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Committee on Sustainable Energy

Group of Experts on Energy Efficiency

Third session

Baku, 18-19 October 2016

Report of the Group of Experts on Energy Efficiency on its third session

I. Introduction

1. The third session of the Group of Experts on Energy Efficiency (GEEE) was held on 18–19 October 2016.

II. Attendance

2. The meeting was attended by 240 experts from the following United Nations Economic Commission for Europe (ECE) member States: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Czech Republic, Georgia, Germany, Israel, Kazakhstan, Kyrgyzstan, Malta, Montenegro, Poland, Republic of Moldova, Romania, Russian Federation, Serbia, Switzerland, Tajikistan, the former Yugoslav Republic of Macedonia, Ukraine, United States, and Uzbekistan.

3. Experts from China, India, Iran, Japan, and Pakistan participated under Article 11 of the Commission's Terms of Reference.

4. Representatives of the Economic Commission for Africa (ECA), Economic Commission for Latin America and the Caribbean (ECLAC), Economic and Social Commission for Asia and the Pacific (ESCAP), Economic and Social Commission for Western Asia (ESCWA), United Nations Development Programme (UNDP), United Nations Industrial Development Organization (UNIDO), International Labour Organization (ILO), World Bank, World Meteorological Organization (WMO), Global Environment Facility (GEF), Energy Charter Secretariat, International Energy Agency (IEA), International Renewable Energy Agency (IRENA), Copenhagen Centre on Energy Efficiency (C2E2), International Partnership for Energy Efficiency Cooperation (IPEEC), League of Arab States (LAS), Renewable Energy Policy Network for the 21st Century (REN 21), and Executive Committee of the Commonwealth of Independent States (CIS) also participated.

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

III. Adoption of the agenda

Documentation: ECE/ENERGY/GE.6/2016/1 – Annotated provisional agenda.

6. In accordance with the Commission's rules of procedure, the first item of the provisional agenda is the adoption of the agenda.

7. The provisional agenda as contained in ECE/ENERGY/GE.6/2016/1 was adopted without amendment.

IV. Election of officers (agenda item 2)

8. The Group of Experts elected Mr. Aleksandar Dukovski (the former Yugoslav Republic of Macedonia) as its chair, and Mr. Vugar Jabbarov (Azerbaijan), Mr. Andrei Miniankou (Belarus), Mr. Zlatko Pavičić (Croatia), Ms. Natalia Jamburia (Georgia), Mr. Christian Noll (Germany), and Mr. Valeriy Pysarenko (Ukraine) as vice chairs for two years. The Group of Experts invited other stakeholders who previously served on the Bureau to join the Bureau for the next two years to strengthen its activities: Mr. Tim Farrell (Copenhagen Centre on Energy Efficiency (C2E2)), Mr. Benoit Lebot (International Partnership on Energy Efficiency Cooperation (IPEEC)), and Mr. Martin Kumar Patel (Energy Efficiency Chair, University of Geneva), as well as Mr. Hannes Mac Nulty (BG Consulting Engineers) and Mr. Stefan Buettner (EEP – Institute for Energy Efficiency in Production).

9. The Group of Experts expressed its appreciation to Mr. Tim Farrell for serving as chair of the Group since its first session and for his contribution to the work of the Group.

10. The Bureau of the Group of Experts has the following members: Mr. Aleksandar Dukovski (the former Yugoslav Republic of Macedonia) as chair and Mr. Vugar Jabbarov (Azerbaijan), Mr. Andrei Miniankou (Belarus), Mr. Zlatko Pavičić (Croatia), Ms. Natalia Jamburia (Georgia), Mr. Christian Noll (Germany), Ms. Maria Gabriela Soares de Menezes Prata Dias (Portugal), Ms. Antonela Solujic (Serbia), Mr. Valeriy Pysarenko (Ukraine), Mr. Tim Farrell (C2E2), Mr. Benoit Lebot (IPEEC), Mr. Martin Kumar Patel (Energy Efficiency Chair, University of Geneva), Mr. Hannes Mac Nulty (BG Consulting Engineers), and Mr. Stefan Buettner (Institute for Energy Efficiency in Production (EEP)) as vice chairs.

V. International Forum on Energy for Sustainable Development (agenda item 3)

Documentation: ECE/ENERGY/GE.6/2016/3-ECE/ENERGY/GE.7/2016/3 – Concept Note of the Seventh International Forum on Energy for Sustainable Development.

ECE/ENERGY/2016/8 – Draft outcome document of the Seventh International Forum on Energy for Sustainable Development.

ECE/ENERGY/2016/9 – Concept note and draft outcome document of the Eighth International Forum on Energy for Sustainable Development and Energy Ministerial.

11. The Group of Experts considered the documentation for the agenda item and presentations by representatives of IPEEC and the International Energy Agency (IEA). It

noted that for the first time its session is being held outside Geneva, in the framework of the Seventh International Forum on Energy for Sustainable Development in Baku, Azerbaijan.

12. The Group of Experts expressed its appreciation to the Government of Azerbaijan for hosting the Seventh International Forum on Energy for Sustainable Development and the third session of the ECE Group of Experts on Energy Efficiency in Baku.

13. The Group of Experts took note of the document ECE/ENERGY/GE.6/2016/3-ECE/ENERGY/GE.7/2016/3 “Concept Note of the Seventh International Forum on Energy for Sustainable Development”.

14. The Group of Experts expressed its support for the draft Outcome Document of the Seventh International Forum on Energy for Sustainable Development and for the Concept Note and draft Outcome Document of the Eighth International Forum on Energy for Sustainable Development and Energy Ministerial. The Outcome Document of the Seventh International Forum on Energy for Sustainable Development is attached to this report in Annexes.

15. The Group of Experts invited the secretariat to continue to closely collaborate with other bodies of the Committee on Sustainable Energy as a way to enhance its contribution to achieving energy-related Sustainable Development Goals (SDGs), in particular SDG7 “Ensure access to affordable, reliable, sustainable and modern energy for all”.

16. The Group of Experts called to deepen collaboration with the Group of Experts on Renewable Energy on using renewable energy sources as an important complementary measure.

17. The Group of Experts proposed that the five United Nations Regional Commissions collaborate on joint input on energy efficiency to the upcoming G20 summit in 2017.

VI. Best practices in selected economic sectors to improve energy efficiency (agenda item 4)

Documentation: ECE/ENERGY/GE.6/2016/4 – Best practices in selected economic sectors to improve energy efficiency. Background paper on exchange of know-how and best practices in industry to significantly improve energy efficiency in the United Nations Economic Commission for Europe (ECE) region

ECE/ENERGY/GE.6/2016/6 – Regulatory and policy dialogue addressing barriers to improve energy efficiency. Background paper on overcoming barriers to investing in energy efficiency – a policy analysis

ECE/ENERGY/100 – Best Policy Practices for Promoting Energy Efficiency. A Structured Framework of Best Practices in Policies to Promote Energy Efficiency for Climate Change Mitigation and Sustainable Development

18. The Chair informed of disseminating the publication Best Policy Practices for Promoting Energy Efficiency and further work on identifying case studies that broaden a menu of high-impact policies and measures undertaken by the Group of Experts. The delegates shared existing practices of implementation of energy efficiency policies and measures in their countries as well as challenges to their implementation and discussed the opportunities for exchanging experience among the ECE member States. A particular focus was given to improving energy efficiency in industry as a sector where significant improvements can have one of the most tangible impacts overall. The importance of baseline data and measuring energy efficiency improvements and multiple benefits was highlighted and the concept of energy productivity discussed.

19. The Group of Experts noted with appreciation the results from disseminating the publication “Best Policy Practices for Promoting Energy Efficiency”. The Group of Experts is continuing work to provide additional exemplars of successful high impact policies and measures to policy makers that they can use in developing energy efficiency policies and programmes in their countries as reflected in the Annex “Best practices in energy efficiency: high impact policies and measures” to the document ECE/ENERGY/GE.6/2016/6 “Regulatory and policy dialogue addressing barriers to improve energy efficiency”. The Group of Experts encouraged continuing exchange of existing best practices of implementation of energy efficiency policies and measures among member States.

20. The Group of Experts took note of the document ECE/ENERGY/GE.6/2016/4 “Best practices in selected economic sectors to improve energy efficiency. Background paper on exchange of know-how and best practices in industry to significantly improve energy efficiency in the United Nations Economic Commission for Europe (ECE) region”.

21. The Group of Experts expressed its support to explore barriers that continue to constrain energy efficiency implementation, with a particular focus on the industry sector, as well as the residential and service sectors, with the view to applying the principle of “energy efficiency first”.

22. The Group of Experts supported organizing a series of workshops that aim to reconsider how to develop industrial energy efficiency policies through a bottom-up approach, which is an important step in identifying and overcoming barriers. The first workshop in the series is scheduled to take place on 18 January 2017 in Geneva.

VII. Energy efficiency standards in buildings (agenda item 5)

Documentation: ECE/ENERGY/GE.6/2016/5 – Energy efficiency standards in buildings. Concept Note on the principles-based energy performance standard in buildings.

23. The delegates discussed developing ECE-wide principles-based performance standards and guidelines and importance of standards to investors. It was emphasized that international standards in energy efficiency can play a valuable role in promoting good energy practices, harmonization of public policies, improving investors’, consumers’ and users’ understanding and confidence, avoiding technical barriers to trade related to energy policies, and enabling the creation of world markets for energy technologies. Experience from other regions, in particular ESCWA region, was presented.

24. The Group of Experts took note of the document ECE/ENERGY/GE.6/2016/5 “Energy efficiency standards in buildings. Concept Note on the principles-based energy performance standard in buildings”.

25. The Group of Experts supported the proposal to develop a principles-based energy performance standard in buildings through the Joint Task Force on Energy Efficiency Standards in Buildings with the Committee on Housing and Land Management and proposed to develop the concept further, subject to available resources.

26. The Group of Experts proposed to the Joint Task Force on Energy Efficiency Standards in Buildings to follow up and exchange views on the newly introduced approaches (e.g. in France, Germany, and other countries) on providing long-term guidance on renovation to building owners in the ECE region.

27. The Group of Experts encouraged the wider adoption of standards and labelling programmes in the ECE region, which includes adopting harmonized international testing procedures as well as revising and ramping up minimum energy performance standards over time.

VIII. Role of utilities and energy service companies in improving energy efficiency (agenda item 6)

Documentation: ECE/ENERGY/GE.6/2016/7 – Role of utilities and energy service companies in improving energy efficiency. Background paper on energy efficiency programmes operated by a Swiss utility

28. The Group of Experts took note of the document ECE/ENERGY/GE.6/2016/7 “Role of utilities and energy service companies in improving energy efficiency. Background paper on energy efficiency programmes operated by a Swiss utility”.

29. The Group of Experts noted that utilities and energy service companies will play a significant role in the transition to clean energy system of the future and that the focus needs to shift to customer-driven service models, greenhouse gas emissions controls, affordability and reliability.

IX. Workshop on promoting energy efficiency in Azerbaijan and other countries of the region (agenda item 7)

30. The delegates discussed best practices and lessons learned from Azerbaijan and other countries in the region related to improvements in energy efficiency with a focus on public and residential buildings. The discussion was focused on the barriers to increased investment in energy efficiency as well as the means and tools that Governments can use to best overcome these barriers and specific programmes and policies to promote energy efficiency in countries of the region. Experience in implementing energy efficiency projects supported by the United Nations Development Programme (UNDP) through the Global Environment Facility (GEF) was presented.

31. The Group of Experts expressed appreciation to the speakers and panellists of the Workshop on promoting energy efficiency in Azerbaijan and other countries of the region and emphasized the value of continuing cooperation with UNDP and GEF.

32. The Group of Experts supported publication of a brochure on promoting energy efficiency in countries of the ECE region jointly with UNDP and GEF as one of the outcomes of the Workshop.

X. Regulatory and policy dialogue addressing barriers to improve energy efficiency (agenda item 8)

Documentation: ECE/ENERGY/GE.6/2016/6 – Regulatory and policy dialogue addressing barriers to improve energy efficiency. Background paper on overcoming barriers to investing in energy efficiency – a policy analysis

33. The delegates discussed policies and actions that increase the bankability of energy efficiency projects and measures and energy efficiency finance options in the region.

34. The Group of Experts took note of the document ECE/ENERGY/GE.6/2016/6 “Regulatory and policy dialogue addressing barriers to improve energy efficiency. Background paper on overcoming barriers to investing in energy efficiency – a policy analysis”.

35. The Group of Experts supported a policy analysis on overcoming barriers to investing in energy efficiency to be conducted jointly with the Copenhagen Centre on Energy Efficiency.

36. The Group of Experts supported continuing cooperation with the World Bank in monitoring and promoting the results of World Bank's Readiness for Investment in Sustainable Energy (RISE) Initiative that assesses the legal and regulatory environment for investment in sustainable energy.

37. The Group of Experts supported collaboration with the other United Nations Regional Commissions, the World Bank, the International Energy Agency, and the International Renewable Energy Agency on the 2017 edition of the Sustainable Energy for All (SEforALL) Global Tracking Framework and its follow-up activities, with a particular focus on indicators of progress in energy efficiency. The Group of Experts stressed the importance that good data, data collection and tracking progress have for its activities and requested that involvement in the Global Tracking Framework activities be added to the draft work plan for 2018–2019.

XI. Global Energy Efficiency Accelerator Platform and progress in industrial energy efficiency accelerator (agenda item 9)

38. The Chair presented an overview of the progress on the existing accelerators, namely Vehicle Fuel Efficiency, Appliances and Equipment, Lighting, Buildings Efficiency, Industry and District Energy.

39. Representatives of the United Nations Industrial Development Organization (UNIDO) and invited speakers provided information on their work in the area of the Industry accelerator with a focus on Energy Management Systems (EnMS). The UNIDO Industrial Energy Efficiency Programme supports enterprises in developing and emerging economies in the implementation of EnMS, thereby helping them improve their energy performance, productivity and environmental sustainability. The delegates highlighted the significance of energy management and energy efficiency as a key driver for inclusive and sustainable industrial development and a substantial opportunity area to support the achievement of the Sustainable Energy for All (SEforALL) goal and SDG7 target on energy efficiency, while mitigating climate change. Examples were provided demonstrating EnMS as the prominent best practice for sustainable energy efficiency in industry, achieving multiple benefits including substantial cost reductions.

40. The Group of Experts expressed appreciation to the speakers and panellists of the Workshop “Global Energy Efficiency Accelerator Platform and Progress in Accelerating Industrial Energy Efficiency. Business and policy value through Energy Management Systems in industry” and emphasized the value of continuing cooperation with UNIDO and C2E2 and engagement in SEforALL Global Energy Efficiency Accelerator Platform.

41. The Group of Experts supported promotion of Energy Management Systems (EnMS) as a proven best practice methodology for organizations to achieve sustainable energy efficiency and continually improve energy performance, especially in industry.

42. The Group of Experts invited UNIDO and C2E2 to collaborate in organizing a series of workshops and/or webinars on developing industrial energy efficiency policies through a bottom-up approach.

XII. Key messages for the Committee on Sustainable Energy (agenda item 10)

Documentation: ECE/ENERGY/2016/16 – Mapping of the Sustainable Energy subprogramme processes and activities that support countries in achieving the Sustainable Development Goals.

43. The Group of Experts conveyed a set of conclusions and recommendations for consideration by the 25th session (resumed session) of the Committee on Sustainable Energy on 19 January 2017 and by twenty-sixth session of the Committee on Sustainable Energy on 26–28 September 2017.
44. The Group of Experts noted with appreciation the progress made since its second session on delivering on its mandated activities and the Work Plan of the Group of Experts on Energy Efficiency for 2016–2017.
45. The Group of Experts recommended that the Committee on Sustainable Energy approve its mandate extension until 31 December 2019 and a draft Work Plan of the Group of Experts on Energy Efficiency for 2018–2019 based on submission to its twenty-sixth session.
46. The Group of Experts requested the secretariat to work with the Bureau of the Group of Experts to develop a draft Work Plan of the Group of Experts for 2018–2019 and submit it for review and approval by the Group of Experts by written procedure. The Group of Experts agreed that, in order to expedite submission of a draft Work Plan and other possible documentation for endorsement by the Committee on Sustainable Energy, it can work by written procedure subject to a minimum comment period of 21 days. No response or feedback is taken to be tacit approval.
47. The Group of Experts expressed its support for the draft Outcome Document of the Seventh International Forum on Energy for Sustainable Development and for the Concept Note and draft Outcome Document of the Eighth International Forum on Energy for Sustainable Development and Energy Ministerial.
48. The Group of Experts expressed its support to explore barriers that continue to constrain energy efficiency implementation, with a particular focus on the industry sector, as well as the residential and service sectors, with the view to applying the principle of “energy efficiency first”.
49. The Group of Experts supported the proposal to develop a principles-based energy performance standard in buildings through the Joint Task Force on Energy Efficiency Standards in Buildings with the Committee on Housing and Land Management and proposed to develop the concept further, subject to available resources.
50. The Group of Experts called to deepen collaboration with the Group of Experts on Renewable Energy on using renewable energy sources as an important complementary measure.
51. The Group of Experts supported collaboration with the other United Nations Regional Commissions, the World Bank, the International Energy Agency, and the International Renewable Energy Agency on the 2017 edition of the Sustainable Energy for All (SEforALL) Global Tracking Framework and its follow-up activities, with a particular focus on indicators of progress in energy efficiency. The Group of Experts stressed the importance that good data, data collection and tracking progress have for its activities and requested that involvement in the Global Tracking Framework activities be added to the draft work plan for 2018–2019.

XIII. Other business (agenda item 11)

52. No issues were raised under this item.

XIV. Report of the meeting (agenda item 12)

53. The Bureau and the secretariat drafted the report of the session, including conclusions and recommendations, for discussion and approval by the delegates at the meeting.

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

XV. Dates of the next meeting (agenda item 13)

55. The fourth session of the Group of Experts on Energy Efficiency is scheduled to take place in Geneva on 31 October – 1 November 2017. The Group of Experts noted that its meetings may take place in venues outside Geneva.

Annex I

Baku Call for action to achieve energy-related Sustainable Development Goals and contribute to the Paris Climate Agreement

Adopted at the 7th International Forum on Energy for Sustainable Development, Baku, Azerbaijan

I. Defining sustainable energy

1. There is no common understanding of sustainable energy or of what could be an efficient pathway to a future sustainable energy system from the perspective of reducing the environmental footprint of the energy system and assuring needed energy for sustainable development. Divergent economic development, resource availability and energy mixes are embedded in national energy strategies. Each country sets its national energy strategy based, inter alia, on its perspectives on sustainable development, environmental protection, poverty alleviation, climate change mitigation and quality of life. As a consequence, multiple approaches and outcomes can be found.

2. If the world is to develop sustainably, it will be necessary to secure access to affordable, reliable, sustainable, and modern energy services while reducing greenhouse gas emissions and the carbon footprint of the energy sector. Achieving the sustainable development goals depends on transformation of the energy system. Notably, improving energy efficiency and energy productivity (particularly in buildings, industry and transport) are the easiest and most cost-effective ways to combat climate change, improve air quality, and reduce energy costs. A sustainable energy system will integrate environmental, economic and social aspects in line with national priorities and concerns. The 2030 Agenda requires countries to pursue concerted and accelerated action on sustainable energy in their national programs in order to reconcile the world's growing need for energy services with mitigating the impacts of energy resource development and use. To understand the full implications of the development imperatives, countries need to understand what has been agreed both in their own national contexts and from others' perspectives. Only then can different but equally effective development pathways be pursued efficiently and collaboratively.

3. The amount of CO₂ that can be emitted while keeping global temperature rises within 2°C, the so-called carbon budget, has been estimated at 1 trillion tons. If the ambition is to keep the temperature rise well below 2°C, then that budget is necessarily lower. Over half of the 2°C budget has been "spent", and at current emission levels the remainder will be spent within the next five years. This logic compels an imperative for profound and immediate changes in how energy is produced and consumed. The challenge is reconciling the tight 2°C emission pathway with development aspirations. To avoid overshooting the remainder of the carbon budget and to set the stage for future reductions in atmospheric greenhouse gas concentrations, all options for reducing net carbon emissions must be developed and pursued urgently to reduce the net carbon intensity of energy services.

4. There is a first gap between current actions taken by governments and the commitments they have made both to Agenda 2030 and in Paris, and a second gap between their commitments and the ambition of limiting temperature rises to well below 2°C. The

rate of improvement in energy efficiency, the deployment of net low carbon energy solutions, the uptake of renewable energy and the provision of sustainable access to modern energy services are insufficient. Energy's contribution to 2030 Agenda will falter in the absence of concrete measures to reduce energy intensities, rationalize energy use, optimize energy resources, deploy new energy technologies and sustainable energy infrastructure, and closely involve end-users and new generations to create the necessary behavioral change.

II. Pathways to Sustainable Energy

5. Never has international cooperation been more important to enhance the understanding of sustainable energy and the choices available for achieving sustainable energy, to promote a policy dialogue, and to raise awareness of the different outcomes that could emerge over time. The Executive Secretaries of the five United Nations Regional Commissions have called on their Member States to accelerate the transition to a new, sustainable and fair energy system, tailored to both national policies and global needs in the 2030 Agenda context. This Call for Action is a request to Member States to commit to concrete measures in energy to support achieving the energy-related Sustainable Development Goals and contributing to the Paris Climate Agreement.

6. Participants at the Seventh International Forum on Energy for Sustainable Development in Baku, Azerbaijan in October 2016 request that all of the United Nations partners submit the attached draft Ministerial Declaration to their member States for consideration for adoption at the Ministerial Meeting organized in the context of the Eighth International Forum on Energy for Sustainable Development and the EXPO-2017 "Future Energy" that will take place on 11 June 2017 in Astana, Kazakhstan.

III. Call for Action with Concrete Commitments

7. The actions called for in the Ministerial Declaration are commitments by countries to pursue coherent, holistic, coordinated, and integrated energy policies and to implement programmes that tackle global energy problems, thereby accelerating the transition to an affordable, reliable, sustainable and modern energy system.

8. The attached draft declaration notes the important role that the United Nations Regional Commissions, in close collaboration with the range of international partners, can play in helping countries implement their commitments. As noted in the preamble to the draft declaration, the state of the global economy and the economics of energy markets have prioritized short-term economic concerns, and geopolitics have moved energy security to the forefront of policy considerations. While sustainable development and better quality of life remain stated objectives, the costs of energy services are rising, and greenhouse gas emissions from the energy sector are increasing.

9. The actions called for in the document are designed to fill the identified gaps and accelerate the transition to a sustainable energy system through an agreed common agenda. The declaration seeks to build on previous outcomes and experiences and to propose potential solutions, as a major stepping stone in the history of this international fora process. In particular, it focuses on the need for an urgent and necessary paradigm shift in policy making and the way we produce and consume energy.

Annex II

Draft Ministerial Statement

1. We, the Energy Ministers of [countries], met in Astana, Kazakhstan on 11 June 2017, to explore how to accelerate the transition to a new, sustainable and fair energy system. Energy plays a crucial role in global economic growth and underpins all areas of development. We recognize that it is essential for our nations to secure access to affordable, reliable, sustainable, and modern energy and reduce greenhouse gas emissions from the energy sector if the world is to develop sustainably.

2. Recognizing that energy is at the core of the 2030 Agenda for Sustainable Development and the Paris Climate Agreement, we emphasize the following points:

- **Equitable access to modern energy services requires mobilizing adequate resources.** Ensuring physical and economic access to quality energy services requires investment throughout the energy value chain, from primary energy development to end use. Enabling investment requires that governments have a long-term vision for providing sustainable energy services, and that we promulgate sustainable policies and regulations that are based on rational economics and that allow producers and consumers to respond to a dynamically changing energy market. The vision includes provision of access to modern energy services for vulnerable groups as part of national poverty reduction strategies and social development policy.

- ***The net carbon intensity of the energy sector must be reduced.*** The amount of CO₂ that can be emitted in a scenario that keeps global temperature rises within 2°C, the so-called carbon budget, has been estimated at 1 trillion tons. If the ambition is to keep the temperature rise well below 2°C, then that budget is necessarily lower. Over half of the 2°C budget has already been “spent”, and CO₂ emissions from energy production, transformation, and use are at the heart of the challenge. In order to avoid overshooting the remainder of the carbon budget and in order to set the stage for future reductions in atmospheric greenhouse gas concentrations, it is imperative that all options for reducing net carbon emissions be developed and deployed urgently to reduce the carbon intensity of providing energy services.

- **Energy efficiency needs to improve.** Improving energy efficiency is one of the most cost-effective options for meeting growing energy demand, and it contributes to energy security, a better environment, improved quality of life, and economic well-being. Significant potential for improving energy efficiency exists worldwide, but attempts to improve energy efficiency often fall short because of flawed national policies that artificially lower energy prices that encourage wasteful consumption, that distort markets through production and consumption subsidies, and that manage housing stocks and land use ineffectively. New participants face barriers to entry, there are inadequate norms and standards, and the statistics and information to manage energy and track progress are incomplete. In addition, there is often a lack of awareness and education about the long-term economic and social benefits of action to improve energy efficiency and industrial productivity.

- ***Renewable energy policies need to be redesigned.*** Renewable energy resources are becoming cost-competitive with conventional resources. They offer a way to reduce the net carbon intensity of the energy sector, improve energy security, and encourage economic development. Integrating renewables into the global energy mix will be important as future energy systems are optimized both on- and off-grid.

However, wider uptake of renewables requires addressing barriers to fair competition vis-à-vis conventional technology (without resorting to long-term subsidies), implementing stable long-term energy policy frameworks in a future energy system context, and deploying innovative and targeted financial mechanisms. Policies should be designed in light of the economic circumstances and development challenges of countries with renewable energy potential.

• *National and regional circumstances vary substantially.* While each country will make its contribution to both the 2030 Agenda and the Paris Climate Agreement, there is no one-size-fits-all solution and each country will choose its approach optimally given its national circumstances. We see significant value in international cooperation and functioning energy markets across regional corridors in the interest of all. We encourage the sharing of experiences and technologies to increase the uptake of successful technologies.

3. In light of the foregoing observations, we commit to the following actions to the extent they are relevant for our national circumstances:

A. Access to Modern Energy

4. Significantly accelerate the required energy transition while ensuring a high level of energy service reliability and equitable energy access.

5. Mobilize needed resources to provide universal access to modern energy services and ensure proper integration of other sectors and other development goals into our national energy plans.

6. Develop regional and international standards or other normative instruments throughout the energy system and share relevant information across areas with similar conditions.

7. Promote the use of quality-of-service regulation as a means of aligning the needs of suppliers and consumers of energy services and encourage the introduction of business models based on competitive companies offering sustainable energy services.

8. Develop well-functioning, resilient and interlinked energy markets with market-based pricing and with greater transparency, flexibility and liquidity.

9. Rationalize the use of energy subsidies by exploring efficient and effective ways to protect vulnerable groups and phase out inefficient energy subsidies that create market distortions and encourage wasteful consumption by 2025.

B. Energy and Climate Change

10. Implement strategic measures to develop energy systems that allow for sustainable economic growth alongside deep reductions in greenhouse gas emissions. Reduce systems costs with market reforms, normative instruments (such as standards), and business models that embrace demand responses, supply flexibility, emerging storage, energy efficiency, and efficient transmission and distribution.

11. Institute well-functioning carbon markets or other mechanism to establish a real price on carbon to promote low carbon growth.

12. Ensure policy parity among all low-carbon technologies, including renewables, clean fossil, and, to the extent countries wish to pursue the option, nuclear power.

13. Deploy clean energy technology and enhance research and development of innovative technologies. Encourage both sustainable development of untapped national resource potential and a transition from higher to lower carbon intensity thermal generation.

C. Energy and Resource Efficiency

14. Reshape energy markets so that energy price signals and energy policies are aligned with sustainable deployment and use of energy resources.

15. Create structural, institutional and regulatory framework conditions that enable substantial investments in energy and resource efficiency throughout the energy value chain.

16. Explore ways for energy suppliers to sell energy services rather than energy products to accelerate energy efficiency uptake and promote the creation of strong energy services companies through public-private partnerships to implement large-scale energy efficiency programmes.

17. Enhance cross-sectoral urban planning to improve energy efficiency in cities, including housing, transport, water, and municipal utility infrastructure.

18. Establish technology-driven energy performance standards and pursue ever-tightening, enforced minimum energy performance standards in all sectors. Institute testing and labelling standards and procedures that meet recognized international requirements and that generate transparent information about them. Implement official energy efficiency labelling for mass consumer equipment.

19. Limit commercialization and sales of appliances and equipment that do not meet internationally agreed minimum standards by 2030.

20. Establish education programmes to train professionals in all economic sectors on ways to reduce energy use and provide information to the public with respect to energy efficiency and family budgets.

D. Energy Investment Framework Conditions

21. Develop energy infrastructure, markets, and trading arrangements that are resilient in the face of natural or geopolitical disruptions, including through well-functioning and transparent markets, diversified energy fuels, sources and routes, enhanced energy efficiency, and enhanced price elasticities.

22. Facilitate investments for secure and sustainable energy, including innovative investment to encourage clean energy technologies, upstream investment, and quality infrastructure investment.

23. Maintain an open dialogue among energy-producing, -transit and -consuming countries on energy security, technology and policy on neutral platforms.

24. Promote regional connectivity of energy infrastructure projects to enhance energy efficiency, to integrate renewable energy, and to optimize energy resource utilization. Enhance efforts to make regional energy integration a reality. Encourage interconnection infrastructure projects among countries with complementary energy resources as a cost-effective way to enhance mutual energy security and stabilize energy systems.

25. Engage in dialogue with financial institutions to align investment incentives with the objectives of the sustainable development goals, including climate change. Create structural, institutional and regulatory framework conditions that enable investment

throughout the value chain that reward efficient provision of energy services rather than use of energy resources.

26. Establish capacity building and qualification programmes for developers, engineers, technicians and workers involved in the design of bankable project proposals to be submitted to institutional, private investors, national and international financial institutions.

E. Technology

27. Increase government investment in clean energy innovation, private sector engagement, and dissemination of advanced technologies to facilitate joint research and information sharing. Encourage collaboration among relevant research laboratories and institutes to promote the development of innovative clean energy technologies.

28. Launch and fund a green energy technology center in Astana to achieve the goals of the Clean Energy Ministerial Mission Innovation and like approaches to encourage technology development, promotion, transfer and capacity building towards a green economy.

29. Support research and development and the commercial introduction of clean energy technology, capital, and management skills to support needed transitions.

30. Encourage local manufacturing of energy efficient and cleaner energy equipment that contributes to cost-effective job creation.

31. Establish capacity building and qualification programmes for engineers, technicians and workers involved in the design and implementation of energy efficiency and cleaner energy solutions.

F. Energy Data, Indicators, and Analysis

32. Collaborate with the United Nations regional commissions and other international partners to develop appropriate indicators of progress to the energy-related sustainable development goals, to build needed capacity to collect the sound data needed to populate the indicators, and to provide input systematically to track progress towards the aspirations of the 2030 Agenda and the Paris Climate Agreement.

33. Strengthen the analytical capacity of the different interactions involving energy policy, especially the water-energy nexus and the water-food-energy nexus, in order to provide innovative sustainable policy approaches to address multidisciplinary energy-related issues.
