

ZEP Advisory Council 57

5th December 2018

Agenda Item 10: ERG update

10.a. ERG Update

Appended to this paper is an update for the ZEP External Relations Group.

10.a.i. External Engagement

Appended to this paper is a meeting note summarising the meetings that took place in October.

10.a.ii. Summary note of ZEP 26th September event

Appended to this paper is a summary note of the ZEP event 'Low Emission, High Ambition: a Just Transition to a Net-Zero Europe' which took place on the 26th September.

10.a.iii. Politico article on the ZEP 26th September event

Appended to this paper is the Politico article on the ZEP 26th September event.

10.a.iv. Letter of intent for the CLUSTAR project

Appended to this paper is a letter of intent for the CLUSTAR project.

10.a.v. Letter of support for the Port of Rotterdam application to the Connecting Europe Facility

Appended to this paper is a letter of support for the Port of Rotterdam application to the Connecting Europe Facility.

10.a.vi. Briefing note for ENVI Committee COP24 Resolution

Appended to this paper is a briefing note which was sent to the ENVI Committee in relation to the draft resolution on COP24.

10.a.vii. Press statement on European Parliament COP24 Resolution

Appended to this paper is a press statement on the European Parliament COP24 Resolution, which was issued on the 24th October.



10.a.viii. Recommendations on Connecting Europe Facility amendments

Appended to this paper is a paper setting out ZEPs recommendations on the Connecting Europe Facility amendments.

10.a.ix. Recommendations on InvestEU programme amendments

Appended to this paper is a paper setting out ZEPs recommendations on the InvestEU programme amendments.

10.a.x. Follow-up to Carsten Bermig

Appended to this paper is a set of follow-up documents requested by Carsten Bermig (DG Grow), following a meeting on the 7th November.

10.a.xi. Draft dissemination plan for ZEP report “Collaboration across the CCS Chain - work stream 1: storage related risks”

Appended to this paper is a draft dissemination plan for the ZEP report “Collaboration across the CCS Chain - work stream 1: storage related risks”.

The AC are invited to approve this dissemination plan.

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Agenda Item 10.a.: ERG update

ERG Co-chairs: Jonas Helseth (Bellona) & Helen Bray (Shell)

External engagement

Since the AC56 meeting, the Secretariat has taken part in the following meetings and events:

- **3-5th October:** Gassnova CCS Safari, Norway.
- **9th October:** Meeting of the DG Grow High Level Expert Group on Energy Intensive Industries.
- **11-12th October:** IEA Gas & Oil Technology Collaboration Programme (IEA GOT) roundtable on “*Role of the renewable - hydrocarbon nexus in accelerating the energy transition*”.

A meeting note summarising these meetings can be found as pre-read 10.a.i.

ZEP events

Since the AC56 meeting, ZEP has held one external event:

- **26th September:** ‘Low Emission, High Ambition: a Just Transition to a Net-Zero Europe’

Presentations from the event can be found [here](#). A summary note of the event can be found as pre-read 10.a.ii.

The event was covered in Politico and EurActiv. The Politico article can be found as pre-read 10.a.iii. and the EurActiv article can be found [here](#).

Media

Following the ZEP event ‘*Low Emission, High Ambition: a Just Transition to a Net-Zero Europe*’ which took place on the 26th September, ZEP wrote an op-ed summarising the key conclusions of the event and setting out the importance of CCS for delivering net-zero emissions. The op-ed was published on the 23rd October and can be found [here](#).

Letters of support

ZEP has written the following letters of support recently:

- **30th August 2018:** Letter of intent for the CLUSTAR project.

The letter can be found as pre-read 10.a.iv.

- **3rd October 2018:** Letter of support for the Port of Rotterdam application to the Connecting Europe Facility (CEF)

The letter can be found as pre-read 10.a.v.

Communications Agency tender process

The CCSA is in the final stages of negotiating its new contract with the EU Commission to provide secretariat services to ZEP. As part of this contract, CCSA has begun the process of sub-contracting for a communications agency to provide communications and PR support to ZEP. A request for proposals was sent to seven communications agencies on the 22nd October and CCSA received six proposals in response. The ERG discussed these proposals on a call on the 8th November and it was agreed to arrange follow-up calls with two agencies to further discuss their proposals. These calls were held in the week commencing 12th November. It is expected that a final decision will be made imminently.

ENVI Committee COP24 Resolution

On the 1st October, the EP Development Committee voted on its contribution to the ENVI Committee draft resolution on COP24. The adopted text of the Development Committee included a number of negative and incorrect statements on CCS. It was therefore decided that ZEP should develop a briefing note to address these statements and circulate this note to the ENVI Committee. The briefing note was sent on the 5th October and can be found as pre-read 10.a.vi.

The Development Committee text was put forward as an amendment to the European Parliament COP24 resolution vote which took place on the 25th October. The ERG and a number of other stakeholders carried out a concentrated engagement effort in the days leading up to this vote to encourage MEPs to reject the amendment. This effort was successful as the amendment was rejected.

ZEP issued a press statement on the 24th October calling for the amendment to be rejected. This press statement can be found as pre-read 10.a.vii.

Connecting Europe Facility

European Zero Emission Technology and Innovation Platform

ZEP Secretariat,
Carbon Capture and Storage Association
6th Floor, 10 Dean Farrar Street, London, UK
www.zeroemissionsplatform.eu



On the 22nd November, the European Parliament voted on Establishing the Connecting Europe Facility (CEF). A number of amendments were proposed which aimed to remove CO₂ transport from the CEF regulations. The ERG therefore agreed that ZEP should develop a short paper setting out its recommendations on these amendments, to be distributed to the ITRE committee. The final paper can be found as pre-read 10.a.viii.

InvestEU programme

On the 3rd December, the ECON and Budget committees will vote on the InvestEU regulation. A number of amendments have been proposed which aim to remove CO₂ transportation from this regulation. The ERG has therefore agreed that ZEP should develop a paper setting out its recommendations on these amendments and highlighting the need for consistency between the Connecting Europe Facility, Innovation Fund and Invest EU. The paper can be found as pre-read 10.a.ix.

Follow-up to Carsten Bermig

Following the meeting on the 7th November between Dr Sweeney and Carsten Bermig (DG Grow), the ERG prepared a number of follow-up documents as requested by Carsten Bermig. These documents can be found as pre-read 10.a.x.

Draft dissemination plan for ZEP report “Collaboration across the CCS Chain - work stream 1: storage related risks”

The NWT Temporary Working Group “Collaboration across the CCS Chain - work stream 1: storage related risks” has finalised their report and the ERG (and Secretariat) have now been tasked with preparing the report for publication, drawing out the key messages and recommendations and developing a dissemination plan. ERG approval of the dissemination plan will take place at the AC57 meeting.

The draft dissemination plan can be found as pre-read 10.a.xi.

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Agenda item 10.a.i.: Summary of external engagement (October)

High Level Expert Group on Energy Intensive Industries

The High Level Expert Group on Energy Intensive Industries held a 'Sherpa meeting' on 9th October. The focus of the meeting was a presentation of the recent report *Industrial Value Chain: A Bridge towards a Carbon Neutral Europe* which was developed by a group of eleven industry sectors as their input to the EC Long Term Strategy. The report can be downloaded from here: https://www.ies.be/files/Industrial_Value_Chain_25sept.pdf

The high level group is led by DG Grow and Commissioner attends the full meetings of the group. The Sherpa meeting was chaired by Gwenole Cozigou, Director Industrial Transformation and Advanced Value Chains, DG Grow. The framing of the discussions was fairly conventional noting that EII's can be part of the climate solution, the EU cannot deliver climate goals without contribution of industry and Europe has to remain competitive, etc.

A key conclusion from the report is table i and table 5 on pg.9 & pg.46 (see below) which shows there are six key technology options for decarbonising EII's. Half of these (CCS, CCU and hydrogen) are linked to CCUS. This is clearly powerful evidence on the importance of CCUS to Europe. In addition, the report highlighted key R&D challenges and included– examples reducing cost of low CO₂ H₂ production including 'methane pyrolysis'.

	Electrification (heat and mechanical)	Electrification (processes: electrolysis/ Electrochemistry excl. H ₂)	Hydrogen (heat and/or process)	CCU	Biomass (heat and feedstock)/ biofuels	CCS	Other (including process integration)
Steel	xxx	xx	xxx	xxx	x	xxx	Avoidance of intermediate process steps and recycling of process gases: xxx Recycling high quality steel: xxx
Chemicals fertilizers	xxx	xxx	xxx	xxx	xxx	xxx(*)	Use of waste streams (chemical recycling): xxx
Cement Lime	xx (cement) x (lime)	o (cement) o (lime)	x (cement) x (lime)	xxx (cement and lime)	xxx (cement) x (lime)	xxx (cement and lime)	Alternative binders (cement): xxx Efficient use of cement in concrete by improving concrete mix design: xxx Use of waste streams (cement): xxx
Refining	xx	o	xxx	xxx	xxx	xxx	Efficiency: xxx
Ceramics	xxx	o	xx	x	x	o	Efficiency: xxx
Paper	xx	o	o	o	xxx	o	Efficiency: xxx
Glass	xxx	o	x	o	xxx	o	Higher glass recycling: xx
Non-ferrous metals/alloys	xxx	xxx	x	x	xxx	x	Efficiency: xxx Recycling high quality non-ferrous: xxx Inert anodes: xxx
o: Limited or no significant application foreseen			xxx: high potential				
x: Possible application but not main route or wide scale application			xxx: Sector already applies technology on large scale (can be expanded in some cases)				
xx: medium potential			(*) in particular for ammonia and ethylene oxide				

Table i: Overview of low-CO₂ technology potential for energy intensive sectors

Another key conclusion relates to the demand for clean electricity. The report contains two key figures 14 and 15 which show a potential mismatch between Eurelectric forecasts on clean energy demand from industry (up to a maximum of 3000 GW of a total EU demand of 6000 GW) and other estimates of industry clean electricity demand of between 2,980 and 4,430 TWh of low carbon electricity.

A number of other points emerged from the discussions;

- The need for alignment on climate policies and energy consumption policies (i.e. some technologies, like CCS, may increase energy consumption in order to drive dramatically lower emissions and it is important these are not excluded).
- There were lots of references to the importance of the circular economy and at times this seemed to be framed as the ultimate objective rather than the reduction of emissions. As has been noted previously this could act as an argument against CCUS if it is seen as contrary to the circular economy.
- There was lots of discussion on CCU as distinct from CCS. The sense from the presentation was that this was being promoted ahead of CCS in terms of a hierarchy. There was also recognition of the need for transparent CO₂ accounting framework for CCU across multiple sectors.
- There were lots of discussion around low-CO₂ policies and infrastructure, e.g. the use of public procurement to support low carbon products and low-CO₂ standards for products as important driver of technology. This framing appeared helpful and could be used to progress CCUS without explicitly mentioning it.



- The Netherlands made a strong intervention highlighting the importance of CCS, BECCS, and Green/Blue H₂.

FuelsEurope discussed CO₂ abatement costs in transport and cited figures of 300 – 500 EUR tCO₂ from biofuel blending to 500 – 600 EUR for fuel standards. They noted that if CCS and Hydrogen could be eligible under existing policies then CCS would be attractive. This was framed as CCS falling between the gaps, too expensive to be driven by the ETS but not allowed under other policies where it would be very cost competitive.

The meeting presented an opportunity to make an intervention on two issues that ZEP has raised. Firstly, the exclusion of CCS under the Industry Cluster in the Horizon Europe proposal and secondly the exclusion of reformed natural gas under the H₂ and Fuel Cell Joint Undertaking. The EC seemed to take this on board and it would be worth ZEP following up on these points.

In summary, the meeting was very worthwhile and the report is an important piece of evidence that framed correctly could make a powerful case for more EC intervention on CCUS. The collaboration between the eleven EII sectors also looks powerful.

Speaking to EII colleagues after the event there is an expectation that there will be ongoing collaboration between the sectors. At this stage it is unclear how this will be structured as it has been ad hoc to date given the urgency of developing the report for the LTS. I noted the importance of them engaging with the CCUS community and this was well received. It appears that the most pressing issue they face is to engage with Eurelectric to understand the mismatch in clean energy demand assumptions.

In addition this process is well linked into DG Grow and could represent an important opportunity to really engage this service on the CCUS debate. It is expected that the next meeting of the full High Level will be early in 2019.

CCS Safari, Norway

ZEP was invited to attend and present at the CCS Safari held on the 3 – 4 October 2018. The safari was organised by Gassnova to educate journalists on the role of CCUS in climate mitigation and the work that Norway is undertaking to progress CCS. A total of 12 journalists joined the trip and these were from a range of countries including, USA, Norway, Belgium and UK.

ZEP was invited to present a wider European perspective and discussed recent ZEP reports (ME5, role of CCUS in a below 2 degrees scenario), national activity on CCUS and the importance of the Norwegian programme to wider efforts to deploy the technology.

In summary, the safari appeared to be very successful and all of the journalists said that they had found the tour interesting and had learnt a great deal. Based on conversations with the journalists there was a clear sense that they left the tour with a more positive view of CCUS which will hopefully result in future constructive articles on the topic. In addition, there was a lot of interest in understanding of ZEP perspectives on the wider European context.



Role of the renewable - hydrocarbon nexus in accelerating the energy transition

The IEA Gas & Oil Technology Collaboration Programme (GOT) held a roundtable on the role of the Renewable - Hydrocarbon Nexus in accelerating the energy transition, 11 - 12 October in Brussels.

The GOT Nexus dialogue was initiated in Colorado, USA, in September 2017 with the Joint Institute for Strategic Energy Analysis (JISEA) and U.S. National Renewable Energy Technology Laboratory, NREL. This was the second meeting and engaged with the European Commission, the IEA Secretariat and international stakeholders. ZEP was invited by the European Commission to participate and present at the roundtable.

ZEP was invited to present on the role of North Sea storage in supporting the decarbonisation of European industry. ZEP was only able to participate on the second day of the roundtable but found the conversations very constructive as there was a genuine discussion on the interaction between fossil fuels with CCS and renewable which is not often evident in many Brussels energy conversations. The feedback afterwards was that there is interest in seeing how ZEP could continue to engage in this process and there may be some follow conversations to explore this.



ZEP event

Low Emission, High Ambition: a Just Transition to a Net-Zero Europe

On 26 September ZEP hosted an event in Brussels on the Commission's long-term strategy focused on the role of CCUS. The aim was to engage Commission officials and industry stakeholders to demonstrate the value and necessity of CCUS to a just transition to a net-zero economy, and to ensure this was reflected in the Long Term Strategy.

The event was attended by around 50 stakeholders, many of whom are outside ZEP's usual audience. Feedback received by the Secretariat has been positive, including on an interesting agenda. Several participants said that they made useful connections during the event which has led to further engagement.

Key points made by the speakers are outlined below.

CCUS opportunity in Europe

Christian Holzleitner, Head of Unit, Land Use and Finance for Innovation, DG Climate Action

- Much has changed since the EU's last Roadmap seven years ago; the Paris Agreement commits the EU to reaching net-zero emissions in the second half of this century; meanwhile the EU has demonstrated that it is possible to decouple CO₂ emissions and GDP. There have been rapid changes in technology, digitisation and energy demand.
- The vision for the long term strategy is one that protects the planet while ensuring no one is left behind in the transition, and that creates new business models, jobs, growth and investment.
- Electrification, hydrogen, bio-economy, CCUS and digitisation can all have a role to play
- The first call under the Innovation Fund will take place in 2020. The Fund is being designed to be much more flexible than its predecessor, NER 300, taking into account lessons learned.
- The Commission wants to work with CCUS projects over the next year to ensure a strong pipeline of projects exists when the fund launches.

Bjørn Haugstad, General Director, the Ministry of Petroleum and Energy, Climate, Industry and Technology Department, Norway and Trude Sundset, CEO, Gassnova

- Both Bjørn and Trude emphasised the necessity of CCS to meeting Paris Agreement targets at an acceptable cost.
- The Norwegian government is continuing to fund development of a full-chain CCS project including capture from two industrial applications; waste-to-energy and cement production. Trude Sundset said the projects represent valuable learning with large deployment potential; HeidelbergCement operate 60 cement plants in Europe, and there are 450 waste-to-energy facilities.

- Bjørn Haugstad stressed that for the Norwegian project to go ahead it must contribute significantly to development of CCUS in Europe.
- Bjørn Haugstad said that one challenge is that the project is two years ahead of the Innovation Fund which will not launch until 2020.

Tim Bertels, Port of Rotterdam PORTHOS project director

- The Dutch government has an ambition of 49% CO₂ reduction (45 Mtpa) by 2030, The preliminary Climate Agreement suggests that this will include 7 Mtpa CCUS from industry
- The Rotterdam CCUS project Porthos aims to deliver at least 2-4 million tons CO₂ reduction per annum amounting to around 40 million tons of CO₂ stored in total.
- The project will develop a **CO₂ transport and storage “hub” for industries in the Port of Rotterdam**, who wish to decarbonise through CCS, along with CO₂ utilisation where possible. In the longer term it is envisioned the project could also provide a solution for storage of CO₂ from Germany and Belgium.

CCUS in modeling: assumptions & limits

Karen Turner, Strathclyde University

- Need to retain quality jobs and industries in Europe, instead of simply offshoring
- Highly industrialised regions such as North-Rhine Westphalia in Germany could reduce emissions by 95% in 2050 if connected to CO₂ transport and storage resources, such as offshore Netherlands or Norway, and retain existing assets and jobs
- Demonstrated that moving emitting industries outside the EU would actually lead to increased global emissions due to the difference of regulation in those countries.

Graham Bennett, DNV GL

- **Presented DNV’s Energy Transition Outlook 2018, which is a forecast based on current and projected activity as opposed to a set of scenarios.** This predicts a 50/50 split of energy use between fossil and renewable sources in 2050, down from the 80/20 split today.
- While demand for oil globally will peak in 2023, demand for gas will continue to grow into the 2030s, accompanied by a 30% increase in investment.
- The forecast leads to 2.6 degrees of global warming by the end of the century.
- Graham shared a comparison of modelling from a range of different organisations. Those that met a below 2 degree target tended to assume a high global carbon price, and CCS.

Joseph Yao, Imperial College

- **Addressed some of the key misconceptions regarding CCS in modelling. A “no CCS” scenario** emails building 2.5x the energy generation capacity of 2015 by 2050. Leads to an overbuilt and underutilised system, which would not lead to full decarbonisation by 2050.
- Challenged the assumption in Commission modelling of a 90% capture rate for CCS technologies. While the CO₂ concentration drives the cost of capture, rates of 98%+ can be achieved today

Benedikt Unger, Poyry

- Presented Poyry analysis of EU scenarios with and without CCS in 2050
- Security of power supply requires low-carbon generation to cover periods of low renewables output, with CCS gas a cheaper and more flexible option compared to nuclear
- CCS will be essential to industrial decarbonisation
- Biggest hurdle is political; four of the seven countries in the study oppose CCS

Negative emissions: Moral hazard or moral imperative?

- Discussion with ETUC, Sandbag, Bellona, E3G and Children's Investment Fund
- Jonathan Gaventa, E3G **thanked ZEP for addressing this issue which is an "awkward" topic.** He said issues around land use for bioenergy, accounting of negative emissions, and business models need to be addressed. However nature-based solutions alone will not get the world to net-zero.
- Benjamin Denis, ETUC said need for net-zero technologies reflects 20 years of inadequate action on climate change. Need to increase ambition now across energy, climate and trade policy
- Frederic Hague, Bellona said need to focus use of biomass into steel, cement and other industry to get double benefit of industrial decarbonisation and negative emissions.
- Suzanna Carp, Sandbag said that negative emissions are both a moral hazard and an imperative. Talking about negative emissions can risk inaction now; however there is an imperative to develop the technology to reduce long-term risk
- Sonia Medina, Children's Investment Fund, **said that global picture is complicated and can't** assume that all states will take economically sensible decisions. New coal plants being built in developing countries are not always economic and can be driven by corruption.
- All speakers stressed that negative emissions are not an excuse to delay other climate action now



Politico article on ZEP 26th September 2018 event

CLIMATE — NORWAY AND ROTTERDAM PITCH CCS: If carbon capture and storage (CCS) technology is needed, the crucial ingredient is more money, two existing projects told Brussels.

— **Norway’s ahead of the pack.** The Norwegian government is piloting a full-scale CCS [project](#) to be launched in 2023-2024. The idea is to capture 800,000 tons of carbon dioxide per year from two industrial sites — Fortum Oslo Varme, a waste-fueled power plant, and Norcem’s cement plant — then transporting it by ship to be pumped under the North Sea. However, the projects’ cost is €1.6 billion over five years, which is still “too expensive to finance ... without participation from others,” said Bjørn Haugstad, director of the climate, industry and technology department at Norway’s energy ministry, at an [event](#) in Brussels on Wednesday. Norway is talking to the Commission and EU countries about co-financing the projects, and in turn it will “ensure the Norwegian project will make a significant contribution” to the spread of CCS in EU countries by sharing expertise.

— **The Netherlands is catching up,** with a carbon capture utilization and storage (CCUS) project named [Porthos](#), designed to capture 2 million to 5 million tons of CO₂ per year from the industrial area of the port of Rotterdam and store it in a depleted gas field under the sea. Some of the captured CO₂ could be used in industry or in nearby greenhouses. A final investment decision is expected in 2019, and Germany and Belgium are already showing interest in storing some of their emissions. But right now, “there is a negative business case,” according to Tim Bertels, Porthos’ project director. The project can deliver storage “at competitive unit costs” of around €100 per ton, but it needs public private partnerships to make it happen, Bertels said at the same event.

— **Brussels is interested:** The Commission is looking at the role that CCS and CCUS can play in the bloc’s long-term emission reduction strategy, and is willing to help. Its new [Innovation Fund](#) — which will be financed via 450 million carbon allowances, worth €10 billion at current prices — will provide startup capital to help projects get off the ground. The first call for projects is planned for 2020, said Christian Holzeinter, head of the land use and finance for innovation unit in the Commission’s climate department.

Letter of intent

Dear Dr. Kraxner,

I am pleased to learn about your effort to prepare and coordinate the EU proposal entitled **'Clusters for CO₂ storage and reuse'** (acronym: CLUSTAR), which aims at providing guidance for the development of CO₂ utilization and storage (CCUS) infrastructure plans for European industries.

Herewith, I would like to express my support of the CLUSTAR application since the planned activities very much lie within our field of interest.

We plan to **participate in the project's** external user group/respective advisory board through representing the ZEP. By doing so, we would like to contribute to the interactive and innovative stakeholder processes together with the other actors of the project development.

I am confident that the proposal project team, with its multi-actor character and broad expertise is well suited to guide stakeholders in identifying collective strategies for the development of joint and participatory CCUS infrastructures.

I hope the proposal will be successful and I am very much looking forward to interacting with you and your team in this important topic.

This is a Letter of Support and Interest, and implies no contractual agreement.

8/30/2018



Graeme Sweeney
Chairman ETIP-ZEP



3rd October 2018

Mr. Tim Bertels
Port of Rotterdam
PO Box 6622
3002 AP Rotterdam

Letter of support from the Zero Emissions Platform for PORTHOS application to the Connecting Europe Facility

Dear Mr. Bertels,

The Zero Emissions Technology and Innovation Platform (ZEP) would like to express its support to the CEF Energy action proposed to the European Commission for the Porthos FEED study towards a cross-border carbon dioxide network in North-West Europe.

ZEP is a European Technology and Innovation Platform (ETIP) under the Commission's Strategic Energy technologies Plan (SET-Plan), and acts as the EU's technical adviser on the deployment of Carbon Capture Utilisation and Storage (CCU and CCS).

ZEP has developed a body of recommendations on how to progress the development of CCS in Europe to meet the EU's climate goals in a cost effective and just way. A key recommendation is the development of shared CO₂ transport and storage infrastructure as a public good to enable deep emissions reductions in multiple Member States, including those without their own geological storage capacity.

ZEP believes the FEED study into a CO₂ Transport Hub and Offshore Storage in the Port of Rotterdam will provide valuable data to inform the possibilities for developing enabling infrastructure for deep decarbonisation in Europe with benefits for multiple Member States. As well as the Port of Rotterdam the project could benefit other areas with high levels of industrial emissions, such as the Port of Antwerp and North-Rhine Westphalia. It would therefore contribute to meeting both the climate ambition of the Dutch Government, and the EU's Paris Agreement commitment.

ZEP supports the application by the Porthos consortium of Port of Rotterdam, Gasunie and EBN for funding from the Connecting Europe Facility, and believes that the proposed action can help accelerate the necessary energy transition.

Yours sincerely,

A handwritten signature in blue ink, consisting of a stylized 'G' and 'S' intertwined.

Dr. Graeme Sweeney

ZEP Chairman



ZEP response to DEVE Committee amendments to Resolution on COP24

Briefing for Members of the Committee on Environment, Public Health and Food Safety

ZEP is a European Technology and Innovation Platform (ETIP) under the Commission's Strategic Energy technologies Plan (SET-Plan), and acts as the EU's technical adviser on the deployment of Carbon Capture Utilisation and Storage (CCU and CCS).

ZEP has become aware of the amendments to the Development Committee's contribution to the Resolution on COP24 regarding the role of CCS and Bioenergy with Carbon Capture and Storage (BECCS) and has a duty to provide ENVI members with further technical and science-based information. In particular, the following text (Recital J) is misleading and is not supported by robust scientific and economic evidence:

"J. whereas the technologies necessary for safe and efficient carbon capture and storage (CCS) remain unproven and in particular the geo-engineering involved in the creation of artificial carbon sinks is associated with risks of an unknown scale; whereas CCS therefore cannot be counted upon as part of any mitigation solution and should be prevented from clouding the urgency of radically stepping up climate action through the use of existing technologies and feasible changes in systems and lifestyles"

To address the accuracy of these comments in turn:

"the technologies necessary for safe and efficient carbon capture and storage (CCS) remain unproven"

- There are 18 commercial-scale CCS projects operating worldwide today, with a further 19 in planning or construction. These are full-chain projects involving the capture, compression, transportation and safe geological storage of CO₂. Furthermore, the various technologies and processes that comprise individual components of the CCS chain are, in many cases, proven, widely-deployed technologies that have been operating at scale for many decades. Barriers to deploying CCS for climate mitigation purposes in Europe have, to date, been commercial and political, and categorically not due to technical limitations.
- Whilst CCS technologies are available today, it is clear that continued innovation and research (including through deployment) will be vital to improving technological and commercial performance. The UNFCCC and the IPCC have long-recognised CCS as critical for climate change mitigation and that is why EU support through Mission Innovation, Horizon 2020, and the forthcoming Innovation Fund is vital.

"in particular the geo-engineering involved in the creation of artificial carbon sinks is associated with risks of an unknown scale"

- The process of storage of CO₂ in geological formations is very similar to the processes involved in extraction of hydrocarbons today, and is subject to similar high standards of regulation. Indeed, in many cases, the same technologies, skills, expertise and science can be applied. Norway has been permanently storing CO₂ offshore in well-understood, carefully-selected geological stores, without leaks, under the North Sea for over 20 years.

- The International Panel on Climate Change (IPCC) has concluded that

“With appropriate site selection based on available subsurface information, a monitoring programme to detect problems, a regulatory system and the appropriate use of remediation methods to stop or control CO₂ releases if they arise, the local health, safety and environment risks of geological storage would be comparable to the risks of current activities such as natural gas storage”.

“Observations from engineered and natural analogues as well as models suggest that the fraction retained in appropriately selected and managed geological reservoirs is very likely to exceed 99% over 100 years and is likely to exceed 99% over 1,000 years”¹.

- In the EU, a rigorous regulatory regime has already been implemented through the CCS Directive, which ensures effective management and robust monitoring of CO₂ storage sites

“CCS therefore cannot be counted upon as part of any mitigation solution and should be prevented from clouding the urgency of radically stepping up climate action through the use of existing technologies and feasible changes in systems and lifestyles;”

- There are very few climate modelling scenarios which achieve a 2 degree target, let alone a 1.5 degree target, without use of CCS.
- CCS is, in some cases, the only solution for mitigating industrial process emissions at Europe’s factories. If the EU is to achieve deep emissions reductions while at the same time retaining valuable industries such as steel, cement and chemicals within the EU, it is essential that CCS is available to these industries. In Germany alone, over 50 million tonnes of residual process CO₂ emissions would remain unabated without CCS, risking about 3.5 million steel-related jobs alone, and several hundred thousand more in the chemicals and cement sectors².
- Furthermore, social fairness entails taking a cost-effective route to decarbonisation, given that much of the associated cost will ultimately be paid by consumers or taxpayers. It is estimated that a portfolio of solutions which includes CCS, biomethane and hydrogen as part of a balanced energy mix, delivers a saving of over €1,150bn compared to a pathway without CCS³.
- Almost all scenarios to meet Paris Agreement targets rely on negative emissions to some extent, to offset residual emissions in areas of the economy that are impossible or too expensive to currently abate. It is important to stress that negative emissions *do not remove the need to act as quickly as possible on climate change mitigation now*. However, even with a rapid acceleration of mitigation globally, negative emissions are likely to still be required. This is what the forthcoming IPCC Special Report on 1.5 Degrees will tell us. There are limited options for enabling negative emissions: land use change and afforestation can, and must play a key role, as can bioenergy coupled with CCS (BECCS) when used in combination with industrial

¹ IPCC (2005), Carbon Dioxide Capture and Storage

² <https://bdi.eu/publikation/news/klimapfade-fuer-deutschland/>

³ http://www.poyry.com/sites/default/files/media/related_material/poyrypointofview_fullydecarbonisingeuropeenergysystemby2050.pdf.

processes, such as steel and cement production. Direct Air Capture of CO₂ combined with CCU and CCS may also have an important role to play.

- With regard to the DEVE Committee's comment on "*feasible changes in systems and lifestyles*," a recent study attempted to set out a route that eliminates BECCS in a 1.5 Degree scenario; this relied on global societal change including population decline, moving to meat-free diets by 2050, genetic modification of crops, a reduction in air and car travel, and growth in developing countries which does not lead to significant increase in energy demand. Only with all these things occurring together is the need for BECCS removed completely⁴. Given that the global public acceptance of such societal change cannot be foreseen, it is important to ensure that technology solutions are also pursued in parallel, to maximise the likelihood of being able to limit damaging levels of climate change.

If it would be helpful to discuss any of the points in this briefing in more depth, please contact the ZEP Secretariat nikki.brain@zeroemissionsplatform.eu to facilitate this.

⁴ <https://www.nature.com/articles/s41558-018-0119-8/tables/1>



PRESS STATEMENT

ZEP Press Statement on EU Parliament COP24 Resolution

Brussels, October 24th – Ahead of the European Parliament vote on the COP24 Resolution on Thursday 25th October, Dr Graeme Sweeney, Chairman of ZEP, commented:

“We are very supportive of the EU’s efforts to increase climate ambition. This is consistent with the science behind the Paris Agreement, and the goal of limiting the global temperature increase to 1.5°C.

The IPCC 15th special report agrees with the overwhelming body of evidence which concludes that CCS is extremely important to achieve deep mitigation, due to its ability to reduce emissions from industry, heat and transport as well its role in removing carbon dioxide from the atmosphere. Indeed, the report is clear that energy intensive and process industries cannot achieve the Paris Agreement targets without CCS.

The benefits of CCS go far beyond climate mitigation. Indeed, ZEP’s recent analysis shows that the value of CCS to Europe’s economy exceeds one trillion euros by 2050. CCS could also create and retain a significant number of jobs in some of Europe’s key industries.

In light of the above and to ensure Europe remains on track to meet the 1.5°C goal, it is essential that the EU Parliament rejects Recital R in its **entirety in tomorrow’s COP24 Resolution, which states that “CCS therefore cannot be counted upon as part of any mitigation solution”.**

We look forward to working with European Parliament representatives to discuss how we can collaborate on the actions that **will be needed to deploy CCS and deliver a 1.5°C goal.”**



ZEP voting recommendations on Connecting Europe Facility amendments ITRE/TRAN

ZEP welcomes moves by both the Commission and the Parliament to refocus the Connecting Europe Facility (CEF) on the transition to a low-carbon Europe and alignment with the Paris Agreement.

For Member States to be able to fully decarbonise their economies, this should include the full range of low carbon infrastructure currently eligible for funding- renewable energy, smart grids, low-carbon hydrogen and CO₂ transport. This is reflected in the Commission's proposed text

"To support the Union's decarbonisation objectives, due consideration and priority should be given to technologies and projects contributing to the transition to a low carbon economy. The Commission will aim at increasing the number of cross-border smart grid, innovative storage as well as carbon dioxide transportation projects to be supported under the Programme."

Currently there are 4 Projects of Common Interest for CO₂ transport, of which one has been awarded funding from the Connecting Europe Facility. The [Acorn CCS project](#) has been awarded €375,000 from CEF for a feasibility study. The project aims to decarbonise the natural gas entering the UK through the St. Fergus gas terminal in Scotland, by reforming the gas to produce hydrogen and storing the CO₂ safely and permanently in the North Sea. The project could provide CO₂ storage for other countries including the Netherlands and Norway, and provide a blueprint for further CO₂ networks in Europe.

Another Project of Common Interest is put forward by the Port of Rotterdam. The Port has expressed ambition to become a zero-carbon port by 2050, and to enable this is developing a project for CO₂ transport and storage for the Port's industrial users, which can also be extended to countries without their own storage capacity¹.

As demonstrated by a recent report by eleven Europe's Energy Intensive Industries, CCS will be crucial to enabling these industries to reduce their emissions in line with EU targets². Furthermore, almost all scenarios under the recent IPCC report demonstrate that CCS will be needed to meet a 1.5 degree target³. Therefore, for the CEF to align with Paris Agreement ambition, development of CO₂ infrastructure should continue to be funded along with other low-carbon infrastructure.

ZEP therefore recommends that members of the Committees responsible reject Amendments 91-13 and 28, 242 and 243 as these remove reference to CO₂ transport.

¹ <https://www.portofrotterdam.com/en/news-and-press-releases/zero-emission-port-by-2050>

² <https://www.ies.be/content/new-ies-report-develops-eus-energy-intensive-industries-contribution-eu-commissions>

³ <http://www.ipcc.ch/report/sr15/>

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Agenda Item 10.a.viii.

ZEP voting recommendations on Connecting Europe Facility amendments



ZEP recommends Amendment 223 referencing Carbon Capture and Storage is rejected.



ZEP voting recommendations InvestEU programme 2021–2027

ZEP is a European Technology and Innovation Platform (ETIP) under the **Commission’s Strategic Energy Technologies Plan (SET-Plan)**, and **acts as the EU’s technical adviser on the deployment of Carbon Capture and Storage (CCS) and Carbon Capture and Utilisation (CCU)**. ZEP’s transparency register number is 793300922868-60.

CCS is broadly recognised as a critical technology to meet net-zero, in Europe and globally, due to its ability to provide a decarbonisation solution to multiple sectors including energy intensive industries (such as steel and cement), heating and transport (through production of low-carbon hydrogen) and power, and to enable negative emissions through combination with bioenergy or Direct Air Capture. The importance of CCS to a net-zero target is highlighted in recent reports from the International Panel on Climate Change (IPCC)¹, International Energy Agency (IEA)², Energy Transitions Commission (ETC)³, World Wildlife Fund (WWF)⁴, and **Europe’s Energy Intensive Industries**⁵.

Furthermore, CCS is assumed to be available in all scenarios in the European Commission’s Long Term Strategy for emissions reduction released this week.

In order for multiple industries to be able to capture and permanently store their CO₂, they will need access to shared CO₂ transport and storage infrastructure. This is reflected by the four CO₂ transport projects currently listed as Projects of Common Interest, one of which has been awarded funding from the Connecting Europe Facility (CEF). In its draft text on the new CEF for 2021-2027, the Commission states that **“To support the Union’s decarbonisation objectives, due consideration and priority should be given to technologies and projects contributing to the transition to a low carbon economy. The Commission will aim at increasing the number of cross-border smart grid, innovative storage as well as carbon dioxide transportation projects to be supported under the Programme.”**

Crucially, CCS projects including transportation and storage projects are a priority area for support **under the new ETS Innovation Fund. Under the Commission’s proposals, it will be possible for money** from the Innovation Fund to transfer to Invest EU, to facilitate loans as well as grants to projects.

Therefore, it is essential that the new Invest EU mechanism, the Innovation Fund and the Connecting Europe facility are aligned.

ZEP therefore recommends that amendments 528 and 774 which propose removal of CO₂ transport from the text are rejected.

If it would be of use to discuss the issues above further please contact Nikki Brain at the ZEP Secretariat nikki.brain@zeroemissionsplatform.eu

¹ http://www.ipcc.ch/pdf/special-reports/sr15/sr15_chapter2.pdf

² World Energy Outlook, International Energy Agency, 2018

³ http://www.energy-transitions.org/sites/default/files/ETC_MissionPossible_FullReport.pdf

⁴ <https://www.wwf.org.uk/sites/default/files/2018-11/NetZeroReportART.pdf>

⁵ https://www.ies.be/files/Industrial_Value_Chain_25sept.pdf



Carsten Bermig
European Commission
Rue de la Loi / Wetstraat 200
1049 Brussels

Dear Mr. Bermig

Thank you for an incredibly constructive meeting on 7th November. Further to our conversation I wanted to follow up on some key issues which could affect the development of CCUS for industry, **and to share some of ZEP's work. These issues are**

- 1) Treatment of CCS and CCU under Horizon Europe
- 2) Treatment of low-carbon hydrogen under Horizon Europe
- 3) European support for Research and Innovation for low-carbon cement

It is important that the Commission's Long Term Strategy is underpinned by the investment in research and scale-up of technologies needed to meet net-zero emissions by 2050 or soon after. ZEP would be happy to follow up with further information or support on any of the below issues.

Kind regards,

A handwritten signature in blue ink, consisting of a stylized 'G' followed by a series of loops and a final upward stroke.

Graeme Sweeney
Chairman ETIP-ZEP

Treatment of CCS and CCU under Horizon Europe

The European Zero Emissions Technology and Innovation Platform (ZEP) is concerned that the separation of Carbon Capture and Storage (CCS) and Carbon Capture and Use (CCU) under the **Commission's proposal for Horizon Europe will create unnecessary barriers** to developing these technologies.

In the current proposal CCS falls under the “energy” cluster of the Commission's Horizon Europe proposal; CCU meanwhile is within the “industry” cluster. This seems an illogical separation as CCU and CCS will both need to be available to industry and to the energy sector.

This split does not reflect the reality of how industrial areas are likely to decarbonise. It is likely CO₂ will be captured with some sent for use while the majority is permanently stored. To meet its goal of becoming a zero-carbon port by 2050, the Port of Rotterdam PORTHOS project envisions an ecosystem comprising CO₂ transport and storage, CO₂ use, hydrogen production, power production and energy efficiency.

CCU can provide an important value stream for CO₂ and therefore incentivise industry to develop CO₂ capture. However, the global existing market for CO₂ today is about 80Mt; even with the development of new products, the potential of CCU to contribute to emissions reduction is small. Furthermore, the CO₂ in products will eventually be released back to atmosphere, either relatively quickly as in the case of fuels, or over a longer term in case of building products. Therefore, CCU is not an alternative to CCS but can be complementary in some circumstances.

ZEP Recommendation: Include CCS and CCU within both the Industry and Energy of Horizon Europe to enable both to be progressed together.

ZEP Recommendations for low carbon Hydrogen under Horizon Europe

Hydrogen has a key role to play in the global energy transition, providing options for cross-sector decarbonisation, and at a European level supporting all 5 pillars of the Energy Union. Recently, the transition to hydrogen economies has gained prominence through global initiatives, such as the Hydrogen Council, established during the 2017 World Economic Forum in Davos¹, with the goal to **promote hydrogen's role in achieving climate goals and energy security**. Also last year, Japan announced ambitious plans to deliver a hydrogen economy by 2050 by cutting current hydrogen fuel costs by 80%, to achieve cost-competitiveness with fossil fuels.² Japan aims to have 40,000 fuel cell vehicles in operation by 2020, increasing to 800,000 by 2030. Similarly the state of California aims to have over 20,000 fuel cell vehicles on the road and 5 operating power to gas projects in place by 2025.³

Horizon Europe presents an opportunity for the Commission to set out a coherent approach to low-carbon hydrogen, recognising its enabling role in establishing early markets for a European hydrogen economy. ZEP makes the following recommendations:

Maximise the synergies between production pathways for low-carbon hydrogen:

The ZEP report: *Commercial Scale Feasibility of Clean Hydrogen*⁴, concluded that natural gas reformed hydrogen with CCS (produced through Steam Methane Reforming (SMR) or Auto Thermal Reforming (ATR) of natural gas) can currently be produced at less than half the cost of electrolysis-derived hydrogen, which is not expected to become cost-competitive until 2045. At the same time, natural gas reformed hydrogen can enable the production of the large volumes needed to establish early markets, an issue discussed at a workshop held by ZEP with the Commission in November 2017. An example of the achievable production volumes is the Magnum hydrogen project in the Netherlands; where Equinor is evaluating options to convert the gas plant into a 1300 MW hydrogen-powered plant, able to deliver backup power constantly over 24 hours.

The European CertiHy scheme⁵ has established an EU-wide guarantee of origin for **'low-carbon hydrogen'**, where the emissions intensity of production is lower than that of the standard route of SMR without CCS. It is recommended that Horizon Europe maximise these synergies by supporting technologies under both production routes.

¹ <http://hydrogencouncil.com/>

² [Japanese Agency for Natural Resources and Energy. Basic Hydrogen Strategy](#) (2017)

³ <https://www.californiahydrogen.org/>

⁴ [ZEP Commercial Scale Feasibility of Clean Hydrogen](#) (2017)

⁵ <http://www.fch.europa.eu/news/certifhy-project-establishing-first-eu-wide-guarantee-origin-green-hydrogen>

The Implementation Plan⁶ for CCS and CCU under the SET-Plan Action 9 includes sustainable hydrogen under the Research and Innovation Activities 1 (Delivery of a whole chain CCS project in the power sector) and 2 (Delivery of regional CCS and CCU clusters, including feasibility for a European hydrogen infrastructure). Horizon 2020 is an important source of funding, and therefore to maintain momentum beyond the period to 2020 Horizon Europe must be consistent with the targets and recommendations set out in the Implementation Plan. FP9 also represents an opportunity to engage across the SET-Plan Action areas, in particular with Implementation Plans for Action 5 (cross-cutting technology for heating and cooling), Action 6 (Energy Efficiency in Industry) and Action 8 (Renewable Fuels and Bioenergy), to ensure recommendations for hydrogen and the supporting infrastructure are fully aligned.

Integrate support for low-carbon hydrogen technologies across multiple sectors:

A European hydrogen economy will return maximum economic benefit where the technology can be applied to multiple sectors. Under the current H2020 Work Programme hydrogen derived from methane reforming with CCS is included only as an industrial application, not recognising the additional opportunities for decarbonising the power, heat and transport sectors.

There is also an opportunity to expand the remit of public-private partnership initiatives, such as the Hydrogen Fuel Cell Joint Undertaking, beyond the current focus on applications for electrolysis-derived hydrogen in the transport sector, to incorporate broader support for low-carbon hydrogen research and innovation initiatives.

Support sustainable hydrogen initiatives across the full TRL range to accelerate commercial-scale deployment as well as drive innovation and cost-reduction:

The Mission Innovation Carbon Capture Challenge programme, where ZEP has worked closely with the **European Commission**, has **identified low carbon hydrogen as a 'Priority Research Direction'**. However, with Mission Innovation currently focusing on lower TRL levels it is important that FP9 supports the transition to higher TRLs.

Europe's position as a leader in the transition towards a low-carbon hydrogen economy will only be realised through coherent and consistent regulation and financial support mechanisms. Flexible support for all forms of low carbon hydrogen production under Horizon Europe will be vital, where this can be integrated across a range of sectors, and able to be used in combination with other sources of EU funding, such as the ETS Innovation Fund and Connecting Europe Facility, in addition to national and industry funding.

⁶ [SET-PLAN TWG9 CCS and CCU Implementation Plan](#) (2017)

European support for Research and Innovation for low-carbon cement

The European Zero Emissions Technology and Innovation Platform (ZEP) has become aware of a potential gap in EU research and innovation funding which could impact the development of innovative new technology in the cement sector. At the same time, this provides an opportunity for leadership in this space with the correct intervention.

Research and innovation funding through Horizon 2020 and Horizon Europe is primarily focused at low-TRL technology development, rather than scale-up to plant-level pilot projects or commercialisation.

At the other end of the scale, the Innovation Fund is likely to benefit scale-up and commercialisation of proven technologies. Under the revised ETS Directive, projects awarded funding from the Innovation Fund will be required to result in real emissions reduction; for industrial CCU and CCS, this will require full-chain applications (i.e. utilisation or storage of CO₂) as part of the project and will therefore support development of technologies which are close to being ready for commercial deployment.

There exists, therefore, a gap in funding for technologies that are somewhere between early scale research and development (TRL levels 1-5) and technologies ready to be deployed at a commercial scale with support (TRL 8-9).

One such project is being led by HeidelbergCement, LafargeHolcim and CALIX to develop oxyfuel technology for CO₂ capture in the cement sector. The technology is able to increase the concentration of CO₂ in the exhaust gas of the plant to 70%, significantly reducing the potential for carbon capture⁷. This technology is at TRL level 6 and now requires a pilot plant to test the concept, without delivering emissions reduction (as this would require the project to operate commercially). This project is therefore not eligible for Horizon 2020 funding and will not be eligible under the proposed Innovation Fund. Industry has told the Platform they have been looking for a source of funding for the project for 5 years. A similar issue is likely to be encountered by other industrial innovation projects above €10m.

When considering how to overcome this gap, it is useful to look at examples of interventions outside the EU to support other emerging technologies. The Norwegian Government has invested in its **Technology Centre Mongstat (TCM), the world's largest facility for testing and improving CO₂ capture**. The TCM focuses on post-combustion capture technologies and has attracted private sector investment.

⁷ <https://www.heidelbergcement.com/en/ecra-oxyfuel>



ZEP recommends that the Commission engages with industry on this issue to explore the opportunities for the EU to develop technologies of global significance within the EU, through providing targeted support for test facilities for demonstration.



Dissemination of **ZEP report** “Collaboration across the CCS Chain - work stream 1: storage related risks”

Recommendations

November 2018

Introduction

This note provides a set of recommendations for dissemination of the ZEP report “*Collaboration across the CCS Chain - work stream 1: storage related risks*” to the media and relevant EU stakeholders.

Dissemination

Context

This report is essentially a technical report, and will provide an important evidence base for discussions/engagement regarding the safety of CO₂ storage. However due to the fact that the report covers CO₂ storage risks and leakage in great detail, the report is open to much misunderstanding and mis-interpretation.

For this reason, it is proposed to develop a stand-alone executive summary for policymakers that summarises the key messages and recommendations in the report in simple and clear language. It is proposed that this stand-alone document be used for wider engagement, with the longer technical report available on request/ on the ZEP website.

Milestone

It is proposed to publish the stand-alone document and longer report as soon as possible in January 2019. Furthermore, it is recommended that the stand-alone document should be used as part of a pre- and post-election EU Parliament strategy, to introduce new MEPs to CCS, its safety and importance for delivering EU net-zero emissions. This activity should take place in the months leading up to the EU Parliament elections in May 2019, as well as the months following the election – and once clarity is reached regarding new MEPs, committees etc.

Media activities

It is recommended that the longer report and stand-alone document should be published as a soft launch; on ZEPs website and possibly on social media with a few tweets highlighting the key messages. Due to the technical and sensitive nature of this report, it is not recommended to launch the report via a press release.



Distribution

As the report provides an important piece of evidence in the debate around CO₂ storage safety, it is proposed that the report should be shared with ZEP members (including Network Policy & Economics, Network Technology and Temporary working group members) as well as a targeted list of CCS organisations and ‘friends’. These organisations should be encouraged to utilise the messages in the ZEP report as necessary/relevant in their own engagement.

Key Messages

The report focuses on a number of key themes including; areas of risk, leakage estimates, operational experience and liability and financial security. A number of high-level overarching messages emerge from the report, which can be found below:

- CO₂ underground storage is a safe technology ready for broad implementation.
 - ZEP’s analysis concludes that for a typical North Sea site, which would be the most probable area for the next European CO₂ storage projects, both the probability of CO₂ release and the expected volumes of CO₂ release are very low.
 - CCS is a relatively straightforward technology frustrated by strict regulations (in the form of the European CO₂ Storage Directive) imposed by the authorities which incur heavy legislative and disproportionate financial burden on the operators. This leads to reluctance from the private sector to invest, in turn increasing the perceived risk.
 - The overall need for CCS to decarbonise power production and heavy industry in Europe remains genuine and urgent. Fewer CCS projects have been implemented than envisaged in 2009/10. Given the lack of practical experience it would not currently be appropriate, and could be counterproductive, to reopen the CO₂ Storage Directive for significant changes. However, some clarifications and softening of Guidance Document 4 (on Financial Security) could help.
 - Involved parties should strive to develop and agree a Monitoring, Measuring and Verification (MMV) program that is fit for purpose for the identified risks (addressing both impact and probability). Excessive monitoring costs and financial security funds could act as a significant blocker to the widespread deployment of CCS in Europe.
 - The urgency and scale of required emissions reduction, and the current costs for CCS, demand that current technologies are implemented at scale while R&D continues into new technologies which can incrementally improve the efficiency and economics of CCS deployment.
-