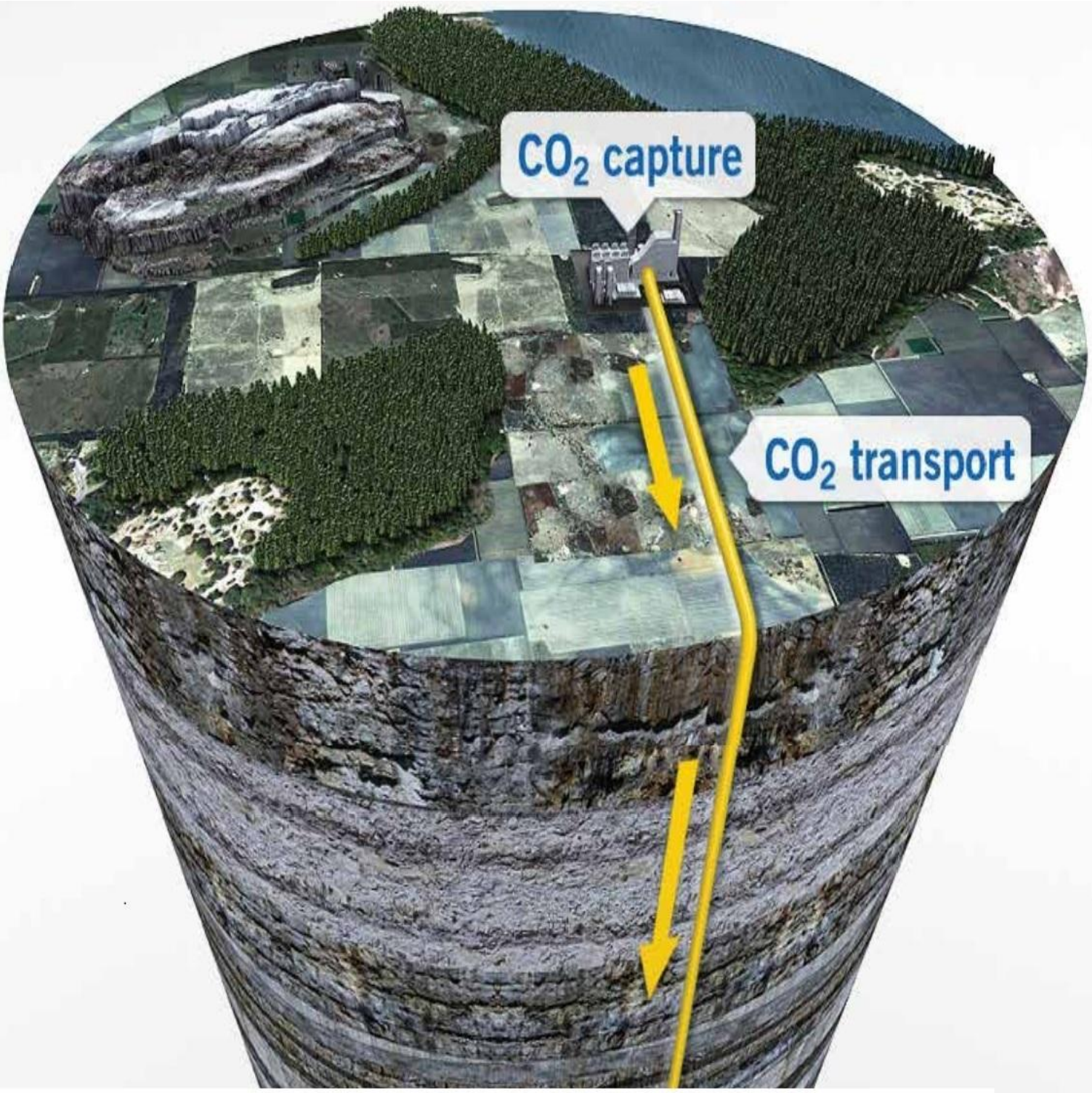

Innovative solutions to accelerate CCS:

The Low-Carbon Technology Partnership (LCTPi) on Carbon Capture & Storage

LCTPi
Led by wbcsd

Contributing to accelerating the deployment of CCS with a global goal of 1 Gt of CO_2 being stored annually by 2030 through an innovative funding solution and a collaborative effort to map CO_2 storage potential.

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Global CCS Institute

Low Carbon Technology Partnership on Carbon Capture & Storage

Global energy-related CO_2 emissions continue to rise, now exceeding some 35 billion tonnes per annum. Estimated cumulative carbon emissions since the start of the industrial revolution are now closing in on 600 billion tonnes, against a threshold level of one trillion tonnes that equates to 2°C warming of the climate system.

Most scenarios recognise that fossil fuel derived energy will continue to have a significant share of the energy mix and this will very likely result in an overshoot of the trillion tonne marker before the middle of this century. Rapid and large-scale deployment of alternative energy sources will be required, but such actions will probably not curtail emissions sufficiently during this century.

CCS is a key technology for delivering net zero emissions during this century: without it, achieving the 2°C global goal will likely at best very costly, at worst not feasible. Irrespective of the energy pathway going forward, the earlier that large-scale deployment of CCS starts, the lower the eventual concentration of carbon dioxide in the atmosphere.

Deployment of CCS – with an early focus on large-scale demonstration of the technology in carbon intense (including also emerging) economies – can be game changing in the context of managing and eventually limiting cumulative emissions.

The IEA CCS Roadmap describes a clear but very ambitious path to deployment of this mitigation lever. More recently, the IPCC 5th Assessment Report describes the much higher cost of reaching a net zero emissions society without CCS by the end of the century and also makes clear that CCS is a necessity if the world should exceed the trillion tonne threshold and require negative emissions. The IPPC suggests a combination of bio-energy and CCS to achieve this (BECCS).

Given that the sole purpose and utility of CCS technology is to reduce emissions, successful deployment will require both push and pull policies within a mature regulatory and permitting framework. As such, it is clear that we need coordinated action from both the public and private side.

Low-Carbon Technology Partnerships initiative (LCTPi)

LCTPi is a joint public and private initiative to accelerate low-carbon technology development, scale up their deployment, and enable the implementation of business solutions.

In December 2015 a new global climate agreement will be brokered at the Paris Climate Change Conference. This will mark a key moment to shape the post-2020 climate regime.

WBCSD is bringing its Action 2020 Business Solutions to the Lima-Paris Action Agenda through the Low-carbon Technology Partnerships initiative and the organization of a series of business government climate dialogues with our global network partners in Brazil, China, India, Japan, South Africa and the USA.

The initiative was launched in Lima in 2014 by the Sustainable Development Solutions Network (SDSN), the World Business Council for Sustainable Development (WBCSD) and the International Energy Agency (IEA). It is one of the flagship initiatives of the French Presidency of COP21.

An ambitious objective

The objective of the initiative is to catalyse actions to accelerate low-carbon technology development, and scale up the deployment of business solutions, to a level and speed that are consistent with the objective of limiting global warming to below 2°C compared to pre-industrial levels.

The LCTPi on CCS has brought together a critical mass of private sector companies and partners. The leading participants include:

This LCTPi on CCS is an open group to all companies, governments and organisations that support accelerated deployment of CCS. Several other groups have contributed to the work of this LCTPi and we continue to encourage new participants to join this initiative.

Key challenges for CCS

The first key challenge for CCS is funding. CCS faces both an upfront capex challenge as well as an OPEX challenge for operations. On the capex side, CCS projects have a high initial investment hurdle given that the solution requires large scale facilities. To cover operating expenditure, only a handful of jurisdictions have a mechanism in place to reward mitigation at a suitable level (e.g. carbon tax in Norway, UK carbon price floor and British Columbia carbon tax).

An important intervention to accelerate CCS is a mechanism that rewards each tonne of CO_2 permanently stored. A financing system such as carbon pricing can deliver this, but experience to date indicates that sustained carbon pricing at the level necessary for ongoing CCS deployment is unlikely in the near to medium term. Given these constraints, the LCTPi on CCS is proposing the creation of a new fit-for-purpose funding mechanism targeted directly at CCS deployment.

The second area that would benefit from collaboration is CO_2 storage. At the moment, the IPCC estimates that sub-surface storage capacity is sufficient relative to the volumes of CO_2 that would need to be sequestered for a 2°C scenario. However, our current mapping of sub-surface storage capacities varies greatly by geography. As such, a globally coordinated effort would help assess storage capacities and options for locations where high point source emissions are expected.

A third bottleneck for CCS, identified by the LCTPi, is the energy efficiency of CO_2 capture. Although incremental improvements continue to be developed by companies active in the CCUS value chain, a coordinated global effort to find “breakthrough” technologies would benefit CCS (and CO_2 utilization) deployment greatly by reducing the operational expenditures incurred by including capture facilities to power and industrial plants.

Finally, shared CO_2 transport infrastructure will be key and CCS would benefit from the development of hubs where sources and sinks can be matched and the resulting transport infrastructure can be optimised for capacity and cost.

A vision for success in the CCS LCTPi

CCS is a critical technology for our energy system. As such, we aim to contribute to accelerate the deployment of CCS with a global goal of 1 Gt of CO_2 being stored annually by 2030 through an innovative funding solution and a collaborative effort to map CO_2 storage potential.

This goal is certainly ambitious as it would add up to between 500 and 1000 projects (each at 2MtCO_2/y or 1Mt CO_2/y respectively). This is approximately 40 times today's activity levels. Today, 27MtCO_2 are stored annually and at this rate of deployment we would only achieve about 100MtCO_2/y by 2030. However, if CCS deployment is successfully accelerated to meet our goal, we will have prevented approximately 6 GtCO2e from reaching the atmosphere between today and 2030.

While CCS still faces a number of important challenges, several of these are being tackled by informed private sector enterprises and governments. We have identified global efforts to coordinate research into improving the energy efficiency of capture technologies and important regional efforts to create CO_2 transport infrastructure hubs. The crucial gaps in global efforts, however, remain in funding and CO_2 storage. To support the vision above and tackle the key challenges identified by the CCS LCTPi, we propose discussions between the public and private sector on two specific solutions:

1. An innovative CCS funding solution

If CCS is to be deployed at very large scale throughout this century to comprehensively manage emissions, a clear, long term economic driver will be needed to trigger the required projects. Conventional wisdom argues for a straight carbon price associated with the use of fossil fuels. However, as the objective of CCS is to capture and store CO2, a mechanism that specifically rewards this activity rather than penalising the emission of all CO2 to the atmosphere may be a more successful approach.

We propose the trial implementation of the above, through the creation of the Zero Emission Credit (ZEC). One ZEC would be granted to a CCS project for each tonne of CO2 captured and stored. The ZEC would in turn provide a revenue stream for the project by having value in the global marketplace which could be realised through its sale. Ultimately, this value would arise through compliance based systems at a national level where capture and storage of some amount of CO2 becomes a requirement. But this is not the case now.

Until the Zero Emission Credit is widely recognised, we further propose a provisional Zero Emissions Credit Development Fund (ZDF) to drive early demand. The fund will buy ZEC units, which will establish methodologies, define the necessary operational parameters and allow limited CCS project activity to proceed in various locations, based on ZEC transactions.

2. A global map for CO_2 storage

For CCS to develop to its full climate change mitigation potential, storage volumes must increase dramatically to a rate of 6 GtCO_2/year by 2050 as indicated by the IEA in its 2°C scenario and its CCS Roadmap. For comparison, global natural gas production infrastructure today caters for a volume of 3364 billion cubic meters, roughly equivalent to 2.4 GtCO_2/year.

Deployment of CCS will benefit from more robust and consistent estimates of regional storage. The fact that many subsurface mapping exercises are underway to create atlases of storage resources

confirms the importance of having accurate information that allows us to consider CCS as a mitigation option.

We propose pooling of resources (geoscientists, data, models and techniques) across research organizations, industry and national/regional geological agencies to create a global map identifying and improving confidence in the availability of storage resources, aiming to classify these resources along the axis familiar from the O&G sector of: certain and available through to likely.

For more details on these proposals please see separate documents.

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