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Economic Commission for Europe**Committee on Sustainable Energy****Group of Experts on Cleaner Electricity
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**Improving the environmental footprint of energy
systems: Fossil fuels in the energy system****Thirteen session**

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Item 7 of the provisional agenda

**Work plan of the Group of Experts on Cleaner
Electricity Production from Fossil Fuels for 2018-2019****Work plan of the Group of Experts on Cleaner Electricity
Production from Fossil Fuels for 2018-2019****Prepared by the Group of Experts on Cleaner Electricity Production
from Fossil Fuels****I. Introduction**

1. The Group of Experts on Cleaner Electricity Production from Fossil Fuels (Group of Experts) carries out concrete, result-oriented activities that significantly reduce greenhouse gas (GHG) emissions from fossil fuel-fired electricity generation. These activities are developed and implemented with the active participation of United Nations Economic Commission for Europe (ECE) member States, energy companies, financial sector, civil society, academia and independent experts.

2. The areas of work of the Group of Experts are regulatory and policy dialogue; sharing best practices in the field of cleaner electricity production from fossil fuels in the ECE region; Carbon Capture, Use and Storage (CCUS); enhanced oil recovery with CO₂; advanced fossil fuels technologies for power generation; and evaluation of efficiency enhancing measures for coal-fired power plants including steam generators, air and flue gas systems, steam turbines, and generators.

3. On the basis of the outcomes of the implementation of the Work Plan for 2016-2017 and the recommendations from the Group of Experts and its Bureau, the Group of Experts will undertake a number of activities. Among these activities, four represent a continuation, adjusted as needed, of the 2016-2017 work plan. A number of new activities in line with the mandate of the Group of Experts are also indicated. Following the request of the Committee on Sustainable Energy to explore opportunities for closer cooperation among

its subsidiary bodies, three of the new activities are cross-cutting in nature. The Group of Experts will also engage, within the scope of its expertise, in joint work on the transition of the energy sector.

4. The Group of Experts notes that under the current resource constraints successful implementation of the work plan requires institution of dedicated task forces. When deciding on which activities to pursue, the Group therefore has considered the willingness of experts to take an active role in the task forces and other Group of Experts' work between sessions as one of the key selection criteria success.

II. 2018-2019 Activities

A. Assess a future role for thermal power plants in sustainable electricity systems (continued activity from 2016-2017 work plan)

Description:

If fossil fuel-fired generation is to remain a viable part of future sustainable electricity systems, there are two main aspects to consider: (a) decreasing the carbon intensity of electricity production and (b) increasing the flexibility of fossil generation to support deployment of variable renewable power generation. The Group of Experts would assess these aspects from a system-wide perspective.

Work to be undertaken:

(a) The Group of Experts, supported by the secretariat and through its Task Force focussed on assessing a future role for thermal power plants in sustainable electricity systems created in October 2016, will review a number of relevant existing electricity generation and transmission systems.

(b) The Group of Experts will analyze future development plans and/or scenarios (including relevant indicators) based on both renewable energy and fossil fuel outlooks to evaluate a range of current approaches to develop sustainable electricity systems and possibly in the context of the broader energy system.

(c) The Group of Experts will look at different possible options such as new builds/replacement invests vs retrofit of existing installations, in particular for countries with a very low or negative growth of electricity consumption. This scenario work could identify typical expected utilisation patterns of fossil power plants as a basis for the work performed under Activity B.

(d) Based on the above, the Group of Experts will organize round tables on the role of thermal power plants in a sustainable electricity system.

(e) The Group of Experts, taking into account the results of the discussions enriched by the work of the Task Force in-between annual sessions, will formulate policy recommendations or concise strategic messages to the energy and climate stakeholder community on the role of fossil fuels in sustainable energy systems.

Deliverables:

(a) Round table on the continued role of thermal power plants in a sustainable electricity system of the future.

(b) Recommendations/strategic message to the energy and climate stakeholder community on the role of and pathways for fossil fuels in sustainable energy systems.

Timeline:

- (a) Round table on the role of thermal power plants by December 2018.
- (b) First draft of recommendations/strategic message by December 2018.
- (c) Final draft of recommendations/strategic message by December 2019.

B. Increase flexibility in coal-fired electricity generation (continued activity from 2016-2017 work plan)

Description:

Increasing the flexibility of existing and new coal power plants could allow for deeper renewable energy penetration and thus reduce the carbon intensity of system wide electricity generation. Due to the design and operation procedures of historical electricity system development coal is used mostly as a baseload resource, however some new studies claim that existing thermal power plants can provide much more flexibility than often assumed. Operating this capacity under different operating regimes could reduce efficiencies of some power plant types and lead to non-compliance with other environmental limits (sulphur oxides (SO_x), nitrogen oxides (NO_x), and particulate matter, for example), if appropriate measures are not taken. However, with proper design and operating procedures, it could be possible to support larger renewable energy integration using coal as a flexible balancing resource where coal-fired power plants and fuel resources are abundant (the role of natural gas power generation for such purposes is being considered by the ECE Group of Experts on Gas).

Work to be undertaken:

(a) The secretariat, together with the Task Force created in October 2016 to focus on this topic, will work to identify gaps in information on interactions, complementarities and tensions at the nexus of coal power plants and renewable power generation. This work could include fact finding on the changing operational patterns of coal-fired power plants in Western Europe.

(b) The secretariat and the Task Force will prepare a background document on the nexus of coal power plants and renewable energy for consideration at the 2018 session of the Group of Experts.

(c) The secretariat and the Task Force will present its findings at the 2018 session of the Group of Experts.

(d) The Group of Experts will consider possible next steps, including collaboration with qualified partners (international organizations, private sector, and academia) in assessing the integration of coal power plants into future electricity systems with a larger proportion of variable renewable energy. Key aspects would be technology, policy and markets that can support flexible operation of plants.

Deliverables:

(a) Round table/stakeholder dialogue on increasing flexibility of coal-fired electricity generation.

(b) Report on good practices and case studies in increasing flexibility of coal-fired electricity generation.

Timeline:

- (a) Round table on increasing flexibility of coal-fired electricity generation by December 2018.
- (b) First draft of good practices in increasing flexibility of coal-fired electricity generation by March 2019.
- (c) Final draft of good practices in increasing flexibility of coal-fired electricity generation by December 2019.

C. Decrease emissions and increase efficiency from new and existing coal-fired power generation using best practices across the ECE region (continued activity from 2016-2017 work plan)

Description:

Both existing and new coal power generation will play an important role in global electricity systems in the short and medium term. In a typical pulverized coal fired plant, for each

1 per cent increase in efficiency of a coal-fired power plant there is a 2–3 per cent reduction of CO₂ emissions and other air pollutants. Improving energy efficiency has been a focus of intensive energy research over the past two decades. As a result, there has been steady technological innovation towards increasing efficiency and reducing emissions from the power generation of fossil fuels, most notably from coal (where most of the research has been focused).

For existing plants, increasing the energy efficiency can offer both economic benefits while reducing GHG emissions. Over the past few years, some countries have recognized concerns with their increasing energy demand and ageing power plants. For example, Mongolia, Kazakhstan and Uzbekistan have recently begun programmes of modernization or of constructing new power plants. However, the average energy intensities in countries with economies in transition are generally still significantly higher than most other countries. Building on the efforts to implement the work plans for 2014-2015 and 2016-2017, a number of best practice guidance documents for improving plant efficiencies were identified as well as an opportunity to disseminate best practice guidance. Collaborative opportunities have been identified with a number of partners, including the World Coal Association and the International Energy Agency (IEA) Clean Coal Centre, to support this effort in the ECE region.

For construction of new coal-fired power plants, there are a number of high efficiency, low emissions (HELE) coal power generation technologies that could increase efficiencies significantly and decrease power generation emissions in the region. Coal gasification, for example, is a promising technology that offers a versatile and clean way to convert coal into electricity, hydrogen, and other valuable energy products. Introduction of HELE technologies that enhance efficiency, environmental performance and reliability is critical for countries in which electricity generation is based on coal. Activities under this topic will be developed with a view to developing best practice guidance in the deployment of HELE technologies across the ECE region. It will provide member States with the opportunity to adjust policy and regulation in a way that could identify solutions to ongoing coal utilization and a pathway towards carbon capture and storage (CCS) retrofits.

Work to be undertaken:

(a) The Group of Experts through its Task Force created in October 2016 will revise the results of activities carried out in 2016-2017 and any lessons learned.

(b) Based on the findings, and in collaboration with partners such as the World Coal Association and the IEA Clean Coal Centre, the Group of Experts will organize a round table discussion in the ECE region.

(c) The Group of Experts will review all the case studies presented at the workshops in 2015, 2016 and 2017 with a view to developing best practices on drivers and barriers to uptake of HELE technologies.

(d) Drawing on the case studies, the Group of Experts will study the drivers and barriers to the deployment of HELE technologies, and other factors affecting decisions to invest in HELE technologies or in conventional thermal power plants.

(e) The Group of Experts will draft a report on best practices in HELE technologies in the ECE region.

Deliverables:

(a) Workshop/round table on HELE technologies.

(b) Report on best practices in HELE technologies in the ECE region.

Timeline:

(a) Round table on HELE technologies by December 2018.

(b) First draft of the report on best practices in HELE technologies in the ECE region by November 2018.

(c) Report on best practices in HELE technologies and on drivers and barriers to their deployment in the ECE region presented at the session of the Group of Experts by November 2019.

(d) Final report on best practices in HELE technologies in the ECE region by November 2019.

D. Assess means for development and deployment of carbon capture, use and storage (CCUS) technology and know-how (continued activity from 2016-2017 work plan)

Description:

Know-how for Carbon Capture, Use and Storage (CCUS) development and deployment is an important way to support progress in ECE member States. This activity would allow them to consider break-through technology options in the development of sustainable electricity and energy systems, especially in countries still relying on fossil fuels for electricity generation. This activity will look at the contribution of CCUS to climate change mitigation potential, as well as at the obstacles to its deployment, in particular related to the public perception of such projects. Given that large scale demonstration projects have faced the most challenges in the development of CCUS, the Group of Experts may initially focus on small scale and/or modular CCUS and aspects related to infrastructure and storage.

Work to be undertaken:

(a) The Group of Experts through its Task Force on CCUS created in October 2016 will review the impact of activities carried out in the previous work plan, progress achieved, and remaining gaps in this field.

(b) The Group of Experts will organize a round table on means needed to develop and deploy CCUS technology.

(c) Provided needed extrabudgetary funds or in-kind contributions are identified, the Group of Experts may draft recommendations on removing obstacles to implementing small scale CCS.

Deliverables:

(a) Round table on ways to develop and deploy CCUS technology.

(b) Recommendations on removing obstacles to large and small scale CCS.

(c) Provide general and country-specific recommendations on CCUS to the United Nations Framework Convention on Climate Change (UNFCCC) as a means to accelerate implementation of the Paris Accord.

Timeline:

(a) Round table on means to develop and deploy CCUS technology by October 2019.

(b) Recommendations on removing obstacles to small scale CCS by October 2019.

(c) Recommendations on CCUS to UNFCCC on the Paris Accord (December 2019).

E. Opportunities in combined heat and power (CHP), gasification and coal to develop other technologies or products (such as liquids or chemicals)

Description:

This activity will look at opportunities for sustainable use of fossil fuels – primarily coal – beyond electricity generation, e.g., for combined heat and power (CHP), coal gasification, or the use of coal and carbon dioxide as a feedstock to develop other technologies or products (such as liquids or chemicals).

Work to be undertaken:

(a) The Group of Experts will conduct a scoping exercise on the state of development of opportunities in CHP and non-energy use of coal (excluding metallurgical use of coal).

(b) The Group of Experts will present its findings at the annual session in 2018 during a round table dedicated to this topic.

(c) The Group of Experts will draft a report on the opportunities in CHP, gasification and chemical use of coal.

Deliverables:

(a) Round table on CHP, gasification and chemical use of coal.

(b) Report on the opportunities in CHP, gasification and chemical use of coal.

Timeline:

- (a) Round table on CHP and chemical use of coal by October 2018.
- (b) First draft of the report on the opportunities in CHP, gasification and chemical use of coal by April 2019.
- (c) Final draft of the report on the opportunities in CHP, gasification and chemical use of coal by November 2019.

Cross-cutting activities

F. Role of fossil fuels in supporting renewable energy deployment

Description:

In collaboration with the Group of Experts on Renewable Energy and the Group of Experts on Gas, the Group of Experts on Cleaner Electricity Production from Fossil Fuels will review the role of fossil fuels in supporting the deployment of renewable energy. In order to increase the uptake of renewable energy sources, a reliable source of energy and capacity is needed for when renewable energy sources are not available. Both coal- and gas-fired electricity generation can provide the needed capacity.

There is also a need for rapid-response capacity to maintain balance in power networks to accommodate oscillations in the output of intermittent energy sources.

Work to be undertaken:

- (a) The Group of Experts will cooperate with and establish a joint Task Force with the Group of Experts on Gas and the Group of Experts on Renewable Energy to explore policy, regulation, and power market design (balancing markets, energy markets, and capacity markets) to consider which approaches are most effective.
- (b) The Group of Experts will organize a dialogue on the role of fossil fuels in increasing the uptake of renewable energy in the ECE region.
- (c) The Group of Experts will collect case studies and relevant lessons learned from the development policies carried out by ECE member States over the past several years.

Deliverables:

- (a) Report from joint Task Force on its findings and any recommendations.
- (b) Dialogue on the role of fossil fuels in increasing the uptake of renewable energy in the ECE region.
- (c) Case studies on the enabling role of fossil fuels in increasing the uptake of renewable energy in the ECE region.

Timeline:

- (a) Report from joint Task Force on its findings and any recommendations presented to the annual meetings of the Group of Experts and the Group of Experts on Gas and the Group of Experts on Renewable Energy in 2018 and 2019.
- (b) Dialogue on the role of fossil fuels in increasing the uptake of renewable energy by October 2019.

(c) Case studies on the enabling role of fossil fuels in increasing the uptake of renewable energy in the ECE region, ongoing, to be carried out throughout the two-year cycle by November 2019.

G. Role of gas and liquefied natural gas (LNG) in electricity generation (with the Group of Experts on Gas)

Description:

In collaboration with the Group of Experts on Gas, the Group of Experts on Cleaner Electricity Production from Fossil Fuels will review the role of coal and natural gas in electricity generation in the ECE region and the competing options for future electricity generation, including an increased use of LNG in electricity generation.

Work to be undertaken:

The Group of Experts will organize a round table on the role of LNG in electricity generation.

Deliverables:

Round table on the role of LNG in electricity generation.

Timeline:

Round table on the role of LNG in electricity generation by October 2019.

H. Innovation in the extraction and use of coal mine methane for electricity production and other uses (with the Group of Experts on Coal Mine Methane)

Description:

In collaboration with the Group of Experts on Coal Mine Methane (CMM), the Group of Experts will explore methane use in the context of cleaner electricity and heat production.

Work to be undertaken:

The Group of Experts will organize a round table on the role of the extraction and use of CMM for electricity production.

Deliverables:

Round table on the use of CMM for energy production.

Timeline:

Round table on the use of CMM for energy production by December 2019.
