Meeting with zero emissions platform (ZEP)

Scene Setter

You will meet members of the Zero Emissions Platform (ZEP), a European Technology and Innovation Platform (ETIP), which is supported through Horizon2020 and provides advice and advocates for CCS. The delegation you will meet consists of high-level representatives of some ZEP members (e.g. BP, Equinor, Shell, Total, Port of Rotterdam, EBN, HeidelbergCement, Linde, and others).

ZEP would like to discuss:

- European CO2 transport and storage infrastructure
- CCS as key in the industrial transition
- Kick-starting a clean hydrogen economy

The Commission's assessment for the EU long-term strategy shows that CCS is expected to play an important role in reaching the objective of a climate-neutral EU and this is why CCS has been identified as one of the seven building blocks of the Commission's Long Term Strategy (Commission on a "Clean Planet for All"). This role, however, remains complementary to elimination of emissions, in particular from power generation.

Despite the uncertainties in the economics and the public acceptance of carbon capture and storage, CCS remains as one of the main options for reducing emissions of large point sources. Energy intensive industries will require it where other alternatives do not exist. If combined with sustainable biomass, in particular in the power sector, it could remove carbon dioxide from the atmosphere. Together with the land use sink, this could compensate for remaining greenhouse gas emissions in our economy.

CCS may also maintain some role in power generation when fossil fuels still need to be used as an input fuel for electricity production, either due to the unavailability of alternative powering options or because of its use in power plants used for reliability purposes.

The Innovation Fund is a major funding opportunity for CCS projects and other clean technologies, including technological solutions relying on hydrogen to decarbonise energy intensive industry and energy sector.

Introductory remarks

- Welcome ZEP members
- Recognise the positive contribution of ZEP ETIP on providing strategic advice on R&I actions in Horizon 2020, the SET Plan (The European Strategic Energy Technology Plan) and the Mission Innovation.
- Point out timeliness of the meeting:
    - Commission presented the Green Deal and we have started implementing it.
    - Commission adopted energy system integration strategy and hydrogen strategy on the day prior to the meeting
    - First call of the Innovation Fund is opening *(currently planned for 1 or 2 July)*, for which of course low carbon technologies such as CCS are eligible. For the Commission, this is one of the main tools for financing CCS. → Express hope that ZEP members will be applying with good projects.
    - Funding under the Recovery and Resilience funding will depend on plans submitted by Member States, however substantially increased InvestEU provides good funding opportunities.
    - Still ongoing stakeholder consultation (closing on 13 July): TEN-E Regulation revision, which is relevant for the transport of CO2 or hydrogen.
- Express interest to hear the views of ZEP

Topic 1: European CO2 transport and storage infrastructure

SCENE SETTER

- European Green Deal specifically mentions CCS. We want a regulatory framework for energy infrastructure that should foster among other things carbon capture, storage and utilisation (p.6)
- In order to reach climate neutrality, CCS will be needed, with special regard to some industrial sectors. In order to bring the captured CO2 to storage, a transport infrastructure will be required.
- This infrastructure is expected to grow first around industrial hubs, e.g. the Port of Rotterdam, and can then be expanded.
- Several ZEP members are part of the Northern Lights project (a PCI project), which aims to collect CO2 from point sources where CO2 pipelines are not economically viable. The project therefore plans to transport CO2 by ship.

MAIN MESSAGES

- We are aware that a significant role out of CCS would also require the appropriate, cross-border transport and storage infrastructure.
- Welcome the Porthos project and the Northern Lights project, which aim to contribute to the 2030 CO2 reduction targets. We need these projects to show that CCS is a viable solution, for industry and for climate change.
- In the long-term, the question of public acceptance for CO2 transport and storage needs to be tackled in countries other than NL or NO. The support of the industry and national governments will be important.

Expected interventions from ZEP:

- Equinor and Total are likely to present the Northern Lights project. It can incentivise industrial emission points around the North Sea and the Baltic Sea to capture their CO2 because Northern Lights can provide a storage solution.
- Port of Rotterdam and EBN are likely to present the Porthos project (CO2 captured in the area of the port being stored under the sea, partly repurposing existing gas infrastructure).
- The Zero Emissions Platform might also refer to its report of June 2020 “A Trans-European CO2 Transportation Infrastructure for CCUS: Opportunities & Challenges” which highlights the need for further development of the key principles underpinning the development of CO2 transportation pipelines and large-scale deployment and identifies legal barriers to CO2 pipeline transportation.

DEFENSIVES

Will transport by other means than pipeline be eligible for European support?

- Currently, the energy infrastructure categories falling under the carbon dioxide transport heading in the TEN-E Guidelines Regulation concern dedicated pipelines, facilities for liquefaction and buffer storage, but do not cover other means of transport (shipping, rail, trucks) or storage. Stakeholders, like ZEP are arguing for the inclusion of these mobile assets, as well as CO2 storage.
- The Commission is currently preparing the review of the Regulation. While many options are open for the moment and the results of the public consultation are expected by end July:

    - The inclusion of mobile assets in the infrastructure categories may not be the likely outcome of the review process. Mobile assets are not project specific and can be repurposed to carry other gases. In general, the Commission does not finance mobile assets under the Connecting Europe Facility (CEF).

    - The inclusion of storage seems likelier. Storage could be interpreted as the last destination in the transport chain. The CO2, once stored, normally under the seabed, will not be used again.
- As part of a CCS project, storage can receive funding from the Innovation Fund.

Will the Commission support CCS?

- The Commission already supports CCS and CCU (carbon capture and usage) through research and innovation projects.
- With the Innovation Fund, we have the unique opportunity to support big demonstration projects employing breakthrough low carbon technologies in the key EU industrial sectors, including CCUS projects, and preparing them for wide-scale roll out. The first calls have just been launched.
- Additionally, CCS will be eligible technology in the future MFF programmes: e.g. Horizon Europe, Connecting Europe Facility, InvestEU. The Northern Lights and Porthos projects is one of the five candidate projects of common interests for CO2 transport.
- But EU budget alone cannot and should not bridge the entire financing gap for CCS or the future hydrogen economy. For CCS and hydrogen to fulfil their decarbonisation potential, additional support needs to come either from support mechanisms available through the Member States willing to enable this option for decarbonisation of their economy, from company's own contribution and from private financiers.

Why is bio-energy with carbon capture and storage (BECCS) not incentivised under the EU Emission Trading System (ETS)?

- While the EU ETS incentivises both biomass use and CCS, it does not recognise negative emissions when biomass use is combined with CCS (this technology is known as BECCS for bioenergy with Carbon Capture and Storage) because it seems that other instruments than the EU ETS could create incentives for BECSS in a more efficient way.
- This is why, as announced in the Circular Economy Action Plan adopted in March 2020, the Commission is launching work on devising a regulatory framework for a carbon removal certification mechanism.
- After the summer, the Commission will launch a study and will invite stakeholders to provide input.
- In the meantime, BECCS projects are likely to be considered more favourably in the Innovation Fund evaluation process, as net carbon removals bring additional points under the degree of innovation award criterion.

Background

Porthos and Norwegian project

- The **Porthos Project and the Norwegian full-scale CCS** project are the most advanced CCS projects in Europe, together with the connected transport and storage project Northern Lights. Other capture (sometimes with storage) projects exist in NL, UK and IE.
- **PORTHOS**: The Port of Rotterdam has transformed the abandoned ROAD concept into a CCUS transport and storage infrastructure project. The partners aim for the system to become operational by 2023. Their ambition is to store up to 5Mt/CO_2/y in the first operation phase of the project, with provisions to allow for an upgrade to 10 Mt/y. For comparison: in 2015, Rotterdam's industrial sector released a combined total of nearly 30MtCO_2 into the atmosphere; the coalition government of the Netherlands announced an ambitions objective in autumn 2017 to have 20Mt/CO2/y geologically stored by 2030, which is now being scaled down to 7Mt/CO2/y in an ongoing consultation with industry. The new objective is still very ambitious but it is more realistic taking into consideration that CCS projects have long lead times of around 10 years.
- Porthos is the Rotterdam leg (onshore pipe in the port area, compressor station and offshore pipe) of the CO_2TransPorts, which connects the Port of Antwerp and North Sea Port to the storage facilities off the coast near Rotterdam. The Ports will be connected via pipelines.
- **Norwegian full-scale CCS project**: Norway is planning to put in place a relatively large industrial CCS project: a waste incinerator and a cement plant in the area of Oslo. The CO2 will be shipped and stored deep under the Norwegian North Sea. The Norwegian government has indicated an aim to reach final investment decision in 2020 for the whole project and to have the project operational in 2023/2024. Norway is very much hoping to receive a grant from the Innovation Fund.
- This project is part of the Northern Lights Project of Common Interest, which aims to connect 13 heavy emitters from 5 European countries by shipping the CO_2. Phase one of Northern Lights will have a capacity of 1.5 Mt/y, in phase 2 this could be expanded to 5 Mt/y.

Connecting Europe Facility (CEF) and Projects of Common Interest (PCI)

- The Regulation (347/2013) on guidelines for trans-European energy (TEN-E) is the basis for developing a list of Projects of Common Interest (PCI) in European energy infrastructure.
- PCIs in the thematic area of CO2 transport should contribute significantly to the avoidance of CO2 emission while maintaining security of energy supply, increase resilience and security of CO2 transport. PCIs should enable connection of multiple sources and storage sites via common infrastructure, minimising the impact on the environment. PCIs must demonstrate significant cross-border impact.
- PCI can apply for financial assistance for studies and works under the Connecting Europe Facility. The five PCIs have all applied for assistance. Seven applications concern studies (3 under Northern Lights, 1 under CO_2TransPorts (study for the Antwerp-Rotterdam connection), 1 for Sapling, Cork CCUS and Athos). There is one application for works to realise the onshore pipeline, compressor station and offshore pipeline of Porthos.
- The 2020 CEF call has been three times oversubscribed.
- The evaluation of the experts has taken place, the Commission Evaluation Committee will meet mid-July. The final decision in the CEF Committee is expected in October.

- The five Candidate PCIs – CO2 transport thematic area:

Project name	Comments
Cork CCUS (Repurposing existing onshore and offshore natural gas pipelines and construction of new CO2 pipelines for CCUS or local geological storage). Affiliated with Athos and Northern Lights	Positive assessment by the Joint Research Centre (JRC) and the technical decision making body
Athos (Infrastructure to transport CO2 from industrial areas in the NL (around Ijmuiden and Amsterdam) and others such as Ireland and Germany to storage locations in the Dutch section of the North sea)	Positive assessment by the Joint Research Centre (JRC) and the technical decision making body
CO2 TransPorts (Infrastructure to facilitate large-scale capture, transport and storage of CO2 from the ports of Rotterdam, Antwerp and the North Sea port)	Positive assessment by the Joint Research Centre (JRC) and the technical decision making body
Northern Lights (commercial CO2 transport connecting several European capture initiatives and a storage site on **the Norwegian continental shelf**	Positive assessment by the Joint Research Centre (JRC) and the technical decision making body
Sapling (CO2 Shipping and Pipeline Infrastructure and North Sea Regeneration) Transportation part of Acorn full scale CCS project in the UK with CO2 from several European capture points)	Positive assessment by the Joint Research Centre (JRC) and the technical decision making body

Topic 2: CCS – key in the industrial transition

SCENE SETTER

- The European Green Deal also states that EU industry needs 'climate and resource frontrunners'. Priority areas include among other things clean hydrogen and carbon capture, storage and utilisation.
- Fortum (with its Oslo waste incinerator) and HeidelbergCement (with a Norwegian cement plant) are industrial CO2 capture projects that might become part of the Norwegian full-scale CCS project.
- In the Port of Rotterdam area, ExxonMobil, Shell, Air Liquide and Air Products (refineries and hydrogen producers) have signed an agreement with the Porthos project to carry out parallel CCS preparations.
- These projects are in line with our vision for CCS that CCS will mainly be used to decarbonise hard-to-abate industrial sectors (steel, chemicals and cement) and possibly blue hydrogen production.

MAIN MESSAGES

- According to EU and IEA modelling, CCS is needed mainly for the decarbonisation of hard-to-abate industrial sectors. To some extend we will also need it for the provision of blue hydrogen, provided that demand for clean hydrogen will be scaling up relatively quickly.
- CCS is also a way to maintain industrial jobs in Europe. There is no point in moving industrial sectors abroad and importing products with a high carbon footprint.
- Many process industries do not voice their need for CCS. Some of them are implementing CO2 capture to support carbon capture and use (CCU); but not CCS. The lack of business case partly explain this.
- With the Innovation Fund and Horizon Europe, the Commission is ready to support the CCS in industry, but we also need the industry to further engage in CCS advocacy and planning, as well as to help overcome challenges with public acceptance. CCS

projects need to be implemented with the support of the general public.

Expected interventions from ZEP:

- Fortum is likely to present its waste incinerator near Oslo. Since part of the residential waste is of biogenic origin, the waste incinerator equipped with CCS could create negative emissions. Fortum is hoping that other cities follow the example of Oslo in a bid to become climate neutral. These cities might be driven by Covenant of Mayors commitments.
- HeidelbergCement is likely to mention its cement plant in NO, which might become one of the capture sites of the Norwegian full-scale CCS project. HeidelbergCement also has a Horizon 2020 funded CO2 capture demonstration project (LEILAC) in Belgium. Hence, their representative might elaborate on the potential of CCS for the company, and the cement sector as a whole.

DEFENSIVES

What is the Commission's position on carbon capture and usage (CCU)?

- By 2050, we need solutions that will either circulate the carbon or remove it from the atmosphere at competitive costs. CCU technologies are one piece of the puzzle especially for industries that will need carbon as a feedstock. However, today there is a lot of uncertainty as to the economic and environmental impact of CCU technologies.

- We must make sure that these technologies are further developed in the EU and become available for the relevant CCU applications in the mid-term. We have the financial support framework – the future Horizon Europe and Innovation Fund – to support the technological development and proving of concepts and impacts.
- In the long-term carbon capture could become a source of CO2 for industries which need CO2 as a feedstock or for low-carbon products (e.g. synfuels based on CO2 and renewable electricity). However, it is not likely that all CO2 emitted can be absorbed by CCU activities.

Have you considered industry and CCS in the energy system integration strategy and the hydrogen strategy?

- Yes, we see the main application of CCS in the industry sector.
- Building on the New Industrial Strategy for Europe, the COVID 19 recovery plan, “Next Generation Europe”, and with the Energy System Integration Strategy and the Hydrogen strategy, the Commission is presenting its longer-term strategic approach on energy and on hydrogen, including orientations for a regulatory framework.

Background

CCS for industry currently not viable without support

- The CO2 price is unlikely to be above EUR 30 per tonne in 2030 (especially if the ETS scope is extended).
- Transport and storage projects aim for the costs to reach EUR 25 to 35 per tonne. This does not include the costs for capture (depending on the source between EUR 30 and 60 per tonne).
- A gradual CO2 price increase will not help industry to make necessary investments. An increased CO2 price that does not make CCS viable would reduce the competitiveness of European producers, possibly driving carbon intense industry out of Europe.

Actions in the Green Deal related to CCS and industry

- The European Green Deal also states that EU industry needs ‘climate and resource frontrunners’. Priority areas include among other things clean hydrogen and carbon capture, storage and utilisation.
    - In the annex of the European Green Deal, a number of initiatives are listed that are related to CCS, let me just mention two of them
    - Initiatives to stimulate lead markets for climate neutral and circular products in energy intensive industrial sectors (from 2020)
    - Proposal to support zero carbon steel-making processes by 2030 (2020)
    - CCS addressed in energy system integration strategy (2020)

Topic 3: Kick-starting a clean hydrogen economy

SCENE SETTER

- For ZEP, a hydrogen economy would have to rely on CCS, arguing that only blue hydrogen can be supplied in the quantities necessary to kick-start a hydrogen economy.
- They will support a "colour blind" approach and the use of the "clean hydrogen" terminology to cover both green and blue or low-carbon hydrogen.

MAIN MESSAGES

- The Commission has developed a specific Hydrogen strategy, linked to the Energy System Integration strategy *(to be published day prior to the meeting)*. Hydrogen is particularly needed for hard-to-decarbonise sectors, such as high-temperature processes in industry or heavy-duty transport, where no alternatives are available, and could play an important role in supporting a renewables-based electricity system.
- The hydrogen strategy will take a full value chain approach to underline how to upscale investments in the demand and supply of renewable hydrogen, how to mobilise Member States, regions and industry, how to advance the regulatory framework for infrastructure and markets, how to strengthen the research agenda and how to position Europe internationally.
- While various forms of hydrogen can contribute to greenhouse gas emissions reduction to a different extent, there are a number of compelling reasons to prioritise the deployment of renewable hydrogen in Europe. This is the only sustainable option in the medium term in order to contribute to a climate neutral economy, but also to support the global leadership of European industry (notably on electrolysers).
- However, the production and scale-up of renewable hydrogen may not happen quickly enough to meet full demand already on a 2030 time horizon. In a transition phase, as support is put in place to

enable the effective scale-up of renewable hydrogen, the production of low-carbon hydrogen based on natural gas combined with carbon capture and storage ('CCS') technologies, or potentially via pyrolysis, could contribute to reduce emissions associated with the existing demand for hydrogen.

- We are carefully analysing how to facilitate the creation of a hydrogen market, prioritising renewable hydrogen and avoiding lock-in effects that may hinder the case for renewable hydrogen. We are discussing classification and definitions of low-carbon hydrogen and related support/enabling instruments.
- The EU energy policy can provide an enabling regulatory framework that facilitates the creation of demand and supply for renewable hydrogen, a European market for hydrogen, in particular for renewable hydrogen, and facilitate transport and cross border trade.

Expected interventions from ZEP:

- Shell is likely to draw your attention to its CCS projects around the world and to its recent energy scenario called Sketch which results has a strong growth of hydrogen in trucks
- Shell is likely to recommend support for R&D for electrolysers, steam reforming with CCS and fuel cells.
- Linde and Air Liquide are likely to point to its expertise in hydrogen.

DEFENSIVES

How does the EU intend to kick-start the clean hydrogen economy?

- In the first phase, from 2020 up to 2024, the challenge is to scale up hydrogen before it becomes fully cost-competitive. The starting point should be decarbonising existing hydrogen production and

facilitating the take up of hydrogen consumption in other end-use applications. To support the emergence of a whole hydrogen eco-system the Commission now kick-starts a Clean Hydrogen Alliance – announced in the Industrial Strategy – bringing together the industry, national and local public authorities and the civil society.

Why does green hydrogen have to come from electrolysers that are directly connected to the RES electricity source?

- We need to make sure that green hydrogen is based on renewable electricity. Using grid electricity with separately traded guarantees of origin to label the hydrogen as green, risks losing the trust of consumers.

Contact(s) – briefing contribution:

Annex I: Background ZEP

Zero Emissions Platform (ZEP)

- ZEP is one of the European Technology and Innovation Platform under the European Commission's Strategic Energy and Technology Plan (SET-Plan). It provides advice to the European Commission on carbon capture and storage (CCS) and carbon capture utilisation (CCU). ZEP includes various stakeholders (petroleum and process industries, utilities, consultancies, academics and environmental NGOs).
- The overarching goal of ZEP is to draw together a broad, effective and inclusive network of Carbon Capture and Storage (CCS) and Carbon Capture and Utilisation (CCU) stakeholders to support the development of zero emission fossil fuel power plants and energy intensive industries.
- A key activity of the ETIP is to support progress of the CCUS Research and Innovation (R&I) activities contained in the SET-Plan CCS and CCU Implementation Plan. ZEP receives Horizon 2020 funding through the following project:
- "Support Stakeholders in zero emission fossil fuel power plants and energy intensive industry (SSFZEP)"

EU project funding info:

- Start date: 01/05/2018
- End date: 30/04/2021
- Total Cost: € 997,671.75
- EU contribution: € 997,671.75