services across the ECE region;

(c) Encouraged continued cooperation with the Group of Experts on Renewable Energy, the Group of Experts on Gas and the Expert Group on Resource Management and other partners in promoting financing decarbonization of the energy system, including through non-fossil technology (renewable energy and nuclear power) and low-carbon technology (gas with CCUS, coal with CCUS) investments, and advising the Committee on Sustainable Energy on possible options. Investment in low-carbon technology may contribute substantially but always will have to be matched with investment in carbon-negative technologies to achieve carbon neutrality. While some technologies are zero- and low-carbon in themselves, sometimes their life-cycle emissions are higher; these also need to be balanced by negative-carbon investments.

VI. Roundtable on technology interplay and innovation: the potential for hydrogen in the United Nations Economic Commission for Europe region (agenda item 4)

Documentation: ECE/ENERGY/GE.5/2021/3 - Opportunities for development and deployment of coal-based gasification for both power and combined heat and power, fuel cells, production of chemicals, and specialist products

14. This session was delivered jointly by the Group of Experts on Cleaner Electricity Systems and the Group of Experts on Renewable Energy. It was also supported by the Group of Experts on Gas. The three Groups of Experts have been implementing activities on hydrogen in the ECE region jointly.

15. The session discussed the contribution of sustainable hydrogen towards clean energy pathways and a hydrogen ecosystem, that will require sustainable hydrogen production through electrolysis from both renewable energy and nuclear power as well as from fossil fuels with CCUS.

16. The discussion highlighted that the market for clean hydrogen production is in the making. There are differences between geographies and there is no one-size-fits-all solution. There is a need to address the principle of additionality for renewable electricity in a manner that is fair and workable. At the moment the burden is solely put on the hydrogen producer to prove the additionality.

17. The session discussed an integrated energy system approach for hydrogen production. It was noted that nuclear energy can be a low-carbon source of electricity and heat and can be used to produce low-carbon hydrogen through several processes to improve hydrogen production efficiency. Large nuclear reactors and advanced modular reactors can be integrated in low-carbon systems with renewables for hydrogen, electricity and heat production.

18. The session looked into current and future hydrogen use taking a subregional approach. It was concluded that current hydrogen demand across the ECE region is based on industrial feedstocks, mainly led by production of ammonia and methanol.

The Group of Experts:

(a) Took note of the Committee's conclusion that it is necessary to agree on a comprehensive and science-based terminology and classification of different types of hydrogen that would provide a clear taxonomy and foster collaboration and investment flows and support a better understanding of the origin of hydrogen to accelerate its sustainable deployment (ECE/ENERGY/137);

(b) Noted the request by the Committee on Sustainable Energy to develop international standards for hydrogen classification and management, including labelling according to its origin and CO₂ footprint, in cooperation with the Expert Group on Resource Management, and the Group of Experts on Gas, should extrabudgetary resources be available (ECE/ENERGY/137);

(c) Noted that across the ECE region countries are recognizing the potential for hydrogen to contribute to meeting the objectives of the Paris Climate Agreement. The regional and national hydrogen strategies have been developed in many ECE countries but there is a gap in ambition and understanding of the potential across the region;

(d) Requested the secretariat to explore possible ways and means to raise extrabudgetary resources in cooperation with the Group of Experts on Renewable Energy and the Group of Experts on Gas in order to assess sustainable hydrogen production potential across the region, and strengthen national capacity in understanding the potential of global, subregional and national cost-effective hydrogen production and transport as well as how hydrogen can contribute to the decarbonization of energy systems.

VII. Attaining carbon neutrality: update on “Carbon Neutrality” project (agenda item 5)

19. The secretariat updated the Group of Experts on the progress in implementation of the project on “Enhancing understanding of the implications and opportunities of moving to carbon neutrality in the UNECE region across the power and energy intensive industries by 2050” (“Carbon Neutrality”). The UNECE Task Force on Carbon Neutrality prepared a number of tools for policy makers – Technology Brief on CCUS, Technology Brief on Nuclear Power, Technology Brief on Hydrogen, and Brief on Carbon Neutral Energy Intensive Industries. This toolkit is designed for policy makers to make informed decisions and advance towards attainment of carbon neutrality.

20. During this session the background paper on “Technology Interplay under the Carbon Neutrality concept” and the report on “Life Cycle Assessment of Electricity Generation Options” and proposed next steps were discussed. The participants had a fruitful discussion on key finding and main takeaways.

The Group of Experts:

(a) Took note of the Committee's recommendation to lead on the issue of energy system transformations, in cooperation with the other expert groups and to explore technology interplay, including technical and societal nexus areas for the range of technologies including low-carbon technologies (i.e., coal with CCUS, gas with CCUS), non-fossil technologies (i.e., renewable energy, nuclear power), negative carbon technologies (i.e. bioenergy with carbon capture and storage (BECCS), direct air capture with carbon storage

(DACCS)), as well as innovative solutions (e.g., net-zero or low-carbon hydrogen) (ECE/ENERGY/137);

(b) Welcomed the progress made on the implementation of the project on “Enhancing understanding of the implications and opportunities of moving to carbon neutrality in the UNECE region across the power and energy intensive industries by 2050” (“Carbon Neutrality”). The Group of Experts concluded that should needed extrabudgetary funds or in-kind contributions be identified, the Group of Experts in cooperation with the Group of Experts on Gas and the Expert Group on Resource Management will conduct an analysis of the potential of hydrogen hubs and carbon storage hubs across the ECE region and their role to decarbonize hard to abate sectors (i.e. energy intensive industries, long-haul transportation etc.);

(c) Stressed the urgency of measures and the complexity of the global energy system, making reference to the current energy shortage and gas price peaks. The Group of Experts further emphasised the importance to focus on the demand side, either for this report and/or going forward, and to enhance work on international collaboration. It would appreciate further drilling down of the findings and recommendations;

(d) Requested the Task Force on Carbon Neutrality to continue engaging in the dialogue on technology interplay under the auspices of the Carbon Neutrality project. The document is the basis for future work considering impacts and practicality, and will be expanded further to explore the roles of additional technology options and demand side opportunities.

VIII. Work Plan for 2020-2021 and 2022-2023 (agenda item 6)

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

21. The Chair provided an update on implementation of current Work Plan 2020-2021 and presented main activities from the Work Plan 2022-2023. The main activities that will form the basis for the Group of Experts work in the period from 2022-2023 include: 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, d) digitalizing electricity systems.

The Group of Experts:

(a) Noted that it had delivered on the concrete activities of the mandate and work plan for 2020–2021 and reported achievements and key milestones at the Thirtieth session of the Committee on Sustainable Energy;

(b) Acknowledged that the Committee on Sustainable Energy has approved the Work Plan for 2022-2023 for the Expert Group on (ECE/ENERGY/2021/8) and noted that the Committee requested that the Groups of Experts consider the suggested clarifications in their work plans and to submit a revised version to the Thirty-first session of the Committee;

(c) Requested the secretariat to work at the implementation of the Work Plan 2022-2023 as approved by the Group of Experts by written procedure and by the Committee on Sustainable Energy at its thirtieth session, under a renewed mandate, and explore possible ways and means of funding by potential donors and partner organizations 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, d) digitalizing electricity systems;

(d) Noted the request by the Committee to explore the opportunities and barriers to reforming energy market design towards greater sustainability, including to conduct research on the full cycle of electricity systems in transportation, industry and building management. The Group of Experts concluded that should extrabudgetary resources be provided, it will consider looking closely in these activities in the next cycle.

IX. Election of officers (agenda item 7)

22. The Group of Experts elected Mr. Sylvain Clermont (Hydro-Québec Canada), Ms. Djamila Aitmatova (Kyrgyzstan) and Mr. Furugzod Usmonov (Tajikistan) as Vice-Chairs with effect from the close of the seventeenth session until the close of the nineteenth session.

23. The Group of Experts extended mandate of Professor Jon Gibbins (United Kingdom) and Mr. Vladimir Budinsky (Czech Republic) until the close of the nineteenth session.

24. The Group of Experts was informed that Chair, Mr. James Robb (United States) and Vice-Chairs Mr. King Lee (World Nuclear Association), Andrew Minchener (IEA Clean Coal Centre) and Mr. Georgy Popov (Russian Federation) will continue serving in the Bureau until the close of the eighteenth session.

25. The Chair of the Group of Experts is a Vice-Chair of the Committee on Sustainable Energy ex officio.

X. Roundtable on digitalizing energy systems (agenda item 8)

26. This session was delivered jointly by the Group of Experts on Cleaner Electricity Systems and the Task Force on Digitalization that is run under the auspices of the Group of Experts on Energy Efficiency.

27. The panellists highlighted that digitalization is making energy systems more connected, efficient, reliable and sustainable. The energy sector has been an early adopter of digital technologies. Digital innovations are offering new ways of looking at the existing energy efficiency challenges and finding exceptional ways to address them.

28. Provoked by the current market developments and gas price peaks, the panel discussed to what extent can digitalization improve the resilience of fuels supply and electricity networks. It was concluded that digitalization might help respond to effects of extreme weather events to manage balance of supply and demand, subject to improved coordination of energy system actors.

29. The session concluded that digital technologies such as Artificial Intelligence (AI), Internet-of-Things (IoT), Big Data, blockchain technologies etc. could provide many benefits for customers, grid operators, regulators and markets by enabling more decentralization, more scalable solutions, more non-traditional generation and more non-transmission solutions such as smarter load management. It will allow more flexible operations of the energy system and could provide new market opportunities that will, for example, allow customer to play a more active role.

30. the panel also concluded that it is important to ensure interoperability by adopting international standards to ensure smooth connectivity and communication of energy assets and supporting software and hardware infrastructure, such as IEEE 2030.5 standard.

The Group of Experts:

(a) Discussed opportunities and challenge for cybersecurity and privacy and concluded that these aspects need further investigation. It also concluded that collaboration between the energy sector, the academic world and the governmental agencies would be key;

(b) Requested continued cooperation with the Task Force on Digitalization in Energy and the Group of Experts on Energy Efficiency, and proposed to launch activities on exploring opportunities and challenges provided by digitalizing electricity systems on grid management and operations and on market, with a focus on supply side.

XI. Preparations for the eighteenth session of the Group of Experts (agenda item 9)

31. The eighteenth session of the Group of Experts will be held on 19-20 September 2022 in Geneva.

XII. Any other business (agenda item 10)

32. At the time the provisional agenda was prepared, there were no issues to be raised under this item.

XIII. Adoption of the report and close of the meeting (agenda item 11)

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