ZEP 62nd Advisory Council meeting
18 March 2020, 10:00 – 13:00

Agenda Item 1: Introduction and welcome

1.a. Virtual meeting instructions

The ZEP AC62 will be a virtual meeting, held on Microsoft Teams.

Below are some instructions in order for the meeting to run smoothly:

- Before the meeting, you will receive an Outlook invitation for the meeting (10.00-13.00 on Wednesday 18 March). The Outlook invitation contains a link to Microsoft Teams to join the meeting. If you have not received it, please contact the ZEP Secretariat.
- The Chair will let the presenter for each agenda item finalise his/her presentation before giving the floor to other participants.
- If you have a question, use the chat function (if you have not used it before, you will find a button at the bottom of the screen and the chat function will open up in a window on the right-hand side of the screen).
- In order for the Chair to organise the speaking order, please use the following vocabulary when you have a question:
    - "Chair: question to NN", if you have a written question for the Chair to highlight, or
    - "Chair: oral question" if you want the Chair to give you the floor for an oral question or comment.
- When you are not speaking, we would suggest that you mute your microphone for sound optimisation.

1.b. AC62 Agenda

Appended to this paper is the agenda for the 62nd meeting of the Advisory Council.

1.c. AC61 Draft Minutes

Appended to this paper are the draft minutes for the 61st meeting of the Advisory Council, which took place on 5 December 2019.

The Advisory Council are invited to approve the minutes of the last meeting.

1.d. ACEC January Meeting Minutes

Appended to this paper are the minutes for the January meeting of the ACEC.

1.e. ACEC February Draft Meeting Minutes

Appended to this paper are the draft minutes for the February meeting of the ACEC.

1.f. New member and AC member vote result

EBN has applied to become a member of ZEP. Appended to this paper is a short information about EBN.

The result from the secret ballot vote regarding the nomination of Stijn Santen to the ZEP Advisory Council will be presented.

ZEP 62 Advisory Council meeting
18 March 2020

Agenda Item 1.b: Meeting Agenda

ZEP Offices, Rue de la Science 14b, 1040 Brussels, Belgium
Virtual Meeting

Item		Lead Presenter	Time
1	Introduction and welcome	Graeme Sweeney	10:00 – 10:10
2	Secretariat Update	ZEP secretariat	10:10 – 10:20
3	Commission updates: • DG RTD • DG ENER • DG CLIMA	 Vassilios Kougionas Peter Horvath Maria Velkova	10:20 – 11:00
4	EU Industrial Strategy	Gabriele Morgante	11.00 – 11:15
5	European Green Deal Policy Update, SET Plan Update	ZEP Secretariat	11:15 – 11:30
6	European Taxonomy for a Sustainable Finance	Martin Spolc, DG FISMA, TBC	11:30 – 12:00
7	Review of Network Work Programmes Network Policy and Economics update Network Technology update	Co-chairs	12:00 – 12:30
8	External Relations Group update	Jonas Helseth, Helen Bray	12:30 – 12:45
9	AOB		12:45 – 13:00

Agenda item 1.c.

Draft Minutes ZEP Advisory Council 61

Attendance

Agata	Zmijewska	DG CLIMA	On behalf of Maria Velkova
Vassilios	Kougionas	DG RTD	
Peter	Horvath	DG ENER	
Graeme	Sweeney	Chair of ZEP	Chair
Kim	Bye Bruun	Shell	Proxy for Mr John MacArthur from Shell
Mehmet	Onal	Shell	
Lamberto	Eldering	Equinor	
Filip	Neele	TNO	
Eric	Deconnick	Arcelormittal	
Ward	Goldthorpe	Sustainable Decision limited	
Martijn	Van de Sande	RVO	
Johanna	Lehne	E3G	
Damien	Dallemagne	CO2 Value Europe	
Stefan	Gielis	CO2 Value Europe	
Ståle	Aakenes	Gassnova	
Angus	Gillespie	GCCCI	
Jonathan	Pearce	BGS	
Irma	Paceviciute	Equinor	Proxy for Anne Cavendish from Equinor
Brian	Murphy	Ervia	
Nils	Røkke	SINTEF	
Robin	Clowes	Exxon Mobil	
Antonella	Sopranzetti	Exxon Mobil	
Arthur	Heberle	Hitachi	
Jonas	Helseth	Bellona	Proxy Frederic Hauge/Rob van der Meer
Roman	Berenblyum	NORCE Research	Presenter for ECOBASE
François	Régis Mouton	IOGP	Presenter for IOGP
Kamila	Piotrowska	IOGP	Presenter for IOGP
Liliana	Guevara	Trinomics	Presenter for CCUS Project Networks
Pierre	Herben	SPIRE	Presenter for SPIRE
Per-Olof	Granström	CCSA	Secretariat
Giorgia	Bozzini	CCSA	Secretariat

Luke	Warren	CCSA	Proxy for Stuart Haszeldine from SCCS

Item 1: Introduction

GS welcomed all participants. He noted that a new agenda is available and asked the AC for approval. The agenda was adopted.

AC60 minutes were approved. GS asks the AC to approve the draft minutes of ACEC October and November meetings. The minutes are adopted.

Item 2: Secretariat update

LW refers to the actions from AC60 meeting in September. He highlights that there is ongoing discussions with DG CLIMA about the sustainable criteria in the Innovation Fund and the Clean Hydrogen Partnership. He notes that this should be consistent with the Sustainable Taxonomy. LW also updates the AC regarding the comment to Horizon Europe's public consultation about climate change mitigation/CCUS and the Network Technology meeting in Brussels and work on pipeline network.

LW gives some updates on personnel issues. He informs the AC that John Mc Arthur (Shell) will step down and Ms Syrie Crouch has been nominated to become Shell's new AC representative. He gives the floor to KBB, who highlights that he will step down from Shell's AC representation and co-chair of NWPE. He shares details about Syrie Crouch's professional background. KBB introduces Mehmet Onal (Shell) as new member of NWPE.

Following a secret-ballot vote, GS informs the AC that Syrie Crouch has been elected unanimously. On behalf of the AC, GS thanks John Mc Arthur and KBB for their service.

Continuing with the personnel updates, LW welcomes GB to the ZEP secretariat.

LW moves on to the 2019 budget. Following up from previous AC meetings, he highlights that outstanding invoices have been paid and settled. He refers underspending in Public Affairs because of changes in the EU institutions and suggests carry over to 2020. LW notes that ZEP has generated a surplus of 50K € in 2019, in line with AC58 decisions to create ZEP budget reserves.

LW shows the 2020 budget and invites the AC to adopt the proposal. GS notes no objections; therefore, the budget is adopted.

LW shares 2020 dates for AC and ACEC meetings, which were also circulated as pre-read. GS asks AC members to have a look at the dates and get back to the ZEP secretariat within a week, should there be any requests for changes.

Item 3: Commission updates

The AC received presentations from;

- Agata Zmijewska (AZ) – DG CLIMA
- Peter Horvath (PH) – DG ENERGY
- Vassilios Kougionas (VK) – DG RESEARCH

DG CLIMA

AZ (DG CLIMA) gives an update on the latest reports published by the European Commission on implementation of the CCS Directive, published in November 2019. The reports show the latest progress on the European Commission and Member States' sides. All reports are available online. DG CLIMA notes positive signs from member states regarding the application of CCS, although some countries have assessed that CCS is not economically feasible. However, there will be a chance for MSs to join in the future.

Regarding the Innovation Fund, she recaps on the several workshops held by DG CLIMA in 2019 to work on modalities to design the first call of the Innovation Fund. Mid-2020 is expected date for launch of the first call of the Innovation Fund. DG CLIMA is currently busy with design of selection criteria. She refers that the Innovation Fund Expert Group Meeting will take place in Brussels on 18 December.

DG ENERGY (PH)

PH informs that there will be one call for Co-funded Partnerships (likely to be a 7-year call) in the first call of Horizon Europe. Flexibility will be applied to member states which want to join later.

The Clean Energy Transition Partnership is carried out under the SET-Plan and it will happen with the support of Member States. The call will be published at the end of 2020 and submission deadline is 2021. The work on EGD is ongoing and no further specifications are available at this point. He refers that at their last meeting, the previous European Commission had approved a list of PCIs and the emphasis has now moved on electricity.

NR asks whether it is clear if the taxonomy will apply on PCIs. PH replies that sustainable taxonomy will not apply to the current list of PCIs and that application methods are not clarified yet.

DG RESEARCH

VK notes that DG RTD is aligning with Von der Leyen's ambitions for more investments in R&I to achieve the EGD. DG RTD is working with DG ENER on how to integrate CCS

in the Horizon Europe and establish new partnerships under the Clean Energy Transition Partnership. The discussions include all technologies included in SET-Plan.

In early 2020, DG RTD will try to link existing framework with member states and various funds. For Horizon 2020, two calls will open in 2020: one on CCS industry and a second one on CCU storage pilot. VK refers that DG RTD is also aiming at bilateral cooperation on R&I, for instance with China.

GS asks DG RTD to share timetables of the upcoming calls for the Clean Transition Partnership. VK refers timelines are being developed. He refers that different technologies of SET-Plan will be involved and that member states are coordinating.

Action: GS suggests chair of IWG9 should be briefed by commission before the commission releases the details of the new Clean Energy Transition Partnership under the Horizon Europe. It is still an internal EC issue but from what we understand there will be a call within this partnership already in 2020-2021. In order for IWG9 to give input to this process, the consortium will need to prepare for a document for the SCG meeting in February.

Item 4: Overview of EU policy development. ZEP and the EGD: updated ZEP objectives and messages

PG informs the AC about the latest policy developments at the EU level. He refers that there are many developments connected to the European Green Deal and the upcoming communication from the European Commission on 11 December. He reminds that the European Council is taking place on 12-13 December and Long-Term Strategies will be discussed during the meeting. He provides an overview on the next deadlines on the European agenda for the next months.

In terms of policy developments, PG highlights that the EP adopted a CCS positive resolution ahead of COP25, that the EP has declared a climate emergency during November's Plenary, and recalls that the EIB has announced plans for a new lending policy.

PG moves onto the new ZEP objectives and core messages, highlighting that there is potential for ZEP to be involved in the political economy and to promote a positive message about CCS. He recalls the decisions of AC60 and shares the outcomes of the ACEC meeting held on 12 November. In that occasion, the ACEC updated ZEP's objectives and core messages, which were shared in the pre-reads with the AC. He explains that, based on a new set of objectives, ZEP has developed some messages (umbrella and supporting). He informs that the ZEP secretariat is working on proof points.

Communication goal:	**To demonstrate to policymakers, legislators and other stakeholders that the implementation of CCS and CCU technologies at scale now, is essential to achieve net-zero GHG emissions in Europe by 2050**
Umbrella message:	**The urgent deployment of CCS and CCU is essential to achieve net-zero GHG emissions by 2050 and to produce large-scale clean hydrogen, whilst making Europe an attractive region for clean investment**
Supporting message 1:	**Europe cannot reach net-zero emissions without CCS and CCU (CCS and CCU is an essential technology to enable Europe to reach net-zero)**
Supporting message 2:	**The urgent development of CO2 transport and storage infrastructure is vital to unlocking the benefits of CCS and CCU across industry, heat and power, and to enable climate positive solutions (negative emissions)**
Supporting message 3:	**CCS and CCU enable a Just Transition for Europe's citizens and industries, making EU regions attractive for clean investment**
Supporting message 4:	**Incentive mechanisms are needed to ensure the urgent roll-out of CCS to achieve EU climate goals**
Supporting message 5:	**CCS enables production of large-scale clean hydrogen, which is critical for the transition to low carbon industrial, transport and heating sectors**

PG refers that 2 comments were unresolved and opens the floor for discussion:

1. "Urgent deployment of CCU";
2. CCS and CCU are essential technologies to enable Europe to reach net-zero.

PG hands over to GS, who opens the floor for comments. Angus Gillespie (GCCSI) comments that consistency in messaging is important: with a new sustainable taxonomy coming in, the communication around CCS needs to be consistent. He looks forward to receiving the proof points.

Wald Goldthorne (Sustainable Decision limited) notes that the communication from policy makers have not focused enough on market results and many economic opportunities that CCS allows and asks the ZEP secretariat to incorporate this point in the new narrative.

DD (CO2VE) hopes to see CCU technologies included in the messages. He reminds importance of deploying CCU to meet 2030 targets and asks for it to be included in the messages. GS notes that the word "now" is key in the messages and stronger than 2030.

JH reminds that no scientific basis is currently available about the role of CCU for meeting 2030 climate targets. It is therefore decided that DD is to get back to the ACEC

before 21st January 2020 with scientific evidence to support his claims and a text proposal for ZEP messages.

Action: GS asks DD to provide input and supporting evidence regarding the proposed amendments to the messages by January 21st 2020 at the latest.

GS reminds that this document is a living one and if AC is okay with reconsideration in due course, that is a possibility and asks for proposals. A discussion follows.

Ståle Aakenes (Gassnova) notes that negative emissions and bioenergy for the future are missing in the message, as well as a reference to hard-to-abate emissions. GS states that he asked the NWT to look into climate positive solutions as part of their 2020 programme, as well as DAC and residual emissions.

The working version is adopted. Any comments that arises will need to be handled by mid-January, as ZEP will be hosting a conference on 28 January 2020 in the European Parliament.

Under the same agenda item, PG illustrates the new plans for outreach and communication activities, explaining that the many events happening at the European level call for an increased ZEP budget and level of outreach. He draws the attention of the AC to a new budget proposal for 2020, with more financial resources allocated to the ZEP secretariat to allow for an additional staff member and more outreach activities. LE asks if the plan applies to 2020, PG confirms. KBB asks if membership fees will be increased, PG confirms they will not be increased.

GS asks the AC to adopt the new budget proposal. The proposal is adopted unanimously.

Item 5: SET-Plan Action 9

LW updates the AC on the latest developments on SET-Plan Action9. The work involves 11 countries and a number of activities. The underlying principle is to get better coordination in order to achieve 10 CCUS targets for CCS and CCU, improving storage, CCU, energy transition and large PCIs. IWG9 supports the deployment of commercial CCS projects as a key priority, although targets need review.

LW elaborates on regional clusters and informs that it is not clear yet where regional clusters will be, although much focus is around the North Sea area. LW replies on questions about timeline of the SET-Plan and informs that IWG9 are still waiting for feedback on the recommendations they had previously shared with the Commission.

He concludes the presentation by giving an overview of the upcoming IWG9 commitments.

Item 6: Guest Presentation: CCS and CCU in the EU Industrial Strategy

Peter Handley could not attend the AC meeting, due to a last-minute engagement. The agenda item is not discussed.

Item 7: Guest Presentation: SPIRE Industrial Roadmap

Pierre Herben presents SPIRE, a project gathering more than 150 members from 20 countries, active 8 sectors and with a budget of 900 Million €. He highlights that the project focusses on cross-sectorial issues and R&I, with a focus on 2050 targets.

Item 8: Guest Presentation: The EcoBase Project

Roman Berenblyum presents the EcoBase project (an ACT project). He argues that CCS needs a boost worldwide. EOR has potential to boost CCS. He highlights that Turkey and Romania are two key countries for the project.

Item 9: Guest Presentation: Overview of NECPs

Kamila Piotroswska (IOGP) presents some slides on NECPs and how CCS is reflected in the national plans. She highlights that Member States are due to submit their NECPs by December 2019, which will later receive feedback from the European Commission. She notes that some Member States will not be able to submit NECPs in time. IOGP has published an assessment of NECPs highlighting the role of CCS and blue hydrogen.

Item 10: Guest Presentation: CCUS Projects Network

Liliana Guevara Opinska (Trinomics) presents the CCUS Projects Network. The project started in January 2019 at the initiative of DG ENER to share best practices among existing and emerging CCUS projects. The network seeks to maximise support to CCUS through cooperation with ZEP and SET-Plan IWG9 project.

DG ENER asks ZEP, CCUS Project Network and SET-Plan to work together on potential overlaps between projects in order to facilitate the coordination and communication of projects.

Item 11a: Network Policy & Economics update

LE recaps on the priorities of the Network Policy and Economics. A consultant has been appointed by the Commission to design the first call of Innovation Fund. LE shares

updates on Long Term Strategies, PCIs and TEN-E framework, informs about the London Protocol ratification and gives updates about Sustainable Taxonomy.

He informs that the next meeting will be held in February 2020. He updates on upcoming deadlines and consultations in 2020. He explains that the TWG on PCIs was initiated to gather support on the projects, but the work of the TWG is now covered by the SET-Plan and IWG9. On behalf of the Chairs of the Network, he proposes to shut down the TWG PCIs. The AC agrees unanimously.

Item 11b: Network Technology update

FN and AH inform about the conclusions of the NWT meeting on 28 November 2019 in Brussels. They give feedback on the presentation of the study "Hydrogen for Europe" by SINTEF. A TWG Hydrogen draft Terms of Reference (ToR) was circulated as a pre-read, a finalised version of the document establishing the TWG should be expected by January 2020. AH provided updates on CCUS sink factors network. The paper is meant to be a pre-assessment on real mitigation effects. AH notes that GS has tasked the NWT to work on climate positive solutions/negative emissions. GS notes that LCA (life-cycle analysis) were not included in the initial document, but it seems that a perspective on LCA will need to be agreed upon by the NWT. FN informs that he secured Robert de Kerk as co-chair for the new TWG Hydrogen.

The chairs inform that work is ongoing on collaboration across CCS chain and update about the status of the report. In March there will be another report on WS2. WS3 is ongoing, as the table of contents was approved during the last NWT meeting. A draft should be ready by the AC62. NWT is also working on the document on the costs of storage, following up from previous Twitter communications. It will be a short assessment of current range of costs for CCS projects. The text is circulated in the network for comments, but it will be ready shortly.

Action: share final document on costs of storage with the European Commission once finalised.

Item 12: External Relations Group

JH updates about the latest activity, namely the launch of a newly designed ZEP website. He asks for feedback and invites members to share relevant context (written and visual) with the ZEP secretariat for upload. JH informs about a meeting with MEP Chris Davies on 20 November 2019. ZEP was invited to brief Chris Davies ahead of his meeting with Frans Timmermans and his chief of cabinet. PG reports about an interesting event organised by BioEnergy Europe, where ZEP was asked to speak. He provides updates on the upcoming key happenings and communication activities from the secretariat, and he highlights the upcoming conference in the EP on 28 January 2020, hosted by Tom Berendsen (EPP, NED).

Johanna Lehne calls on the importance for the CCS community to feed into the EP own-initiative reports on Industrial transition.

Item 13: Any Other Business (AOB)

No items are noted. The meeting is closed at 16.30

Actions		**Owner**	**Deadline**
2	Send comments regarding 2020 meeting dates	ZEP Secretariat	End of January 2020
3	IWG9 chairs to prepare input to Clean Energy Transition Partnership process with a strategy document (SCG meeting)	ZEP secretariat	February 2020
5	Provide summarised proof points and new text for umbrella messages and first supporting message by January 21st 2020.	CO2VE	21 January 2020
12	Share final document on costs of storage with the European Commission once finalised	Secretariat	End of January 2020

Agenda item 1.d.

Draft Minutes ZEP ACEC January 2020

Attendance

Dr Graeme Sweeney	ZEP
Per-Olof Granström	ZEP
Luke Warren	ZEP
Chris Gent	ZEP
Charlie Garner	ZEP
Rob van der Meer	Heidelberg Cement
Jonas Helseth	Bellona, proxy from Frederic Hauge
Filip Neele – phone	TNO
Nils Rokke – phone	Sintef
Helen Bray – phone	Shell, proxy from Lamberto Eldering
Giorgia Bozzini	ZEP
Arthur Heberle – phone	Mitsubishi

1. Introduction and adoption of agenda

GS welcomes the participants and opens the meeting. The agenda is adopted.
The draft minutes of AC61 are adopted, now pending the approval of the Advisory Council at the March AC62 meeting.

Under agenda point 1.c, **GS** and **POG** give updates on Horizon Europe. Following two meetings with representative of DG ENER and DG RTD, it is clear that the European Commission has started to work on two new initiatives, the Clean Energy Transition Partnerships (CETPs) and an internal EC co-creation group on CCUS, with the aim to define R&I priorities. ZEP has been asked to give input to these new initiatives. **GS**, **POG** and NR – also bringing the EERA Net perspective, stress the need for an immediate feedback to be shared with the EC. The SET-plan IWG9 will also discuss this during the next strategic coordination group meeting in London on 11 February. ZEP and EERA agree that coordination of the input is important. **GS** encourages the ZEP secretariat and the ACEC to draft an indicative list of R&I priorities to send over to the EC by the end of the week. He invites the NWT co-chairs to think about potential topics to share with the EC and send them for discussion to ZEP secretariat. NR mentions that EERA are also proposing topics and technologies to include in CETP; however, it seems that member states will have the final say on the technologies that will be financed. While Austria has shown a reluctant approach to CCS, other countries are more positive.

DG RTD's approach is to involve as many stakeholders as possible in the process of defining which technologies should be included in the co-creation group initiative.

POG will liaise with MB on the EERA Net side to agree on a strong, joint message around CCS.

Action 1: NWT chairs to put forward indicative input for DG RTD.
Action 2: GS will give final approval to the proposed list.

2. Network updates

Technology

FN gives feedback on the first call of the CO2 Transport Working Group. A group of experts was assembled, and topics were distributed. The work will continue with regular phone calls.

LW asks which transport issues are covered in the report. **FN** says that the report aims to describe the various aspects of CO2 storage and transport, analysing technical, regulatory and legal issues of CO2 transport. The PCIs are an interesting case study to analyse when evaluating which transport solutions have been chosen so far.

RvdM suggests drafting a map of storage spots, showing the connections from industrial sites to the CO2 storage sites in Europe. **GS** suggests looking at assessment of modalities and suggests that, when regulations are revised, shipping (as a modality) is included in the regulation.

The work of TWG on Hydrogen has not started yet. AirLiquide was invited to co-chair the Working Group, as they were previously involved in Hydrogen working groups. They are currently looking into potential co-chairs. **FN** registers interest from more people to join the WG on Hydrogen.

NR asks if it is possible to have a cooperation with Hydrogen Europe and also to connect with the study Hydrogen for Europe. **POG** says that this is a good idea and highlights the need to help Hydrogen Europe to also communicate about blue hydrogen with CCS, which they have not done so far. He also mentions that ZEP has been invited to participate at the advisory group meetings of the Hydrogen for Europe study. **JH** suggest keeping a critical eye on Hydrogen Europe to see where potential synergies could be found.

Under agenda point 2.a.i. (Report on Cost of Storage), ACEC has no comments and the report will be communicated.

AH informs that he has shared a draft ToR for DAC and climate solutions with co-chair Filip and the ZEP secretariat. He believes that the technical report on DAC and climate positive solutions which will result should be around 20 pages and that it should give an overview of technologies, costs, social and ecological implications of climate positive solutions. **POG** suggests that FN, AH after an update of the draft, circulate this for discussion within the ACEC.

GS notes that the Expert Group on Taxonomy has examined climate positive solutions. Bio-solutions are excluded from the mitigation solutions (since it will take 70 years before the CO" will be compensated through the planning of new trees). The Taxonomy agrees that those mechanisms work, but that these solutions are not relevant for net-zero by

2050. Under the sustainable taxonomy, agriculture is an open topic. BECCS is not included among the recommended instruments of taxonomy. The taxonomy does not describe DAC as a sustainable economic activity by itself, although investment in it is recommended in combination with an economic activity for the residual emissions.

POG asks when we can expect something official and written on the taxonomy. **GS** says a written document may be released ahead of the 12 March meeting but most probably not. **GS** notes that LCAs have been underestimated in the work of taxonomy and might remain an unresolved issue.

Blue Hydrogen is included in the taxonomy. The governance of the platform will be crucial, and it would be recommended to have a group of independent experts in the governance. The initially proposed thresholds for hydrogen has been changed, with more relaxed thresholds initially. The ZEP proposal to delete the third threshold was initially accepted but has now been exchanged for a solution with guarantees of origins for electricity and SMRs (the same solution as for aluminium).

Action: NWT to propose ToR for DAC and climate positive solutions and ACEC to approve the documents at the next meeting. In the meantime, the co-chairs shall start the work on the report.

Action 2: ZEP to schedule a telco to discuss the ToR during next week.

Policy & Economics

JH refers that the NWPE has not held any meetings since the AC in December. The next will take place on 13 February in Brussels. **JH** believes the Just Transition Fund and the criteria for application should also be included on the agenda, as well as the TEN-E review.

POG gives feedback from CCUS PN meeting, where Subgroup 1 of IWG9 presented their work on large-scale project and discussed barriers and business cases for large-scale projects, which will result in a report to the EC later this year.

Under agenda point 2.b.iii., Innovation Fund (IF) Expert Group, **POG** informs about the meeting on 18 December, referring to the pre-reads. He also highlights that the agenda for the expert working group on 5-6 February and two discussion papers from the EC on GHG emissions avoidance and Relevant costs have been circulated to the ACEC for comments and input. ZEP secretariat will prepare this input for Lamberto Eldering, who will take part on behalf of ZEP in the meeting.

GS gives feedback from his and **POGs** meeting with Christian Holzleitner and Maria Velkova from DG CLIMA. During the autumn, there has been unclear messages regarding which parts of the CCS value chain that will be eligible for funding through the IF. This meeting was set up in order to clarify this in order to communicate a clear description to the CCS community. In very short terms this is what we understood: in order to get high scores on your application (get funding) it has to be clear to the EC that it is about the whole value chain, from capture to storage. This can be managed in two ways, either with projects on capture and storage (and transport) applying together or

that a capture project in the application also includes contracts (the exact level of agreement is not clear) with the storage or storages project (and vice versa for storage).

Since the EC will not clarify this in writing themselves, they have invited ZEP to put this down in writing for them to comment on.

Action: ZEP to ask Christian Holzleitner for a meeting regarding this and to invite some practitioners and possible applicants to the meeting to assess what the above methodology would mean regarding eligibility for funding under the IF.

HB highlights that CO2 providers need to be together to look at IF, not just CEF. Both CEF and IF do not support new projects, unless you have a capture site connected to it. We need to help Porthos and other projects in getting message across to the EC. The matter of the IF is imminent, and a limited number of players are potential applicants – all need to be present at the meeting with Holzleitner.

POG informs that the IF expert group on Finance will take place on 11-12 March. ZEP will be asked to nominate an expert.

HB suggests ZEP to contact Marion Perelle at the EC to possibly provide someone to participate in a panel discussion at this workshop.

ERG Updates

ACEC members give positive feedback regarding the ZEP event in the European Parliament. The event was well attended, and we have received positive feedback from speakers and participants.

On the engagement plan, **GS** informs that the meeting with Stefano Grassi and DG ENER was excellent. ZEP will make suggestions as to what should be included in TEN-E review. There was also a very good meeting with MEP Jan Huitema. He has a technology-neutral view on climate change, and he might be open to give ZEP access to just transition funding mechanisms. He is keen on the just transition narrative.

ZEP should keep a high level of engagement with Jens Geier and Tom Berendsen.

POG informs that the EUSEW application process is progressing. Further updates will be shared in the next months. He also highlights the plan to host a conference in autumn and activities at the COP26. The interest is confirmed by the ACEC members.

3. ZEP messages

GS and **POG** give feedback from their meeting with CO2VE on ZEP messages and objectives. The meeting was held to follow up on AC61 action ("CO2VE to provide scientific evidence to support the proposed amendments to ZEP's communication goal and supporting message n.1"). The meeting was attended by Damien Dallemagne, Jean-Yves TILQUIN (vice-chair of CO2VE), Anastasios Perimenis and Célia Sapart (both working for CO2VE).

Complying with an action from AC61, Damien had shared with ZEP documentation to support the suggested amendments. The proof would serve as a basis for discussion at the meeting. During the meeting, however, it appeared that the documents sent by CO2VE do not qualify as scientific evidence to support the claim of CCU as "essential technology for net-zero GHG emissions by 2050", hence CO2VE have not met the requirements set at the AC61. Agreed in the meeting was that CO2VE will bring evidence that "the implementation of CCU may decrease the need for CO2 storage". Given that we receive good evidence for this, it could be included in the ZEP messages. Thus, there is no need to amend the messages so far.

GS and **POG** note that the discussion with Vice-chair of CO2VE was very positive and that it is important that ZEP maintains good relations and an open approach to CCU. The ACEC discussed about the importance of keeping an open channel of exchange and communication with CO2VE at all management levels. This way ZEP and CO2VE will be able to continue to critically assess and evaluate the role of CCU in emissions reduction and its timeframe for implementation.

GS notes that the Sustainable Taxonomy recognises that some CCU applications as eligible for funding and there is space for ZEP and CO2VE to adopt a shared narrative.

HB reiterated the importance of finding a wise way to work with the CCU community, as CCU will play a big role in industrial plan. She commends the way future cooperation with CO2VE has been described.

RvdM asks to draft a document with a clear offer to CO2VE, which would serve as a basis for a cooperation. The key message would be that CCS and CCU are complementary and they need to join forces to fight climate change. **GS** agrees that ZEP can support an inclusive messaging around CCS and CCU. **RvdM** suggests assessing critically the role and timeframe of CCU activity and to evaluate if it helps remove CO2 consistently.

Action: invite Vice chair of CO2VE to next ZEP meetings.

4. ISO

RvdM informs that the planned ISO meeting on 19 February will be postponed.

The ACEC agrees that it is important for ZEP to liaise with ISO. It is agreed that ZEP will apply for the role of liaison organisation, acting as an observer/sleeping liaison member. This way we can observe and monitor potential implications of ISO decisions for Europe. ZEP would only act if and when actions are needed.

LW mentions that a key issue is the adoption of ISO standard by CEN.

5. AC62 agenda

POG mentions that the AC62 draft agenda has been circulated in the pre-reads and asks for comments. He highlights that the focus for the meeting is the IF, Sustainable Taxonomy and the Industrial Strategy. An item for cooperation with CCUS Projects Network is also included. He asks for further comments on the agenda.

HB asks to cover the "circular economy action plan", which will be announced by the EC in Q1, with the idea to focus around the potential implications for CCU. **GS** notes that the agenda reflect the conclusions of ZEP conference at the EP, to make sure there is a follow-up to the conference. He highlights the importance of the political economy narrative, the upcoming revision of regulatory frameworks such as the TEN-E regulation, and the crucial role of DG CLIMA in providing input to two sessions (general updates from DG CLIMA and IF discussion).

JH suggests extending the discussion on the Just Transition Mechanism and possibly invite a speaker from the EC to illustrate it.

It is agreed that the digital archive will be used instead of the extensive documentation in email for AC62 in March.

6. AOB

No items are noted under agenda item 6.

Actions :

2	NWT to propose ToR for DAC and climate positive solutions and ACEC to approve the documents at the next meeting. In the meantime, the co-chairs shall start the work on the report.
2	ZEP to schedule a telephone call to discuss the ToR.
2	ZEP to ask Christian Holzleitner for a meeting regarding this and to invite some practitioners and possible applicants to the meeting to assess what the above methodology would mean regarding eligibility for funding under the IF.
3	Invite Vice chair of CO2VE to next ZEP meetings.

Agenda item 1.e.

Draft Minutes ZEP ACEC February 2020

Attendance

Graeme Sweeney	ZEP Chair
Lamberto Eldering	Equinor
Jonas Helseth (Proxy from Frederic Hauge)	Bellona
Nils Rokke	SINTEF
Helen Bray	Shell
Rob van der Meer	Heidelberg Cement
Arthur Heberle	Hitachi-Mitsubishi
Per-Olof Granstrom	ZEP
Giorgia Bozzini	ZEP
Chris Gent	ZEP
Luke Warren	ZEP

1. Introduction

The agenda is adopted. The actions from January ACEC meeting are reviewed. All actions are completed.

The minutes from ACEC January are adopted.

2. NWT

AH gives an overview of the work of Network Technology. He informs that the next NWT meeting will be on 5 March in Brussels.

NWT is working on a CO2 transport report. **AH** informs that an update will be shared during the next NWT meeting. The report will cover several issues (transport modalities, business models, policy framework, etc). He notes no updates regarding the TWG on Hydrogen.

He informs that a TWG on Climate Positive Solutions (Negative Emissions) has been established. A draft ToR was circulated. The focus of the report is to understand the status of current technologies and address policy issues. The overall reactions from the ACEC are good. **POG** highlights that policy issues and a ZEP opinion related to negative

emissions will be discussed separately in NWPE. Some of the issues to address are LCAs, basic definitions, BECCS and overview on carbon removal technologies, not related to CCS.

Action: *NWT meeting to come back with clear timeline on Report + enquire if more are interested to join the TWG.*

3. NWPE

LE gives feedback from NWPE meeting in Brussels. He states that the goal of the meeting was to clarify the network's priorities for 2020. As a result, IF, HE, the revision of the TEN-E regulation and 5th PCI list are flagged as priorities. **POG** says that the revision of the TEN-E regulation has was discussed in the NWPE, that there will be a consultation end March and that ZEP should give input to the process. **HB** fully agrees to prioritise TEN-E regulation.

LE informs that the NWPE has asked IOGP about the progress of the "Hydrogen for Europe" study, and ZEP is waiting for indication. He gives feedback from IF technical workshop on 5-6 February and informs that ZEP is working on a final feedback document for DG CLIMA.

POG recalls that the Commission is working on a sector-integration strategy by June 2020 and highlights that ZEP should give input on the role of CCS and CCU in sector-integration.

GS believes that ZEP should start to think about a position on the upcoming Carbon Border Adjustment mechanism, to identify the expertise and propose a timeline for action. Although ZEP's participation will be demanding, ZEP start preparing.

Action: *ZEP to start preparing for a position on CBA.*

ZEP has responded to the Climate Law consultation for the AC to formally endorse in March.

4. ERG

JH notes that the next ERG call is scheduled at end February, therefore the ERG update will be led by the ZEP secretariat.

POG highlights that the ITRE committee approved a resolution on TEN-E and that the upcoming 5th PCI list should be in line with net-zero (carbon neutrality). A discussion follows around the phrasings "carbon neutrality", "net-zero" and "climate neutrality".

POG gives feedback from GCCSI event at the British Residence, where ZEP gave an intervention, highlighting the need for CCS and CCU in the Industrial decarbonisation. He also mentions the document that ZEP is preparing to feed into EP INI report on Industrial strategy, linked to the expected EC communication on 10 March.

POG gives feedback from the meeting with DG RTD. He notes that DG RTD seeks to understand the role of blue hydrogen, he informs that ZEP will compile a document for DG RTD and asks for input that may be of interest.

Action: *ZEP secretariat to prepare a list of the different definitions of "carbon neutrality", "net-zero" and "climate neutrality".*

5. Feedback from SET Plan SCG and CCUS R&I Priorities

GS states that ZEP provided input on CETPs and the co-creation groups under Horizon Europe. He notes that the SET-plan IWG9 did not wish to take a position on CCUS R&I priorities, and suggests ZEP takes the lead on this. There is a need to work to ensure support for CCUS from member states.

GS informs that the SCG of SET-Plan also discussed the update of targets. The discussion will continue at next SCG call in April ahead of plenary. **LW** noted that the discussion on SET-Plan targets should focus on near-term targets and long-term KPIs for CCS and CCU in Europe to put continent in trajectory to 2050.

6. IF

LE gives feedback from latest workshop. ZEP secretariat sent out a document sharing items to send to commission as comments or input after the workshop.

LE sees that discussions around IF are going in the right direction, although the challenge of estimating mitigation is still there. Projects would need to commit to a certain amount of storage, which is a challenge. From a capture point of view, joint bids or contracts are two possibilities to apply for funding. It is difficult to make a firm commitment of a certain amount of CO2 to capture while no European infrastructure is in place. When several capture plants come together, the risk lies in coordinating transport and storage. Storage capacities are a challenge.

GS notes that ZEP needs a separate piece discussing at greater depth the challenges (methodology of abatement, methodology of costs). **LE** thinks ZEP should also address cluster development and the issue of interdependence.

7. Draft Agenda AC62

The agenda for the 62nd ZEP Advisory Council meeting is highlighted.

8. AOB

No items are noted.

Actions

2	NWT meeting to come back with clear timeline on Report + enquire if more are interested to join the TWG.
3	ZEP to start preparing for a position on CBA**.**
4	ZEP secretariat to prepare a list of the different definitions of “carbon neutrality”, “net-zero” and “climate neutrality”.

Agenda item 1.f.
New member and AC member vote result

Presentation of new ZEP member

Energie Beheer Nederland B.V. (EBN) is a state-owned Dutch entity. EBN executes parts of the climate and energy policy on behalf of the Ministry of Economic Affairs and Climate Policy (EZK).

Until 2016, EBN mainly focused on the exploration, extraction and storage of gas and oil. Now we are one of the driving forces behind the energy transition in the Netherlands. EBN has thorough knowledge of the Dutch subsurface and plays a key role in connecting private and public parties within the energy sector. Cooperation is very important in order to achieve the climate ambitions.

As a non-operating partner, EBN is involved with virtually all oil and gas projects in the Netherlands, such as:

- Exploring geological energy sources and exploiting them in a safe, sustainable and optimum way;
- Investing in the reuse and decommissioning of old pipelines, wells and platforms;
- Developing, deploying and sharing know-how of geological energy sources and new applications of the Dutch subsurface;
- Connecting public and private parties in the energy sector;
- Managing participations in oil and gas companies.

EBN has indicated that Mr Stijn Santen would be their representative to the ZEP Advisory Council, pending the approval of the AC.

More information is available on the EBN website (link).

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Agenda Item 2: Secretariat update

2.a. Finance update

Appended to this paper is the ZEP finance update.

2.b. ZEP-C financial report

Appended to this paper is the ZEP-C financial report.

2.c. Follow up on actions from ZEP AC61

Share final document on costs of storage with the European Commission once finalised

The final document on "The cost of subsurface storage of CO2" was prepared, approved by the ACEC in January, communicated and shared with the European Commission.

The document is available at this link.

Meeting dates for the AC and ACEC

There were no further comments to the proposed meeting plan for 2020. AC and ACEC meeting dates for 2020:

ACEC	29 January 2020
ACEC	19 February 2020
AC	18 March 2020
ACEC	21 April 2020
ACEC	19 May 2020
AC	10 June 2020
ACEC	14 July 2020
ACEC	12 August 2020
AC	23 September 2020

ACEC	21 October 2020
ACEC	17 November 2020
AC	16 December 2020

IWG9 chairs to prepare input to Clean Energy Transition Partnership process with a strategy document (SCG meeting)

ZEP prepared, together with EERA and with input from the CCUS SET-plan IMPACTS9 consortium partners, a draft CCUS R&I priorities document – highlighting the most important areas. This document was discussed with the SET-plan SCG on 11 February and shared with DG RTD.

The draft document has since been updated and also discussed in the ZEP NWPE and NWT meetings for further input. It has been released to DG RTD and other stakeholders, in line with the ACEC advice. The document is appended to this paper as pre-read 2.c.i.

Provide summarised proof points and new text for umbrella messages and first supporting message by 21 January 2020

At the AC61 meeting in December ZEP presented new, updated messages for AC discussion and approval. During the discussion, Damien Dallemagne highlighted that CCU should be included in the messages and defined as essential to reaching net-zero by 2050. He also stressed that 2030 target also should be highlighted for this purpose. The conclusion from the AC was that CO2VE should provide evidence to support that CCU is essential to reaching net zero by 2050.

CO2VE submitted documentation to ZEP and a meeting with CO2VE was held at the end January. The conclusion of the meeting was that, today, CCU cannot be defined essential to reaching net-zero by 2050, because of a lack of supportive scientific evidence.

Instead, it was discussed that one way of showing the value of CCU would be in relation to CO2 storage. The amount of CO2 storage capacity needed could be decreased if CCU is used, but this would need to be proven. Here CO2VE said that they will take on this challenge and come back with a way of demonstrating this.

CO2VE has presented a possible supporting message to be added to the ZEP message model, highlighting that CCU can accelerate the integration of more supply from intermittent RES in the European energy system by facilitating the storage and transport of electricity as a liquid/gaseous fuel (sector coupling).

As follow up action from the meeting, CO2VE will look into how to demonstrate that the amount of CO2 storage capacity needed can be decreased if CCU is used, and ZEP will look into the possible addition of a supporting message on CCU for storage and transport of RES.

Extended budget with a focus on communication and outreach and additional staff member in Brussels

At the ZEP AC61 in December 2019, the addition of a member of the ZEP staff in Brussels was proposed based on the new situation:

- The European Green Deal and the political economy.
- The clear potential to build greater political and institutional support for CCS and CCU.
- ZEP's unique position to engage constructively in the debate and support a positive outcome for CCS & CCU.
- The new EU mandate, the EGD and net-zero by 2050 will dramatically increase the number of EU initiatives, packages and reviews of existing regulations and directives that are directly relevant to ZEP.

To increase ZEP's impact, the AC supported the proposal and adopted an extended budget for 2020 of €85,000 (including €32,500 from the 2019 surplus, €32,500 from the 2020 Public Affairs budget and to seek opportunities to fund an added €20,000). From this, €60,000 was calculated to cover the additional staff member and the needed office space.

In order to set up the employment in a cost-efficient and practical way – using already existing employment contracts, payroll setup, insurances, general administration etc. – the preferred solution was determined to be that CCSA, through its Belgian subsidiary CCSA ASBL, will employ an additional staff member for the Brussels office and, in parallel, that a service agreement be set up with ZEP Communications ASBL (ZEP-C).

A decision along these lines has been taken by the CCSA Board and the ZEP-C will be approached to make a decision.

In parallel, the advert for a Communications and Events officer for the CCSA Brussels office has received a large number of applicants, showing a good basis for employment.

2.d. ZEP Mid-Term Review

The Mid-Term Review of SSFZEP – 826051 will be held in London on 24 March.

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Agenda item 2.a: Finance Update

Attached to this note is the 29th February ZEP-Communications financial management report. This covering note provides commentary on developments since the AC61.

2019 ZEP-C Budget

- 2019 Income and expenditure: The income for 2019 was €167,500. The budgeted expenditure for 2019 was €129,992 and end of year expenditure was €103,206.
- ZEP-C started 2019 with a net equity position of €40,144 a budget surplus by the end 2019 of €125,787.
- The ACEC agreed that the 2019 audit for ZEP-C should be undertaken by Vandelanotte. Once the accounts have been finalised the audit will be completed.

2020 ZEP-C Budget

- The AC adopted an initial 2020 ZEP-C budget which allows continuation of the core ZEP-C services (Chair, accounts, legal support, etc). The AC also agreed that ZEP should allocate €85,000 for enhanced communications and events services. Since the last AC meeting EBN has agreed to join ZEP and this has also been reflected in the attached management report.
- The final 2020 Budget can be found in the attached financial report.

Forecast 2020

€ 125 787	**Starting point 2020 (= Left over budget 2019)**

Budget management: Expenditure against 2020 budget

Activity	*Contractor*	*Budget 2020*	*Comments*	*To date Spent*	*Comments*	*To Date Committed*	*Comments*	*2020 Total Spend*	*Comments Relative to budget*
Administration / Auditing	Adams accountants / Vandelanotte	€ 8 000		€ 400				€ 8 000	
Website maintenance		€ 1 000		€ 0				€ 1 000	
Legal advice	PWC	€ 4 000		€ 0				€ 4 000	
Chair	Ardnacraggan Energy Services	€ 67 992		€ 11 332				€ 67 992	
Contingency		€ 4 000		€ 465				€ 4 000	
Communications and events		€ 85 000		€ 0				€ 85 000	
Total		**€ 169 992**		**€ 12 197**		**€ 0**		**€ 169 992**	**Total budget spent 2019**

Spent: Actually paid or contractually due for delivered work
Committed: Based on signed contracts, yet to be approved invoices or founded estimates

Spent + Committed	€ 12 197
Remaining total budget	€ 157 795

Cash management of ZEP Communications VZW / ASBL

Category	**Source**	Issued invoices	Comments	Pending invoices	Comments	Received payments	Comments		
2019 contributions	O&G		Total	€ 120 000	BP, Shell, Equinor, Total			€ 120 000	
	OEM							€ 0	
	Others (confirmed)			€ 62 500	Heidelberg, Gassnova, Port of Rotterdam, EBN			€ 62 500	
	Others (Potential)			€ 5 000	Sponsorship			€ 5 000	
General	VAT return	€ 99	VAT declar 2020/02	€ 819	Invoices 2020 to be rec.	€ 1 455	REIMBURS 19 Q 4		
Total outstanding / pending ZEP-C		**€ 99**		**€ 188 319**				**€ 187 500**	**Total forecasted income 2018**

Cash situation (of 12 March 2020)

Current account (KBC - Business compact rekening)			**€ 134 222**
Savings account (KBC - Spaarrekening)			€ 101
Actual cash at bank and in hand			**€ 134 324**

143 294,74	**Forecasted Left over budget 2020**

Expenditure situation

Source		*Outstanding invoices*	*Comments*	*Pending invoices*	*Comments*
Short term creditors		€ 0		€ 4 719	VDL + CA + E & Y
Outstanding invoices in spent to date, to be paid		**€ 0**		**€ 4 719**	

Cash boundaries

Minimum virtual financial position (all creditors paid, no more income)	**€ 129 605**
Maximum virtual financial position (all creditors paid, all income realised)	**€ 318 023**

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Pre-read 2.c.i.

Priorities on CCUS R&I activities

Areas of importance for R&I activities – input to DG RTD, European Commission (EC), by the Zero Emissions Platform (ZEP) and the European Energy Research Alliance (EERA) and with input from the CCUS SET-plan IMPACTS9 consortium. A draft of this document, highlighting the most important areas, was shared with Vassilios Kougionas (who is leading the EC CCUS co-creation group) and discussed in the SET-plan Strategic Coordination Group on Tuesday 11 February. We also refer to the Mission Innovation CCUS Challenge Priority Research Directions Report[1] and Report of the Mission Innovation Carbon Capture, Utilization and Storage Experts' Workshop of June 2019[2].

Basis

The basis for the CCUS R&I priorities is the political EU climate ambition, highlighted in the European Green Deal and in the European Climate Law. CCS, CCU and low-carbon hydrogen will be crucial in order to reach these targets. It will be crucial:

- to implement CCS and CCU technologies at scale now.
- to accelerate the deployment of large-scale CO2 transport and storage networks, which enable clean, competitive energy (power, heating and transport) and industrial sectors, including early large-scale clean hydrogen and climate positive solutions (negative emissions).

For this to be possible, conditions necessary to reach net-zero GHG emissions in Europe by 2050 with a focus on energy and industrial sectors must be determined and created in the political economy.

[1] http://mission-innovation.net/wp-content/uploads/2018/09/Accelerating-Breakthrough-Innovation-in-Carbon-Capture-Utilization-and-Storage-_0.pdf
[2] http://mission-innovation.net/wp-content/uploads/2019/11/CCUS-Mission-Innovation-Challenge-Workshop-Report-Trondheim-2019.pdf

The European Union is responsible to create a favourable environment for clean investments.

Socio economic context

With the communication on the European Green Deal and the consequent proposed regulations, establishing a Just Transition Mechanism and a framework for a European Climate Law, the EC set out an ambitious trajectory to net-zero greenhouse gas emissions by 2050. The European Climate Law also highlights that all upcoming pieces of legislations will need to be consistent with the target of net-zero. Additionally, the EC has announced that it might review existing pieces of legislation to achieve climate neutrality by 2050.

Climate neutrality brings about major challenges for all economic sectors and for the European society as a whole. Europe will need to deploy all available technologies that can support a just transition in a cost-efficient manner. CCS and CCU technologies will, therefore, play a key role in the decarbonisation of especially industrial and energy sectors across Europe, enabling a just transition for European regions and citizens.

The urgent deployment of European CO2 infrastructure is also vital to unlock the benefits of CCS and CCU technologies and can deliver a safe, cost-efficient transition for European industrial and energy sector, while ensuring competitiveness and productivity levels. CCS and CCU, together with European CO2 transport and storage infrastructure, will also create new jobs along the CCS and CCU value chain, while maintaining those who are most exposed to climate change.

The activities proposed below should support ongoing work being undertaken in participating countries, which could involve a knowledge-sharing element to the proposals.

Industrial-scale deployment of CCS and CCU

The need for early deployment of industrial-scale CCS projects remains a key priority for Europe. The level of deployment must be consistent with reaching net-zero GHG emissions by 2050 and the intermediate targets. Europe should enable the equal application of CCUS for all industrial sectors including process emission heavy sectors such as cement and steel.

- **Industry**: Adaption of current capture methods to new areas and development and deployment of higher RTL capture.
- **CCU**.

- The role of CCS in enabling **clean hydrogen**, including the role of blue hydrogen as bridging technology for the introduction of green hydrogen.
- The role, feasibility and scale of climate positive solutions (**negative emissions**), i.e. Bioenergy CCS and Direct Air Capture CCS.
- **Flexible Power Generation**.

For all these activities, the integration of CO2 transport and storage infrastructure is crucial to enabling decarbonisation and support for these activities should include relevant and appropriate studies of the required transport and storage infrastructure.

European CO2 infrastructure

The development of regional CCS and CCU clusters and the development of European CO2 transport and storage infrastructure, that enables cross-border cooperation across all regions is crucial for the possibility to reach net-zero GHG emissions by 2050. CO2 infrastructure is deployable today and already operational in Europe, although challenges remain, why further R&I is needed. Recommended focus areas are:

Projects of Common Interest (PCI)

The importance of developing economic instruments that can support the deployment of CO2 infrastructure is critical. CEF/ Projects of common interest (PCI) remain a very important tool and should be updated as follows:

- The number of PCIs should be consistent with the development of regional CO2 infrastructure.
- PCIs should be extended to connecting also Member States without North Sea coastline to ensure that all regions with potential can plan CCS & CCU infrastructure.
- PCIs should utilise the full range of transport modality options, e.g. barge, ship and rail.

Reviews of infrastructure re-use (pipelines, wells, platforms from hydrocarbon industry) for transport and storage should identify those assets of strategic importance to PCIs and wider Member State plans for CCS.

Map European CO2 storage assets

A Europe-wide storage atlas will strongly support the strategic planning of activities to develop CCS. A “white paper” describing the benefits, intended users, functionalities and operation of the “European CO2 Geological Storage Atlas” was supported by IWG9.

We would recommend further exploring the use of big data and artificial intelligence.

Support a European storage development/appraisal programme

In line with a revision to the IWG9 Implementation Plan on CCS and CCU, a range of priority CO2 storage geological appraisal activities should be supported to ensure the required CO2 storage capacity is provided for the CCS deployment needed to achieve Europe's decarbonisation targets. This should include:

- Appraisal of storage regions which would include pre-competitive evaluation of storage options to encourage subsequent commercial project uptake.
- Detailed characterisation of storage sites across Europe to define the *contingent storage resource* and to provide storage hubs for CO2 capture projects. This has strong links to the role of CCS in the energy system, described below, which will determine possible scenarios of rates of CO2 capture at regional, national and European levels. This could include the testing of new formations to assess their feasibility for storage.
- Assessment of long-term and post-closure storage liabilities (technical risk and uncertainty) and the development of technical, regulatory, policy and commercial solutions.

Map European CO2 sources/utilisation opportunities and longevity

- CO2 sources and utilisation capacities across the EU should be assessed.
- Inventory of pre-commercial and/or industrial demonstration scale level CCU projects.

We would recommend further exploring the use of big data and artificial intelligence.

CCS and CCU Research

Building industrial scale CCS and CCU projects will generate many new challenges that can best be solved by undertaking R&I in parallel with large-scale activities. An iterative process is needed where R&I projects address specific industrial challenges, with the results then implemented in large-scale projects. A recommended approach would combine existing datasets with specific analyses of industrial areas or plants, obtained by the use of artificial intelligence. Priority research topics include the following areas and are best addressed through R&I at a range of scales from laboratory to pilot scales:

CO2 capture in industrial clusters

- Integration and synergies with other sectors and renewable solutions.
- Process intensification – including utilisation of waste heat.
- Retrofitability.

- Part-load operation and flexibility.
- Buffer storage and shared transportation infrastructure.
- Treatment of waste products from capture plants.
- Degradation and life span of capture technologies.

Cost reduction of CO2 capture

- Lift innovative and particularly effective capture technologies from TRL5-6 to TRL 7-9.
- Modularization of capture technologies.
- Develop next generation capture technologies.
- Carbon removal technologies
- Fuel flexible combustion systems.

Technological elements for capture and application

- Flexible, modular and energy efficient capture and purification technologies considering specificities of the downstream application
- Capture and conversion integration and intensification for reduced energy consumption (including waste heat valorisation) and waste generation
- Novel and cost-effective materials (membranes, adsorbents, absorbents) with high durability and recyclability for increased capture rates.
- Catalyst and material development for conversion technologies into fuels and chemicals (electrochemical, photoelectrochemical, thermochemical).
- Increased uptake of CO2 during carbonation of primary and waste materials for the production of building materials (mineralisation).
- Increased direct uptake of CO2 for polymer production.
- Synthetic biology for increased conversion efficiencies in biological conversion and efficient downstream product processing.

CCS and CCU transport systems

- Value chain analyses (full chains, H2, ammonia and liquid organic H2 carriers).
- New CCUS chain concepts and transport networks (including hubs, buffers).
- Impact of CO2 composition and impurities.
- Safety assessments and engineering design tools.
- Non-pipeline transport of CO2 (e.g. ships, rail, trucks, etc.).
- Reuse of wells and platforms.
- Improved understanding of thermophysical properties of CO2 and CO2 mixtures.

CO2 Storage

- Develop experience with site conformance monitoring and assessment.
- CO2 flow behaviour near valves and chokes.
- Storage optimisation through development of a range of injection strategies including in highly depleted reservoirs.
- Cost-effective ways to repair legacy wells.
- New geophysical techniques for examining and characterising legacy wells.

- Great and deeper understanding of induced seismicity.
- Effective prediction of plume under geophysical and geological uncertainty.
- Storage of small volumes of CO2 and scale storage if needed.
- Dynamic storage capacity; understanding pressure responses, pressure-connected volume and pressure management techniques.
- Risk mitigation for storage value chain (financial, technical, regulatory).

Standardisation and legislation issues

- Provide data to include emissions from CO2 capture technologies.
- Standard CO2 specifications.
- Incentives for carbon negative solutions.
- Development of methods for measuring biogenic/fossil CO2 ratio.
- CO2 stream composition, including technical considerations such as pressure, temperature and physical state and MMV.
- Incentives for initiatives addressing a harmonization of legal standards / regulations relevant for the development of a European CO2 transport- and storage-network.

Non-technological elements

- Computational tools in process engineering & intensification (e.g. AI-driven process control, machine learning for catalyst development).
- Harmonised guidelines for life cycle sustainability assessment.
- Social acceptance of technology solutions towards achieving climate neutrality goals.

The contribution of CCS and CCU to reaching net-zero by 2050

Analyses are needed on sector, Member State and EU level regarding how to enable Member States and the EU to reach net-zero emissions by 2050, including key technologies, milestones, etc.

CCS and CCU in the industry and Energy sectors in the Member States' National Energy and Climate (NECP), compatible with reaching net-zero by 2050. This is crucial in order to decarbonise Europe and should include the following elements:

- The national plans should be reviewed to ensure that they remain relevant to both Member States' and the EU processes and be updated in light of the European Green Deal and net-zero by 2050.
- The plans should include a relevant assessment of the role of CCS and CCU technologies to CO2 mitigation, including the contributions that clean hydrogen

(green and blue with CCS), might make to decarbonisation of domestic heating, heat for energy-intensive industries, and for transport.

- The plans should also describe the Member State strategies and approaches to progress the deployment of CCS and CCU.

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Agenda Item 4: Industrial Strategy

On 10 March the European Commission presented a new Strategy to help Europe's industry lead the twin transitions towards climate neutrality and digital leadership. To read the full communication, click on this link. A factsheet has also been released and it is available at this link.

The Strategy aims to drive Europe's competitiveness and its strategic autonomy at a time of moving geopolitical plates and increasing global competition. To uphold Europe's industrial leadership, a new Industrial Strategy will help maintain European industry's global competitiveness, making Europe climate-neutral by 2050 and shaping Europe's digital future. A Clean Hydrogen Alliance to accelerate the decarbonisation of industry has also been announced for summer 2020, followed by Alliances on Low-Carbon Industries and on Industrial Clouds and Platforms and raw materials.

Following the communication from the European Commission, ZEP released a press statement, whose objective was to highlight the need for CCS, CCU and CO2 infrastructure to deliver a just industrial transition. ZEP also highlighted that the production of hydrogen from natural gas with CCS should be a key component of the upcoming European Clean Hydrogen Alliance.

The press release is available at this link.

ZEP input for European Parliament's own-initiative report on "A new long-term strategy for Europe's industrial future"

In parallel to this, the European Parliament's ITRE committee has started to work on an own-initiative report on "A new long-term strategy for Europe's industrial future". The work is led by MEP Carlo Calenda (S&D, IT) as a rapporteur, supported by MEP Tom Berendsen (EPP, NL) as a shadow rapporteur for the EPP Group. The timeline for the report is set to follow the European Commission's timeline. The report would, therefore, serve as a response to the European Commission's strategy.

ZEP engaged the NWPE to produce a short document outlining the contributions of CCS, CCU and European CO2 Infrastructure in the transition towards decarbonised industrial and energy sectors.

The indication received from the MEPs' offices leaned towards a brief document for non-experts, which would remain open for revisions and a more thorough analysis if required at a later point.

The input is copied hereafter.

The European Climate Law on Climate Neutrality by 2050 set a clear timeline. Europe will need to take concrete steps towards net-zero greenhouse gas (GHG) emissions by 2050, deploying all available technologies that can support a just transition in a cost-efficient manner and keeping a technology-neutral approach, considering that there are no silver bullets. CCS and CCU technologies can play a key role in the decarbonisation of industrial and energy sectors across Europe, enabling a just transition for European regions and citizens.

Urgent large-scale deployment of CCS technologies is essential to achieve net-zero GHG emissions by 2050

The urgent large-scale deployment of CCS is needed across Europe to meet the target of net-zero GHG emissions by 2050. CCS is essential in the "A clean planet for all[1]" reference scenarios from the European Commission, complying with the objective of net-zero GHG emissions by 2050. Additionally, CCS is a scientifically proven, environmentally safe and cost-efficient technology and it plays a crucial role in the decarbonisation of energy-intensive industries and especially the hard-to-abate sectors.

The implications of climate change and the legally binding obligation to reach climate neutrality Europe by 2050 pose challenges to the European industrial and energy sectors. To tackle these challenges, Europe will, therefore, need to scale up the deployment of low-carbon technologies such as CCS to enable the transition towards net-zero.

European CO2 transport and storage infrastructure is vital to unlocking the benefits of CCS and CCU for industry

Energy-intensive industries such as cement, lime and steel are at the core of the European economy. For these sectors, CCS represents the lowest-cost route to decarbonisation. On the one hand, CCS and CCU technologies will help create new jobs along the CCS industrial value chain, while helping to the existing industrial activities adapt in a low carbon environment and preserve European jobs. On the other hand, it will make European regions attractive for clean investments.

[1] European Commission, A Clean Planet for All, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0773&from=EN

To fully unlock the potential of CCS technologies for the industrial and energy sectors, European CO2 transport and storage infrastructure will need to be urgently deployed. Cross-border CO2 transport and storage infrastructure will connect industrial clusters, allowing numerous emitters to benefit from CCS applications. Industrial clusters would promote the re-use of CO2 as feedstock at low investment risk and create a reliable supply chain of CO2 for storage sites. This will, in turn, enable low-carbon industrial development in Europe's regions.

Additionally, CCS will enable the production of early, large-scale volumes of clean hydrogen for the industrial sector. The transportation of large volumes of clean hydrogen from natural gas will need to be supported by appropriate hydrogen infrastructure.

An adequate policy framework to support the development of European CO2 infrastructure

A low-carbon industrial sector will need a coherent and coordinated policy framework, as well as economic incentives to maintain a high level of R&I activities in low-carbon technologies and carbon removal technologies.

The revision of existing policies, such as the EU ETS regulation and the TEN-E regulation, will also need to reflect the net-zero target set by the European Green Deal, as well as the provisions of European regulations such as the EU Taxonomy for a Sustainable Finance.

The EU ETS regulation would need to be adjusted (i.e. cap to be changed) to lay solid foundations for an industrial business case and encourage a market for low-carbon products. Secondly, a revision of the TEN-E regulation would need to look into other CO2 transport modalities (ship, barge and rail) to facilitate the access to European CO2 infrastructure.

Although some challenges remain, CO2 transport is feasible and already operational in Europe. There is recognition of the substantial cross-border transportation potential, especially to create economies of scale.

Parallel to the storage of CO2, industry may look into the commercial use of CO2 for low-carbon products, provided that a thorough life-cycle analysis is conducted. While several CCU applications, in many cases, have a limited potential for CO2 abatement at scale, they could provide a valuable means of incentivising investment in enhanced CO2 capture technology in the short term, reducing costs for industry and society. Any CO2 reduction allocation needs accurate carbon accounting covering all processes involved, including e.g. energy inputs and embedded emissions.

Upon an accurate carbon accounting and life-cycle analysis, these solutions should be combined to enable large-scale permanent storage for captured CO2 to meet the

required level of reductions, thus enabling the long-term sustainability of energy-intensive industries in a low carbon Europe. Given the critical importance of CCS in enabling decarbonisation of Europe's energy-intensive industries, the rapid deployment of CO2 transport and storage infrastructure to support these important sectors is a matter of priority. A failure to provide such enabling infrastructure in the short term will increase CO2 liability risk and undermine investments in jobs and economic activity.

Climate neutrality will also require the development of a range of greenhouse gas removal options.

CCS and CO2 transport and storage infrastructure will also enable negative emissions and provide further support to a low-carbon transition for European industry. Solutions such as direct air capture (DAC) may be another tool that could support industrial decarbonisation pathways, notwithstanding open questions regarding the full potential, costs, maturity and capture rates of these technologies.

To conclude, all these solutions will have to be implemented and combined to meet the objectives of the European Green Deal, thus enabling the European industries to thrive in a low-carbon future.

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Agenda item 5: European Green Deal, Policy Updates

European Council endorsed the objective of climate neutrality by 2050

In December 2019, European heads of state and government gathered in Brussels at the European Council meeting to discuss climate change and the next Multiannual Financial Framework (MFF).

The conclusions of the European Council meeting state that "the European Council endorses the objective of achieving a climate-neutral EU by 2050, in line with the objectives of the Paris Agreement. One Member State [note: Poland], at this stage, cannot commit to implementing this objective as far as it is concerned, and the European Council will come back to this in June 2020".

European leaders reiterated their support to "Forward-looking research, development and innovation policies" and recognise "the need to put in place an enabling framework that benefits all Member States and encompasses adequate instruments, incentives, support and investments to ensure a cost-effective, just, as well as socially balanced and fair transition, taking into account different national circumstances in terms of starting points".

Leaders also agreed on "the need to ensure energy security and to respect the right of the member states to decide on their energy mix and to choose the most appropriate technologies".

In March 2020, Member States have also agreed on a European long-term low greenhouse gas emission development strategy for 2050, available at this link. This will be forwarded to the United Nations Framework Convention on Climate Change (UNFCCC) as required by the Paris Agreement. The document highlights the European Union's commitment to the Paris Agreement and its long-term goals, urging all parties to communicate their long-term climate strategies to 2050 to the UNFCCC.

The EU's strategy recalls the full commitment of the EU and its member states to the Paris Agreement and its long-term goals. It refers to the endorsement by the European Council, as reflected in the conclusions of its meeting of 12 December 2019, of the objective of achieving a climate-neutral EU by 2050.

European Commission presented a Just Transition Mechanism and a Sustainable Europe Investment Plan

On 14th January 2020, the European Commission presented the European Green Deal's Just Transition Mechanism and the Sustainable Europe Investment Plan.

The Just Transition Mechanism (JTM) is a financial tool put in place to provide targeted support to help mobilise at least €100 billion over the period 2021-2027 in the most affected regions. The Mechanism will create the necessary investment to help workers and regions to move out of the fossil fuel value chain. It will come in addition to the substantial contribution of the EU's budget through all instruments directly relevant to the transition.

The Just Transition Mechanism will consist of three main sources of financing:

1) A Just Transition Fund, which will receive €7.5 billion of fresh EU funds, coming on top of the Commission's proposal for the next long-term EU budget. Member States will identify the eligible territories through dedicated territorial just transition plans. They will also have to commit to match each euro from the Just Transition Fund with money from the European Regional Development Fund and the European Social Fund Plus and provide additional national resources. Altogether, this will provide between €30 and €50 billion of funding.

2) A dedicated just transition scheme under InvestEU to mobilise up to €45 billion of investments. It will seek to attract private investments.

3) A public sector loan facility with the European Investment Bank backed by the EU budget to mobilise between €25 and €30 billion of investments. It will be used for loans to the public sector.

The plan will need to be supported by a Multiannual Financial Framework (MFF) for 2021-2027, which is currently being negotiated among the European Parliament, European Commission and the Council.

In February, the European Council held an extraordinary meeting to seek an agreement for the upcoming MFF, which was not successful. The ongoing budgetary discussions have been postponed to the next European Council meeting, taking place from 26-27 March 2020. A provisional agenda is available here.

Timeline:

- European Council, 26-27 March 2020

European Parliament endorsed the European Green Deal

In January 2020, the European Parliament approved a resolution on the European Green Deal.

The Parliament called for legally binding economy-wide carbon neutrality 2050 target, including intermediate EU targets for 2030 and 2040. Furthermore, the MEPs called for an increase to a 55% target for 2030, which would be accomplished through a revision of existing energy and climate legislation and by introducing national binding targets in these respective pieces of legislation. The EU ETS was also under scrutiny with regards to its linear reduction factor, the rules for the allocation of free allowances and the potential need for a carbon floor price. MEPs were supportive of the introduction of a carbon border adjustment mechanism.

The Parliament also highlighted that the industrial strategy should focus on supporting sustainable value chains and sustainable products, processes and business models. The role of environmentally safe CCS in making heavy industry climate neutral ("*where no direct emission reduction options are available*") was noted. Natural gas did not receive much positive treatment, and the Parliament labelled it as "transitional fuel" in light of 2050 climate neutrality.

4th PCI list up approved by the European Parliament's plenary in February

A vote on the PCI list took place during February's EP plenary. The following CO2 projects are included for Cross-border carbon dioxide network and will be eligible for funding under the "Connect Europe Facility":

- ***CO2-Sapling Project*** *is the transportation infrastructure component of the Acorn full chain CCS project (United Kingdom, in further phases Netherlands, Norway)*
- ***TransPorts*** *aims to establish infrastructure to facilitate large-scale capture, transport and storage of CO2 from Rotterdam, Antwerp and the North Sea Port*
- ***Northern lights project*** *– a commercial CO2 cross-border transport connection project between several European capture initiatives (United Kingdom, Ireland, Belgium, the Netherlands, France, Sweden) and transport the captured CO2 by ship to a storage site on the Norwegian continental shelf*
- ***Athos*** *project proposes an infrastructure to transport CO2 from industrial areas in the Netherlands and is open to receiving additional CO2 from others, such as Ireland and Germany Developing an open-access cross-border interoperable high-volume transportation structure is the idea.*
- ***Ervia*** *Cork project aims to repurpose onshore and offshore existing natural gas pipelines and construct new dedicated CO2 pipeline to transport captured CO2 from CCUS of heavy industry and combined cycle GTs to a storage facility.*

The Delegated Act containing the fourth PCI list will be submitted to the Council for a two-month non-objection period, extendable once.

Timeline:

- Council approves the 4th PCI list (not timeframed yet)

Remarks by Commissioner Simson on the revision of TEN-E guidelines

Prior to the approval of the 4th PCI list, Commissioner for Energy, Kadri Simson, was asked to comment on the 5th PCI list and the revision of the TEN-E regulation.

Commissioner Simson stated that:

- The European Commission will evaluate TEN-E regulation in 2020 and will release a new legislative proposal by December 2020;
- The focus will shift to deploying clean energy across the whole economy in the most efficient way. By 2050, we will need electricity infrastructures and innovative technologies such as smart grids, offshore wind and hydrogen that works, as well as carbon capture, storage and utilisation and energy storage.

On the 5th PCI list:

- It is likely that the new regulation will not be in force in time for the adoption of the 5th projects of common interest (PCI) list in fall 2021;
- More energy transition projects shall be included in the 5th PCI process, in particular "*smart clean CO2 infrastructure projects. I commit to working closely with the Member States and project promoters to help bring forward these projects*".
- The sustainability criteria will be thoroughly applied for any projects, including gas candidate projects.

Reacting to the Commissioner's remarks, MEP Christian Busoi (EPP/RO), Chair of the ITRE Committee, filed a motion for resolution to open the revision of TEN-E guidelines. The motion was approved within the ITRE Committee in February, with a final vote from the EP Plenary tabled during the March plenary.

However, due to a reduced activity of the European Parliament, the vote did not take place.

Timeline:

- Vote in the European Parliament's plenary, not yet framed.
- Open consultation on the revision of the TEN-E guidelines is expected in April.

The European Commission presented a legally-binding Climate Law

The European Climate Law set out the clear goal of climate neutrality by 2050, whereby 'climate neutrality' is defined as net-zero GHG emissions by 2050. The Commission made several references to the 'solidarity' dimension of the law, stressing that net-zero GHG emissions will need to be achieved across all economic sectors and Europe-wide. From the leaked document, it is clear that the EC would have the possibility to adopt, through delegated acts, a clear trajectory to reach climate neutrality by 2050.

The text mentions that the Commission will assess all draft legislative proposals in the light of this climate neutrality by 2050 objective before they are adopted by the College.

The text refers to the assessment of the 2030 target (40% to 50% or 55%) to be carried out by the European Commission by September 2020. Should the Commission decide to increase the emissions reduction target by 2030, all existing legislation governing the Energy Union (ETS, ESR, REDII, EED, EMR, etc) will be reviewed according to the new target.

If the Commission decides to revise these pieces of legislation according to new targets, the review process is foreseen in June 2021.

The Commission highlighted the role of the EU Taxonomy as a guidance tool to define sustainable investments and mentioned carbon removal technologies, as one of the instruments to achieve climate neutrality.

In a note to the Climate Law, the Commission clarified that EU 2050 climate-neutrality objective covers all sectors and all greenhouse gases - not only CO2-, and to be achieved domestically within the Union. The Climate Law "*recognises that while greenhouse gas emissions should be avoided at source as a priority, removals of greenhouse gases will be needed to compensate for remaining greenhouse gas from sectors where decarbonisation is the most challengin*g".

The natural sink of forests, soils, agricultural lands and wetlands should be maintained and further increased and carbon removal technologies, such as carbon capture and storage and carbon capture and utilisation, should be made cost-effective and deployed. The Article also requires the European Parliament, the Council and the Commission and the Member States to take the necessary measures both at Union and national level to enable the collective achievement of this objective. Measures at Union level will constitute an important part of the measures needed to achieve the objective.

Timeline:

- Open consultation on the proposal of a regulation establishing the framework for achieving climate neutrality (open until 1 May)

- Debate in the European Parliament. The ENVI Committee, specifically MEP Jytte Guteland /S&D, SE, ENVI), will lead the European Parliament's work on the Regulation.

European Commission releases Industrial Strategy

The European Commission presented "a new Industrial Strategy for Europe" on 10 March 2020. The communication outlines a clear action plan and sets the timeline for upcoming initiatives, stressing the need to ensure a transition towards a low-carbon industrial sector while maintaining competitiveness and productivity level. Energy-intensive industries "will play a key role" and they will have to "accelerate the transition by providing affordable, clean technology solutions and by developing new business models", based on the "secure supply of clean and affordable energy and raw materials".

The Commission intends to use the Innovation Fund to deploy large-scale, clean projects and Horizon Europe to promote R&I activities.

A European Clean Hydrogen Alliance, as well as an Alliance for Low-carbon Industries, are announced in the communication, although the timeline is not specified.

The commission mentions the role of low-carbon technologies to decarbonise energy intensive industries and announces that "the use of trans-European energy networks will also support the transition to climate neutrality".

Finally, the Commission "will propose a Carbon Border Adjustment Mechanism" in 2021 to reduce the risk of carbon leakage in compatibility with WTO rules.

As part of the Industrial Strategy, the European Commission has announced a new strategy for Smart Sector Integration, which is tabled for summer 2020. The Commission aims to give a strong message on energy efficiency with the strategy for smart sector integration, which will also set out the Commission's vision on clean hydrogen. The use of trans-European energy networks will also support the transition to climate neutrality.

Timeline:

- Consultation on Strategy for Sector Integration is expected in April/May 2020.
- European Commission is expected to publish a new Strategy for Sector Integration in June 2020.
- The European Clean Hydrogen Alliance is expected in June 2020.

European Commission announced a new Circular Economy Action Plan

In March the European Commission adopted a new Circular Economy Action Plan - one of the main building blocks of the European Green Deal, Europe's new agenda for

sustainable growth. With measures along the entire life cycle of products, the new Action Plan aims to make European economy fit for a green future, strengthening its competitiveness while protecting the environment and ensuring a just transition.

The plan includes a reference to the "*re-use and storage of carbon in products such as mineralisation in building material*", as well as a reference to carbon removal technologies. The European Commission noted that climate neutrality will also need to develop carbon removals, which should be incentivised, as well as scientific methodologies to assess their impact in terms of carbon removal potential. To this end, the European Commission will explore the development of a regulatory framework for certification of carbon removals based on robust and transparent carbon accounting to monitor and verify the authenticity of carbon removals by 2023.

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Agenda item 5: SET-Plan Updates

ZEP is very actively following the activities of the SET-Plan action 9 on CCUS. In February, ZEP Chair and secretariat attended the Strategy Coordination Group meeting, which discussed several topics such as the update of the targets for the IWG9 and the CCUS R&I priorities for Horizon Europe.

This was the first meeting of the SCG since the announcement of the European Green Deal, therefore many discussions focused on the need to update the IWG9 targets for 2030 in consistency with the objectives of the European Green Deal, while ensuring that current targets are met. The discussions are ongoing and will continue in April ahead of the next Plenary. The plan is to discuss possible new targets to the Plenary for feedback and endorsement.

The draft CCUS R&D priorities document that was prepared in advance was initially meant to be endorsed and a joint ZEP-EERA-IWG9 document. However, it was deemed not appropriate for the government representatives do so, since there is a separate process for the Member States regarding these issues. Instead this document is now a joint ZEP and EERA document with input from the CCUS SET-plan IMPACTS9 consortium.

In February, the ZEP secretariat participated in the SET-Plan Monitoring & Reporting Workshop, whose aim was to give feedback on the "Implementing the SET-Plan – Progress from the Implementation working groups" and to discuss the reporting process and tools and evaluate the need to make adjustments. The SET-plan reporting for 2020 is planned to take place between Mid-April and Mid-July with the report ready for the SET-plan conference in Berlin in November.

The next Plenary will take place in Brussels on 30 April. The agenda will focus on the update of the targets, the updates from work packages and subgroups and the workplan for the year.

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Agenda Item 6: European Taxonomy for Sustainable Finance

The final report of the Technical Expert Group (TEG) on Sustainable Finance and the technical annex have been released. These reports contain a set of recommendations and an updated list of technical screening criteria for 70 economic activities that can substantially contribute to climate change mitigation or adaptation, including an assessment of significant harm to other environmental objectives.

Guiding principles for the Taxonomy:

- Substantial contribution to at least one of six environmental objectives (art. 5 regulation on Taxonomy)
- Do-No-Significant-Harm
- Alignment with the IPCC goals and the target of net-zero greenhouse gas emissions by 2050 (as announced in the European Climate Law),

What is the taxonomy and why is it needed?

The EU Taxonomy is a list of economic activities and performance criteria consistent with the European Union's commitment to net-zero GHG emissions by 2050 and building resilience to climate change. The Taxonomy provides the clearest picture yet for companies and investors of an economy that can fulfil Europe's 2030 and 2050 climate goals.

The Taxonomy is part of the tools that will support the European Commission in the implementation of the European Green Deal, making the European Union the first climate-neutral continent by 2050.

What does the taxonomy mean for ZEP?

The taxonomy confirms the role of CCS in delivering "a net reduction in greenhouse gas emissions". Consequently, CCS can be applied to all economic activities in order for them to qualify as "sustainable economic activities" under the Taxonomy. CCS can be eligible in any sector/activity if it enables that primary activity to operate in compliance with the threshold – for example, steel, cement or electricity production. Unabated gas

will fail to meet the threshold criteria and is not defined as a sustainable activity in the taxonomy.

With regards to CCU, the TEG has decided not to include it in the final report, but it recommends the Platform on Sustainable Finance look at "how and under what conditions to include carbon capture and utilisation (CCU) technologies in different manufacturing sectors" in the future.

On carbon dioxide removals, there are three points to make:

(1) Direct Air Capture with CCS is included in the Taxonomy, as it provides substantial contribution to achieving net-zero GHG emissions target by 2050. However, DACCS will need to be consistent with the purpose of complementary remediation, as announced by the Directive on environmental liability (EU Environmental Liability Directive, Annex II, page 12) – the purpose of complementary remediation.

(2) Regarding BECCS, the TEG could not settle the matter of LCA, which was, therefore, deferred to the Platform for future deliberation. The TEG found that an appropriate LCA of biomass feedstocks had not been carried out yet, hence it is unclear whether a positive mitigation impact would happen by 2050.

(3) Regarding waste-to-energy, questions around the a scientific LCA and the counterfactuality of waste prevented the TEG from including in the Taxonomy, therefore the matter is deferred to the Platform on sustainable finance. In short, the TEG noted that the key issue is whether or not any waste would otherwise have been recycled with no agreement on a methodology.

Proposed action: The TWG on Negative Emissions shall discuss the matters that arise from the Taxonomy on carbon dioxide removals and try to elaborate a position.

How are CO2 capture, transport and storage treated?

Where CCS is used to meet the emissions intensity threshold, a contractual agreement is required as proof to show that the carbon will be transported and sequestered in economic activities which are themselves eligible under the taxonomy. The need for a 'contractual agreement' might be a link to the Innovation Fund. Additionally, the retrofit of gas transmission and distribution networks to transport CO2 and hydrogen qualifies as sustainable activity.

CO2 transport and storage are defined as "essential" for the EU to meet its climate objective.

What has changed from previous reports?

The final report confirms two important outcomes for the CCS/CCU community:

- Regarding the manufacturing of hydrogen from natural gas with CCS, the threshold for direct CO2 emissions is increased to **5.8 tCO2e/t**. (Reference: "Manufacture of Hydrogen, 3.5")
- Regarding the modalities of CO2 transport, all modalities of CO2 transportation that enable CO2 storage will be eligible under the taxonomy (Reference: "Transport of CO2, 5.11")

If confirmed in the delegated acts by the European Commission, these provisions will allow the first CCS projects in Europe to be compliant with the Taxonomy.

How is the Taxonomy governed?

The European Commission has established a Platform on Sustainable Finance, which is expected to be in operation by the end of 2020. The Platform will be composed by public and private stakeholders and it will be chaired by the European Commission. Its role will be of advisor to the EC on the implementation of the Taxonomy regulation.

Looking ahead:

- By end 2020: EC will adopt delegated acts on technical screening criteria for climate change mitigation and climate change adaptation
- By June 2021: EC will specify disclosure obligations for financial and non-financial companies
- First company reports and investor disclosures are expected in 2022

What was ZEP's contribution?

ZEP was invited to give input to the Working Groups on electricity and several working groups on Manufacturing, in particular on cement, electricity and hydrogen. ZEP was represented by its Chair, Dr. Graeme Sweeney, during the second phase of the drafting process.

Additionally, ZEP established a TWG under NWPE on Sustainable Taxonomy to provide contributions at different stages of the process. ZEP is also particularly grateful for the direct contributions made by several ZEP members during the process.

(We have taken up the matter of the thresholds referring to the "average carbon intensity of the electricity for manufacturing of aluminium, hydrogen and chemicals, which is set at 100g CO2e/kWh. We had understood that certificates of origin would be allowed and we are seeking confirmation as to whether or not this will be allowed.)

Regulation on European Taxonomy

The legislative process around a regulation on a European Taxonomy for Sustainable Finance developed rather quickly between 2019 and 2020.

Following five unsuccessful trilogues, the former Presidency of the Council of the European Union, held by Finland, concluded the ongoing negotiations with the European Parliament in a sixth trilogue. The Finnish Presidency submitted the negotiated text to the Permanent Representatives Committee (COREPER) on 18 December 2019 for endorsement of the agreement reached with the European Parliament. Following a positive vote from ECON and ENVI Committees on 23 January 2020, the Chairs of said committees transmitted the approved text to the Council, and addressed a letter to the Presidency indicating that they would recommend to the Plenary that the Council's position be accepted.

On 5 February 2020, the Permanent Representatives Committee confirmed the agreement reached with the European Parliament and suggested to the Council to adopt a political agreement on the text of the Regulation. Some European member states chose to make statements to clarify their position. The statements are available at this link.

The final document, "Regulation on the establishment of a framework to facilitate sustainable investment", is available at this link.

For CCS, these are the references in the text:

An economic activity shall be considered to contribute substantially to climate change mitigation where that activity substantially contributes to the stabilization of greenhouse gas concentrations in the atmosphere at a level which prevents dangerous anthropogenic interference with the climate system by avoiding or reducing greenhouse gas emissions or enhancing greenhouse gas removals through any of the following means, including through process or product innovation, consistent with the long term temperature goal of the Paris Agreement:

> *(e) increasing the use of environmentally safe carbon capture and utilisation (CCU) and carbon capture and storage (CCS) technologies that deliver a net reduction in greenhouse gas emissions;*

[…] An economic activity for which there is no technologically and economically feasible low carbon alternative, shall be considered to contribute substantially to climate change mitigation as it supports the transition to a climate-neutral economy consistent with a pathway to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels including by phasing out greenhouse gas emissions, in particular from solid fossil fuels, where that activity:

(i) has greenhouse gas emission levels that correspond to the best performance in the sector or industry;

(ii) does not hamper the development and deployment of low-carbon alternatives; and

(iii) does not lead to a lock-in in carbon-intensive assets considering the economic lifetime of those assets.

The next steps in the legislative process are the following:

- second vote in the Council (COREPER level)
- vote at the next European Parliament plenary (second reading, no amendments allowed). The vote was originally planned for March but did not take place.

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Agenda item 7: Review of Networks

Appended to this paper are the following pre-reads:

7.a. Network Policy and Economics

7.a. Network Policy and Economics update

7.a.i. Draft Minutes NWPE meeting, 13 February 2020

7.b. Network Technology

7.b. Network Technology update

7.b.i. Draft Minutes NWT meeting, 5 March 2020

7.b.ii. TWG CO2 Transport – slides

7.b.iii. TWG CCU and Sink Factor Methodology – slides

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Agenda item 7.a.
Network Policy and Economics update

Feedback from NWPE meeting

The NWPE held a meeting on 13 February. The meeting aimed to highlight the priorities and the workplan for 2020 and to identify where ZEP could feed into the European policy agenda with relevant input. The meeting notes are attached as pre-read 7.a.i.

The NWPE identified the following areas as key priorities for 2020.

Policy priorities and legislative processes:

- European Climate Law (including the related policy initiatives)
- Revision of TEN-E regulation
- Industrial Strategy
- Smart Sector Integration
- Carbon Border Adjustment Mechanism

Funding instruments:

- EU ETS (Innovation Fund)
- Connecting Europe Facilities (CEF)

The NWPE has also discussed its engagement on consultations, taking the view that it would be good for ZEP to feed into the following consultations:

- ZEP is preparing a response to the following consultations (available through the hyperlinks):
  - Revision of the **Energy Taxation Directive**, open until 1 April
  - Roadmap for **European Carbon Border Adjustment Mechanism**, open until 1 April
  - EIB stakeholder consultation on Climate Bank Roadmap 2021-2025, open until 24 April
  - Consultation on the proposal of a regulation establishing the framework for climate neutrality (European Climate Law), open until 1 May
  - **European Climate Pact**, open until 27 May

- ZEP has responded to the **Roadmap on European Climate Law.**

Industrial Strategy

The NWPE provided input to the EP own-initiative report on "A new long-term strategy for Europe's Industrial Future". The report will serve as a response to the European Commission's communication on a new European Industrial Strategy. The report has been initiated by the ITRE Committee and the Rapporteur is MEP Carlo Calenda (S&D, ITA), supported by MEP Tom Berendsen as shadow rapporteur for EPP, NED.

The input provided by ZEP was reported under agenda item 4 (Industrial Strategy).

Innovation Fund

ZEP attended the Innovation Fund Technical Workshop in February. The aim of the meeting was to discuss the methodologies to estimate GHG emissions avoidance and relevant costs of innovative projects eligible for funding under the Innovation Fund, in preparation of the first call for proposals expected in June 2020. An agenda (hyperlink) is available.

The discussions around the Innovation Fund are progressing towards the first call. ZEP provided input to DG CLIMA, highlighting some challenging issues for CCS projects. From a capture point of view, joint bids or contracts are the two possibilities to apply for funding. This does not solve the counterparty risk and the difficulty, for a capture cluster, to make a firm commitment of a certain amount of CO2 to capture. It is not clear what would happen if a partner – part of an industrial cluster – does not qualify for IF funding.

Another issue concerns the total lack of support for the development of storage capacities, which is currently not included in the Innovation Fund. The focus is clearly on emissions avoidance and mitigation.

ZEP's input (available through the hyperlink) focused on the following points:

- Storage capacity development exclusion
- What kind of contract/how firm agreement is needed?
- The co-dependence of clustered projects is a risk in the evaluation
- Overcapacity on transport and storage – negative effect on cost/ton criteria
- GHG emissions from non-stationary sources should be in the methodology
- Clarification on CCU in the European Commission's documentation:
    - Treatment of carbon utilisation beyond fuel production not clear – examples should be added
    - The European Commission's documentation refers to "negative emission", when they mean "emission reduction"
    - Accurate carbon accounting is crucial

The timeline for the next meetings is the following:

- 12 March: Workshop on project maturity, scalability and innovation selection criteria
- An IF expert group in April (summary of technical work)
- First call in June 2020

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Pre-read 7.a.i.
Draft Minutes NWPE meeting

ZEP Network Policy and Economics
13 February 2020

Location: ZEP offices, Rue de la Science 14, 1040 Bruxelles, Belgium
10:00-15:00 CET

Name	Organisation
Peter Horvath	European Commission
Vassilios Kougionas	European Commission
Lamberto Eldering	Equinor/co-chair
Jonas Helseth	Bellona/co-chair
Irma Paceviciute	Equinor
Rob van der Meer	HeidelbergCement
Mehmet Onal	Shell
Ståle Aakenes	Gassnova
Giorgia Manno	BP
Isabelle Czernichowski	BRGM
Eric De Coninck	ArcelorMittal
Eve Tamme	GCCSI
Chris Gittins (phone)	TAQA
Nora Hansen	IOGP
Caterina de Matteis	IOGP
Per-Olof Granström	ZEP
Giorgia Bozzini	ZEP
Chris Gent	ZEP
Graeme Sweeney (phone)	ZEP

1. Introduction

LE opens the meeting, shares safety instructions and asks the attendees to present themselves.

LE asks to approve the minutes. The minutes are approved.

2. Commission's Update

PH (DG ENER) gives updates on Horizon Europe and Sector Integration. He states that no specific CCUS strategy will be published by the Commission, but CCUS will be a cross-cutting theme. He informs that the EC is revising several pieces of legislations, striving to produce coherent strategies and providing sufficient funding mechanisms.

On Horizon Europe, he informs that member states attended a meeting on Clean Energy Transition Partnerships, overarching partnership to address all low-carbon technologies currently covered by SET-plan. CCUS-positive countries were active, and this will ensure that CCUS technologies are included in the CETP.

Horizon Europe will also consist of "Co-creation groups". Different DGs have been invited to provide input on CCUS, which is included in cluster 4 (industry) and 5 (energy). DG GROW, CLIMA, ENER, RTD are working together to create consistency across the work. The aim is to produce a roadmap for all the technologies by end February.

PH informs that the EC is looking at proposing a sector integration strategy and asks for input from the CCUS community. CCUS can have implications and bring benefits to sector integration (hydrogen, feedstock, renewable fuels) and address the issue of residual Co2 emissions. The timeline for the strategy is summer (Q2 2020), with an early workshop being organised in March.

Action: ZEP will provide input by end-March for the workshop on sector integration.

LE notes interest in boosting R&I around low-carbon products and strikes the difference between CCS/ CCU. **PH** believes that the European Commission has a good understanding of CCS and CCU. For sector integration: he notes that an input would be needed from CCS/U community in the creation of industrial, decarbonised hubs, potentially opening up for CO2 transport and storage infrastructure.

LE also notes that the 4th PCI list (including 5 CO2 transport and storage projects) has been approved by European Parliament.

VK informs that DG RTD is working closely with member states and other DGs on CETPs and co-creation groups. He notes the need to revise SET-plan targets to ensure consistency with the objectives of the European Green Deal.

3. ZEP and EGD

POG gives a background and highlights the ZEP decision to take on a more active role in the political economy and the shaping of the framework that will bring us to net-zero by 2050. He also highlights the ZEP strengthening of focus and resources. He points out the positive momentum for CCUS and mentions some of the recent important milestones. Here he also acknowledges that the EP has approve the fourth PCI list, including five cross border CO2 transport projects, which represents a big achievement.

He also gives an overview of the European Green Deal political landscape as a basis for the discussion about the Network's workplan. **GB** informs about the expected industrial strategy on 10 March and that ZEP is preparing input for the EP INI on Europe's long-term industrial future.

As a comment to the slides on the Just Transition Mechanism, **PH** informs that it will be possible to blend EU funding and regional funds to be approved on the national level, to then be matched by European funds. **IP** states that, within the ERDF and the IF, EU ETS installations are out of the list for funding applications, although NECPs could provide more indications as to how countries plan to use the funds of the Just Transition Mechanism.

POG gives a short overview of the status regarding the **Innovation Fund** (IF), highlighting that CCS projects are eligible for funding if they apply as joint bids including the whole value chain (capture project + transport + storage project) or if a capture project can show that they have signed contract with T&S providers. He also mentions that ZEP is preparing input to DG CLIMA by 21 February and that ZEP is coordinating with DG CLIMA to organise a meeting with project coordinators and experts to seek clarification on questions and challenges.

LE gives feedback from the IF Technical workshop on 5-6 February, mentioning that for a storage provider it will be difficult to secure high volumes to seek IF funding. He also says that some questions for CCS projects remain critical and unanswered. The issue of negative emissions and CCU is limitedly addressed under the IF. The IF takes into account how your energy is produced, what you produce, what is CO2 used for (fuel, storage, utilisation, chemicals, etc). IF will cover up to 60% of costs, up to 40% can be financed before FID. During the second part of the project (construction + operational), the EC could fund up to 10 years of project running, provided that the project can meet 75% of the claim of GHG emissions reduction. **RvdM** notes that ZEP should make a statement, welcoming the IF as a major step ahead for CCS and CCU in Europe. A discussion around business case and a market for low-carbon products follows.

In June 2020, the IF first call will be published, evaluating the level of maturity of the business plan, the innovation level and the level of emissions reductions. After that, the pre-selected projects go to second round, and the real application process starts.

POG informs that ZEP, together with EERA and supported by the partners in the SET-plan CCUS, has provided input on CCUS R&I priorities to the EC –the Co-creation group on CCUS, led by Vassilios, and to the work on preparing the Clean Energy Transition Partnership.

4. Targets and Priorities

LE opens a discussion around the priorities for NWPE in 2020, noting that there is a need to prioritise areas of interest and allocate resources to specific topics. He notes

that the IF is a key area and invites the NWPE to focus on the upcoming Industrial strategy, the revision of the TEN-E regulation, the revision of the EU ETS. **PH** adds that sector integration shall also be included to the priorities.

LE highlights the importance of feeding into the revision of TEN-E guidelines and extend the scope to rail, ships. An appraisal of storage is also needed.

Action: *ZEP is monitoring the revision of TEN-E and will prepare input.*

Action: *NWPE priorities will be presented at the ZEP AC62.*

5. Updates from NWPE

NH shares updates from the "Hydrogen for Europe" study, where ZEP has been invited to join the Advisory Group. The works on the study has started. By the end of the year, IOGP plans to identify some topics to use for external outreach and communication.

JH presents the report "Cities Aim at Zero Emissions: How carbon capture, storage and utilisation can help cities go carbon neutral".

LE shares feedback from CCUS PN knowledge sharing meeting in January, where the SET-Plan IWG9 presented their work on barriers for large-scale projects. A report is planned for June 2020.

6. Chair's Update

GS gives feedback on Sustainable Taxonomy. Works around the report are almost finalised. A long conversation around LCA will need to be carried out after the release of the report in March 2020. There is an ongoing conversation around taxonomy compliance groups, consistent with the 100 g/kWh threshold. The point is to exclude from definition of 'sustainable' those systems that will add high emissions capacity. He notes that the taxonomy is technology-neutral, with a higher threshold in the beginning, in exchange for further deployment. Certificates of origin will be allowed for renewable energy. The manufacturing of Hydrogen through SMR and ATR with CCS would be compliant with the Taxonomy.

GS and **POG** also shared updates from 11 February IWG9 meeting in London, and from the meeting with DG CLIMA. ZEP will arrange a second meeting to share with DG CLIMA the input and considerations from CCS projects on the design of the IF.

JH asks how biomass is addressed under the Taxonomy. **GS** replies that waste to energy conversation will not be resolved prior to publication.

The Taxonomy report is expected to be published in March. The Taxonomy will then be operated by a "Platform" through a delegate act. The Platform will decide what further

activities will be needed to implement in the system. CCU is yet not included as a sustainable activity.

GS informs that new methane infrastructure is not compatible with net-zero. Existing pipelines converted to hydrogen or CO2 transport will qualify. Taxonomy lacks a definition of what a "transition activity" means and what the timeline would be. However, it is technology neutral, which means that if higher thresholds for emissions will be allowed in short run, but operations in the longer terms will need to decrease emissions dramatically. He believes the remaining unresolved issues will be addressed by member states.

GS informs that there is no mentioning in the report that CCU is a mitigation activity, although it is listed in the ADD 5478/20. CCS is listed as a mitigation activity, not as an economic activity. CCS may apply to all economic activities; therefore, it is always compliant with taxonomy. For CCU, no standards for mitigations have been set. CCU will need to show that mitigation has occurred. It is not clear how mitigation will be calculated. He notes that the Taxonomy will have big implications on many other pieces of legislation around the EGD.

7. GCCSI Annual Report

ET presents the latest report on CCS by Global CCS institute. The Global CCS Institute has released the 2019 Global Status of CCS report, a publication that highlights and elaborates on the main changes in the global CCS scene. 2019 was an important year for CCS, gaining new momentum in Europe and consolidating its status across the world. The report provides detailed information on, and analyses of, the global CCS facility pipeline, policy, CO_2 storage and the legal and regulatory environment. In addition, four regional updates and a CCS Technology section further demonstrate global development and the versatility of CCS across a variety of applications and industry sectors.

Over the past year the global development and deployment of CCS continued to gather pace. In 2019, the number of large-scale CCS facilities increased to 51. Of these 19 are operating, four are under construction, 10 are in advanced development using a dedicated front-end engineering design (FEED) approach and 18 are in early development.

8. AOB

The next meeting: 30 June 2020.

ZEP Advisory Council 62
18 March 2020

Agenda item 7.b.
Network Technology update

The NWT held a face-to-face meeting on 5 March. The network discussed the progress of ongoing reports such as the report on CO2 Transport and the draft ToR for a report on Climate Positive Solutions/Negative Emissions. Additionally, the Network gave input on CCUS R&I priorities for Horizon Europe.

The notes of the meeting are attached as pre-read 7.b.i.

TWG Transport

The TWG on CO2 transport is working on a report on CO2 transport. The co-chairs have assembled a group of experts and a list of topics ranging from technical to legal issues, business models and existing case studies. The message of the report is that CO2 transport is possible and already operational in Europe. Therefore, the time has come for European scale-up, which needs to happen urgently.

There is recognition of the substantial cross-border transportation potential, especially to create economies of scale. It is essential to communicate the topic of CO2 transport in the right way, addressing the concerns of public society.

The NWT agreed to produce an executive summary to accompany the report. The summary would be a short document emphasising key takeaways and messages, while the report would be more extensive.

The slides are annexed as pre-read 7.b.ii.

TWG DAC and Negative Emissions

Following the decision of the 61st Advisory Council meeting, the NWT has established a TWG on Negative Emissions, chaired by NWT Chair Arthur Heberle. The TWG held phone calls to discuss draft Terms of Reference for the report and the scope of the work.

At the last NWT meeting, it was noted that the topic of carbon dioxide removal (CDR) is becoming increasingly relevant at the European level and ZEP has the opportunity to provide input to the European Commission on existing CDR technologies.

Based on an initial ToR, the TWG will start to work on a first document addressing basic definitions, showcasing different CDR technologies and CDR options with their scope, timeline, TRL. Such report would be completed by end of May, to be approved in the June AC meeting.

A second, a more extensive report with more detail about CDR technologies will be completed after the summer. The final report would be ready for presentation at the December ZEP AC meeting.

Key questions presented in the ToR and key outputs are the following:

- What are the potential technologies for generating of negative CO2 emissions?
- What are the technologies based on natural and on engineered processes?
- What are the technologies which remove CO2 only and the technologies which are multi-use ones (addition heat/power, chemical production)?
- What technologies will be selected for a detailed analysis by using defined criteria?
- What is the current TRL/maturity?
- What is today's scale?
- What is the timeline for large-scale deployment?
- Do the technologies store CO2 permanently?
- What are the potentials and resources consumption in terms of land use, energy availability etc.?
- What is the specific energy consumption, costs, land use etc. per ton removed CO2?
- What are the potential positive and negative side-effects due to technology deployment (environmental impacts, social/public, political acceptance)?
- What are the potentials and indications to reduce energy consumption, costs and other negative side-effects?

Key outputs are to indicate:

- when negative CO2 emissions can be generated at large-scale size first time with the minimum possible costs and energy consumption;
- what is the status of the current technologies.

CCUS R&I Priorities

ZEP has provided input on CCUS R&I priorities for DG RTD for the design of Horizon Europe. The input was supported the European Energy Research Alliance (EERA) and

received remarks from the CCUS SET-plan IMPACTS9 consortium. The document also refers to the Mission Innovation CCUS Challenge Priority Research Directions Report[1] and Report of the Mission Innovation Carbon Capture, Utilization and Storage Experts' Workshop of June 2019.

The final document gives an overview on the socio-economic background and the policy developments of the European Green Deal. It describes the role of CCS and CCU for the industrial transition and highlight how both technologies can pay a role in reaching net-zero by 2050. The focus of the document is CCUS R&I priorities, which have been clustered under capture, storage, transport, research and non-technological aspects (legal barriers, business model).

The document is included under agenda item 2 (Secretariat Update).

TWG CCU and Sink Factor Methodology

The work of TWG on CCU and Sink Factor Methodology has recently resumed with the aim to present some slides for discussion and comments at the March AC meeting. The input received from the AC will feed into the report and it will be further discussed at a physical meeting on 2 April. The TWG aims to deliver a report by April 2020.

Slides for discussions are annexed as pre-read 7.b.iii.

NWT to work on smart sector integration

As part of the Industrial Strategy, the European Commission has announced a new strategy for smart sector integration, expected in June 2020. The European Commission is, therefore, seeking advice on the potential role of CCS/CCU in a new smart integration strategy.

The European Commission will be launching a consultation in April to collect feedback on the design on a new European strategy for smart sector integration. The NWPE agreed to feed into the process and to highlight how CCS and CCU can play a role in this matter.

[1] http://mission-innovation.net/wp-content/uploads/2018/09/Accelerating-Breakthrough-Innovation-in-Carbon-Capture-Utilization-and-Storage-_0.pdf

ZEP Advisory Council 62
18 March 2020

Pre-read 7.b.i.
Draft Minutes NWT meeting

Attendance

Filip Neele	TNO	
Jean Xavier Morin	Co2-H2	
Owain Tucker	Shell	
Charlie Garner	CCSA	
Keith Whiriskey	Bellona	
Thomas Le Guénan	BRGM	
Per-Olof Granstrom	ZEP	
Mark Preston	Bellona	
Giorgia Bozzini	ZEP	
Mahgerefteh, Haroun	UCL	Phone
Roland Span	Uni Bochum	Phone
Kristin Jordal	Sintef	Phone
Jørild Svalestuen	Gassnova	Phone
Graeme Sweeney	ZEP Chair	Phone

1. Intro (agenda adopted, minutes)

POG gives safety instructions, informs that co-chair Arthur Heberle is not able to attend and asks to adopt the agenda. The agenda is adopted.

2. Updates from ZEP secretariat and Chair

POG shares developments from the ZEP secretariat, highlighting the conference in January and feedback from the NWPE and Government Group meetings.

GS gives updates on the sustainable taxonomy, mentioning that the European Climate Law makes a reference to the sustainable taxonomy. Negative emissions are included in the taxonomy, namely DAC is included whereas BECCS is not. The main reason behind it is the unclarity around the LCA. He encourages ZEP to take a view on negative emissions and look carefully at waste-to-energy. He reminds that CCS is a climate mitigation activity under the taxonomy and informs that the taxonomy will be governed

by a body called 'Platform'. When talking about negative emissions, he suggests looking carefully at offsets to other sectors.

GS gives feedback from earlier meeting with DG ENER and informs that TEN-E guidelines will be revised. He encourages the NWT to take a view on that.

GS gives feedback from SCG meeting. He mentions that ZEP was invited by DG RTD to provide input and feedback on CCUS R&I priorities for Horizon Europe, mentions that member states were reluctant to engage and encouraged NTW to give input and views on R&I priorities.

GS mentions the matter of leakage and risk of storage. He believes that external stakeholders might raise criticism in the future on previous ZEP's work on risk of storage. Bellona reports that they had talks with Transport & Environment, and it seems that some groups are prepared to re-open the discussion on storage and leakage risks. **GS** suggests being prepared to respond and as NWT.

GS also reflects on the issue of long-term, short-term LCAs, which is being looked at by the taxonomy. However, he notes that the discussion is rather limited around the longevity of LCAs and suggests this might be a topic for R&I priorities. The timeline for 2050 is very relevant now that the European climate law has been approved.

POG highlights the political agenda timeline for 2020. He shares feedback from NWPE meeting, highlighting the priorities identified by the network and asking for further input. He gives feedback from the discussion around the Innovation Fund and informs that ZEP has provided input.

OS highlights issue of state-aid when it comes to IF.

3. TWG Transport

The co-chairs of the TWG Transport, **RS, HM** and **FN,** gave a presentation of the progress of the report. Several aspects around CO2 transport are being looked at and the key message to convey is that CO2 transport is feasible and already operational in Europe, although some challenges remain.

There is recognition of the substantial cross-border transportation potential, especially to create economies of scale. It is essential to communicate the topic of CO2 transport in the right way, addressing the concerns of public society.

It is agreed that an executive summary will accompany the report. The summary would emphasize key takeaways, while the report would look into additional challenges and provide more information.

4. TWG Negative Emissions

The objective of this TWG is to produce a report that highlights the status of technology, looking at technological options, LCAs, costs, maturity.

KJ informs that Sintef is starting a similar piece of work. She suggests producing a short report by June 2020 and to add a longer report later on. **KW** agrees and highlights that the report should aim to provide basic definitions on negative emissions. It is key to highlight the role of CO2 transport and storage for negative emissions. Offsetting is another issue to address.

FN concludes that a first, a brief (10 pages) report that explains carbon Dioxide Removal (CDR) provides definitions and gives a brief description of options should be finalized end of May, to be approved in the June AC meeting. A Second, a more extensive report with more detail about CDR technologies can then be completed after the summer. A call within the group will be held.

5. CCUS R&I priorities for Horizon Europe

POG gives feedback from meetings with DG RTD on Horizon Europe and invites the NWT to share their further thoughts on the updated document on R&I priorities. A discussion follows, around CO2 storage, CO2 transport infrastructure, industry, CCS and CCU research, and the R&I priorities for CCUS are updated.

TWG CCU and Sink Factor Methodology and Sink factor.
Some slides will be presented at the next AC meeting, with the intention to meet at the beginning of April to discuss comments and feedback. The goal is to present a draft report at the next ACEC call in April.

6. AOB

The NWT is encouraged to have a position around smart sector integration ahead of the upcoming consultation, possibly providing concrete examples and business models for industries.

The next meeting will take place on 25 June 2020.

FN asks to approve the minutes from previous meeting. The minutes are approved.

FN thanks the participants and closes the meeting.

ZEP Advisory Council 62
18 March 2020

Pre-read 7.b.ii.
Slides – TWG CO2 Transport

Zero Emissions Platform
Rue de la Science 14b, 1040 Brussels, Belgium
www.zeroemissionsplatform.eu

ZEP Network Technology

5th March 2020

ZEP Bruxelles Office

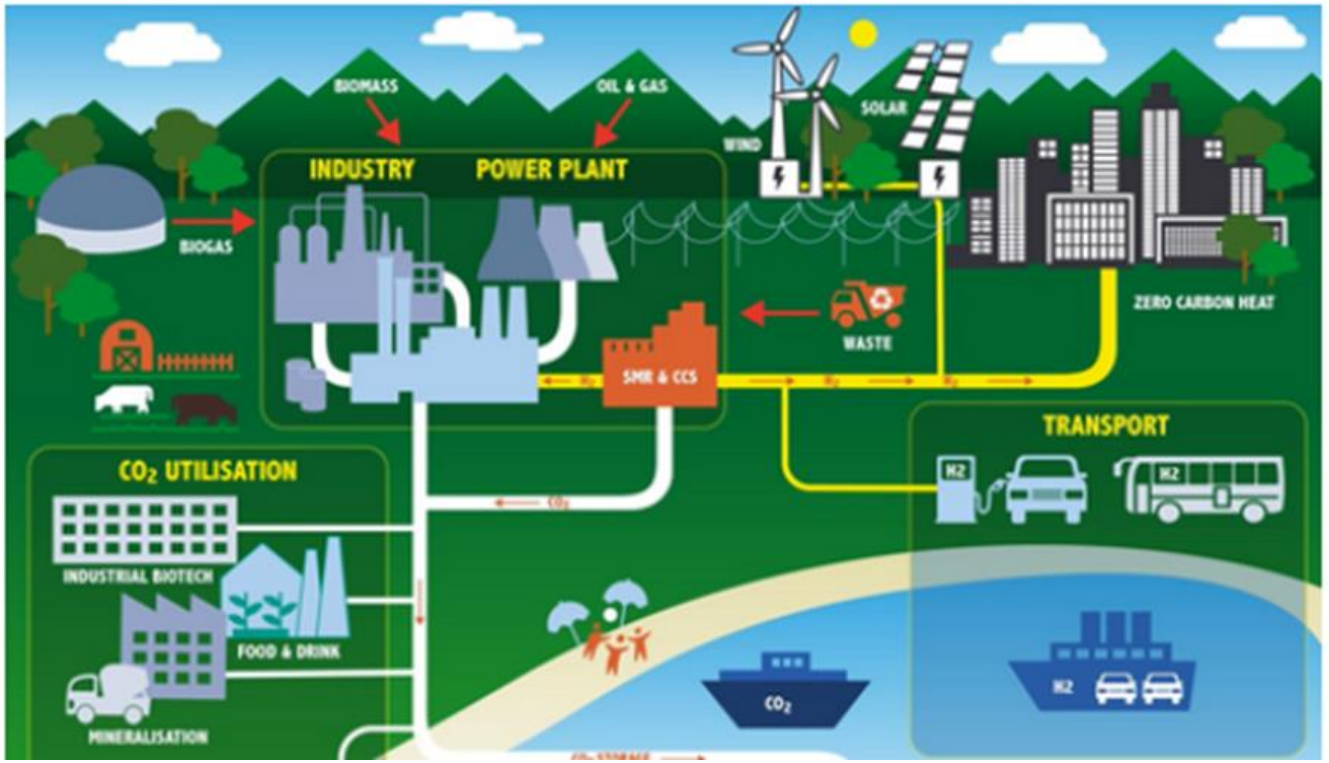
TWG Transport

A trans-European CO_2 Transport Infrastructure for CCUS: Opportunities & Challenges

Chairs
Prof Roland Span:Ruhr-Universität Bochum (Germany)
Prof Haroun Mahgerefteh: University College London (UK)
Facilitator
Dr Filip Neele: TNO (NL)

Zep
Zero emissions platform

Carbon Capture, Utilisation and Storage (CCUS) clusters involve the capture of CO_2 from a variety of energy intensive industrial emission sources, followed by its storage and utilisation *using a shared CO_2 transportation infrastructure*. **Overall, it is estimated that CCUS could provide up to 37% of the total CO_2 abatement potential by 2050[1].**



1.https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/819648/ccus-business-models-consultation.pdf. [Online]

Despite its importance, as of 2019, there are only a few CCUS facilities operating in Europe[2] ; examples are Sleipner & Snohvit (Norway; Natural Gas Processing), Port Jerome (France: Hydrogen production) and OCAP (CO2 from industrial sources delivered to greenhouses).

To meet the European Commission's net zero emission target, CO_2 capture capacity needs to increase by between 200 to 400 fold by 2050 [(3)].

2. Global CCS Institute database, CO2RE. CCS facility data. [Online] https://co2re.co/FacilityData.
3. The potential for CCS and CCU in Europe. [Online] https://ec.europa.eu/info/sites/info/files/iogp_-_report_-_ccs_ccu.pdf.

Zep Zero emissions platform

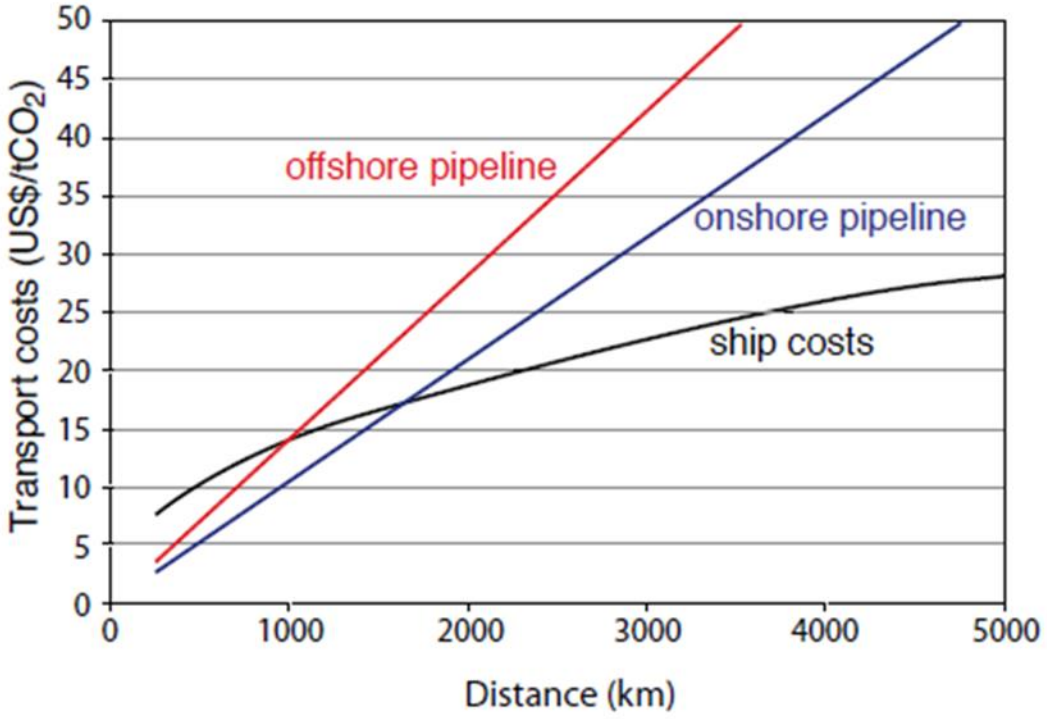
Potential Industrial CCUS clusters in Europe

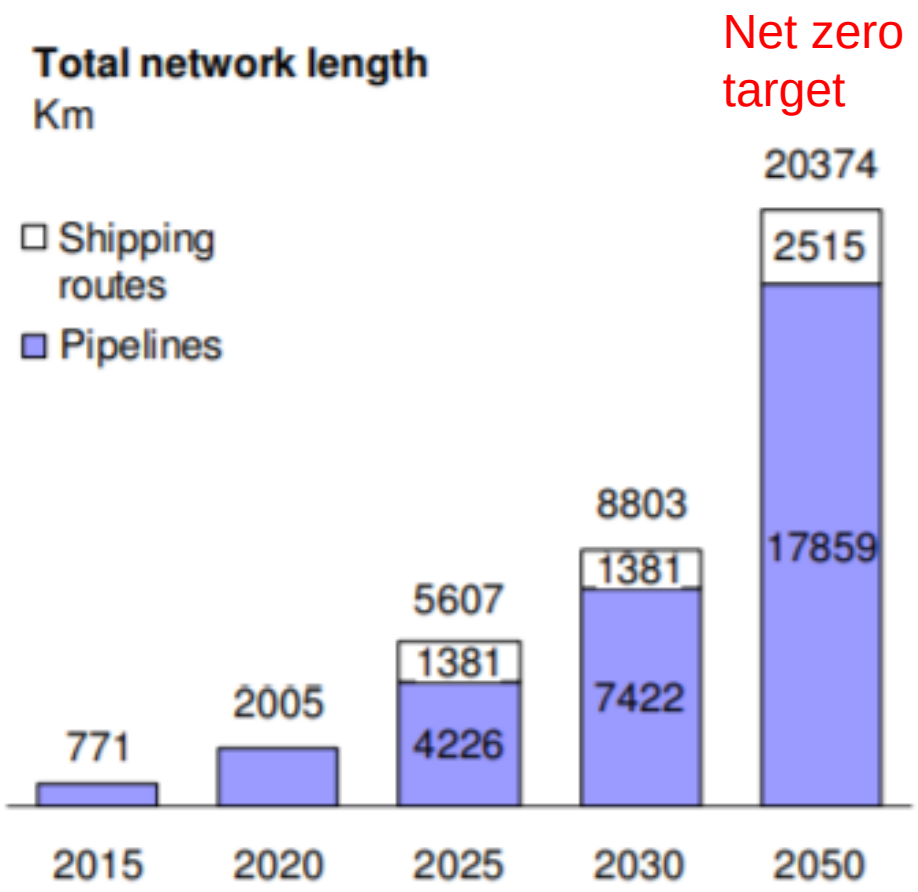
Industrial cluster/region	CO_2 emitted (Mtpa)
Antwerp (BE)	18
Skagerrak/Kattegat (North Sea)	14
North Sea Port (BE)	16
Marseille (FR)	35.5
Le Havre (FR)	14.5
Firth of Forth (UK)	7.6
Yorkshire (UK)	60
Teesside (UK)	3.1
Grangemouth (UK)	4.3
Rotterdam (NL)	17.5
Humberside (UK)	12.4
North Rhine-Westphalia (GER)	30
Oltenia Region (ROM)	30
Ervia Cork (IE)	4.9

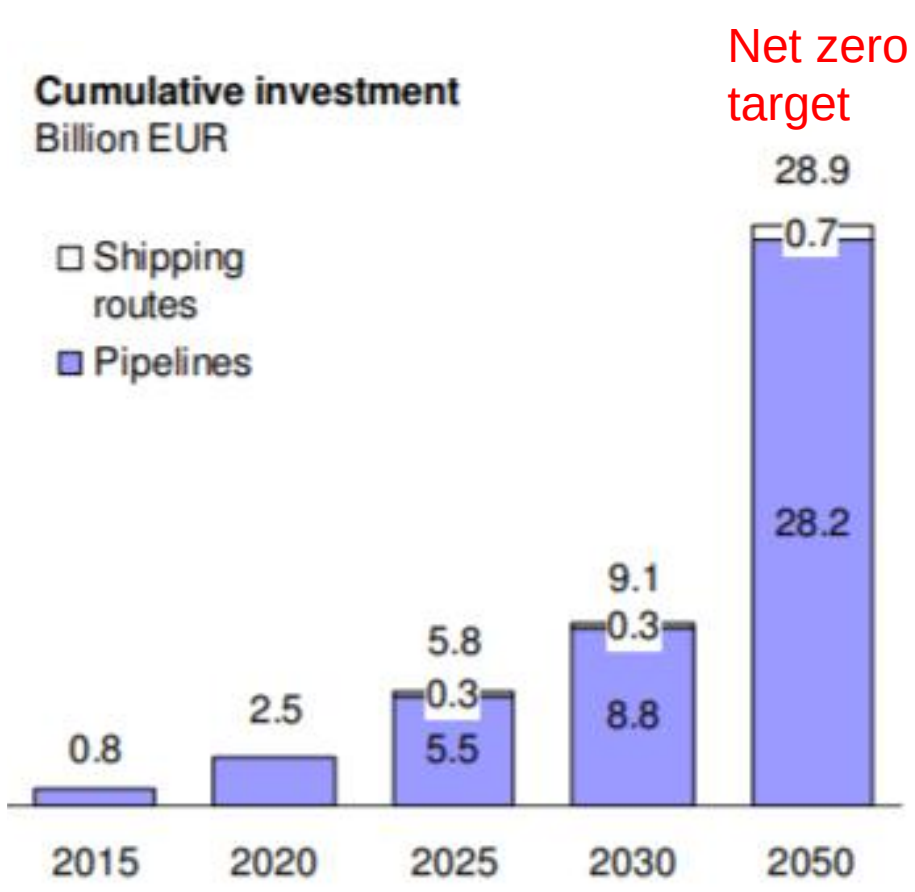
Endrava. *Potential for CCS in Europe: Report for the Norwegian Oil and Gas Association.* [Online] 2018. https://www.globalccsinstitute.com/resources/publications-reports-research/bioenergy-andcarbon-capture-and-storage/ .

Zep Zero emissions platform

The large-scale deployment of CCUS clusters in Europe will require the development of appropriate infrastructure capable of transporting hundreds of millions of tonnes of captured CO_2. **The most practical solution involves shared high-pressure pipeline networks, although on occasions, the use of ship transportation, such as that for the Northern Lights CCS project in Norway may also be considered.**



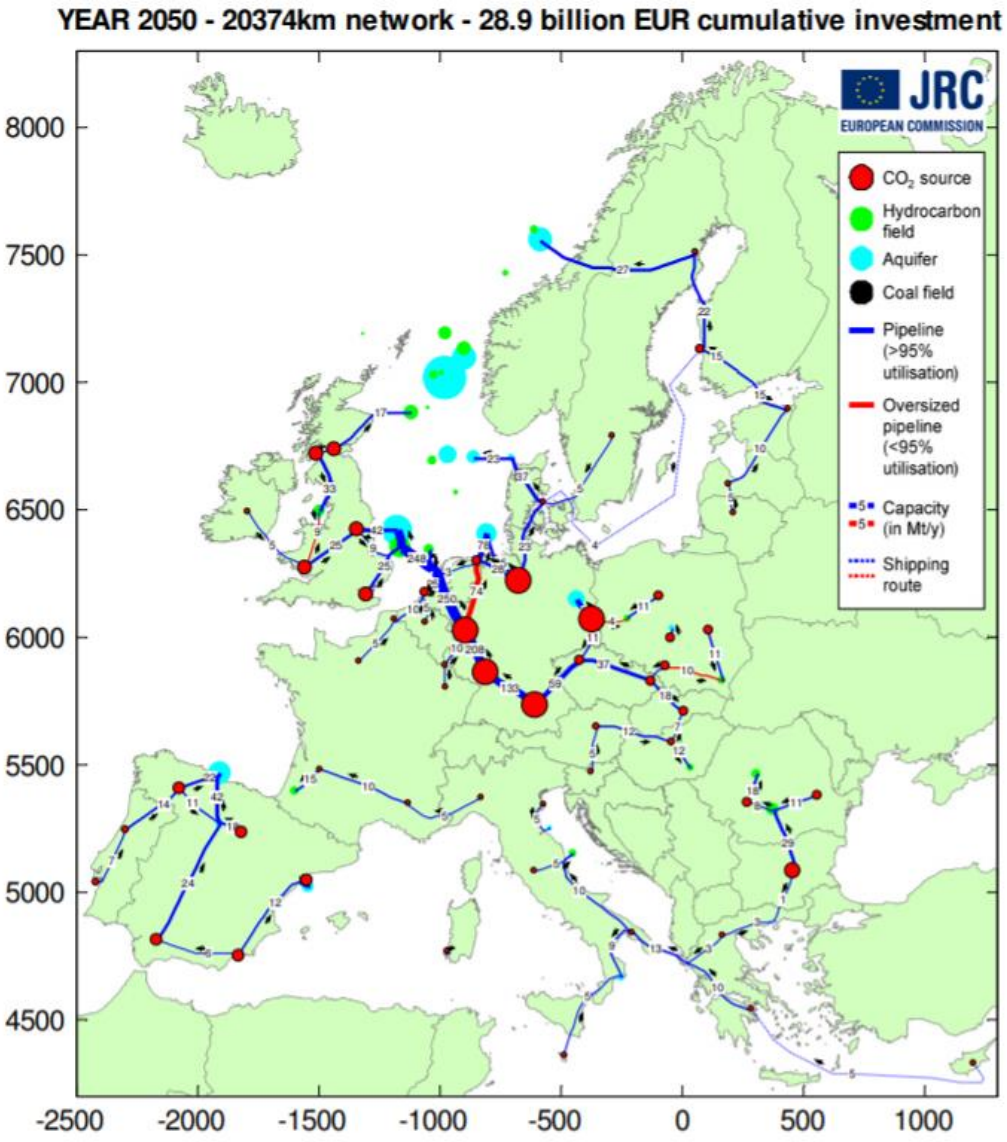




Zep Zero emissions platform

4. CO2 network Joint Research Centre. [Online] http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/15100/1/ldna24565enn.pdf.

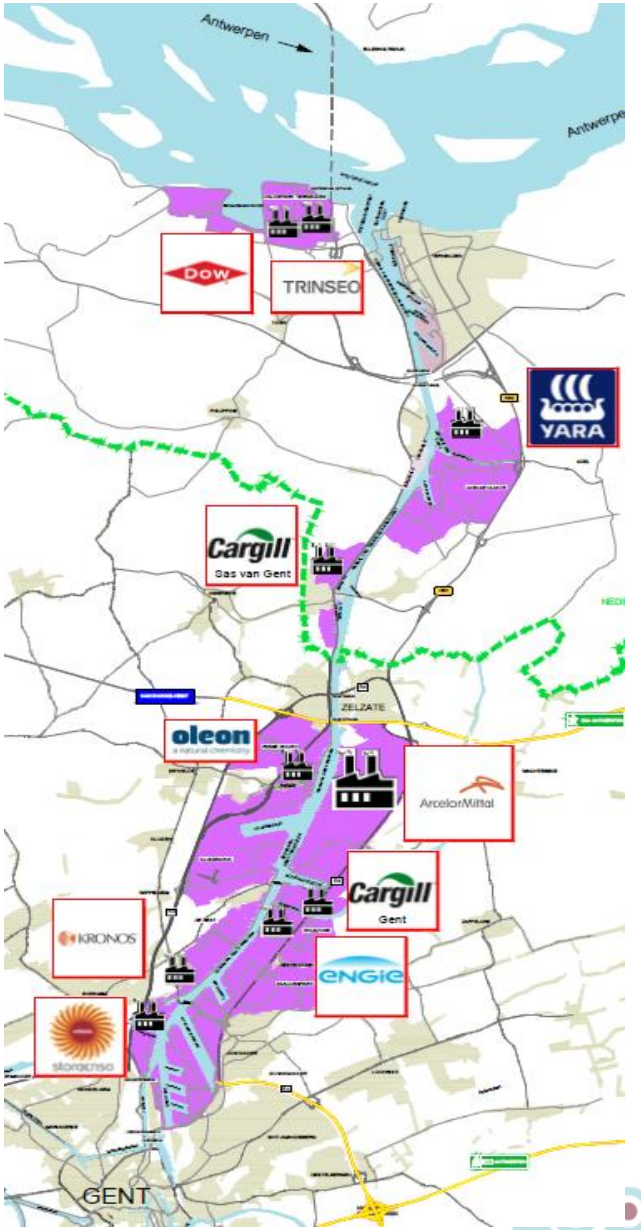
By 2030, 16 EU Member States may be involved in cross-border CO_2 transport. International coordination is therefore crucial for the development of an optimised trans-European CO_2 transport network.



➢ The Challenge

CCUS clusters, involving the use of a common pipeline network transportation infrastructure offer significant opportunities due to economies of scale.

Given the enormous amounts of CO_2 transported in such pipelines (typically several thousand tonnes), their safe and economic operation is of paramount importance.



Zero emissions platform

Pipeline transportation of CO_2 is a well-established technology. However, most of this experience is:

- primarily restricted to low population density areas
- mostly confined to single source to single sink scenarios

CCUS cluster pipeline-networks are significantly more complex presenting a new set of challenges. Such networks take CO_2 from a myriad of sources, which are characterised by varying flow rates, process conditions and compositions.

These flows are blended and delivered to one or more, potentially quite different sinks. CO_2 impurities that may be tolerated in the pipeline, may not necessarily be acceptable during storage even if present in relatively small proportions given their long-term cumulative effects.

Zep Zero emissions platform

Catch 22!

Clearly without viable plans for CO_2 pipeline transportation networks, CCUS industrial clusters will not materialise in Europe.

Investors are unwilling to invest in capture plant where there is an uncertainty regarding the availability of transport and storage infrastructure; and, conversely, infrastructure investors are unwilling to invest without the certainty that capture plants will emerge.

Zep Zero emissions platform

➢ Aims and Objectives

This TWG will report the opportunities and challenges that must be overcome to enable a safe and cost effective trans-European CO_2 Transport Infrastructure for CCUS.

Onshore, high-pressure CO2 pipelines may require different regulations in some Member States. The report also considers the harmonisation of such regulations to enable cross border projects.

The A Team

Name	Affiliation	Area of Expertise
Anders Martin Moe	WOODPLC	ship transport
Arne Dugstad	IFE	corrosion
Clement Merat	Total	
Daniel Benrath	RUB	legal issues
Edward Jukes	Krohne	flow measurement
Emrah Durusut	Element Energy	business models
Filip Neele	TNO	best practise examples
Frank Grunert	Krohne	flow measurement
Gearoid FitzGerald	ERVIA	
Giorgia Bozzini	ZEP	coordination of activities
Haroun Mahgerefteh	UCL	intermittent supply, CO2 quality
Jader Furtado	Air Liquide	
Jane Holder	UCL	legal issues
Julian Barnett	National Grid	intermittent supply, existing grid
Michael Drescher	EQUINOR	best practise examples
Petter Nekså	SINTEF	ship transport
Roland Span	RUB	thermophysical peoperties
Sidonie Ruban	Air Liquide	
Solomon Brown	U. of Sheffield	truck and rail transport
Svend T. Munkejord	SINTEF	flow assurance, pipeline integrity

➢ 9 Topics

List of Topics

1. Technical & operational (4 - 5 pages)

(**Haroun Mahgerefteh**, Solomon Brown, Julian Barnet, Roland Span, Edward Jukes, Arne Dugstad, Nilay Shah?)

1.1. Transient flow modelling in multisource CO2 pipeline networks (Haroun)

1.2. Optimal pipeline network design (Nilay, Haroun(Julian))

1.3. CO2 purity and quality techno-economic assessment, (Haroun, Arne, (Julian))

1.4. Flow metering & Online CO_2 quality monitoring (Edward (flow metering), Arne (CO_2 composition measurement challenges)

1.5. Thermophysical properties for design, approval, and accounting (Roland)

1.6. Required resilience and flexibility in networks to deal with (Solomon, Nilay, Haroun (Julian))

i. CO_2 supply intermittency and system upsets whilst ensuring safe and economic operation of the pipeline network and the storage site
ii. additional CO2 emitters joining the cluster

Zep Zero emissions platform

2. Injection of CO2 into highly depleted gas fields & aquifers (1-1.5 page)

(**Filip Neele**, Haroun Mahgerefteh, Julian Barnet, Svend Munkejord)

Filip to prepare a short scope under this heading and delegate.

3. Pipeline network safety (3 pages)

(**Roland Span**, Julian Barnet, Arne Dugstad, Svend Munkejord, Haroun Mahgerefteh)

I. emergency isolation & valve spacing (Haroun (Julian), blowdown (Svend) & operational risks due to solid formation (Roland)
II. pipeline corrosion (Arne)
III. fracture propagation (Svend (Julian))

4. Business models (1 page)

(**Emrah Durusut**)

5. CO2 Marine transportation (1 page)

(**Roland Span**, Petter Neska, Anders Marton Moe)

6. The viability for the use of existing stock of natural gas pipelines for CO2 transportation (1 page)

(**Julian Barnet** , Haroun Mahgerefteh)

7. Legal, regulatory (1 - 1.5 pages)

(Daniel Benrath Roland Spa) ,

I. London Protocol (Daniel)
II. differences in regulations between Member States during cross border CO_2 pipeline transport
III. coordination mechanism (Daniel)

8. Case studies: examples of designs of operational systems and of system designs (1.5 - 2 pages)

(Filip Neele)

I. Snohvit: one-on-one pipeline, high-pressure aquifer
II. Northern Lights: ships and pipeline
III. NorthSeaPorts / Porthos
IV. ACORN
V. ERVIA: long offshore pipeline to depleted field at very low pressure (*ERVIA*)
VI. Germany: ECRIA

9. Stranded emitters: Onshore transport, truck and rail (1.5 pages)

(**Solomon Brown**, Emrah, Julian)

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Pre-read 7.b.iii.
Slides – TWG CCU and Sink Factor Methodology

Zero Emissions Platform
Rue de la Science 14b, 1040 Brussels, Belgium
www.zeroemissionsplatform.eu

CCUS comparison

Simplification of the assessment

European Zero Emissions Technology and Innovation Platform

Recommendations from ZEP report 2017

ZEP 2017 Recommendation	Status 2020
EU & Member States' climate policy must be linked to European commitments for climate change mitigation.	EU ETS innovation fund is based on avoided emissions
Climate solutions must be merited also on the pressure they place on resource use that could be more efficiently spent in other sectors.	Supply of renewable energy to carbon mitigation projects might (or will?) become the bottleneck.
Climate measures should be assessed on the role they will be able to play in bringing our economy to net zero emissions and beyond in the longer term.	
Providing EU industry with access to shared infrastructure networks for CO2 transport and large-scale storage is a no-regrets option.	With expected increasing targets for 2030 reductions in industry (EU ETS) this will become even more important in very short term.
The EU, it's Member States and not least Europe's key industrial regions themselves need to act now to turn real, large-scale climate ambition in industry from being a risk into being an opportunity for investors and industry.	Yes…. Are the conditions changed so that risks have changed in opportunities for industry?

What is the issue?

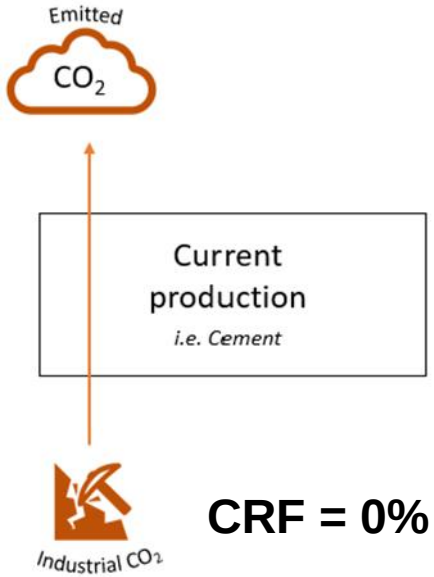
It is not <u>one</u> issue. We have 4.

Issue	**KPIs**	
What is the mitigation effect of any CCUS methodology / project on climate change?	1.	Effect of CO_2 abated on climate change = Carbon Reduction Factor (= improved ISF (ZEP, 2017))
How much energy is needed?	2.	The net energy need for the abatement.
How to account for emissions from biomass and negative emissions in general?	3.	The Green House Gas emissions from the net energy need.
When ?	4.	The implementation period.

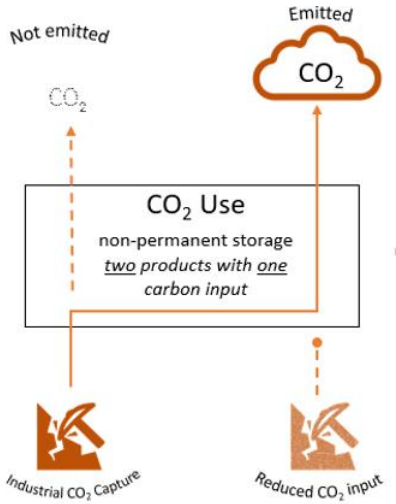
KPI 1 = Carbon Reduction Factor (updated from 2017)

CRF 0%	= Process has no emissions reduction
CRF 50%	= Process has a maximum potential to half CO2 emissions
CRF 100%	= Process has a maximum potential to be carbon neutral
CRF 200%	= Process has a potential to be carbon negative, removing CO2 from the atmosphere

KPI 1 – examples Carbon Reduction Factor



CRF = 0%



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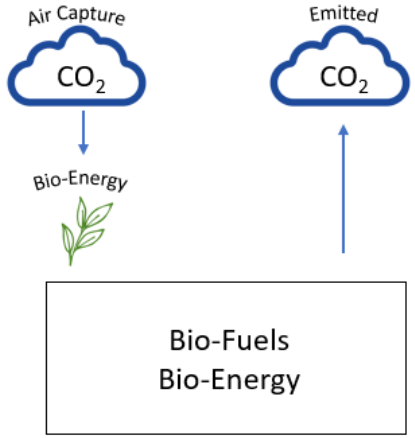
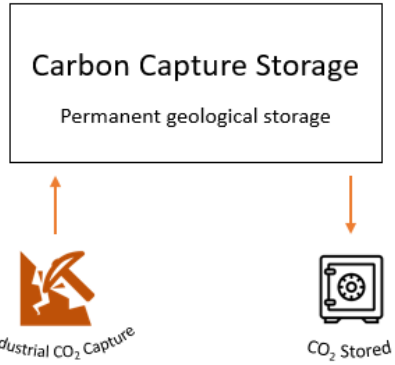
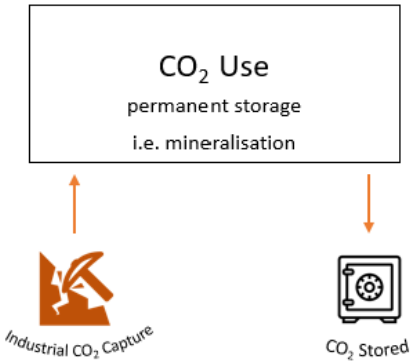


CRF = 100%



CRF = 100%



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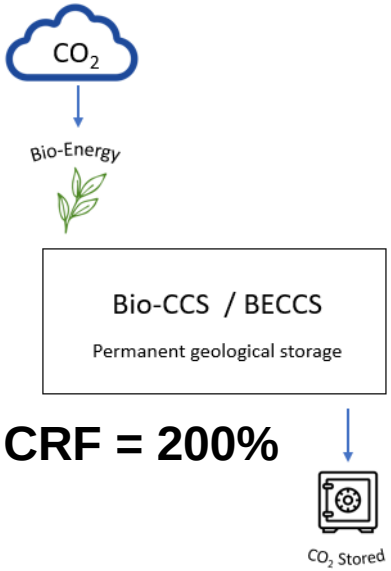

CRF = 200%

KPI 2 = Net energy need

Application of CCU and CCS technologies will need normally additional energy, especially electrical energy. But some of the sources of Green House Gas can contribute with part of the energy needed.

The net energy need should be part of the assessment of CCU and CCS technologies. For the net energy demand a factor will be needed to express the net energy needed for the production process including capture and utilisation/storage. That net energy demand is to be calculated on basis of the process without further use of the Green House Gas.

$E_{process}$ = net energy need for the process (MWhr/ton $G_{EU\ ETS}$)
E_{total} = net energy need for process, capture and use/storage (MWhr/ton $G_{EU\ ETS}$)
EF_{CCUS} = Energy Factor (%)

$$EF_{CCUS} = \frac{E_{total}}{E_{process}}$$

KPI 3 = Green House Gas emissions from net energy demand

Obvious

KPI 4 = Implementation period

The idea is to have four time implementation periods:

A. Before 2030
B. Period 2030 – 2040
C. Period 2040 – 2050
D. After 2050

ZEP Advisory Council 62
18 March 2020

Agenda item 8: External Relation Group

Appended to this paper are the following pre-reads:

8.a. ERG Update

8.a. ERG Update

ZEP Advisory Council 62
18 March 2020

Agenda item 8.a.
External Relation Group update

Feedback from ERG calls

Since the last Advisory Council, the ERG held two calls. The first call focused on the developments and the organisation of ZEP's conference at the European Parliament, as well as regular updates from the Chair and ERG members. European taxonomy, the Innovation Fund and workplan for the year were also discussed in relation to open consultations and COP26.

During the second call, the ERG discussed among other things the conclusions from the SET-Plan SCG meeting, some updates regarding the European Taxonomy, takeaways from January's engagement plan, and the IOGP coalition campaign.

The outcomes of these discussions are reflected hereafter in the update.

ZEP Conference

On 28 January, the Zero Emissions Platform organised a conference on "How European CO2 Transport and Storage infrastructure can enable an innovative industrial transition" at the European Parliament.

The conference was hosted by Tom Berendsen MEP (EPP, NL) and Jens Geier MEP (S&D, DE).

Some takeaways from the event, photos and slides were published on the ZEP website.

ZEP engagement plan

The ZEP secretariat is running an extensive engagement plan for 2020 with relevant European institutional stakeholders. At the end of January 2020 a first series of meetings with EU officials was held, aiming to meet with new important officials, promote the visibility of CCS, to urge policymakers and relevant stakeholders that the deployment of large-scale CCS facilities is essential for net-zero GHG emissions by 2050, and to

reiterate the message about the urgency of cross-border, European CO2 transport and storage infrastructure.

The meetings were attended by the ZEP Chairman and the ZEP secretariat. ZEP met with:

- Titas Aneskevicius, Antti Valle, Resource Efficiency and Raw Materials Unit in the European Commission, DG GROW
- Stefano Grassi, Head of Cabinet of Commissioner for Energy, Kadri Simson, DG ENER, and Kitti Nyitrai
- Christian Holzleitner, Head of Unit, Land Use and Finance for Innovation, DG CLIMA
- Jan Huitema, Member of the European Parliament for Renew Europe / the Netherlands, Member of the ENVI Committee
- Hélène Chraye and Vassilios Kougionas, Head of Unit and Policy Officer, Clean Energy Transition, DG RTD

ZEP published a press release on the European Climate Law

ZEP reiterated its support for the European Union's commitment to climate neutrality by 2050. ZEP highlighted that carbon capture and storage (CCS) and carbon capture and utilisation (CCU) technologies play a crucial role. CCS technologies are ready for large-scale deployment, which is urgently needed to achieve the target of net-zero GHG emissions by 2050. Read the full press release.

The press release was also published on the website and Twitter.

ZEP spoke at event "Delivering on Net-Zero: Supporting Industrial Decarbonisation with CCS"

ZEP spoke at the event "Delivering on Net-Zero: Supporting Industrial Decarbonisation with CCS", hosted by the UK Mission to the EU and the Global CCS Institute. ZEP was invited to set the scene by giving an update of the policy developments connected to the European Green Deal.

Among other things, ZEP highlighted the positive momentum for CCS and CCU in Europe. ZEP emphasised that the European Green Deal and the Sustainable Taxonomy have changed everything, and that there is a great need for a European CO2 transport and storage infrastructure in order to enable a just, industrial decarbonisation pathway. CO2 transport and storage infrastructure is key to to kick-start a clean hydrogen economy.

Other speakers touched upon the following points:

- CCS as a service for small-scale emitters;
- The role of financial markets to support sustainable investments;
- The developments in the UK around hydrogen, CCUS in industrial clusters and new opportunities for storage;
- Opportunities for industry to attract low-carbon investments.

ZEP's applications for the EU Sustainable Energy Week

One of ZEP's applications to host a session at the EU Sustainable Energy Week in June has been successful. The application was originally submitted in partnership with the GCCSI and focused on industrial decarbonisation.

As a result of the selection process, ZEP has been paired with ET Europe for the organisation of a joint session, whose agenda will be submitted to the European Commission in April 2020.

ZEP's involvement in CCS/CCU campaign of IOGP

ZEP has attended meetings, organised by the IOGP, where a CCS/CCU campaign coalition has been discussed. IOGPs objective has been to gather stakeholders for joint action to advocate for the support for CCS and CCU, in terms of policy, funding and acceptance. A physical meeting with stakeholders was held in February, where the format of cooperation for the coalition and a proposed joint letter regarding the Industrial Strategy to send to the European Commission was discussed.

As a prerequisite to participate in the joint letter, ZEP requested that ZEP's current views regarding the support for the European Union's commitment to climate neutrality by 2050 would be taken into account in the letter and that the group of signees would be diverse and broad. Since these prerequisites could not be fulfilled and not reflected in the letter, ZEP could not be part of the signees but will continue to cooperate with the group.

Notes from the meeting with DG GROW, 27 January 2020

Present: Antti Valle and Titas Anuskevicius (both policy officers within Resource Efficiency and Raw Materials at DG Grow), Graham Sweeney and Per-Olof Granström (the meeting was originally set up with Peter Handley, who could not attend).

Background a reason for the meeting

The reason for the meeting was the EU Industrial strategy that will be presented on 10 March and the role of CCS/CCU. The aim was to discuss what to expect from the upcoming Industrial Strategy – especially what we can expect regarding the following legislative processes, what ZEP should do and where we can be of help. We are planning for a bigger session on the Industrial Strategy at the ZEP AC62 and would like to invite Peter Handley to give the introductory presentation.

Some takeaways from the meeting

After an introduction and discussion Antti gave a background to the upcoming Industrial Strategy, mentioning the EC/consultancy report "Masterplan for a Competitive Transformation of EU Energy-intensive Industries Enabling a Climate-neutral, Circular Economy by 2050".

ZEP asked how ZEP, EERA and the CCUS SET-plan can assist DG GROW.

During the discussion the following was mentioned:

- That the barriers for CCS are now more about the political economy than on the technical side and that it is now about the journey to the market. The framework must incentivise investment.
- That DG ENER is reviewing all the reference scenarios from the Clean planet for all. And that CCS is essential in the scenarios reaching net-zero. Time is running out, therefore we will need negative emissions, Direct Air Capture, where storage will be a priority, and Bio-CCS, which will be much more complicated depending on the 70-year carbon cycle.
- That clean hydrogen will be crucial for the industrial transition, that steam methane reformers with CCS will be needed to guarantee large volumes early and that gas pipelines already can manage as much as 20% hydrogen today. For steel processes early clean hydrogen will matter. It will be crucial with CO2 transport from Germany to the Netherlands and Athos and Porthos for storage. Here Antti Valle highlighted that for the EC it will be important to secure both green and blue hydrogen in the EGD and the Industrial Strategy.
- That European CO2 infrastructure will be crucial for the Industrial transition and that there is a need to look at the policy actions on EU level. Private/public partnerships are important and there is a need for different use of the existing

funds available. This is something we are currently discussing with both DG CLIMA on the Innovation Fund and ENER on the TEN-E regulation/CEF. Regarding the TEN-E regulation, there should be an initial regulation on the CO2 infrastructure, securing open common access, regulated asset base and a tariff, to give a good basis for investment in Industrial capture. For the Innovation fund it is crucial that also transport and storage are included.

- Competition is crucial; thus the border tax adjustment mechanism will be needed.
- Hydrogen will be important both for industrial and domestic use. As an example, the difference in cost for converting from gas to electricity would be ten times the cost per household for the use of hydrogen.
- Regarding the Sustainable Taxonomy, Titas highlights that the decisions regarding several issues will be deferred to the Platform. There are several ongoing, not least regarding negative emissions.

Regarding how ZEP could help, Antti highlights the infrastructure and the ongoing pilot project between Germany and the Netherlands. It is important to see concrete action. He highlights that it would be great for the EC to get a better picture of what the European CO2 infrastructure would look like.

Notes from the meeting with DG CLIMA, 28 January 2020

Present: Christian Holzleitner and Maria Velkova, Graeme Sweeney and Per-Olof Granström.

Background a reason for the meeting

The key issue for discussion is the Innovation Fund and the eligibility of CCS projects for funding - not only for the capture part, but also for the CO2 transport and storage infrastructure. The aim of the meeting was to have a clarification on how the different parts of the CCS value chain can apply, and if there is further information ahead of the upcoming expert workshops on Technical issues (5-6 February) and Finance (beginning April).

Some takeaways from the meeting

After an introduction, explaining the challenges that project promotors and experts within the CCS community can see regarding the possibility to be eligible for the Innovation Fund, the worries regarding the counter party risk and the risk that transport and storage would not be eligible, there was a short, more general discussion about how to reach net-zero by 2050. Here, the possibility to regulate the CO2 infrastructure in order to secure a good basis for investment in carbon capture, was highlighted, noting that an initial phase with open common access, regulated asset base and clear tariffs, just like for methane pipelines, would be beneficial.

Specifically, on the Innovation Fund, this was highlighted:

- ZEP highlighted the need to also focus on transport and storage in the Innovation Fund was highlighted. The example from Canada with capture of 1 MtCO2/y and CO2 transport through a 300 miles pipeline shows that it can be done. Transport can have a core role in the Innovation Fund.
- DG CLIMA highlighted that the focus is on capture, but transport and storage are also included. In order to be eligible, there must be real mitigation, the whole value chine must be included. This can be done by applying together (i.e. the whole value chain) or that capture applies and has a contract ensuring the other parts, transport and storage.
- First, with the whole value change involved, there is no change from the NER300. There is an apparent counterparty risk. This will make things too difficult: capture, transport and storage need to be separated. It needs to be set up in a different way. For CCU there would be a need to also include a contract for the renewable energy.
- Graeme highlighted the possibility to find a solution where a capture project could refer to the storage as co-dependent. That capture would only have to refer to

storage and vice versa, thus if both would have positive outcome for their application, both would be seen as avoiding emissions – real mitigation. This way we would avoid the counterparty risk. Christian seemed to think that this was possibility.

- There was also a discussion regarding clean hydrogen, where SMRs with CCS would be the only possibility to add larger volumes early. For the Innovation Fund it would quite complicated. There would be a need to have several contracts in order to comply with the eligibility: for the furnace, the hydrogen and the storage of CO2.
- There is a need for a clear vision where the Innovation Fund can be the most beneficial. This should come out of the long-term modelling.

For the application process, there will first be a competition between projects within the different sectors and then as a second step, between the sectors. ZEP highlighted that there could be a separate sector for storage.

There was also a short information exchange regarding the Sustainable Taxonomy and the role of CCS. Here it was highlighted that fundamental development of the gas networks will not be considered green by the Taxonomy, while CO2 and hydrogen pipelines will. The general need for LCAs was also highlighted, since everything has a carbon footprint, even for example wind and hydro power. Incentives for carbon removal!

Referring to what ZEP can do to help, the following was highlighted:

- To give feedback on what needs to be clarified or adjusted, in general and from the two workshops on technical and financial issues.
- Since the EC are not able to further describe what would be eligible and not for applicants, ZEP can describe how we see it, with a focus on CCS projects.
- ZEP can initiate a bigger meeting with DG CLIMA/the Innovation Fund team, including projects promotors and experts to present and discuss challenges with the proposed methodology.

Notes from the meeting with MEP Huitema (NED, Renew Europe)

Present: Jan Huitema and Dorien Vandebroek (policy adviser), Graeme Sweeney and Per-Olof Granström.

Background a reason for the meeting

This was a first meeting. The general aim was to connect, introduce ZEP, see how we can be of help and to find ways of cooperating.

Jan Huitema MEP (NED, Renew Europe) is a member of the ENVI Committee. He has proposed amendments to EP's report on the Long-Term Strategy, which elaborated that the "feasibility" issue of CCS is related to large-scale deployment. During the EP hearing of Timmermans,

- he stressed that innovation would be crucial in this transition;
- he stated that old European legislation may prevent the emergence of innovation, and called for more margin to experiment;
- he also asked if the Commissioner-designate had any taboos on innovation, for instance in the field of nuclear energy.

Some takeaways from the meeting

After an introduction, descriptions of ZEP, the CCUS SET-plan work and the need for CCUS and clean hydrogen in order to reach net-zero by 2050, the most important takeaways were the following:

- Jan highlighted the moral hazard and the strong pressure to focus only on electricity. Here the lack of renewable electricity was mentioned, highlighting results from the ZEP previous modelling work, including wind power covering all usable land up to the arctic circle and the problems and high cost for transmission to the European markets.
- He also mentioned that for steel for example there are no other options than CCS but that in the Netherlands this is not a reality until there is real CO2 storage capacity.
- Jan also mentioned the CCS money in the recovery funds and how this instead led to plants closing down early.
- Jan highlighted that he receives mixed signals regarding the decarbonisation, CCS and the residual CO2 from the European Commission and DG CLIMA.
- It was highlighted that the Netherlands is "all about pipelines" with the question on how we could stimulate the demand side. Here also the cross-border connection with Germany and other nearby countries was mentioned. The

possibility to develop CO2 transport infrastructure by helping DG ENER to find good basis for regulating cross-border transport was also discussed. The upcoming review of the TEN-E regulation could open up for an addition of common, third party access, adding the infrastructure to the regulated asset base and initial regulation of tariffs.

- There was also an information exchange regarding how the Sustainable Taxonomy will tackle the CCS, CCU and gas.
- The European Commission reference scenarios on pathways to 2050, where only two scenarios reach net-zero, both with carbon capture, was highlighted. To also remove the last 20 percent of emissions will make it much more difficult. ZEP will do more modelling work regarding the pathway to 2050 and the SET-plan CCUS targets will be reviewed in relation to the new political ambition. Here it was also said that we do not have time enough, so we also need carbon removal technologies.

Regarding how ZEP can be of help, three things were mentioned:

- to show the need for CCS using modelling/scenarios,
- to help in the communication with the European Commission, and
- to clarify how the decarbonisation will be done: which sectors will do what.

Notes from the meeting with Cabinet of Commissioner Kadri Simson, DG ENER, 28 January 2020

Present: Stefano Grassi, Head of Cabinet, and Kitti Nyitrai, member of the Cabinet, Graeme Sweeney and Per-Olof Granström.

Background a reason for the meeting

The head of Cabinet to the Commissioner for DG ENER will play a crucial role for the development of the framework for and the deployment of CCS and CCU. This was a first meeting with the new Cabinet, Stefano is new to ZEP (and CCS). The general aim was to connect, introduce ZEP, give a general introduction on CCS and CCU and how these technologies could deliver on the European Green Deal targets for 2030 and 2050, and to see how ZEP could be of help.

Stefano Grassi is a Brussels veteran who has previous experience in energy diplomacy. He served as head of the cabinet for High Representative for Foreign Affairs and Security Policy Federica Mogherini. When Stefano started as the head of Cabinet, Kadri Simson stated that he is a Brussels veteran who will help her in grappling with EU decision-making and his previous experience will help in energy diplomacy.

Some takeaways from the meeting

After an introduction to ZEP, the governance structure, the members, objectives etc, there was a discussion regarding the impact of the European Green Deal and net-zero by 2050 on the long-term scenarios where among other things, this was mentioned:

- Only two of the European Commission scenarios to 2050 will reach net-zero, both include carbon capture. Here Stefano highlighted that net-zero cannot happen without CCS.
- CCS, but not CCU, is included in the Sustainable Taxonomy.
- The carbon border tax adjustment mechanism will be crucial if we are going to get real economic activity on carbonisation in European industry.

The main focus area for the discussion with the DG ENER Cabinet was the Connect Europe Facility and the TEN-E regulation.

The fourth PCI list and the five cross-border CO2 transport projects were mentioned, as well as the crucial connection between Germany and the Netherlands regarding CO2 transport, CCS Leilac project and the depleted oil and gas fields licence by Acorn in the UK. Also an example from Canada, including CCS with a 300 miles pipeline 1 Mt CO2/y, was mentioned.

ZEP highlighted the need for investors in capture to know that the CO2 can be transported to storage. There is a risk of monopoly, why there is a need to open up for

real competition, thus, to regulate the infrastructure, at least to begin with. This is why there should be an addition in the TEN-E regulation:

- That it is crucial to have open and common (third party) access to the infrastructure.
- To regulate possibly for the first ten years, and then open up for private use.
- That the systems should be included in the regulated asset base and a common quality standard.
- There should also be a common tariff, at least in the introductory phase, in order to give security for investment.
- It is also crucial that the regulation will allow CO2 transport by other modalities than pipelines, for example ships.

Even if most of the decisions will be regional or national, the European Commission needs to embrace the CO2 networks – "a European CO2 transport and storage infrastructure".

ZEP also highlighted the importance of CO2 storage being a part of the DG CLIMA Innovation Fund. Strong political control is needed, offshore storage is crucial. And, it should not only be about technology, the innovation fund should also be about innovative business models and new ways of doing things.

The European Parliament own-initiative report on energy storage was also mentioned here.

Clean hydrogen was also discussed, and it was highlighted that CCS is the only possibility to get large volumes of clean hydrogen at scale fast. Here, the connection between the Netherlands – with methane reformers and CCS – and Norway, to where the CO2 would be transported for storage, was mentioned.

It was also mentioned that there is not time enough until 2050 to reach net-zero, why we will also need negative emissions. Here BECCS is difficult because of the long carbon turnaround of 70 years. Direct Air Capture will be needed for the very last part of mitigation, but we have to take into account that there is a moral hazard built in here.

Regarding where ZEP can be of help, there will be a consultation on the TEN-E regulation in March and ZEP will come back with a clear proposal regarding the need for further regulation on CO2 infrastructure.

Notes from the meeting with DG RTD, 29 January 2020

Present: Hélène Chraye and Vassilios Kougionas, Graeme Sweeney, Per-Olof Granström and Luke Warren

Background a reason for the meeting

- A general introduction, Hélène Chraye is new to ZEP. DG RTD is the home base for ZEP and the CCUS Set-plan.
- Two important issues referring to Horizon Europe – the Clean Energy Transition Partnership and the EC internal co-creation group on CCUS – to gain further information and discuss how ZEP best can give input and help.

Hélène Chraye is of 1 June 2019 is the Head of Unit for Clean Energy Transition within the Directorate Clean Planet (where Vassilios also works).
After a stay in the French Administration to build the Energy Observatory and then on State Aids to the industry, she joined the European Commission and worked successively on various domains of the European Transport policy: Inter-modality, Trans-European Networks, Single Sky, as well as dealing with enlargement and with Mediterranean area.

Some takeaways

After introduction, descriptions of ZEP and the need for CCUS and clean hydrogen in order to reach net-zero by 2050, the most important takeaways are the following:

- Chraye clarified that there will be a part for CCUS in the transition towards net-zero and CCUS is an enabler for hydrogen.
- Chraye referred to the discussions within the EC, highlighting that there is a competition going on between green and blue hydrogen. “The EC wants one single solution, but that is wrong.” (some examples were highlighted: only electric cars in California/hydrogen cars in Korea). Chraye highlighted that all costs should be internalised in the price for hydrogen and asked for input on clean hydrogen, in general and especially regarding volumes possible from blue hydrogen with CCS and green hydrogen. We cannot wait for the best/perfect solution.
- She also highlighted that the focus should be on supply rather than demand, “we need a supply intervention”.
- Chraye said that sector integration is too limited, it should look at all needed integration. There is too much energy lost in the conversions. It is all about the overall efficiency for the whole chain. She asked for help to increase the understanding that there will not be enough RES (adding up all the electricity needed leads to collapse).
- Chraye asked for input regarding expert evaluators and highlighted the need for gender balance.
- Chraye asked for input regrading R&I priorities regarding CCUS and hydrogen and highlighted that they will need an early draft as soon as possible.

- Talking about input, Chraye highlighted some criticism towards the European Energy Research Alliance (EERA) – they have to do their job, also saying that EERA should be turned into a thinktank. She also mentioned that the SET-plan work should be much more strategic than it is today.

Regarding where ZEP can be of help:

- To give input to the EC DG RTD, regarding CCUS R&I priorities.
- To give input regarding clean hydrogen, especially regarding volumes possible in the short term.