



Economic Commission for Europe**Committee on Sustainable Energy****Group of Experts on Energy Efficiency****Tenth session**

Geneva, 5-6 October 2023

Report of the Group of Experts on Energy Efficiency on its tenth session**I. Introduction**

1. The tenth session of the Group of Experts on Energy Efficiency (the Group of Experts) was held during two days from 5 to 6 October 2023.
2. This report summarizes the proceedings of the Group of Experts at its tenth session. All the documents related to the session are available on the website of the United Nations Economic Commission for Europe (ECE).¹

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 43 participants. Additionally, 9 contributed to the session by providing their pre-recorded video addresses.
4. Experts from the following ECE member States participated: Armenia, Belgium, Canada, Croatia, Georgia, Germany, Ireland, North Macedonia, Poland, Republic of Moldova, Russian Federation, Sweden, Switzerland, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, and Uzbekistan. The session was attended by representatives of the European Union.
5. The following United Nations specialized agencies, funds and programmes were in attendance: Economic and Social Commission for Asia and the Pacific (UN ESCAP), United Nations Environment Programme (UNEP) Copenhagen Climate Centre, UNEP Global Alliance of Buildings and Construction (GlobalABC), United Nations Development Programme (UNDP; country offices in Armenia, Georgia, Republic of Moldova, Ukraine, and Uzbekistan), United Nations Industrial Development Organization (UNIDO), and United Nations Institute for Training and Research (UNITAR).
6. The meeting was also attended by representative of World Economic Forum and other international organizations, as well as major groups including non-governmental

¹ Official documents, room documents, presentations and video addresses delivered at the meeting, as well as other relevant materials are available on the ECE website (see <https://unece.org/sustainable-energy/events/group-experts-energy-efficiency-tenth-session>). Official documents of the session are also available at Official Document System of the United Nations (see <http://documents.un.org/>).



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.6/2023/1 – 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, Mr. Stefan M. Buettner, presented the annotated provisional agenda as contained in ECE/ENERGY/GE.6/2023/1. The annotated provisional agenda for the tenth session of the Group of Experts was adopted.

IV. Opening remarks (agenda item 2)

9. The Chair of the Group of Experts delivered opening remarks summarizing the activities of the Group of Experts during the intersessional period in 2022–2023 and on the progress in implementation of the Work Plan for 2022–2023 (ECE/ENERGY/2021/10) and deliverables under its pillars: (a) Improving Energy Efficiency in Industry; (b) Improving Energy Efficiency in Buildings; (c) Digitalization in Energy; (d) Regulatory and Policy Dialogue Addressing Barriers to Improve Energy Efficiency; (e) Assessing Energy Consumption and Emissions of Electric Vehicles.

10. The Chair highlighted particularly the activities of the Group of Experts targeted on increasing systemic efficiency through advancements in economic, technical, and policy research in line with the 2030 Agenda for Sustainable Development and the objectives of the Committee on Sustainable Energy (the Committee). Such activities span across buildings, industry, transport, and other end-use sectors in view of helping attain energy system resilience, along with progress on research and dissemination of findings on the role of digitalization in optimizing the complex energy systems.

11. The Group of Experts took note of the results achieved in the course of implementation of its Work Plan for 2022–2023. The Group of Experts also took note of joint activities undertaken with other subsidiary bodies of the Committee, of cross-sectoral collaboration within ECE, as well as with other relevant United Nations organizations and other stakeholders.

V. Election of officers (agenda item 3)

12. The secretariat received no new nominations to stand for election at the tenth session of the Group of Experts.

13. The Bureau of the Group of Experts (the Bureau) invited Mr. Romanas Savickas (UNEP-CCC) to continue service on the Bureau as Vice-Chair to strengthen its activities.

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

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

(a) Until the conclusion of its eleventh session: Mr. Stefan M. Buettner (Germany), as Chair; and Ms. Nurangiz Farajullayeva (Azerbaijan), Mr. Calvin Johnson (United States), Mr. Omar Tsereteli (Georgia), Mr. Benoit Lebot (French Ministry of Ecological Transition), Mr. Martin K. Patel (University of Geneva), Mr. Zlatko Pavicic (Croatian Inventors Network), Mr. Serhiy Porovskyy (Professional Association of Ecologists of Ukraine) as Vice-Chairs, and Mr. Hannes Mac Nulty (Green Growth Knowledge Partnership), Mr. Vahram Jalalyan (UNDP Armenia), Mr. Andrei-Silviu Covatariu (Energy Policy Group), and Ms. Elizabeth Massey (The Energy Authority) as Vice-Chairs ex officio;

(b) Until the conclusion of its twelfth session: Mr. Romanas Savickas (UNEP-CCC) as Vice-Chair.

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

VI. Activities and priorities of the Committee on Sustainable Energy and matters for consideration by the Group of Experts (agenda item 4)

17. The secretariat provided an overview of recent activities of the Committee on Sustainable Energy following its thirty-second session (13–15 September 2023), as well as decisions taken by the parent bodies related to the work of the Group of the Experts.

18. The Regional Advisor provided an overview of projects, studies, meetings and events, and other collaboration activities relevant to the work of the Group of the Experts.

19. The Group of Experts reconfirmed its intention to lead the work of the Committee on exploring matters related to “scaling systemic efficiencies and digitalization of energy system networks”, including aspects of energy storage and cybersecurity. The Group of Experts also reconfirmed its readiness to contribute, within its scope of expertise and in line with a joint and collaborative multistakeholder process to shape the Platform on Resilient Energy Systems, to activities related to:

- (a) Sustainable resource management and access to critical raw materials to help countries understand what resources they have available;
- (b) Low-, zero- and negative-carbon technology interplay;
- (c) Just Transition; and
- (d) Urban planning and modelling of decentralized energy systems.

VII. Plenary session (agenda item 5)

Documentation: ECE/ENERGY/2023/11 – United Nations Economic Commission for Europe Platform on Resilient Energy Systems Work Plan

20. The session “Increasing energy resilience, saving costs, and curbing emissions with systemic efficiency approaches” discussed national perspectives and sectoral examples of ongoing efforts to improve systemic efficiency. It addressed aspects of energy use and supply chains in the buildings and industry sectors, explored impacts of developments of energy systems, considered issues of location efficiency, as well as the role of digitalization in optimizing energy systems.

21. The Group of Experts underscored the importance of optimizing the entire energy system, as opposed to addressing its individual components only. It was argued that this requires not only a combination of technologies, business models, stakeholder engagement, and capacity-building, but also an in-depth analysis of the effects from potential disruptions on the society to ensure that no one is left behind.

22. The Group of Experts:

- (a) Noted that the transition to systemic efficiency is characterized by the development of integration and interaction of various public and private sector actors within the energy system, taking account of education, training, and behavioural aspects;
- (b) Stressed the importance of defining criteria, conditions, and new properties of systemic efficiency;
- (c) Recognized that integrated solutions for energy systems, despite covering different dimensions, must be also specific by the type of energy, including how they contribute to demand-side flexibility and to improved energy security; the presented example was on decentralized on-site generation combined with energy storage;
- (d) Acknowledged that successful implementation of energy efficiency programmes is dependent on the level to which these programmes are promoted and

facilitated; recognized the importance of community-based approaches for successful delivery and for ensuring end-user benefits;

(e) Requested the Bureau, with support from the secretariat, to continue the activities that contribute to increasing the reliability, resilience, and sustainability of energy systems in the ECE region, and to consider and formulate possible new activities in support thereof.

VIII. Digitalization and energy system resilience (agenda item 6)

Documentation: ECE/ENERGY/GE.6/2023/3, ECE/ENERGY/GE.5/2023/3 – Key considerations and solutions to ensure cyber resiliency in the smart integrated energy systems

ECE/ENERGY/GE.6/2023/4, ECE/ENERGY/GE.5/2023/4 – Improving efficiency and reliability of energy systems by means of big data analytics

23. The Group of Experts took note of the progress and acknowledged the contributions that the Task Force on Digitalization in Energy made in advancing the ECE agenda on digital transformation, including within the Committee and across its subsidiary bodies, as well as across the ECE subprogrammes. The Group of Experts reconfirmed its support to continuation of work on Digitalization in Energy in furtherance of the high-level theme “Digital and Green Transformations for Sustainable Development in the Region of the Economic Commission for Europe” of the Commission at its seventieth session (18–19 April 2023) and in line with the relevant decisions taken by the member States.

24. Having reviewed the documents “Key considerations and solutions to ensure cyber resiliency in the smart integrated energy systems” (ECE/ENERGY/GE.6/2023/3-ECE/ENERGY/GE.5/2023/3) and “Improving efficiency and reliability of energy systems by means of big data analytics” (ECE/ENERGY/GE.6/2023/4-ECE/ENERGY/GE.5/2023/4) developed by the Task Force on Digitalization in Energy in preparation to the tenth session, the Group of Experts:

(a) Observed that structural support is needed in the form of national cybersecurity strategies that describe prevention and management of cyberattacks on smart integrated energy systems, which may result in power outages and system failures. Specifically, underscored the need for international collaboration to benchmark standards and share information on potential threat actors, in order to manage cybersecurity risks more effectively and to ensure proper allocation of responsibilities for cybersecurity in the energy sector governance at national, regional, and international levels to mitigate risks of cyberattacks;

(b) Underscored that regulatory measures enforcing implementation of applicable standards and guidelines which address matters of improving cybersecurity for operational technology in automation, control systems, and cybersecurity for critical infrastructure, are necessary for reliability of energy systems;

(c) Recommended the establishment of structures for the unification of international and national standards and regulations to curate, manage, and safeguard data, as well as data architectures to develop and deliver turnkey services for data owners, and to establish jurisdiction-relevant regulations around data monetization;

(d) Also recommended the development of specific financial products designed to offer tax incentives for companies that implement relevant cybersecurity standards;

(e) Further recommended the allocation of funding for cybersecurity initiatives such as cybersecurity-related research and development and education and training programmes, to ensure that best practices for prevention of cyber threats are maintained in organizations at every level and cybersecurity measures are practically implemented, enable strategy planning and reporting, and encourage lead-by-example practices;

(f) Underscored that more research into application of findability, accessibility, interoperability, and reusability (FAIR) principles for data is needed, notably for data assets

acquired but untapped ('dark data'), and further recommended to explore funding opportunities for data and learning models to be made available across countries, companies, and curricula;

(g) Deemed advisable the establishment of national and international testbeds for large-scale, cross-discipline collaboration to ensure the cyber-safety of smart Internet-of-Things devices and the connected grid;

(h) Encouraged investments in human capital for skills translations and up-skilling of current work force and the youth, to take advantage of ever greater computing power, data architecture technologies, and data sets;

(i) Noted the potential benefits of the development of cost recovery models that show customer benefit for the capital investments made into a more resilient energy system through the design and deployment of data collection, management, analytics, and Artificial Intelligence (AI) infrastructures;

(j) Took note of the two case studies developed by the Task Force on Digitalization in Energy. Expressed support for continuation of this work, notably to enhance countries' efforts in the areas of cybersecurity, grid edge management, AI, and smart buildings;

(k) Highlighted the need for a focused research on funding models for those areas in greatest need of attention, such as: Big Data technology advancement (e.g., natural language processing, digital twin modelling, demand and load forecasting, optimized machine learning, progression of AI capabilities to include large language models, power grid resiliency, infrastructure investment - particularly as it relates to data access, storage, management, and real-time analytics), in line with the Work Plan of the Group of Experts on Energy Efficiency for 2024-2025 and the planned activities of the Task Force on Digitalization in Energy contained therein;

(l) Considered the possibilities for development, at the relevant administrative levels, of specialized interactive information systems on energy and energy efficiency, to support decision-making by collecting and analysing energy data in compliance with relevant national and international regulation on data governance, ownership, and privacy. These systems could also provide public services for companies and citizens, including management of support measures and provision of information about best practices to encourage investments in energy efficiency;

(m) Encouraged the Bureau to seek in-kind contributions and extrabudgetary funding opportunities to support activities of the Task Force on Digitalization in Energy.

IX. Improving energy efficiency in buildings (agenda item 7)

25. This agenda item comprised a panel on the implementation progress of the preparation phase of the project "Improving the energy efficiency of the global building supply chain industry and its products to deliver high performance buildings", and a panel on the activities in the framework of the ECE High Performance Buildings Initiative.

26. The Group of Experts:

(a) Took note of the implementation progress of the preparation phase of the project "Improving the energy efficiency of the global building supply chain industry and its products to deliver high performance buildings" and the related activities;

(b) Also took note of the report on the activities in the framework of the High Performance Buildings Initiative aimed to advance energy efficiency standards in buildings in the ECE region. Aligned itself with the respective recommendation contained in the Report of the Committee on Sustainable Energy on its thirty-second session (ECE/ENERGY/149);

(c) Recommended the upskilling of workforce involved in the construction sector to include specific training in high performance buildings. This is to be integrated with digitalization and data analytics to produce a fully integrated housing solution;

(d) Expressed its readiness to contribute, within the scope of expertise and that of the Joint Task Force on Energy Efficiency Standards in Buildings, to promoting and scaling-up energy efficiency in public and municipal buildings, notably as relates to introduction of energy management information systems and municipal energy management systems in the ECE member States, and formulate possible activities in support thereof.

X. Improving energy efficiency in industry (agenda item 8)

Documentation: ECE/ENERGY/GE.6/2023/5 – Advancing energy resilience and decarbonization across the ECE region: analysis of macro-level status quo and action points for the industrial sector

ECE/ENERGY/GE.6/2023/6 – Advancing energy resilience and decarbonization across the ECE region: unleashing the potential of energy storage and demand-side flexibility

27. The Group of Experts:

(a) Observed that the proportion of the overall energy consumption of industry, as well as its energy mix, varies significantly across ECE member States. Noted at the same time, that the availability of cleaner forms of energy, including renewable energy, lags behind in most of the member States;

(b) Took note that, in many instances, the substitution of electricity and other forms of energy consumed by industry is not possible at the current level of development of cleaner energy generation technologies, including renewable energy technologies. Underscored, however, that energy efficiency improvement allows to reduce emissions independently of energy supply, provided that approximately two thirds of them are energy-related and one third is process-related in the industrial sector (e.g., stem from chemical reactions);

(c) Noted that while electrification of industrial processes reduces the dependence on largely fossil forms of energy (gas, coal, oil, etc.), it often requires a change of the process and parts of the equipment thus affecting the financial feasibility and the timeframe of its implementation. Recognized that a substitution of the currently used fuels with hydrogen is dependent on availability of the latter in sufficient amounts at affordable prices, as well as technological readiness. Underscored in this regard that energy resilience, cost-competitiveness, and reduction of emissions in the industrial sector are best served by emphasizing systemic efficiency measures that comprise on-site measures (e.g., heat recovery by means of process integration) in parallel to the increasing generation capacity based on cleaner forms of energy, including renewable energy, and expansion of associated transmission and distribution infrastructure;

(d) Stressed that increasing systemic efficiency in the industrial sector requires measures that are tailored to companies which consider locally available energy sources and alternative categories of industrial processes. Argued that such an approach would take account of process-related conversion losses, unnecessary energy use (wasted energy) and ways to harness it (electricity, heat), thus rationalize use of resources (e.g., by smart control and by industrial heat pumps, where applicable). In this context, underscored importance of targeted support for micro, small, and medium-sized enterprises;

(e) Recognized that process heating and cooling is responsible for more than sixty percent of industrial energy use, and thus recommended development of capacity-building programmes to help make better use of commonly unused waste-heat potentials. Noted in this regard that process heating and cooling is often powered by fossil fuels-based combustion processes, thus in some instances waste-heat utilization may present a potential for improving security of energy supply. Pointed out that waste-heat recovery may be implemented in the form of improved heat exchanger networks in combination with industrial heat pumps, heat storage, and renewable energy supply. Emphasized that the mobilization of these potentials requires major efforts related to training, equipment development and manufacture (e.g., industrial heat pumps) as well as incentives for implementation by manufacturing companies. Also took note that embracing circularity principles has the

prospects of reducing product-related emission footprints and the potential of reducing challenges related to price and availability of raw materials and interim products, and as such boosts energy system resilience. Encouraged further exploration of the related matters jointly with the Expert Group on Resource Management, the Group of Experts on Gas and its Hydrogen Task Force, and the Group of Experts on Renewable Energy;

(f) Acknowledged that the flexibility to adjust energy demand of end use sectors to the amounts of energy available (dispatchable) at any given time, would contribute to a more stable energy system and further enable stakeholders to avoid peak-pricing. Recommended to continue exploring means to increase demand-side flexibility in view of accommodating the expansion of the generation capacity of intermittent energy coupled with various forms of system-level and on-site energy storage options;

(g) At the same time, noted that the large range of different types of storage calls for deeper analysis and international collaboration to enable member States, energy system operators, and end-users to optimize operations, enhance energy security, and reduce the exposure to volatility of energy price. In view of this, deemed advisable to continue research in this direction and to prepare, in cooperation with relevant subsidiary bodies of the Committee, a report on energy storage options based on the scoping study contained in the document “Advancing energy resilience and decarbonization across the ECE region: unleashing the potential of energy storage and demand-side flexibility” (ECE/ENERGY/GE.6/2023/6). A future report could:

(i) Explore how different types and levels of storage as well as industrial energy efficiency measures can support and increase the energy system resilience, expedite and reduce the costs of transport decarbonization, and ensure the best use of intermittent renewable energy;

(ii) Explore funding opportunities to design and develop policy frameworks and regulatory mechanisms that are needed to incentivize adoption and integration of energy storage technologies as well as industrial energy efficiency measures;

(iii) Develop business models that address proper integration of energy storage as well as industrial energy efficiency measures with other technologies and fair participation of energy system actors (suppliers, consumers, prosumers) in the operations, as well as environmental considerations. Research financial products that can facilitate a broader rollout and adoption of system-, community-, and micro-level energy storage;

(iv) Further explore how digital solutions can help optimize energy storage as well as industrial energy efficiency measures and enable demand-side flexibility.

(h) Recognized that digital approaches can facilitate, enhance, and expedite harnessing energy-, emission-, and cost-saving potentials, and took note of the efforts made by the Task Force on Energy Efficiency in Industry to joint research on applicability of digital tools to scale-up, ease access, and facilitate decarbonization of industrial sector;

(i) Acknowledged the value of collaboration networks, knowledge, training, and capacity-building platforms, tools to gather and aggregate demand-side evidence, as well as thematic discussion fora to facilitate exchange of knowledge;

(j) Noted the requirements for the development and provision of, and advisory on adequate financial mechanisms to account for specific risks related to financing industrial energy efficiency, decarbonization, and resiliency efforts. Also noted the necessity to consider potential negative impacts of carbon removal technologies;

(k) Recognized the necessity to create trust and hence facilitate end-user uptake, by ensuring transfer of knowledge and training and awareness-raising at every level, especially decision-making and implementation.

XI. Exploring pathways for a balanced integration of electric mobility (agenda item 9)

28. The Group of Experts:

(a) Noted the activities of the ECE Sustainable Transport subprogramme in exploring general trends and developments surrounding electric vehicles (EV) and their charging infrastructure, and welcomed the ongoing cooperation. Pointed out the high potential relevance of smart charging and vehicle-to-X approaches to enable demand-side flexibility;

(b) Recognized, in keeping with the observations made at ECE Working Party on Transport Trends and Economics (WP.5) at its thirty-sixth session, that facilitating progress in electric mobility (e-mobility) calls for establishment of a dedicated informal task force that would focus on coordinating efforts related to EV developments and their charging infrastructure both within ECE and in collaboration with other concerned institutions. Expressed readiness to work in consultation with WP.5 and subsidiary bodies of the Committee on Sustainable Energy, notably the Group of Experts on Cleaner Electricity Systems, on the development of draft terms of reference for such a task force;

(c) Agreed to continue explore opportunities for securing in-kind contributions and extrabudgetary funding including from partner organizations for specific projects, notably focused on activities related to promoting the use of geo-spatial data in the provision of energy services to e-mobility to increase location efficiency;

(d) Discussed potential inclusion of issues related to electricity powered trains in its future e-mobility considerations. Recognizing that electrification of railway lines comes along with significant investments and lead-up time which may not be economic on less frequented routes, noted that innovative charging technologies allow deployment of battery-electric or hydrogen-electric trains particularly in locations where electrification is deemed economically inefficient;

(e) Noted the relevance of systemic efficiency also in individual, public and freight transport. Recognized that location efficiency and accessibility play a central role in reducing the mobility needs, thus also linking buildings, industry, transport, and infrastructure through land use. Recommended to further explore the concept of location efficiency, accessibility, and land use.

XII. Implementation of the Work Plan of the Group of Experts on Energy Efficiency for 2024-2025 (agenda item 10)

Documentation: ECE/ENERGY/2023/10 – Work Plan of the Group of Experts on Energy Efficiency for 2024-2025

29. The Chair presented the Work Plan of the Group of Experts for 2024-2025 (ECE/ENERGY/2023/10), which contains the following five sections: (a) Supporting energy efficiency improvement and decarbonization in industry; (b) Develop, update, and disseminate energy efficiency standards aimed at raising energy performance of buildings and improving the built environment; (c) Unlocking the potential of energy system efficiency through digitalization; (d) Development of approaches for a balanced integration of electric mobility; (e) Regulatory and policy dialogue addressing barriers to improve energy efficiency.

30. The Group of Experts:

(a) Welcomed approval of the Work Plan of the Group of Experts for 2024-2025 (ECE/ENERGY/2023/10) by the Committee on Sustainable Energy at its thirty-second session (13-15 September 2023);

(b) Recognized that collaboration across the subsidiary bodies of the Committee on Sustainable Energy, the other ECE subprogrammes, and engagement of relevant external groups, is key to ensure timely and quality deliverables;

(c) Underscored the importance of additional resources for full implementation of the Work Plan of the Group of Experts for 2024-2025 (ECE/ENERGY/2023/10) and encouraged the Bureau to make efforts to explore funding opportunities through extrabudgetary projects.

XIII. Other business (agenda item 11)

31. No issues were raised under this agenda item.

XIV. Dates of the next meeting (agenda item 12)

32. The eleventh session of the Group of Experts is scheduled to take place in Geneva on 16 and 17 September 2024.

XV. Adoption of conclusions and recommendations (agenda item 13)

Documentation: GEEE-10/2023/INF.1 – Draft conclusions and recommendations arising from the tenth session of the Group of Experts on Energy Efficiency

33. Draft conclusions and recommendations arising from the tenth session of the Group of Experts on Energy Efficiency (GEEE-10/2023/INF.1) were circulated to participants and Geneva Permanent Representations.

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

XVI. Adoption of the report and close of the meeting (agenda item 14)

Documentation: ECE/ENERGY/GE.6/2023/2 – Report of the Group of Experts on Energy Efficiency on its tenth session

35. 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.

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

37. Following that, the session was closed.
