

Unofficial UNECE document: CEP-10/2014/INF3

# **Draft Executive Summary**

(as at 21 October 2014)

**UNECE Recommendations to UNFCCC on how Carbon Capture and Storage (CCS) and CCS for Enhanced Oil Recovery should be treated in a Post-Kyoto Protocol Agreement**

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1. The policy architecture under the United Nations Framework Convention on Climate Change (UNFCCC) is under discussion. It is { expected that parties will adopt a legally binding instrument no later than 2015 for application from 2020. The mechanisms could provide an important source of financing and technological learning to support uptake of carbon capture and storage (CCS<sup>1</sup>) } [Language in { } to be confirmed with UNFCCC].

<sup>1</sup> The technically correct expression is “CO<sub>2</sub> capture and storage”, but because the expression “carbon capture and storage” is widespread and well-known it will be used in this report.

2. The United Nations Economic Commission for Europe (ECE) has asked its Group of Experts on Cleaner Electricity Production from Fossil Fuels to assist UNFCCC by preparing recommendations on how CCS, including CCS for enhanced oil recovery (Carbon Capture Use and Storage, or CCUS), could contribute to the climate change mitigation policy portfolio in the post-2015 instrument. This document has been prepared in response to that request.

3. According to all credible projections and forecasts, fossil fuel use is expected to grow significantly by mid-century. Even if Western Europe and North America reduce their fossil fuel consumption, use in the rest of the world is certain to expand. Fossil fuel-related carbon dioxide (CO<sub>2</sub>) emissions reached 32 GtCO<sub>2</sub>/year in 2010, which was more than 65 per cent of total anthropogenic greenhouse gas (GHG) emissions (49 GtCO<sub>2</sub>/year). Without additional efforts to reduce GHG emissions, their growth, driven by growth in global population and economic activity, will persist.

4. Without additional emissions mitigation, global mean surface temperatures are expected to increase between 3.7 to 4.8°C by 2100 compared to pre-industrial levels. Scenarios in which atmospheric concentration levels of CO<sub>2</sub>eq are kept to about 450 ppm by 2100 are consistent with keeping global temperature rise below 2°C relative to pre-industrial levels. Such scenarios oblige substantial cuts in anthropogenic GHG emissions by mid-century through large-scale changes in energy systems and improved land use management. These scenarios are characterized both by global GHG emissions that are 40-70 per cent lower in 2050 than in 2010 and by emissions rates that drop to zero or less by 2100, which would require more rapid improvements in energy efficiency and tripling or quadrupling the share of zero and low carbon energy supply (from renewables, nuclear energy and fossil energy with CCS, or bioenergy with CCS (BECCS)) by 2050. Overshoot scenarios of GHG emissions reductions that keep the temperature rise below 2°C could only be achieved if BECCS and afforestation are deployed widely by the second half of the century.

5. If the world is to succeed in constraining CO<sub>2</sub> emissions to levels consistent with a 2°C rise in global temperatures, then CCS will have to contribute one-sixth of needed CO<sub>2</sub> emission reductions in 2050, and 14 per cent of the cumulative emissions reductions between 2015 and 2050 compared to a business-as-usual approach. Given their rapid growth in energy demand, the largest deployment of CCS will need to occur in non-OECD countries. By 2050, non-OECD countries will need to account for 70 per cent of the total cumulative mass of captured CO<sub>2</sub>. Given the magnitude of CO<sub>2</sub> emissions from coal and natural gas-fired electricity generation, the greatest potential for CCS is in the power sector. However, CCS is not only about electricity generation. Around 45 per cent of the CO<sub>2</sub> captured between 2015 and 2050 in the 2°C scenario is from industrial applications. In this scenario, between 25 per cent and 40 per cent of the global production of steel, cement and chemicals would have to be equipped with CCS by 2050.

6. CCS has a vital role to play as part of an economically sustainable route to deep emissions cuts. Making CCS technology available as a viable de-carbonisation policy option will require further fully-integrated, large demonstration projects – these are needed urgently – and governments must commit to achieving global CO<sub>2</sub> storage levels of at least one billion tonnes per year by 2030, as set forth in the most recent IEA CCS roadmap, and more thereafter. Implementing such a programme will require collective commitment by countries to fund CCS demonstration and development in power and industrial applications at levels commensurate with the required outcomes. This commitment will require that a significant share of global funds allocated to clean energy be allocated to CCS. The programme will also require careful alignment of the collective public commitments and support with enduring business incentives that enable industry investment. The nexus of commitments and incentives needs to be put in place immediately. Ensuring the availability of CCS will also require regulatory and legislative support at all levels. Particular attention should be given to supporting technical solutions and siting approaches that conform to requirements for public acceptance.

7. There is a growing market for using captured CO<sub>2</sub>, primarily in enhanced oil recovery (EOR) but also possibly for chemical conversion for use in feedstocks for products that represent long term storage. Selling captured CO<sub>2</sub> provides a valuable revenue source to help overcome the high costs and financial risks of initial CCS projects. Regarding whether enhancing production of fossil fuels using CCS should be credited as a legitimate element of the global mitigation action portfolio, ECE considers that the emissions of CO<sub>2</sub> from fossil fuel use should be fully accounted for in the post-Kyoto Protocol agreement and that not considering CCS for EOR would represent a double penalty for the technology that could limit its needed contribution in a longer-term future by impairing a nearer-term working business model. Further, national systems of accounts record CO<sub>2</sub> emissions at the point of emission, not at the point of production of the primary fuel. There cannot be a distinction between fuels produced using EOR and those not using EOR.

8. All of these points are elaborated in the attached document. Drawing on the analyses and assessment of its Group of Experts on Cleaner Electricity Production from Fossil Fuels, ECE recommends that the following elements be considered in the post-Kyoto Protocol agreement:

# Public Policy Parity

9. CCS and CCUS should be technologies that earn emission reduction credits for each tonne of CO<sub>2</sub> that is captured and prevented from being emitted to the atmosphere.

10. Noting that the current policy setting for CCS is insufficient to support commercial development, it is critical that policies that address CCS/CCUS have parity with other no carbon/low carbon technologies and should receive commensurate support that reflects the state of technological and infrastructure development.

11. While knowledge sharing regarding CCS/CCUS deployment is valuable, international agreements must ensure that the developers of intellectual property rights are protected. Any post-Kyoto Protocol instrument should not require technology developers to release/forego intellectual property rights as a condition of earning carbon credits.

# Public Policy Parity

12. A post-Kyoto international agreement should accept a broad array of fiscal instruments to encourage CCS/CCUS, but the selection of instruments should not be mandated but rather left to the discretion of national governments. Any revenue from fiscal instruments should be received by national governments where the project is located and not flow to any international governments or non-governmental organization.

13. CCS projects should receive preferential dispatch ranking when “stacking” electric power generating units for dispatching.

14. Public-private partnerships should be encouraged and decisions left to national governments as to how best encourage these arrangements in their jurisdiction.

# Public Policy Parity

15. A post-Kyoto international agreement must recognize that capturing CO<sub>2</sub> from all industrial sectors will be essential to reach climate goals. Cement, steel, chemicals, refining and transportation must be addressed in a manner similar to how energy production, transportation, distribution and utilization are addressed.

# Government Support for Global Demonstration Projects

16. CCS/CCUS deployment will accelerate if governments work together to financially sponsor demonstration projects. An international agreement should allow for and encourage joint venture projects, particularly between developed and developing nations. A framework should be established to recognize these projects and prescribe how a sharing of benefits can be achieved.

17. A framework of joint projects should suggest how technology developers' intellectual property can be protected.

18. Establish incentives to develop alternative, cost-effective applications involving captured carbon dioxide that result in emissions reduction and its permanent removal from the atmosphere.

# Investments in Developing Countries

19. Developed country investment in developing countries can take many forms. The agreement should be flexible to accommodate a broad variety of mechanisms including:

- (a) Foreign direct investment.
- (b) Development assistance efforts.
- (c) Follow-on to the Clean Development Mechanism that recognizes CCS and CCUS.<sup>2</sup>
- (d) Sharing emission credits.
- (e) Recognizing the role of regional development banks and rewarding national governments for financing projects through regional development banks.
- (f) Recognizing the role of the World Bank Group and recognizing national government contributions to financing projects through World Bank facilities.

<sup>2</sup> FCCC/KP/CMP/2011/10/Add.2; Decision 10/CMP.7: Modalities and procedures for carbon dioxide capture and storage in geological formations as clean development mechanism project activities

# Role of the United Nations as a Governor and Enabler of Progress

20. A post-Kyoto international agreement could be a major opportunity to give proper treatment to CCS, CCUS and carbon capture and transportation for enhanced oil recovery. It is crucial that enhanced oil recovery be treated as storage. Properly addressing CCS/CCUS in an international agreement may be one of the few strategies to enable progress toward rapid deployment of CCS.

21. Public outreach and communication is a determining factor for the future of CCS, and the UNFCCC should consider outreach and communication regarding CCS as a carbon dioxide emissions reduction strategy. Coordination should occur between UNFCCC and other United Nations organizational units, with multilateral government organizations; and with multi-national non-governmental organizations.

22. Monitor and track CCS developments globally. Develop and disseminate best practice guidance on CCS.