



IEAGHG Information Paper 2018-IP27; CCUS is Critical to Achieving a Net-Zero Emissions Europe

The European Zero Emissions Platform¹ has recently produced a report that looks at the *Role of CCUS in a below 2 degrees scenario* in Europe. The press release for ZEP on the report can be found at: <http://www.zeroemissionsplatform.eu/component/downloads/downloads/1689.html>

Whilst the full report can be found at:

<http://www.zeroemissionsplatform.eu/component/downloads/downloads/1688.html>

The report draws upon recently published material such as the report by Pöyry on fully decarbonising the European energy System that was the subject of an IP in its own right see:

- IEAGHG Information Paper 2018-IP26; Fully Decarbonising Europe's Energy System by 2050 (please go to <http://documents.ieaghg.org/index.php/s/rwGp8ghtdoFIMvn> to download).

The headline conclusions from the report are:

- The urgent deployment of Carbon Capture Utilisation and Storage (CCUS) is central to ensuring that Europe can meet its contribution to the Paris Agreement, and deliver long-term emissions reduction.
- CCUS is particularly necessary for tackling emissions in 'hard to mitigate' sectors such as Industrial processes and distributed heating.
- European industry in particular needs to deploy low-carbon solutions that are available today, and CCUS represents one of the few technologies that is available, scalable and cost effective.
- CCUS, therefore, enables a transition that is 'just' both locally and globally, sustaining the economic contribution of the industries in which Europe has already invested.

The report makes recommendations to the European Commission that are set out below:

- (1) Taking Paris targets seriously.** To keep the warming of surface temperatures below 2 degrees compared to preindustrial levels, countries will have to become significantly more ambitious in reducing source emissions across all sectors. It is imperative to implement all available and cost-effective measures to enable net-zero emissions by mid-century. CCUS (emissions reduction in industries, incorporating opportunities to use CO₂ as a useful input to production) and hydrogen (for heating and transport) are central to address hard to mitigate emissions, for instance in industrial processes and heat generation.
- (2) Ensuring a 'just' transition.** A just transition allows for the achievement of sustainability and climate targets without damaging welfare, jobs, and livelihoods. To ensure Europe meets its commitments under Paris without endangering its economic future, climate measures need to be effective in reducing emissions, protect jobs and existing assets, while also being cost-efficient. Without a balanced energy mix, CCUS and eventually, hydrogen, industries will struggle to meet the 2050 target. They are then left with increasing costs for emitting CO₂ and rising public pressures as other sectors approach carbon neutrality. They will also face a lack of options to reduce emissions, endangering their continued existence in Europe with fatal consequences for Europe's economy and the climate. Therefore, it is in these industries' interest to develop emissions reduction measures now that enable them to remain competitive in a net-zero

¹ The ZEP was founded in 2005, the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) is a unique coalition of stakeholders united in their support for CO₂ Capture and Storage (CCS) as a key technology for combating climate change. ZEP serves as advisor to the European Commission on the research, demonstration and deployment of CCS. For further details on ZEP go to: <http://www.zeroemissionsplatform.eu/>



economy. At the same time, it is also in the interest of labour unions and governments to ensure a sustainable industrial sector that provides continued employment and wealth generation, preserving and generating domestic/local investments and economic activity.

- (3) **Quantifying economic narratives on CCUS.** Engaging with government departments concerned with wider economic affairs, to consider the merits of public support for CCUS action has previously been challenging. Therefore, it is crucial to shift the direction and focus of discussion to developing an economic narrative. In making this a sustainable just transition both locally and globally we can ensure that the value that CCUS can bring to the economy is taken into account alongside cost. Bringing CCUS into the narrative may be helpful to associate the capture of CO₂ with useful production. It may add an intuitive element (for example, in 2018 European media and publics have learned of CO₂ shortages impacting production of favourite beverages). To this end a wider stakeholder audience must be involved to build a consensus around such narratives and evidence-based metrics. This should be done in a manner that effectively brings treasury budget holders and a wider set of policy stakeholders concerned with economic affairs into the conversation around CCUS. This requires building on the type of ‘economic multiplier’ analysis considered here with more sophisticated economic modelling. Such a development is necessary to enable consideration of the fuller private and public (social) costs and benefits (and, crucially, their distribution) involved in introducing systems around CCUS, hydrogen and other low emissions solutions. Multiple sector, economy-wide modelling and evaluation frameworks are required. These will include the changing roles of energy service suppliers and demanders (e.g. as the traditional oil and gas industry takes on the role of supplying CO₂ transport and storage services, and producing low carbon fuels such as hydrogen). Analysis is required on how different markets and actors respond to different scenarios of economic and policy conditions over different timeframes. Frameworks that may be used do exist, such as multi-sector economy-wide ‘computable general equilibrium’ (CGE) simulation models for policy evaluation. CGE methods are already employed by finance ministries around the world to evaluate the wider impacts of different policy options, industry changes and economic disturbances.
- (4) **Infrastructure development.** The report urges European governments to collaborate together to develop and implement plans for CCUS infrastructure that allow for accelerated and deep reductions in CO₂ emissions of key and so far largely untouched emitters. In many ways, we can think of the change we face as like public health and/or national infrastructure provision. Actions to reduce emissions can be compared to actions to improve public water treatment systems in the 19th century or to develop road transport networks over the last century. Government action was needed to ensure investment happened and the infrastructure was built. The public water systems needed water collection, treatment, pipelines and storage solutions. Similarly, the road transport network required connectivity across countries and to link populations to industry hub. Both cases have similarities with what we need for CO₂ emission removal today. To meet the Paris COP21 targets and safeguard the value and prosperity already enjoyed in our economies, we need equivalent solutions to be in place before 2030 so that CO₂ emissions can actually be reduced, and a NetZero economy established by mid-century. The role of governments in financing CO₂ transport infrastructure will be crucial in the short-term since European funding availability is likely to be limited before 2020. Nonetheless, CO₂ transport and infrastructure projects need to be coordinated at European level given that all countries do not have access to storage sites. The European Commission can support these developments by providing a strong framework through its long-term strategy, enabling Member States to plan effectively and fairly for the transition to a 2050 net zero economy, including for the areas that remain largely untouched. Moreover, the EU Structural Funds should also be made available for developing CCUS infrastructure as this will be critical to ensuring a just transition in the industrial regions these funds are intended to support.



(5) Regulatory reform to support new institutions for CCUS or to activate new capacity within existing regulatory bodies. Establishing a European CCUS infrastructure benefits all parts of society through sustained domestic industrial production, continued jobs and affordable products, and effective climate mitigation. However, an increasing carbon price alone does not provide the necessary incentives for companies and governments to begin implementing capture technologies, build pipelines, and begin permanently storing CO₂. Nor can the entire CCUS value chain be expected to be developed by and for a single industry site alone. What is needed is a cooperative framework that reduces risks across involved actors (industries capturing CO₂, and companies transporting and storing it), as well as costs by allowing as many industrial CO₂ source points as possible to participate. A central coordinating body or ‘market maker’ can support the planning and implementation of an infrastructure between industry clusters, transport hubs and storage locations, much as Gassnova is doing for Norway’s full-chain CCS project. A market maker could also operate on a trans-regional, European basis. Financial support coming from the private sector, regional and national governments, as well as the EU (for example through the Innovation Fund or PCI framework) can help stem the initial capital investments needed. It is therefore important for governments and the private sector to cooperate, and establish the needed regulatory bodies. Immediate action is required to ensure a timely implementation of measures is possible.

The report also outlines ZEP’s thinking on CCU. The report states that CCU has the potential to strengthen business models for industrial emissions reduction and can contribute to emissions reduction. However, the market for CO₂ use is minimal compared to the amount, which will need to be permanently stored. Additionally, while some forms of CCU permanently avoid CO₂ reaching the atmosphere, other forms may only constitute a postponement of emissions – any incentive policies driven by climate must hence rely on full Life Cycle Analyses including energy input.

Conclusions:

The ZEP report following the Pöyry assessment makes a strong case for the need for CCUS if Europe is to meet its Paris commitments. Like the more global IEA WEO 2017 B2DC and Shells Sky Scenario CCUS looks to be an essential part of the tool box if we are going to get below 2°C.

With central Europe seemingly less convinced on CCUS, the report makes the case that, to keep the industrial investments in place, CCUS is needed to preserve the investments made to date, retain jobs and reduce the social impacts if these industries were to move elsewhere.

There is also an interesting line of argument that Europe should consider building a CO₂ infrastructure to be in the public good much like other transport infrastructure and water grids.

ZEP also support the idea that CCU is a short-term driver for CCUS and more work is needed to justify that CCU is permanent storage and there is a net contributor to climate change mitigation because non-permanent and temporary storage will not allow Europe to meet its Paris objectives.

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