Meeting our Sustainable Development Goals through an integrated carbon management approach – key messages

COP26 side event in the EU pavilion (1st November 19:00 – 20:00) hosted by CO_2GeoNet, the German Research Centre for Geosciences (GFZ) and the Institute for Advanced Sustainability Studies (IASS).

Key messages

- Achieving our Sustainable Development Goals (SDGs) and pathways for 1.5°C requires rapid and large-scale reduction of and negative CO_2 emissions;
- Nature-based solutions and CO_2 capture and storage (CCS) are essential and complementary options to tackle the climate challenge;
- CCS is already safely storing millions of tonnes of CO_2 every year and can enable negative emissions;
- There is abundant geological capacity to safely store CO_2 captured from sources such as industrial and energy-intensive processes where CCS is the only option to cut emissions;
- CO_2 capture utilisation and storage (CCUS) can be accelerated and upscaled through the provision of, and access to, large scale transport and storage infrastructure;
- CO_2 capture and utilisation (CCU) can offer long-term storage opportunities and help make CCS an investable proposal while supporting the SDGs and providing low carbon commodities to build essential infrastructure;
- Life cycle analysis is essential to ensure that activities and projects reduce emissions and support relevant SDGs;
- Adapted carbon accounting could support CCUS by providing fair recognition of all carbon capture, transport and storage technologies;
- Nature-based climate solutions can offer up to 1/3 of the emission reductions needed between now and 2030 to achieve the Paris Agreement targets;
- Nature-based climate solutions have a high acceptability by local communities and offer, in addition to emission reduction and CO_2 removal, many ecosystem services essential for achieving our SDGS and adaptation to the climate challenge;
- Policy support and demand for low carbon activities is needed to enable all these options to achieve their full potential in tackling the climate challenge.

Report on the event

Ceri Vincent (CO_2GeoNet) introduced the event: Achieving our SDGs and pathways for 1.5°C requires large-scale reduction & negative CO_2 emissions through implementation of a portfolio of complementary options. Nature-based solutions (e.g. peatland rewetting), CO_2 capture with secure geological storage & low carbon building materials all have an important role to play in meeting climate targets. Utilisation can add value to help realize the economic, environmental & societal potential of CO_2 removal. We can't afford to ignore any of the tools to help us meet our climate targets. Governance needs to support an integrated approach, but implementation will need to be

adapted to match the opportunities presented by different situations and locations. How we act now will determine if we succeed in meeting the climate challenge.

Eva Halland (Norwegian Petroleum Directorate, NPD); *Growing CO_2 capture and storage for rapid and significant emission reductions*. In Norway, more than 26 $MtCO_2$ has been injected and stored over the past 25 years in deep saline aquifers offshore; Sleipner and Snohvit. These developments demonstrate secure and permanent storage. The Longship project reflects the Norwegian government's ambition to develop, by 2024, a full-scale CO_2 transport and storage option for Europe that will accelerate CCS, develop the full-scale CCS value chain and facilitate cost effective CO_2 management at scale. Longship is focused on storing CO_2 from industrial processes that have no other options to reduce their emissions. There is increased interest in developing CCS value chains and invitations for storage applications for two new areas on the Norwegian Continental Shelf are currently open. The Norwegian CO_2 storage atlas (2014) gives an overview of where and how much CO_2 can be stored, with up to c.80 Gt capacity available. We have the knowledge, the instruments and the capacity to store - CCS is ready now.

Barbara Olfe-Kräutlein (Institute for Advanced Sustainability Studies, IASS); *Reducing industrial CO_2 emissions and fostering a circular economy through CO_2 utilisation.* CO_2 capture and utilisation (CCU) has three stages; CO_2 capture (e.g. from industrial sources), conversion to useful products (e.g. energy carriers, solvents, concrete or plastics) and disposal at end of product life. There are already products in the market that utilise captured CO_2 and by 2030 expect utilisation to be 5 – 7 Gt per year, with the largest potential lying in materials for the building industry where the CO_2 is stored permanently. We need to use all the tools in our toolbox to tackle the climate challenge. CCU can interact with societal change processes and SDGs to support, for example, the energy transition, decarbonisation and decentralised energy supply infrastructure. Implementation needs to be carefully monitored to avoid locked in emissions. Each utilisation option needs a full Life Cycle Analysis to confirm its climate potential. CCU doesn't have a business case yet and needs policy support now and will continue to do so for the foreseeable future.

Claude Lorea (Global Cement and Concrete Association, GCCA) *Adding value and storing CO_2 through utilisation.* Concrete is essential to build the world of tomorrow and meet the challenges for our future generations – we need hospitals, schools, renewable energy, sustainable buildings, especially with a growing population. We need concrete and, at the same time, we need to achieve our net zero target. The GCCA Roadmap to net zero shows that 2020 – 2030 is the decade to make it happen. For concrete, CCU and CCS are important for achieving net zero (36% of reduction from capturing and storing emissions, 6% from recarbonation of cement during its lifetime). This is a CCU option that delivers a permanent/long term option with the same length of storage as geological storage of CO_2; the CO_2 is embedded in the final product and not re-emitted. We need policies to support CCUS and demand for low carbon products in order to make manufacture of low carbon concrete investable. We also need supporting infrastructure for circular and net zero manufacturing environment – key for CCUS and for creating the circular economy.

Franziska Tanneberger (Greifswald Mire Centre) *Nature-based solutions - the example of peatland restoration for GHG emission reduction, carbon dioxide removal and adaptation.* Ecosystems have the potential for large additional climate mitigation by combining enhanced sinks with reduced emissions. We can work with nature to address the climate crisis, which is a particularly urgent societal challenge. Nature climate solutions such as conservation, restoration and improved land management can provide 1/3 of the cost-effective climate mitigation needed between now and 2030 to stabilise global warming to below 2C. Peatlands are one example, as peat can be a source or sink of CO_2. In Europe we have degraded more than 50% of our peatlands, mainly for agricultural

use; 3% of agricultural land in EU is drained peatland, but these areas cause 25% of agricultural land use emissions. Models show we need to rapidly re-wet these peatlands otherwise they will further contribute to warming. The emission trajectory to achieve the Paris Agreement targets and net zero by 2050 implies all peatlands are rewetted. EU common agricultural policy subsidises draining wetlands but not land use on peatlands, we need to change this so that strategic policies align with the Green Deal and to improve land use practices. Wet peatlands link to all 17 SGDs including clean water, sustainable growth, climate action.

Ceri Vincent – in terms of storage capacity in Europe, the GeoCapacity project (2008) assessed EU storage capacity to be at least 116 Gt and noted the need for more data to complete the assessment. Using the 2019 EU Environment Agency industrial emissions (518 $GtCO_{2e}$/year), if we use could use 1/10 of that identified storage space, we could store two decades worth of emissions from industrial sources. We are not worried about capacity; we have the capacity to store, we have the technology to store, CCS is real and ready to go.

Aram Kalhori (German Research Centre for Geosciences, GFZ) – would also like to emphasise that we need to intensify engagement with the public and their participation in research and action. For these nature-based solutions, which often have positive public acceptability, we can avoid, reduce and remove emissions from the atmosphere and quickly change land areas from a CO_2 source to a CO_2 sink.

Paal Frisvold (EU Climate Pact ambassador and EU Advisor to SINTEF) – This is achievable, this is safe, we have the long-term capacity, nature-based solutions have a lot to offer. We need the policy, we need the infrastructure, we need an adapted accounting system.