IEAGHG Information Paper 2018-IP33; IPCC's Special Report on Global Warming of 1.5°C (SR1.5)

The Intergovernmental Panel on Climate Change (IPCC) has released its Special Report on the Global Warming of 1.5°C (SR1.5) today after its 48th Session in Incheon, Korea. This Information Paper provides a brief summary. A more detailed discussion will be provided by IEAGHG at our 54th ExCo in Melbourne and by IPCC Vice-Chair Thelma Krug in a Keynote address at GHGT-14 later this month.

"One of the key messages that comes out very strongly from this report is that we are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes. Every extra bit of warming matters, especially since warming of 1.5°C or higher increases the risk associated with long-lasting or irreversible changes, such as the loss of some ecosystems. Limiting warming to 1.5°C is possible within the laws of chemistry and physics but doing so would require unprecedented changes." (Quotes from IPCC press release.)

Some main findings re BECCS and CCS:

The report acknowledges that limiting warming to 1.5°C implies reaching net zero CO_2 emissions globally around 2050 and concurrent deep reductions in emissions of non-CO_2 forcers. Such mitigation pathways are characterized by energy-demand reductions, decarbonisation of electricity and other fuels, electrification of energy end use, deep reductions in agricultural emissions, and some form of carbon dioxide removal (CDR) with carbon storage on land or sequestration in geological reservoirs. The assessment suggests a remaining budget for limiting warming to 1.5°C with a two-thirds chance of about 550 $GtCO_2$, and of about 750 $GtCO_2$ for an even chance.

CDR features prominently in SR1.5. All analysed 1.5°C-consistent pathways use CDR to some extent to neutralize emissions from sources for which no mitigation measures have been identified and, in most cases, also to achieve net-negative emissions that allow temperature to return to 1.5°C following an overshoot. However, the report notes that CDR deployed at scale is unproven and reliance on such technology is a major risk in the ability to limit warming to 1.5°C. CDR is needed less in pathways with particularly strong emphasis on energy efficiency and low demand. The scale and type of CDR deployment varies widely across 1.5°C-consistent pathways, with different consequences for achieving sustainable development goals (SDGs). Some pathways rely more on bioenergy with carbon capture and storage (BECCS), while others rely more on afforestation, which are the two CDR methods most often included in integrated pathways. Trade-offs with other sustainability objectives occur predominantly through increased land, energy, water and investment demand. Bioenergy use is substantial in 1.5°C-consistent pathways with or without BECCS due to its multiple roles in decarbonizing energy use. Large-scale, deployment of BECCS and/or afforestation/reforestation (AR) would have a far-reaching land and water footprint. Whether this footprint results in adverse impacts, for example on biodiversity or food production, depends on the existence and effectiveness of measures. The impacts of large-scale CDR deployment can be greatly reduced if a wider portfolio of CDR options is deployed, a holistic policy for sustainable land management is adopted and if increased mitigation effort strongly limits demand for land, energy and material resources, including through lifestyle and dietary change. Most CDR options face multiple feasibility constraints, that differ between options, limiting the potential for any single option to sustainably achieve the large-scale deployment in 1.5°Cconsistent pathways. The impacts of CDR options on SDGs depend on the type of options and the scale of deployment. If poorly implemented, CDR options such as bioenergy, BECCS and AFOLU would lead to trade-offs. Appropriate design and implementation requires considering local people´s needs, biodiversity, and other sustainable development dimensions.

The share of primary energy from renewables increases while coal usage decreases across 1.5°C-consistent pathways. By 2050, renewables supply a share of 49–67% of primary energy, while the share from coal decreases to 1–7%, with a large fraction of this coal use combined with CCS. The energy system transition that would be required to limit global warming to 1.5°C has started in many sectors and regions around the world. It notes that the political, economic, social and technical feasibility of solar energy, wind energy and electricity storage technologies have improved dramatically over the past few years, while that of nuclear energy and CCS in the electricity sector have not been able to show similar improvements. Electrification, hydrogen, bio-based feedstocks and substitution, and in several cases CCS, would lead to the deep emissions reductions required in energy-intensive industry to limit warming to 1.5°C.

Notes

More detailed assessments of BECCS and CCS are contained within the related chapters of the main body of the report. A special highlight is a table mapping the mitigation options against the SDGs. However, the table contains several gaps for CCS and BECCS, thus IEAGHG has started a study this topic.

Tim Dixon and Jasmin Kemper have acted as expert reviewers of both first and second order drafts of SR1.5 and IEAGHG is now an accredited observer of the IPCC.

A more detailed discussion of the contents of SR1.5, especially the findings covering CCS/BECCS, will be provided at the 54th ExCo in Melbourne on 19 October, and by IPCC in a Keynote address at GHGT-14 on 22 October.

The full report is available for download at:
https://www.ipcc.ch/report/sr15/

Jasmin Kemper & Tim Dixon
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