ZEP 68th Advisory Council meeting

22 September 2021, 10:00-13:00

Agenda Item 1: Introduction and welcome

1.a. Virtual meeting instructions

The ZEP AC68 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, 22 September). 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. AC68 meeting agenda

The agenda for the 68th meeting of the Advisory Council is appended as pre-read 1.b.

1.c. AC67 draft meeting minutes

The draft meeting minutes from the 67th meeting of the Advisory Council, which took place on 15 June 2021, are appended as pre-read 1.c.

1.d. ACEC July meeting minutes

The ACEC July meeting minutes are appended as pre-read 1.d.

1.e. ACEC August draft meeting minutes

The ACEC August draft meeting minutes are appended as pre-read 1.e.

ZEP 68th Advisory Council meeting

22 September 2021, 10:00-13:00 CET

Meeting agenda

Item		Lead Presenter	Time
1	**Introduction and welcome**	Graeme Sweeney	10:00-10:10
2	**ZEP development and planning** – *for information, recommendation and guidance* • End of the ZEP grant and planning for 2022	Per-Olof Granström	10:10-10:25
3	**Updates from Networks** – *for information and approval* • ZEP academic paper on low-carbon hydrogen in Europe	Co-chairs Filip Neele / Robert de Kler, TNO	10:25-11:00
4	**Updates from External Relations Group** – *for information and approval* • Upcoming events, COP26 preparations • ZEP CCS/CCU Facts & Information Toolkit – *for approval*	Co-chairs, ZEP Secretariat	11:00-11:15
5	**EU policy development and certificates for reductions and removals** – *for information* • Updates from the European Commission ▪ Fit for 55 – focus on EU ETS ▪ Innovation Fund ▪ EC work on CDR certificates • CCS+ Initiative	Maria Velkova / Timo Herberz, DG CLIMA Adrian Nicolae, DG CLIMA Fabien Ramos, DG CLIMA Matthias Krey, CCS+ Secretariat lead	11:15-12:00
6	**TEN-E regulation** – *for information* • Update ahead of the ITRE vote on TEN-E regulation • ZEP actions on TEN-E regulation	Willem van Laatum, Assistant to MEP Berendsen (TBC)	12:00-12:30
7	**CCUS development** – *for information* • Update on the CCUS Forum • Update from DG RTD	Chris Bolesta, DG ENER Vassilios Kougionas, DG RTD	12:30-12:50
8	**Closing remarks and next meeting**	Graeme Sweeney	12:50-13:00

1.c. AC67 draft meeting minutes

DRAFT MEETING MINUTES

ZEP 67th ADVISORY COUNCIL MEETING

15 June 2021, 10:00-13:00 CET

Virtual meeting

1. Introduction and welcome

Chair, **GS**, begins the meeting and reminds all of the meeting rules.

Chair invites the AC members to approve the AC67 meeting agenda, AC66 meeting minutes, ACEC April meeting minutes, and ACEC May draft meeting minutes. Minutes and actions recorded in the minutes, are all approved.

Chair welcomes new ZEP member Eni represented by Salvatore Giammetti.

Chair thanks Luke Warren for his extraordinary contributions to the Platform over the years.

Chair highlights the AC members' proxies for the meeting.

2. Horizon Europe work programme

Vassilios Kougionas, DG RTD European Commission, gives an update on the Horizon Europe work programme. The work programme is planned to be adopted today and published in one week, by 22 June. **VK** discusses the activities and topics that will be published. 'Information days' will be held on 5 and 6 July. On the work programme, CCUS will play a crucial role in Horizon Europe and the European Green Deal for energy-intensive industries.

Chair notes that the items addressed in **VK**'s update will be instrumental in agenda item 3.

Chris Bolesta, DG ENER European Commission, gives a general update from DG ENER. **CB** informs that the CCUS Forum is postponed until after the summer holidays. With additional time to propose a date, there is a possibility to update the programme. There are a number of CCS projects in national recovery plans and hopes that at a stage when the plans have been adopted, he can provide an overview of the projects.

NR asks about Mission Innovation and previous challenges and Clean Energy Ministerial CCUS topic. A short discussion follows.

3. ZEP development – preparing for 2022

POG presents the ZEP-C finances and outlook, the CSA call for proposals in the Horizon Europe work programme and the IWG9/ZEP guidance document, and the ZEP setup with two parallel work programmes.

On the call for proposals, he highlights the EC's interest in proposals leading to a combined IWG9/ZEP grant, and that the EC funding is halved – around €1 million – compared to current grants. The call deadline is set to 5 January, indicating a possible grant start not earlier than May 2022, which would result in a six-month funding gap between grants. On ZEP-C finances, **POG** highlights that €50,000 is included in the budget for November-December after the end of the ZEP grant and, that the financial reserves by the end of 2021 are expected to increase to €270,000 – due to increased membership income and lower expenditure. With a start of the new grant 1 May 2022, another €100,000 will be needed for January through April next year. He notes that the ZEP-C General Assembly will be held directly after this AC meeting and that the ZEP-C Board of Directors will be asked how the secretariat support will be provided during the funding gap – to hold a tender or continue with the current provider, CCSA.

On the new grant, **POG** highlights that ZEP will formalise the continuation of delivering on the grant objectives as well as above and beyond, in a IWG9/ZEP work programme and, in parallel, a ZEP own-work programme funded by ZEP members. To lead and coordinate the two work programmes, ZEP will continue to fund resources or re-introducing employment of staff. The own work programme will be presented together with the budget in December 2021. Based on the interest to expand ZEP membership, a value proposition for new members is also being developed, to be presented at the AC in September. He also presents the guidance document for potential grant applicants that has been prepared by the IWG9 Chairs and ZEP.

POG notes that the ACEC has endorsed the presented way forward, now up for approval and further guidance from the AC today.

AP asks how a single grant holder will handle the workload that beforehand was handled by a consortium. **POG** responds that the work going forward will be different from the current grants, that there is a wish from the EC and a possibility to efficiently coordinate the two work programmes and engage the stakeholders, and that the funding for the new grant will be halved compared to the current grants. It will be very difficult to ensure this with more than one entity and sharing the budget. **GS** adds that the scope of this grant is substantially less that the two grants than came before. In order to have best return on funding, we need a coordinated work programme dealing with both institutions. **AP** notes his doubts on the efficiency of handling both grants with a single grant holder, but thanks for the responses.

GS asks for AC to:

- Support and recommend the 2021 budget, in particular since the members will fund the services in November and December? **The AC supports and recommend the budget.**
- Approve the guidance document describing the proposed common IWG9 and ETIP ZEP work programme. **The AC approves the guidance document and supports the common programme and topic areas.**
- Endorse the direction of travel regarding a proposal in September and approval in December. **The AC endorses.**

4. Updates from Networks

CS provides an update from Network Policy & Economics, discussing work on TEN-E regulation revision, draft consultation responses on CO_2 PCIs and gas decarbonisation package, and draft position on revision of EU ETS Directive. CDR and hydrogen have also been discussed at the latest meeting, with ToRs drafted for AC endorsement.

GS asks AC for endorsement of:

- ZEP consultation response for hydrogen and gas market decarbonisation package
- ZEP consultation response on candidate PCIs CO_2 infrastructure
- ZEP previous responses and communication on EU Taxonomy
- The ToRs for the ZEP work on CDR and hydrogen.

The AC endorses.

FN updates from Network Technology, noting the next meeting is 1 July. Several working groups are ongoing. The group working on the Directive on geological storage of CO_2 focuses on knowledge sharing and advising newcomers to CO_2 storage by sharing best practices and experiences, as well as discussing improvements to the guidance documents. An update will be provided at AC68 in September. The group on CO_2 shipping will have its first meeting on 1 July and aim to focus on standards for CO_2 transport by ship. **FN** adds that ZEP is a liaison member of ISO/TC 265, which will be of use for CO2 shipping work.

AH updates on the working group on CCS for Clean Flexible Power Generation, holding a meeting on 17 June. The main topics to discuss are the role of CCS in sector integration, integration of heating, low-carbon hydrogen, what can be learned from examples outside of Europe, and the role of biomass and waste-to-energy.

RvdM provides an update on biomass report, which is being finalised and brought back to the AC for approval.

GS asks for AC approval of the ToR for the working group on CO_2 shipping – **The AC approves.**

5. Updates from the External Relations Group

LB updates, highlighting coordination with other stakeholders and cooperation and outreach on CCS topics, to ensure ZEP takes the forefront and can come out with joint positions. On EU Taxonomy, the pre-reads contains a document on ZEP's support of a complementary delegated act. The ZEP Conference planned for September coincide with AC68 meeting and to address some challenges. **LB** discusses the conference programme and challenges to highlight including CO_2 storage, CO_2 infrastructure, and a CCS strategy.

MK gives an overview of ZEP's communications and events activities in the past months and an update on planning looking ahead. Recent activities include updates to the ZEP CCS/CCU market-ready projects map, partner event at EU Green Week co-organised by ZEP and GCCSI, and a joint application for EUSEW 2021. Looking ahead, ZEP has been asked to organise and moderate a session at the CCUS Forum, ZEP is preparing an application to organise a side event at EU Pavilion at COP26, and work continuing on the CCS/CCU Facts & Information Toolkit.

GB highlights ZEP's engagement plan over the past months, noting focus areas of low-carbon hydrogen, CDR, TEN-E Regulation. Recent meetings held with DG CLIMA and Austrian Environment Agency on CDR.

GS raises the topic of coordination with other stakeholders, highlighting a recent letter from IOGP requesting ZEP to sign. Short timelines means it can be difficult for ZEP, and following extensive discussion with ERG, **GS** took the decision not to sign the letter as some matters did not align with ZEP's positions.

CS asks if a CCS strategy at EU level, could be something to consider at CCUS Forum. **CB** responds that it is a good idea and would encourage it. **GS** notes we will progress with this and have a substantial session on it at the conference.

The AC endorses the draft conference agenda.

6. IEA Net Zero by 2050 report

Samantha McCulloch, IEA, presents the recent Net Zero by 2050 report. 2020s decade is crucial to develop technologies and roll out. Need to scale up CCUS to more than 7.6 Gtpa abated by 2050.

NR asks about scale up from 40 MT to 7.6 GT and the role of CCS. What are the known and unknown technologies and is CCS seen as a mature technology? **SMC** replies that it is a significant scale up of CCUS and relative to other scenarios consistent with 1.5 degrees of 2050 pathway have not had as much reliance on CCUS. The scale up is symptomatic of the challenge of reaching a 2050 global net zero pathway. This scale up is of a similar magnitude for other technologies. We look at CCUS as separate technologies.

SS asks if they see specific sectors deploying more CCUS and is a specific growth of capture technologies required? **SMC** replies that for the sectors, we see a role in power generation and heavy industry but also low-carbon hydrogen, ammonia and direct air capture. By 2050, only 50% of CO_2 being captured is fossil-based. We see that for the most part there are technologies available that are mature but there is further work to be done to deploy these at scale.

SH asks how does the IEA model work to produce vast deployment of CCUS deployment? **SMC** replies: Primarily cost-optimised model but also taking into account energy security, deployment rates. Recognising global ambition to reach net zero by 2050. Would require policy action, not just carbon price.

LB asks when it comes to CCS and CCU, do you see value in separating the value chain as there is a difference in maturity and business case? **SMC** replies: In terms of a TRL discussion, certainly. In the context of modelling, we assume storage is available for the 95% of CO_2 that is captured (and not the 5% used for CCU).

CSo asks, investment in energy infrastructure, but what CCUS is included in this and how much? **SMC** replies: In general, we look at CO_2 transport and storage infrastructure. Needs to be early investment in transport and storage infrastructure.

Chair notes that it would be good to keep in contact regarding further questions.

7. The TEN-E Regulation revision

Liam McDonnell, from the office of MEP Seán Kelly, gives a brief update on the TEN-E Regulation negotiations in European Parliament. Slow progress on the file and political points on electrolysers, CCS and natural gas have not been agreed upon yet. Timetable was to have a vote in ITRE Committee in July, which seems to be delayed, possibly October/November. The Rapporteur has included storage, which was not the case for the Commission's proposal.

8. EU ETS Directive and Carbon Dioxide Removal

Fabien Ramos updates on DG CLIMA work on CDR certificates. Soon setting up an online form to submit views on CDR certification work. The Commission will for this autumn prepare a communication on carbon removals, carbon farming and certification of removal. There is a plan to hold a conference early 2022. **Christian Heller,** from the Austrian Environmental Agency, updates on carbon removal mechanisms work and project structure.

A short discussion with questions follows.

Maria Velkova gives an update on the Innovation Fund, highlighting the following: Right now finalising evaluations of the small-scale call. On the large-scall call, next week is the deadline for the 70 applicants invited to submit full proposals for the second stage with results expected at the end of 2021. The plan is to announce the second large-scale call end of October this year, with deadline end of February 2022. An Innovation Fund expert group meeting will be organised in July.

Questions and short discussion follow.

9. Low-carbon hydrogen

Gunhild Reigstad from SINTEF gives a presentation on the Hydrogen for Europe study. Questions regarding meeting 2030 targets and a short discussion follow. **GS** notes the upcoming Hydrogen Forum and the possibility to re-discuss the topic following this.

10. Closing remarks and next meeting

GS notes that the ZEP-C meeting takes place following AC67.

ACEC August meeting will take place at a later date, 24 August, to be communicated.

GS Thanks all speakers and participants and closes the meeting.

List of participants

ZEP AC representatives		
1	Vicente Cortes-Galeano	AICIA / University of Sevilla
2	Jonas Helseth	Bellona
3	Isabelle Czernichowski	BRGM
4	Shirley Oliveira	bp
5	Stijn Santen	EBN
6	Salvatore Giammetti	Eni
7	Lamberto Eldering ***(Proxy to Lucie Boost)***	Equinor
8	Robin Clowes	ExxonMobil

9	Constantin Sava	GeoEcoMar
10	Florence Delprat-Jannaud ***(Proxy to Paula Coussy)***	IFPEN
11	Kim Bye Bruun	Northern Lights JV DA
12	Stuart Haszeldine ***(Attending 11:00-13:00)***	SCCS
13	Syrie Crouch ***(Proxy to Christian Schwarck)***	Shell
14	Nils Røkke	SINTEF
15	Charles Soothill ***(Attending 12:00-13:00. Proxy to ZEP Chair 10:00-12:00)***	Sulzer
16	Ward Goldthorpe	Sustainable Decisions
17	Filip Neele	TNO
18	Stanislas van den Berg ***(Proxy to Frédéric Linsig)***	TotalEnergies
External speakers		
19	Christian Heller	Austrian Environmental Agency
19	Fabien Ramos	European Commission
20	Chris Bolesta	European Commission
21	Vassilios Kougionas	European Commission
22	Maria Velkova	European Commission
23	Liam McDonnell	Office of MEP Seán Kelly (EPP/IE)
24	Samantha McCulloch	IEA
25	Gunhild Reigstad	SINTEF
Guests		
26	Lea Chauvin	Air Liquide
27	Bernice Cruz	Air Liquide
28	Armin Guenther	Air Liquide
29	Frederik Pieters	BASF

30	Eric De Coninck	ArcelorMittal
31	Lina Strandvåg Nagell	Bellona Europa
32	Ceri Vincent	British Geological Survey
33	Paul Zakkour	Carbon Counts
34	Rob van der Meer	CEMBUREAU
35	Magnolia Tovar	Clean Air Task Force
36	Alessia Virone	Clean Air Task Force
37	Anastasios Perimenis	CO_2 Value Europe
38	Karl Smyth	Drax
39	Tom Mikunda	Dutch Ministry of Climate and Economics
40	Domien Vangenechten	E3G
41	Daniele D'Angelo	Eni
42	Roberto Ferrario	Eni
43	Maria Francesca Nociti	Eni
44	Brian Murphy	Ervia
45	Jan Steinkohl	European Commission
46	Antonella Sopranzetti	ExxonMobil
47	Paula Mazzucchelli	F Circe
48	Markus Sebastian Hole	Fortum
49	Ståle Aakenes	Gassnova
50	Anghel Sorin	GeoEcoMar
51	Angus Gillespie	Global CCS Institute
52	Eve Tamme	Global CCS Institute
53	Guloren Turan	Global CCS Institute
54	Marlene Arens	HeidelbergCement
55	Winston Beck	HeidelbergCement
56	Jan Theulen	HeidelbergCement
57	Caterina de Matteis	IOGP
58	Iskren Kirilov	IOGP

59	François-Régis Mouton	IOGP
60	Cedric de Meeûs	Lafarge Holcim
61	Arthur Heberle	Mitsubishi Power Europe
62	Stig Svenningsen	Norwegian Ministry Petroleum & Energy
63	Mark Driessen	Port of Rotterdam
64	Bram Sommer	Port of Rotterdam
65	Martijn van de Sande	Rijksdienst voor Ondernemend Nederland
66	Pietro Gimondo	RINA
67	Mehmet Onal	Shell
68	Kristin Jordal	SINTEF
69	Svante Söderholm	Swedish Energy Agency
70	Tim Peeters	Tata Steel Europe
71	Carl van der Horst	Tata Steel Europe
72	Anders Krag	Technical University of Denmark
73	Francis Poivre	Total
74	Hernan Silva	Total
ZEP Secretariat		
75	Per-Olof Granström	ZEP Secretariat
76	Giorgia Bozzini	ZEP Secretariat
77	Meghann Kissane	ZEP Secretariat
78	Luke Warren	CCSA
79	Chris Gent	CCSA
80	Dr Graeme Sweeney	Chairman of ZEP

1.d. ACEC July draft meeting minutes

ACEC July meeting

13 July 2021

9:00-11:00 CET

Draft meeting minutes

1. Introduction

Chair welcomes participants and declares quorum. Asks ACEC for approval of ACEC July meeting agenda – approved. Notes that the ACEC May meeting minutes were approved at AC67 meeting. The AC67 draft meeting minutes are appended by the ACEC and will also be approved at AC68. No matters arising from these meeting minutes.

2. ZEP development

POG gives an update on the ZEP development, noting that the guidance document and the basis for the work programmes is approved by the AC, that the 2021 ZEP-C budget is approved by the General Assembly, and that the ZEP-C Board of Directors have decided to continue with CCSA as service provider for the funding gap period. **POG** presents three items for guidance by the ACEC: (1) the special work programme for the funding gap period, to be presented for approval and recommendation by AC68 and for approval by the ZEP-C Board of Directors before the work starts in November; (2) the questions and how the interviews with the AC members will be conducted for the ZEP value proposition; and (3) items for the next ACEC strategic seminars, planned for beginning of September and end of November – focusing on how ZEP can engage in and impact the work on voluntary carbon market and Article 6 in the Paris agreement.

POG also suggests that **LSN / CSc**, the co-chairs of NWPE, take on the role of chairing the TWG P&F meetings and **LB** the role of chairing the informal Communications Group meetings.

Chair notes the three items to discuss and asks the ACEC for input and comments on the gap work programme. **CSc** suggests further detailing the working groups for the programme. Chair supports, notes no further comments and adds that ZEP-C will need to receive clear reports on the work progress.

Chair asks for comments regarding the proposed work on ZEP value proposition. He notes no further comments and mentions that further input can be given also directly after this meeting.

Chair moves to the ACEC strategic seminar meetings. **JH** supports the proposal on CCS+ Initiative and voluntary carbon market topics. **CSc** notes that other CDR platforms are emerging, and it could be beneficial to focus on more than one. **NR** suggests adding the topic of biodiversity and land use and CCS role in this for the strategic seminar. **POG** notes that criticism on this item is expected over the coming year and asks if **NR** has good documentation to share. **NR** has done some preparatory work to share and proposes to also ask NWT. Chair adds that its relevance and importance could accelerate during the year and asks how to find contributors to help produce something that will be impactful? Short discussion follows.

Chair proposes that NR shares the preparatory work, and following this, a call will be set up to discuss what expertise is needed, where it can be found, and to formulate a work programme.

For the next ACEC strategic seminar, voluntary carbon markets will be a topic.

3. AC68 & AC69 draft meeting agendas

The draft agendas for AC68 and AC69 are presented. COP26 is highlighted as important and included in both programmes. The ACEC are content with the presented agendas as the basis for the further planning of these meetings.

4. Updates from Networks

Chair updates on Innovation Fund expert group meeting and notes that the ACEC received further information separate to the ACEC meeting pre-reads. He highlights blended funding and the CEEAG consultation, that cost definitions should be aligned with those in the Innovation Fund.

GB updates on the Fit for 55 package to be presented on 14 July. It revises many legislations and proposes new ones. From ZEP's perspective, focusing on EU ETS Directives. CBAM will also be presented and will cover cement and steel sectors, both direct and indirect emissions. Also expecting revision of REDII directive, expecting the share of renewable energy sources to increase and a classification system for renewable gases to be presented. On the CEEAG consultation, this item will also be discussed at P&F group and ERG meetings and will be prepared for early August.

LSN asks for clarification regarding the outcome on CO_2 infrastructure and shipping, if it was regarding the EU ETS. **GB** confirms that it was the consultation on State Aid guidelines. **POG** clarifies regarding the EU ETS Directive, that the expectation is that the revised descriptions on CO2 transport infrastructure will be general, opening up for other modalities. A lot of work will now have to be put into the monitoring and reporting regulation for the specific modalities, ship, train, etc.

A short discussion follows on the EU ETS revision.

AH updates on Network Technology, highlighting the recent meeting on 1 July, where there were updates from the working groups on ongoing work. On CO2 shipping, this

new TWG will focus on EU policy such as EU ETS ad EU Taxonomy. There was also a presentation on ISO TC265 standardisation. New topics suggested for NWT work going forward included methane leakages and the potential capacity for CO_2 storage.

CSc notes the EU Commission will release methane a legislation in December, to establish Europe-wide reporting on methane emissions. Possibility for a discussion with DG ENER on reporting of methane and blue hydrogen. Also notes a CO_2 storage atlas – shared in the meeting chat.

Chair suggests setting up a working group to focus on methane. **AH** to discuss with **FN** and ZEP secretariat. Regarding CO_2 storage capacity, Chair suggest to first review the work done by IWG9 and other already available documentation.

5. Update from External Relations Group

MK updates on Communications Group and ERG activities, highlighting next meetings take place on 22 and 23 July, respectively. ZEP's communications and events will focus on TEN-E, COP26, and EUSEW. The ZEP conference, programme was also presented for ACEC input and comments.

POG updates on a recent ZEP meeting with DG ENER and presents, referring to the pre-reads, proposed ZEP input on CO_2 infrastructure, funding CCUS development, CCS strategy, and basis for the for CCUS Forum working groups and how ZEP can support lead. The aim is to discuss with the TWG P&F this week and prepare the input on CCS strategy and the CCUS Forum for discussion and approval by the ERG next Friday.

Chair confirms the proposed ZEP actions and the agreement to proceed.

6. Items from CCUS SET-Plan

The IWG9 will over the coming weeks circulate its proposed input to the annual SETIS monitoring and reporting exercise, including suggested 'exemplary CCUS projects' that address one or more targets and can showcase main successes of the IWG. Also the draft IWG9 'CCUS 2030 Roadmap' will be circulated for input and comments. The ACEC are asked to give input and comments.

7. Closing remarks

Chair notes the next ACEC meeting will take place on 24 August and AC68 on 22 September. Thanks all participants and closes the meeting.

List of participants

1	Dr Graeme Sweeney	ZEP Chair

2	Jonas Helseth	Bellona
3	Lina Strandvåg Nagell	Bellona
4	Arthur Heberle	Mitsubishi Power
5	Christian Schwarck	Shell
6	Nils Røkke *(Attended 9:00-10:00, proxy to Jonas Helseth for 10:00-11:00)*	SINTEF
7	Charles Soothill *(Attended 9:20-11:00, proxy to Chair for 9:00-9:20)*	Sulzer
8	Per-Olof Granström	ZEP
9	Giorgia Bozzini	ZEP
10	Meghann Kissane	ZEP

1.e. ACEC August draft meeting minutes

ACEC August meeting

24 August 2021

9:00-11:00 CET

Draft meeting minutes

1. Introduction

Chair, **LE**, welcomes all to the meeting and notes that he will chair the meeting on behalf of **GS** who sends his apologies as he cannot attend. Declares quorum and reminds all of the meeting instructions. Asks if there are additional items for the meeting agenda – agenda is approved. Asks if there are any amendments to be made to the ACEC July draft meeting minutes – minutes are approved.

2. ZEP development – work programme

POG gives an update regarding the ZEP work programme during the gap in grant funding. The draft work programme with the additions highlighted by the ACEC will be brought to AC68 in September for recommendation and then for approval to the ZEP-C Board of Directors. Regarding the provision of services during the gap in grant funding, the ZEP-C Board of Directors have decided to continue with the current service provider, CCSA. There will be an agreement between ZEP-C and CCSA on how to deal with the funding. **POG** also mentions that questionnaire/interviews with AC member, as a basis for a new value proposition, will be carried out during the autumn with the set of questions sent out well in advance. A short discussion followed.

3. Updates from Networks

LSN updates on Network Policy & Economics, highlighting the consultation response on CEEAG was submitted by ZEP. Some upcoming consultations will be on Taxonomy and Fit for 55. **CSc** highlights the importance of the EU ETS in the Fit for 55, which has been positive for CCS. **LSN** notes that the deadlines for Fit for 55 consultations have been pushed to October.

On Policy & Funding, **LSN** notes discussions on Fit for 55 and how it relates to CCS, which has been positive. Work continues on next steps for CDR and hydrogen. The main initiatives on hydrogen are planned for Q4 2021. The next P&F meeting is on 3

September and the next NWPE meeting in October. **CSc** notes the upcoming CCUS Forum, to which proposals were submitted.

GB updates further on Fit for 55, presented in July, a comprehensive revision of many legislations, aimed for 2030. After the presentation, there has not been much activity in EC or EP due to summer recess. The initiative most relevant for CCS is the EU ETS revision – positively includes all modalities for transport of CO2 and CCU when CO2 is stored in a manner intended to be permanent, both in line with ZEP's positions. ZEP is preparing a consultation response. **CSc** highlights what do we want to aim for with the consultation response – keep what is included or change proposal? **LE** agrees that we need to keep an eye on any developments.

POG updates on CDR, highlighting the questionnaire included in the pre-reads with draft ZEP's input, based on ZEP reports and positions, asks the ACEC for input and comments. **CSc** highlights that ZEP should also reply to question 14 in the questionnaire and argues that it will be crucial to have a single type of certificate. **LE** supports and a short discussion follows. **LE** reiterates that any further input can be submitted, and ZEP Secretariat can judge if it can be included based on consensus. **POG** notes that this item and CCS+ will be discussed at the upcoming ACEC strategic seminar.

Action: ZEP Secretariat to finalise input on CDR questionnaire in accordance with ACEC discussion. Follow-up discussion at next ACEC strategic seminar.

POG mentions ZEP's involvement in the Advisory Group (AG) of the CCS+ initiative, that the main role will be on compliance, and that the AG ToR has been revised given ZEP's input. **FN** highlights that TNO will be taking part in the AG as well. A short discussion follows, where the aim of the certificates is discussed as well as how to make these CCS+ certificates compatible with the certificates for carbon removals that the EC is working on.

MB discusses the consultation on social taxonomy. Aims for criteria for social products and services based on basic human rights. Approve accessibility of products and services and basic economic infrastructure. Very tight deadline, 26 August. ZEP secretariat will together with **MB** draft a short response based on ZEP positions. This will be discussed with ZEP Chair before submitting it.

Action: Draft a short response to the consultation on social taxonomy based on ZEP positions, to be discussed with ZEP Chair before submitted.

FN updates on Network Technology and working groups. The working group on CO2 shipping held a meeting on 23 August. Good discussions and the co-chairs set up a table of contents for the report. Attendance included various branches of CO2 shipping, such as regulatory, operational experience in ship transport, R&D. Planning to have a draft report ready by the end of the year, which aims to show the value of CO2 shipping, why it will become important, and the obstacles to large-scale transport by ship. Regarding the work in other working groups: There will be an update on the Carbon-neutral biomass report at AC68. Flexible power generation with CCS is ongoing, but

seeking further members to join the group. The working group on directive on geological storage of CO2 has prepared a report outline. Topic of inclusion of EOR in a report has been raised. **FN** suggests possibility for group members to submit short texts and decision can be made if it can be included. **POG** suggests a discussion with ACEC in November before the report is sent to the AC for approval in December. Short discussion follows.

POG discusses the recent "How green is blue hydrogen" study, very critical towards blue hydrogen and with assumptions that do not apply at all to the European situation. After discussion with the ZEP Research constituency and the NWT co-chairs, they have been asked to prepare a short and clear 'peer-reviewable' paper that can be sent to policymakers and made available on the ZEP website. **FN** proposes **RdK** from TNO with support from **NR** and **FN** to prepare the technical text based on a document outline from the ZEP secretariat. The ERG will oversee the overall document. Questions and discussion on the report follow and the ACEC is asked to share any input. All approve.

Action: Prepare 'peer-reviewable' paper on blue hydrogen.

4. Update from External Relations Group

MK gives an update on communications activities and events coming up in September and October. Upcoming important items include the ITRE vote on TEN-E in September, EUSEW, COP26, and the ZEP conference in September – ZEP is currently contacting and confirming speakers. ZEP will also have a session at the CCUS 2021 conference in October, organised by the CCSA. ZEP is also planning to publish an article ahead of the vote in the Parliament on the TEN-E regulation review.

5. AC68 & AC69 draft meeting agendas

LE invites the ACEC to give comments and/or input on the draft meeting agendas. **LE** notes that as AC69 takes place in December, this meeting could take place in person or be a hybrid meeting.

6. CCUS Forum

POG notes the draft CCUS Forum 11 October agenda available on EC website. ZEP has been asked to moderate a session at this Forum, but there is no further official information and no response yet regarding ZEP's input regarding the forum. He highlights that the CCUS Forum is a good opportunity to kickstart an EU CCUS strategy. **LE** discusses the possible for separate "side events" connected to the Forum.

7. Closing remarks

LE opens the floor for AOB. **NR** raises the topic of COP26 and who will attend from ZEP. Please send in if and when you plan to be engaged in COP26 and the ZEP secretariat will prepare a list to share with the ACEC.

LE reminds all of next meetings.

Action: ZEP Secretariat to prepare a brief overview of ZEP's planned activities at COP26 to send to ACEC.

List of participants

Lina Strandvåg Nagell	Bellona
Jonas Helseth *(Proxy to Lina Strandvåg Nagell for 9:00-9:45)*	Bellona
Lucie Boost	Equinor
Lamberto Eldering	Equinor
Christian Schwarck	Shell
Nils Røkke	SINTEF
Marie Bysveen	SINTEF
Charles Soothill	Sulzer
Filip Neele	TNO
Per-Olof Granström	ZEP Secretariat
Giorgia Bozzini	ZEP Secretariat
Meghann Kissane	ZEP Secretariat

Unable to attend

Dr Graeme Sweeney	ZEP Chair
Mark Driessen	Port of Rotterdam
Arthur Heberle	Mitsubishi Power

Agenda item 2: ZEP development and planning – *for information, recommendation and guidance*

2.a. Finance update per 31 August 2021 and outlook to 31 December 2021

Appended is the ZEP-Communications financial management report of 31 August 2021.

- Income: Referring to the ZEP-C budget that was endorsed by the AC67 and approved by the ZEP-C AGM in June 2021, three new members joined ZEP during the first half of 2021, adding €50,000 to the budgeted (€232,500) income for 2021.
- Expenditure: Due to Covid-19, the expenditure for January through August 2021 is lower than budgeted.
- There will be a gap in ZEP grant funding from 31 October 2021 – when the current grant ends – until the next grant starts, expected in May 2022. ZEP AC has anticipated this and built up financial reserves in ZEP-C. These funds amounted to approximately €190,000 at the end of 2020 and are expected to increase – due to increased membership and Covid-19 lockdown – to €270,000 by the end of 2021.

2.b. End of the ZEP grant and planning for 2022

Background

The ZEP grant will come to an end on 31 October this year and the IWG9 grant on 30 April next year. Call for proposals for the new combined ZEP/IWG9 grant is open, with a deadline on 5 January 2022. This new grant is expected to start in May 2022.

The basis for the application, the European Commission's (EC) Horizon Europe work programme 2021-22, was approved on 15 June. Chapter 8 on 'Climate, Energy and Mobility' contains the call for proposals 'Support to the activities of the ETIPs and technology areas of the SET Plan' (p.170):

- A single 'Coordination and Support Actions' call for proposals for all ETIPs and IWGs.

- Only one such project will be funded for CCUS, with an interest in proposals combining ETIP and IWG, resulting in a single grant ("… advancement towards more interconnected activities, both in terms of contents and implementation mechanisms").
- The grant funding is decreased to 'around €1M', while the budgets for the current grants are €1M for the ZEP grant and €1.1M for the IWG9 grant.

At the AC67 in June:

- The Advisory Council (AC) supported and recommended the 2021 ZEP-C budget – including the members' funding for the secretariat's activities in November and December after the current grant has ended. At the ZEP-C General Assembly in June, the budget was approved.
- The AC approved *the basis for* the two work programmes that will come into force when the new common IWG9 and ETIP ZEP grant starts, expected in May 2022 (the combined IWG9/ZEP work programme and the ZEP own work programme) and supports the way forward towards approval at AC69/AC70.
- The AC also approved the ZEP/IWG9 guidance document that is aimed at guiding potential applicants for the call for proposal for the common IWG9 and ETIP ZEP: 'HORIZON-CL5-2021-D3-02-15 – Support to the activities of the ETIPs and technology areas of the SET Plan'.

At their meeting on 29 June, the ZEP-C Board of Directors decided to continue with the current service provider, CCSA, during the gap in grant funding from 1 November 2021 until the start of the new grant, expected in May 2022.

An agreement on providing services will thus be set up between ZEP-C and CCSA ahead of 1 November 2021.

Work programme during the gap in grant funding

Given that the ZEP-C members will provide the funding, there is a need for a separate ZEP work programme for the period during the gap in grant funding from 1 November 2021 until the start of the new grant, expected on 1 May 2022. During the funding gap, the work will continue as usual based on the ZEP governance structure, with the addition of regular reporting on progress and budget updates to the ZEP-C Board of Directors.

Below is the proposed '2.c. Work Programme during the grant funding gap', for recommendation by the AC68, after which it will be presented for approval to the ZEP-C Board of Directors before the work starts on 1 November.

2.c. Work programme during the gap in grant funding

On an overarching level, ZEP foresees these focus areas during November 2021 – May 2022:

- Given the continued positive political momentum around CCUS and the new grant coming up, there is a need for strategic development – further strengthening ZEP's role for CCUS in the EU arena and serving as a basis to attract new members. There is also a need to further develop the engagement and dialogue with member states and with other stakeholders, forming strong alliances to support the development of CCUS. The ZEP ACEC will also continue the series of strategic seminars during the period between grants.
- The new EC Forum on CCUS that will start in October 2021 has the possibility to be very important for the development of CCUS in Europe. ZEP will be engaged in this work and would like to see a concrete annual CCUS workplan – with this Forum being the start of an EU CCUS strategy.
- ZEP will continue providing support and input to the CCUS SET-Plan (IWG9) activities – necessary to reach Europe's ambitious 2030 climate goals – and a high level of coordination with other European and global programmes. This will be coordinated in full when the new common grant starts, expected in May 2022. Further preparatory work, based on the described basis for the cooperation and the IWG9/ZEP guidance document, will be needed ahead of the new grant starting.
- As more and more CCUS projects are becoming market-ready, ZEP intends to intensify its support for these projects and monitor their development.

The work programme is a living document based on the EU (and member state) policy agenda. Delivering on the day-to-day work:

- Network Policy & Economics (NWPE): The Network remains the main point of contact for ZEP responses to consultations. TWG Policy & Funding has been reactivated to support the secretariat and the Network in preparing consultation responses and other input to the European Commission. Focus areas for the NWPE will be:
    - The 'Fit for 55 package' – revision of the 13 policy instruments – with a focus on the EU ETS, REDII, Innovation Fund, and the Carbon Border Adjustment Mechanism.
    - The ongoing revision of the TEN-E regulation, the PCIs and CEF funding.
    - The many ongoing hydrogen workstreams: European Clean Hydrogen Alliance, Hydrogen IPCEIs, the Hydrogen and Gas market decarbonisation package, and the complementary delegated act – implementing the EU Taxonomy.

  - The newly started EC work on CDR, aiming for a regulatory framework for CDR certification, and other linked workstreams e.g. the CCS+ Initiative.

- Network Technology (NWT): will continue its very active work programme, engaging experts from members and observers. Two TWGs will deliver reports for approval at AC69 in December:
  - TWG Biomass – describing and analysing when CO_2 emissions are to be seen as carbon-neutral, and
  - TWG CCS Directive – bringing forward recommendations for the guidance documents that are linked to the Directive for geological storage of CO_2, as well as guidance for European Governments that are new to CO_2 storage.

  In March 2022, two more TWGs are planning reports for AC approval:
  - TWG CCS in clean and flexible power generation, describing the challenge to the energy system of the increasing use of variable renewable energy sources and the key role CCS will play in this perspective.
  - TWG CO_2 transport by ship, the first step of the work: European guidelines – ensuring consistency between upcoming and planned EU projects, ports and shipping operators, and a map and scale of the European challenge – highlighting connections between industrial hubs and clusters, ports, and potential inland and continental routes.

  NWT will also be engaged on low-carbon hydrogen and CDR – following up from the reports finalised in December 2020 – and in delivering the CCUS 2030 Roadmap, in coordination with the CCUS SET-Plan. The Network will also look into Biodiversity and the impact of CCS.

- The External Relations Group (ERG): For the areas of specific interest for ZEP – highlighted above – the ERG will guide communications and outreach activities. Given the many ongoing EU policy initiatives and legislative processes, the initial focus of ZEP's communications for the end of 2021 and the beginning of 2022 will be on securing meetings with policymakers and giving necessary input to EU policy initiatives at the right time. In parallel, the ERG will guide the execution – on behalf of the AC – of the communications and dissemination activities connected to the ZEP reports; hosting events and webinars, and communicating through social media and the newsletter. The ZEP Communications Group will play an important role here, as a direct channel to the wider group of members for coordination and information exchange on messages and activities. ZEP will hold a co-organised event in the EU pavilion at COP26. Active presence of CCUS is crucial.

- With several countries preparing national strategies for CCUS and an increasing number of ongoing and planned CCUS projects across Europe, the ZEP

Government Group – where the interest from member states and permanent representations is growing – will be crucial in the coordination between EU and national strategies, policies, and funding opportunities.

2.d. Strategic seminars in light of the new ZEP grant

The ZEP grant will end in October 2021 and a new combined ZEP/IWG9 grant is expected to start during Q2 2022. In light of this, the ACEC holds strategic seminars to discuss how to further develop ZEP, with a focus on support to stakeholders, a value proposition for new members, and increasing impact.

The following topics have so far been on the agenda for these seminars: preparations for 2022 and the new grant, CDRs, the CCS+ Initiative, business models for CO_2 transport, and strengthening the industrial base in ZEP. To have a good basis for strengthening the industrial base in ZEP and increasing the value and impact, during October and November, ZEP members and observers will be contacted for input.

Budget management: Expenditure against 2021 budget

Forecast

186 871	**Starting point 2021 (= Left over budget 2020)**

Activity	*Contractor*	*Budget 2021*	*Comments*	*To date Spent*	*Comments*	*To Date Committed*	*Comments*	*2021 Total Spend*	*Comments Relative to budget*
Administration / Auditing	Adams accountants / Vandelanotte	€ 8 000		€ 1 706				€ 8 000	
Website maintenance	Karakas	€ 1 000		€ 0				€ 1 000	
Legal advice	Lawsquare	€ 4 000		€ 0				€ 4 000	
Chair	Ardnacraggan Energy Services	€ 67 992		€ 69 078				€ 67 992	
Contingency		€ 4 000		**€ 1 632**				€ 4 000	
Communications and events		€ 85 000		€ 18 214				€ 85 000	
Funding for 2021 + Strategic work		€ 62 500						€ 62 500	
Total		**€ 232 492**		**€ 90 630**		**€ 0**		**€ 232 492**	**Total budget spent 2021**

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

Spent + Committed € 90 630
Remaining total budget € 141 862

Cash management of ZEP Communications VZW / ASBL

Category	**Source**	Issued invoices	Comments	Pending invoices	Comments	Received payments	Comments		
2021 contributions	O&G			€ 120 000	BP, Shell, Equinor, Total	€ 66 300	ExxonMobil, ENI	€ 186 300	
	OEM							€ 0	
	Others (confirmed)			€ 102 500	HC, Gassnova, Port of Rotterdam, EBN, Fortum, Oslo Varme, Northern Lights			€ 102 500	
	Others (Potential)								
General	VAT return	€ 3 660	VAT declar 2021/08	€ 336	Invoices 2021 to be rec.	€ 3 764	REIMBURS Q01/2021		
Total outstanding / pending ZEP-C		**€ 3 660**		**€ 222 836**				**€ 288 800**	**Total forecasted income 2021**

Cash situation (of 8 June 2021)

Current account (KBC - Business compact rekening)			**€ 200 925**
Savings account (KBC - Spaarrekening)			€ 101
Actual cash at bank and in hand			**€ 201 026**

243 179,00	**Forecasted Left over budget 2021**

Expenditure situation

Source		*Outstanding invoices*	*Comments*	*Pending invoices*	*Comments*
Short term creditors		€ 0		€ 7 226	VDL + CA + Ardna
Outstanding invoices in spent to date, to be paid		**€ 0**		**€ 7 226**	

Cash boundaries

Minimum virtual financial position (all creditors paid, no more income) **€ 193 800**
Maximum virtual financial position (all creditors paid, all income realised) **€ 420 297**

Agenda item 3: Updates from Networks – *for information and approval*

3.a. Network Policy & Economics

The next meeting will take place in October 2021.

ZEP recently responded to several consultations

- List of candidate Projects of Common Interest in cross-border carbon dioxide transport networks. View ZEP's response here.
- 'Hydrogen and gas market decarbonisation package'. View ZEP's response here.
- Consultation on the revised Climate, Energy & Environmental Aid Guidelines (CEEAG). View ZEP's response here – *for approval*.
- Call for feedback on Draft report on Social Taxonomy by the Platform on Sustainable Finance. View ZEP's response here – *for approval*.

TWG Policy & Funding

The TWG Policy & Funding is working on several topics, such as the Fit for 55 package and the next steps in the work on CDR and hydrogen. The work on hydrogen is aimed to follow the ongoing and upcoming initiatives from the European Commission – with a view of giving input and providing expert advice. The main initiatives on hydrogen are currently planned for Q4 2021.

TWG P&F has contributed to giving input to the consultation in relation to the European Commission/DG CLIMA study – conducted by Umweltbundesamt, Ramboll, Ecologic and Carbon Counts – which aims to support the Commission with the development and design of a carbon removal certification mechanism and to support the underlying policy decisions.

The survey looks at nature-based solutions and technological solutions to achieve carbon dioxide removals. This work supports the European Commission's intention to develop a regulatory framework for the certification of carbon removals based on robust and transparent carbon accounting to monitor and verify the authenticity of carbon removals.

View ZEP's response appended after pre-read 3. Updates from Networks.

Additionally, ZEP is currently working to be prepared with science-based input for the upcoming legislative processes listed below. The initiatives are summarised below, together with an overview on the next steps:

- The Commission has opened a period of feedback on a roadmap on 'Restoring Sustainable Carbon Cycles'. ZEP is preparing a response to be discussed with the TWG Policy & Funding and the ACEC before the final submission.
- In an upcoming communication, the Commission will set out a vision for CDR in Q4 2021.
- Stakeholders' consultations will be ongoing in 2022 in the lead up to the presentation of a regulatory framework for carbon dioxide removals, planned for 2022.

Open Stakeholders consultation on Low-Carbon Industrial Technologies Prospect Report

ZEP TWG P&F will prepare a draft response for the open stakeholders' consultation (link: EUSurvey - Survey (europa.eu)) on the pilot 'Industrial Technology Prospect Report on low-carbon technologies for energy-intensive industries', published by DG RTD and the JRC in June 2021.

The report looks at different technologies that will be needed to reduce emissions from energy-intensive industries – CCS and CCU are mentioned. There is a possibility to stress the role of CCS, CCU, CDR and hydrogen (potential, state of development, current investments).

In the update of the New Industrial Strategy in May 2021, the Commission stated that Industrial Technology Roadmaps will provide input to transition pathways, which the Commission will develop with industry for specific EU sectors and that should be ready by Q2 2022.

The feedback from industry and other stakeholders to the evidence base for the roadmap on low-carbon industrial technologies shall serve to amend this pilot report, also covering a new chapter on main obstacles in development and uptake of relevant breakthrough technologies. The deadline to give input is 30 September.

Innovation Fund Expert Group meeting

On 8 July, the Innovation Fund Expert Group held a meeting. Some takeaways are shared hereafter:

- In November, the Commission will present the results of the first large-scale call for projects. The second call for large-scale projects is planned for March 2022.

- The Commission will introduce blended funding for projects: in order to cover the 40% of costs that will not be covered through the Innovation Fund, other funding opportunities, such as InvestEU, will be coordinated with the Innovation Fund.
- EIB will increase the link with other funding alternatives.

Fit for 55

The Commission published the 'Fit for 55 package' on 14 July. Among others, the following initiatives have been announced:

- EU ETS Directive
- Effort Sharing Regulation
- REDII Directive
- Proposal for a Carbon Border Adjustment Mechanism (CBAM)
- Energy Tax Directive
- Energy Efficiency Directive
- LULUCF

ZEP has prepared and shared a briefing focused on CCUS (link).

On the revision of the EU ETS Directive, the two main policy asks that ZEP brought forward have been taken into account in the Commission's proposal:

- On modalities of CO_2 transport: transport of CO_2 by ship, truck and pipeline will be treated equally under the EU ETS Directive. There is now extensive work ahead to facilitate the inclusion of the different modalities in the Monitoring and Reporting Regulation.
- CCU is included when CO_2 is stored in a manner intended to be permanent, in line with ZEP's position: '*The proposal establishes that surrender obligations do not arise for emissions of CO_2 that end up permanently chemically bound in a product so that they do not enter the atmosphere under normal use*.'

On the revision of REDII, it is important to note that the Commission's work on a delegated act on additionality is ongoing. This was communicated in the Impact Assessment Report accompanying the REDII proposal, where the Commission analysed the expected economic, environmental and social impacts of the REDII proposal.

Further updates are provided under *agenda item 5. EU policy development and certificates for reductions and removals.*

3.b. Network Technology

ZEP Working Group on CO_2 shipping

The first meetings of the Working Group on CO_2 shipping took place in July and August. Through this work, the intention is to develop consensus on standards for key elements of CO_2 transport by ship – both maritime and inland – to support cost-efficient CCUS deployment in Europe.

Key discussions from the meeting included:

- Introduction to the Zero Emissions Platform, CCS and CO_2 transport.
- Expectations, views, and questions from participants regarding the upcoming work.
- Among the technical points discussed, were which areas would benefit from standardisation/guidelines (temperatures, pressures, purity of CO_2), considerations on custody transfer, the potential overlap between the transport of CO_2 and the transport of low-carbon hydrogen, and lessons that can be learnt from previous experience with LPG.

The group gathered representatives from companies, port authorities, projects, shipping operators – a broad range of stakeholders. There was great interest from the attendees. However, to ensure that the work is efficient and well-coordinated, the working group will count on 10-15 active members. Seminars to share the progress of the work will be held regularly.

Currently, the ZEP secretariat is discussing with the co-chairs to plan the way forward and set up the report outline. The first work phase aims to be concluded with an update at the ZEP Advisory Council meeting in March 2022.

Update on ZEP working groups

- Carbon-neutral biomass: All input has been integrated in the draft report and the secretariat is in contact with the chair to prepare a final draft version, which is planned to be revised for comments by the TWG during the next weeks. With a swift final meeting with the TWG, the report can be brought to the December AC meeting for approval.
- CCS for clean flexible power generation: The group will resume its activities following the first meeting end-June and the summer break. A draft report outline has been proposed and will be further expanded with input from the working group members. The co-chairs are still seeking additional members to join the group.
- Directive on the geological storage of carbon dioxide: The work is ongoing, and the aim is to have a report ready for approval at the December AC. At the July

Network Technology meeting, several points were raised in relation to cross-border liability – which will not be discussed in depth in the report but addressed separately. The focus of the report remains on the items closely connected with the Directive. The matter of the inclusion of a section on EOR in the report will be discussed with the ACEC, before presenting it to the AC in December.

Work on CCS/BECCS and biodiversity

Based on discussions at the ACEC Strategic Seminar in September 2021, preparations are being made for a new ZEP workstream on 'Biodiversity and land use – the role of CCS and BECCS'. Conclusions from the seminar discussions indicate that it will be critical to engage the right experts in order for the work to really create added value.

The next steps will be to set up a draft ToR for the work and identify experts to be involved. ZEP will also get in touch with the experts who worked on this issue for the European Taxonomy's Technical Expert Group report to provide input.

Low-carbon hydrogen

The study – How green is blue hydrogen – from Cornell and Stanford Universities by Robert W. Howarth and Mark Z. Jacobson has consequently been picked up by several media outlets, especially in the UK.

The study is based on assumptions, and input data – referring to methane leakage, technology used, energy use, capture rates, etc. – that do not apply to the European context. Several reactions have been published to clarify the importance and the role of low-carbon hydrogen for European industrial decarbonisation.

The ZEP Research constituency and the NWT co-chairs are engaged in preparing a fact-based, academic, 'peer-reviewable' paper that will address the study's inconsistencies and compare the study with the European context. The purpose of this paper is to give a more realistic picture of blue hydrogen and its role for Europe to reach climate-neutrality.

ZEP is also preparing an article on low-carbon hydrogen – *referring to item 4. Updates from ERG.*

The work in the European Clean Hydrogen Alliance is continuing. On 16 September a workshop on 'Financing for hydrogen projects', with a focus on renewable hydrogen, is organised. The draft reports prepared by the Alliance roundtables on barriers to the large-scale deployment of hydrogen in Europe – where ZEP gave input on low-carbon hydrogen – will be presented to the Commission in September.

DG GROW has presented a Hydrogen Public Funding Compass, an online tool that offers guidance to EU and Member States public funding instruments supporting hydrogen projects: Hydrogen Public Funding Compass | Internal Market, Industry, Entrepreneurship and SMEs (europa.eu). A European Hydrogen Forum is expected in November this year.

An update and presentation will be provided at the AC meeting.

Input to CCUS roadmap

ZEP NWT and NWPE will give further input to the ongoing work of the CCUS Roadmap for 2030, led by the CCUS SET-Plan. Following a session of feedback and comments from the wider CCUS community over summer, the CCUS Roadmap will be updated with the aim of producing a 20-page main report, including an executive summary. In this report there will also be links to an extensive, free-standing document with the annexes (based on the CCUS SET-Plan deliverables).

The CCUS Roadmap is aimed at EU and national policymakers, and its objective is to identify and stress what is needed for the large-scale development and deployment of CCS/CCU during this decade. Higher climate targets for 2030 – a net reduction of 55% GHG emissions – requires the urgent development of cross-border CO_2 infrastructure, CCS and CCU to permanently store large volumes of CO_2 and begin cost-efficient industrial decarbonisation.

The aim is to distribute the CCUS Roadmap broadly in the run-up to COP26 and present it at an EU Pavilion side event. Further information is provided under *item 4. Updates from External Relations Group*).

Appendix to 3. Updates from Networks:

ZEP response to the online survey 'Support on devising a carbon removal certification mechanism'

Reading instructions: ZEP's input is marked in blue.

5. How much experience do you have working on technology-based solutions (TBS) and nature-based solutions (NBS) for carbon removal?

Technology-based solutions:

- Biochar
- Biomass in buildings
- Bio-Energy with Carbon Capture
- Fossil Fuel with Carbon Capture
- Direct Air Capture
- Carbon Storage
- Carbon Utilisation (short/medium lifetime)
- Carbon Utilisation (long lifetime)
- Terrestrial Enhanced Weathering

8. In your opinion, which technology-based solutions (TBS) face the most significant challenges for increasing deployment in the EU? Which present the most significant opportunities? Please select maximum three removal solutions for each question.

Climate change mitigation must be pursued as a matter of priority. Mitigation efforts should be supplemented with the active removal of CO2 from the atmosphere. Both actions are needed to achieve the ambitious target of net-zero GHG emissions by 2050 and they should be seen as complementary.

CCS and Europe-wide CO2 transport and storage infrastructure can be real drivers for the decarbonisation of energy-intensive industries and the energy sector, enabling carbon dioxide removals (CDR) at the scale that will be required for Europe to achieve climate neutrality. Geological storage is a proven method to lock CO_2 away from the atmosphere. For all intents and purposes, geological storage is permanent. Also *mineralisation* of CO_2 captured from biomass or through DAC can be a route for CDR where CO_2 can be stored in a manner intended to be permanent.

ZEP recognises that other forms of CO_2 storage may also realise CDR. Natural sinks, usually the biosphere, have huge potential to retain carbon. It is likely that the potential for natural removals is orders of magnitude larger than removals via technological means. However, natural sinks require more active management than geological storage and are susceptible to reversals, whereby the stored carbon is re-emitted into the atmosphere. Natural events such as forest fires and droughts, exacerbated by climate change, complicate the management of natural sinks for the purposes of removing carbon for extended periods of time.

Proper carbon accounting must be ensured. There should be an acknowledgement that any industrial or energy installation capturing CO2 from atmospheric or biogenic sources, for storage in a manner intended to be permanent, has the potential to realise carbon dioxide removal. The potential should be verified through robust life-

cycle analysis and carbon dioxide accounting to confirm that removal of CO2 is indeed happening. Incentives are needed to support the scale-up of carbon dioxide removals in Europe.

CCS is a safe, scientifically proven and cost-efficient technology which can enable CDR through capture and geological storage of CO2 from biogenic sources and direct air capture and storage. The development of Europe-wide CO2 transport and storage infrastructure is needed to deliver CDR at the scale that will be required for Europe to achieve climate neutrality.

In a CCS and CCU context, Bio-CCS and Waste-to-Energy with CCS will play an important role for the decarbonisation of energy-intensive industries and the management of residual waste in cities, providing a real and sustainable alternative when recycling and reuse has already taken place.

Geological storage is a proven method to lock CO_2 away from the atmosphere. For all intents and purposes, geological storage is permanent. Also *mineralisation* of CO_2 can be a route for CDR where CO_2 can be stored in a manner intended to be permanent.

11. Taking account of their current maturity and predicted development, when do you think various removals solutions could be included within an EU-wide CRC mechanism?

CCS projects are ready to become operational within this decade. There is a need to support CO2 storage now. Upcoming and planned projects such as the Combined feedstock with CCS – Norcem project, Combined feedstock with CCS – Fortum Oslo Varme Waste-to-Energy plant with CCS, Combined feedstock with CCS plant – Stockholm Exergi, Direct Air Capture and Storage project – Climeworks, Bioenergy and Carbon Capture and Storage project – Drax, Bioenergy and Carbon Capture, Storage and Use – CO2SERRE project, have the potential to deliver carbon dioxide removals,

CCS is a safe, scientifically proven and cost-efficient technology which can enable CDR through capture and geological storage of CO2 from biogenic sources and direct air capture and storage. The development of Europe-wide CO2 transport and storage infrastructure is needed to deliver CDR at the scale that will be required for Europe to achieve climate neutrality.

In a CCS and CCU context, Bio-CCS and Waste-to-Energy with CCS will play an important role for the decarbonisation of energy-intensive industries and the management of residual waste in cities, providing a real and sustainable alternative when recycling and reuse has already taken place.

12. What role do you think an EU-wide CRC mechanism should play in relation to other EU climate policies that also address the implementation of carbon removals? A CRC mechanism's role should be: (Choose all that apply)

- To certify carbon removals at a project level in the context of incentives or requirements under current climate policies (.e.g. Emissions Trading Directive, CORSIA, the Innovation Fund, Sustainable Taxonomy)

- To certify carbon removals that contribute to the measurement of carbon removals at a national level under current climate policies (e.g. LULUCF Regulation, Effort Sharing Regulation)
- To certify carbon removals at a project level demonstrating fulfilment of actions for purposes of receiving financial incentives under other policies (e.g. the Common Agricultural Policy, the Renewable Energy Directive, the Energy Performance of Building Directive)
- To certify carbon removals at a project level used towards reporting related to the climate component of products' environmental footprint, or any other compulsory environmental performance
- To certify carbon removals at a project level used towards the achievement of voluntary pledges, targets or other types of non-state/corporate climate actions
- To certify carbon removals at a project level demonstrating the impacts of results-based climate finance
- Other

If you wish, elaborate.

ZEP understands that a significant part of the trade will be done on a voluntary basis. Voluntary Markets are crucial in order to draw conclusions, learn lessons, and develop the regulated part of the market.

13. How do you think an EU-wide CRC mechanism should relate to existing certification mechanisms for removal solutions, such as standards developed in the voluntary carbon market and/or national voluntary schemes developed by some Member-States? (Choose all that apply)

- The CRC mechanism should make use of existing carbon removal certificates, where these are demonstrated to be equivalent in scope and quality
- The CRC mechanism should make use of existing carbon removal certificates, with adjustments to accommodate any differences in standards
- The CRC mechanism should only certify removals in accordance with its own rules and standards for certification and governance
- Other

14. Carbon removal solutions are very diverse and can differ significantly in terms of duration of the removals or complexity of the monitoring, reporting and verification of the removals (MRV). In this context, do you think a CRC mechanism should potentially issue different types of certificates for different types of removals? (Please choose all that apply)

- No, only a single type of certificate should be proposed that may be traded and counted towards incentives or targets for emissions and removals in all sectors
- No, only a single type of certificate should be proposed that is not be tradeable (e.g. used only quantification of removals used for reporting purposes in relation to a certain policy)
- No, only a single type of certificate should be proposed that may be traded and counted towards incentives or targets for emissions and removals in all sectors, however the number of certificates issued should be adjusted according to the likely permanence of the solution.
- Yes, different types of certificates should be proposed that could be traded and counted towards incentives or targets for either emissions or removals in all sectors

- Yes, different types of certificates should be proposed that could be traded and counted towards incentives or targets for emissions and removals but only in the sectors in which they are generated (e.g. only in the land sector for nature-based solutions)
- Yes, different types of certificates should be proposed that could be traded and counted towards incentives or targets for emissions and removals but only of similar requirement in terms of MRV and measurement confidence
- Yes, different types of certificates should be proposed based on other factors and criteria (please elaborate below)
- Other

ZEP addition: Thorough carbon accounting should be ensured and implemented.

15. How do you think a CRC mechanism could evolve over time to progressively integrate new needs and solutions for carbon removals?

In the long term, the CRC mechanism could be integrated in the EU ETS.

16. Which aspects of a CRC mechanism do you think could pose the most significant challenges for design and implementation? Choose up to three challenges for nature-based solutions and three for technology-based solutions.

- Specifying certification boundaries and managing leakage risks (leakage risk refers to the possibilities for the removal action to increase emissions or decrease removals outside of the specified certification boundary)
- Determining baselines and demonstrating additionality [*]
- Managing measurement and monitoring uncertainty (i.e. when quantifying removals, baseline and project emissions, validation and verification)
- Dealing with permanence and carbon reversals risk
- Incentivising innovation (i.e. offering incentives to early stage technology demonstrations)
- Ensuring that the certification of removals does not undermine actions for deep reduction of emissions)
- Sustainability (i.e. maximise co-benefits/ avoid negative externalities, lifecycle impacts, impact on biodiversity or ecosystems)
- Participation costs (e.g. methodology development, Monitoring, Reporting, Verification (MRV), learning, other costs)
- Administrative costs (e.g. establishing methodologies, managing day-to-day administrative work, establishing tracking systems etc.)
- Governance, including authorization procedures, liability over the long-term, benefit sharing, articulation between non-state actor commitments and national state commitments
- Public acceptance (i.e. stakeholder engagement and transparency)
- No opinion

ZEP addition:

When assessing the potential of a process to lead to CDR, four principles should be considered:

1. Carbon dioxide is physically removed from the atmosphere.

2. The removed carbon dioxide is stored out of the atmosphere in a manner intended to be permanent.
3. Upstream and downstream greenhouse gas emissions, associated with the removal and storage process, are comprehensively estimated and included in the emission balance.
4. The total quantity of atmospheric carbon dioxide removed and permanently stored is greater than the total quantity of carbon dioxide equivalent emitted to the atmosphere.

A failure to meet principle 1 and 2 would prevent a process from qualifying as carbon dioxide removals. In this sense, principles 1 and 2 should serve as screening criteria. Additionally, a cautious and comprehensive verification of principle 3 is critical to make sure that all associated emissions are included in the life-cycle analysis and calls for a case-to-case evaluation.

18. Are there any best practices for Monitoring, Reporting and Verification (MRV) for carbon removal solutions that you consider a CRC mechanism should take into consideration?

A revised and robust EU ETS directive, coupled with incentives to support timely large-scale deployment of all parts along the CCUS value chain, are needed to support the ongoing development of European CO2 infrastructure and to reach the climate objectives.

20. What kind of information or data should be made available to the public upon the certification of carbon removals? (Choose all that apply)

- Certificates issued, sold by type of solution
- Number of projects by project type
- Number of projects by Member State / region
- Methodologies (e.g. baselines, quantification of carbon removal,…)
- Carbon removal price
- Administrative costs
- Complaints filed, cases of fraud
- Results of stakeholder consultation (e.g. on new methodologies)
- (Type of) Buyer of credits
- (Type of) Solution provider
- Sustainability impacts (e.g. biodiversity impacts)
- Social and environmental co-benefits
- Timeline and process of implementation (including planned adaptions of the mechanism)
- Interaction with other EU policies and regulations
- Oversight over verification bodies
- Other

Agenda item 4: Updates from External Relations Group – *for information and approval*

4.a. Updates from ERG and Communications Group meetings

The next informal Communications Group meeting will take place on 16 September and the External Relations Group meeting will be held on 17 September. Items to be discussed include ZEP's planned communications and events, participation in external events, ZEP articles on TEN-E regulation and low-carbon hydrogen, and key EU policy topics to communicate on over the autumn. *An oral update on the meetings will be given at the AC68 meeting.*

ZEP articles on TEN-E regulation and low-carbon hydrogen

TEN-E regulation

ZEP has prepared an article to be published in the lead up to the ITRE Committee vote. The op-ed highlights that the large-scale deployment of cross-border, European CO_2 transport and storage infrastructure is crucial for the EU to reach its 2050 target and to ensure the successful deployment of CO_2 infrastructure, all modes of CO_2 transport – pipeline, ship, barge, truck, train – and CO_2 storage should be included in the revised TEN-E regulation.

Further updates on ZEP's communications activities around the TEN-E regulation are included in pre-read 6. TEN-E Regulation.

Low-carbon hydrogen

ZEP is preparing an article on low-carbon hydrogen. The aim is to publish the article in October.

4.b. Upcoming events and COP26 preparations

ZEP Conference 2021

The ZEP Conference 2021 takes place online on 22 September (14:00-17:00 CET) in coordination with the 68th Advisory Council meeting and coincides with the end of the current ZEP grant in October, as well as being timely in the lead up to COP26. The conference is comprised of five short sessions running back-to-back. Speakers from the CCUS community, as well as EU policymakers and EU member states will join us to reflect on the past ZEP grant, the main challenges facing CCUS development in Europe, and the way forward: a CCUS strategy for Europe.

View the conference programme and register to attend here.

CCUS 2021: Leading on net zero and clean growth

CCUS 2021 is a three-day virtual conference from 12-14 October, hosted by the CCSA. The event will provide a unique perspective on CCUS developments both in the UK and overseas. ZEP will organise a session on 14 October at 13:00-14:00 CET, "A CCUS strategy for Europe: The path to 2030."

EU Sustainable Energy Week

EUSEW takes place on 25-29 October. ZEP is involved in coordinating a Sustainable Energy Day event as part of EUSEW. The event will take place on 26 October and will focus on decarbonising industry with CCS. The ZEP Chairman will chair and moderate the event. Planning for the event is ongoing.

COP26 – EU Pavilion side events

DG CLIMA launched a call for applications to allow side event organisers to include their events in the EU Pavilion programme at COP26. ZEP submitted an application coordinated with the CCSA and has received positive feedback that the application has been selected based on merging the event also with other applicants. Such a merged application has been submitted.

As mentioned in pre-read *3. Updates from Networks*, the CCUS Roadmap will be distributed broadly in the run-up to COP26 and presented at the EU Pavilion side event.

4.c. ZEP CCS/CCU Facts & Information Toolkit – for approval

As presented at the AC67, the Toolkit has been developed over the past months by the ZEP Communications Group and it has been discussed in the ERG and ACEC. The basis is facts, clear references to sources, ZEP reports and papers.

The ZEP CCS/CCU Facts & Information Toolkit is appended after this pre-read for approval by AC68. The Toolkit will be made available as a resource on the ZEP website.

There is positive momentum around CCS and CCU in Europe: from new projects and developments, to increased focus from policymakers in the European Commission and Parliament, as well as in EU Member States, with great interest in ZEP's Government Group. Following the successful developments and multitude of projects, media coverage of CCS and CCU technologies is increasing. This will probably continue to increase as the CCUS community sees further developments in projects and possible successes. In order to effectively manage both positive and negative information in the media as well as any inaccuracies around CCS/CCU, there is a need for a coordinated approach and a toolkit with questions and answers and further material.

The CCS/CCU Facts & Information Toolkit aims to take a positive approach and to be proactive, by informing about CCS/CCU technologies and explaining the complementary role of CCS in combatting climate change. The Toolkit will also serve as a point of reference to determine how to react when CCS/CCU is not being accurately presented in the media.

ZEP CCS/CCU Facts & Information Toolkit

There is positive momentum around CCS and CCU in Europe: from new projects and developments, to increased focus from policymakers in the European Commission and Parliament, as well as in EU Member States, with great interest in ZEP's Government Group. Following the successful developments and multitude of projects, media coverage of CCS and CCU technologies is increasing. This will probably continue to increase as the CCUS community sees further developments in projects and possible successes. In order to effectively manage both positive and negative information in the media as well as any inaccuracies around CCS/CCU, there is a need for a coordinated approach and a toolkit with questions and answers and further material.

The CCS/CCU Facts & Information Toolkit aims to take a positive approach and to be proactive, by informing about CCS/CCU technologies and explaining the complementary role of CCS in combatting climate change. The Toolkit will also serve as a point of reference to determine how to react when CCS/CCU is not being accurately presented in the media.

Furthermore, the Toolkit provides a basis for unprompted proactive and positive communications around CCS/CCU to a wide audience, with the aim to communicate:

- The role of CCS in the energy transition and industrial transition.
- The role that CCS has to play as a transitional technology and the share of its role.
- To provide balanced points of view.

Contents

1. **Q&As** – Questions based on common criticisms and misunderstandings and answers to provide clarity.
2. **Guide** – What to consider when criticism and/or misinformation around CCS/CCU arises and deciding how to respond.
    a. *To categorise the source of criticism/misinformation*
    b. *To define the severity of the criticism/misinformation*
    c. *How and when to respond to criticism/misinformation*
3. **Communications material** – Short, positive messages communicating the value of CCS/CCU and addressing common critical remarks.

Q&As – Questions based on common criticisms and misunderstandings and the answers to provide clarity

Questions	Answers
Technology – What is CCUS? • What are CCS technologies? • What is CCU? • How successful/effective are capture rates? • Do we need CCS? • How much CCS is needed? • What is Bioenergy with CCS (BECCS)? • What is Waste-to-Energy with CCS? • What is Carbon Dioxide Removal and how does it relate to CCS?	• ***What are CCS technologies?*** *Carbon Capture and Storage (CCS) is a three-part chain. Carbon Capture technologies can be applied to a variety of carbon dioxide (CO_2) emitting processes, where the CO_2 is separated from process emissions by physical and chemical processes. The CO_2 is transported for permanent storage. Storing CO_2 underground uses a natural process that has trapped CO_2, oil and gas for millions of years.* *(Source: Zero Emissions Platform)* • ***What is CCU?*** *Carbon capture and Utilisation (CCU) applies to a wide range of applications that either use carbon dioxide (CO_2) as part of a conversion process, for the fabrication or synthesis of new products (e.g. methanol, urea, polymers, building materials), or in non-conversion processes, where CO_2 is used (e.g. as a solvent, for food & beverages or in greenhouses).* *(Source: What is CCU – Zero Emissions Platform)* • ***How successful/effective are capture rates?*** *It is technically feasible to achieve very high capture rates (>95%) with only minor (<3%) efficiency and financial penalties compared to a capture facility capturing at 90%. Capture rates above 99% are possible, and as technologies develop through deployment, capture technology efficiencies are expected to improve.* *(Source: CO_2 capture – Zero Emissions Platform)* • ***Do we need CCS?*** *To reach net-zero greenhouse gas (GHG) emissions by 2050, Carbon Capture and Storage (CCS) technologies will be an important tool to both deliver needed climate change mitigation and safeguard European industrial competitiveness. CCS will be key in the industrial transition towards net-zero GHG emissions – safeguarding jobs, industrial activity and economic growth. The pathway towards climate neutrality will bring about a major transformation of energy-intensive industries, such as cement, lime, steel and chemicals, that are at the core of the European economy. For these sectors, pathways including CCS represents the lowest-cost route to decarbonisation whilst maintaining industrial activity and preserving jobs.* *(Source: A CCS industry to support a low-carbon European economic recovery and deliver sustainable growth – Zero Emissions Platform)* • ***How much CCS is needed?*** *Reaching climate neutrality in Europe by 2050 and the increased EU ambition for 55% greenhouse gas (GHG) emissions reduction by 2030 make the role of CCS even more critical. To reach these climate targets in a cost-efficient way, there is a need to support early deployment and establish the foundation for CCS and CCU to become investible technologies during this decade (2020s). 50 $MtCO_2$/yr abated by CCS in 2030 is a preliminary yet well-founded indication based on companies' current plans. Today, this could be seen as an ambitious volume from every point of view, but, given the strongly increased ambitions (and the global development we can now see), this will most certainly be an underestimation of what will really be needed from CCS.* *(Source: How much CCS and CCU will be needed in 2030? – Zero Emissions Platform)* • ***What is Bioenergy with CCS (BECCS)?*** *With bio-CCS, CO_2 is removed from the atmosphere by photosynthesis and bound as carbon in biomass. The biomass is combusted for energy or converted to a product or a gas with*

	the carbon extracted. This carbon as CO_2 is captured and geologically stored. (Source: Europe needs a definition of Carbon Dioxide Removal – Zero Emissions Platform) • ***What is Waste-to-Energy with CCS?*** *Waste-to-Energy (WtE) plants burn waste of mixed biogenic and fossil origin generated by human activities to produce heat and/or power. This waste should consist of residual, non-recyclable waste fractions that would otherwise go to landfill. Applying CCS to a Waste-to-Energy plant means that CO_2 will be captured from a flue gas that contains a mixture of fossil and biogenic CO_2, for subsequent geological storage.* (Source: Europe needs robust accounting for Carbon Dioxide Removal – Zero Emissions Platform) • ***What is Carbon Dioxide Removal and how does it relate to CCS?*** *Carbon Dioxide Removal involves taking CO_2 out of the atmosphere, where it contributes to climate change, and putting it in a location where it will not affect the climate for an extended period of time. The aim is to reduce the concentration of CO_2 in the atmosphere. This can be achieved through natural and technological means.* (Source: Europe needs a definition of Carbon Dioxide Removal – Zero Emissions Platform) *CCS is a safe, scientifically proven, cost-efficient technology which can enable CDR through capture and geological storage of CO_2 from biogenic sources and direct air capture and storage.* (Source: Europe needs robust accounting for Carbon Dioxide Removal – Zero Emissions Platform)
Status and development • How long have CCS technologies been in operation? • Where is CCS operational?	• ***How long have CCS technologies been in operation?*** *Commercial, full-chain CCS projects have been operational since the 1980s, with more than 260 million tonnes of CO_2 emissions from human activity captured and stored over 40 years and an overall estimation of around 40 million tonnes of captured and stored CO_2 per year at present.* (Source: 2019 Global Status of CCS Report – Global CCS Institute) • ***Where is CCS operational?*** *Commercial, full-chain CCS projects have been operational since the 1980s, with more than 260 million tonnes of CO_2 emissions from human activity captured and stored over 40 years and an overall estimation of around 40 million tonnes of captured and stored CO_2 per year at present.* (Source: 2019 Global Status of CCS Report – Global CCS Institute) *There are a number of European market-ready projects.* (Source: ZEP CCS/CCU projects map – Zero Emissions Platform)
How can CCS contribute to mitigating climate change? • Why invest in CCS instead of renewable energy/greener alternatives? • What are the benefits of CCS for the climate? • How can CCS contribute to mitigating climate change? • Developing CCS infrastructure takes time – how is CCS	• ***Why invest in CCS instead of renewable energy/greener alternatives?*** *The pathway towards climate neutrality will bring about a major transformation of energy-intensive industries, such as cement, lime, steel and chemicals, that are at the core of the European economy. For these sectors, pathways including CCS represents the lowest-cost route to decarbonisation whilst maintaining industrial activity* (Source: Climate solutions for EU industry – Zero Emissions Platform) *and preserving existing jobs. It can capture and store emissions produced during industrial processes, and it also plays an important role in the manufacturing of clean hydrogen which can be used to fuel energy-intensive industries and households. When applied to industrial processes and power plants, CCS can secure jobs and incomes and ensure European industrial competitiveness in international markets while delivering sustainable growth.* (Source: A CCS industry to support a low-carbon European economic recovery and deliver sustainable growth – Zero Emissions Platform.) • ***What are the benefits of CCS for the climate?*** *CCS are proven and cost-efficient technologies, available now and necessary for Europe to reach its target of net-zero emissions by 2050. CCS technologies can make a significant contribution to climate change mitigation. Their potential for carbon emissions abatement and removal*

contributing to mitigating climate change now?	*is scientifically proven and acknowledged by the European Taxonomy for Sustainable Finance and the 'Clean Planet for All' scenario.* (Source: A CCS industry to support a low-carbon European economic recovery and deliver sustainable growth – Zero Emissions Platform.) *Commercial, full-chain CCS projects have been operational since the 1980s, with more than 260 million tonnes of CO_2 emissions from human activity captured and stored over 40 years and an overall estimation of around 40 million tonnes of captured and stored CO_2 per year at present.* (2019 Global Status of CCS Report – Global CCS Institute) • ***How can CCS contribute to mitigating climate change?*** *Reaching climate neutrality by 2050 will only be possible if mitigation efforts are supplemented with active removal of CO_2 from the atmosphere. CCS is a safe, scientifically proven, cost-efficient technology which can enable Carbon Dioxide Removal through capture and geological storage of CO_2 from biogenic sources and direct air capture and storage.* (Source: Europe needs robust accounting for Carbon Dioxide Removal – Zero Emissions Platform, 2021)
Cost • What is the cost of developing CO_2 transport and storage infrastructure? • What is the cost of CO_2 storage?	• ***What is the cost of developing CO_2 transport and storage infrastructure?*** *For the European Union, CO_2 infrastructure is a no-regret investment opportunity that would support the production of early, large volumes of low-carbon hydrogen and deliver CO_2 removal, allowing the EU to become a global leader in low-carbon economic growth and paving the way for a clean hydrogen economy.* (Source: A Trans-European CO_2 Transportation Infrastructure for CCUS: Opportunities & Challenges – Zero Emissions Platform, 2020) • ***What is the cost of CO_2 storage?*** *In a mature CCS industry, the technical cost of storing CO_2 in offshore storage reservoirs is expected to lie in the range €2-20 per tonne. Adding transport and compression cost will bring this in the range of €12-30 per tonne.* (Source: The cost of subsurface storage of CO_2 – Zero Emissions Platform)
Safety and risks: Observations and best practice • How effective is CCS? – From capture rates to a climate change perspective. • How safe is CO_2 storage? • How do we ensure that captured CO_2 is safely and permanently stored?	• ***How effective is CCS? – From capture rates to a climate change perspective.*** *It is technically feasible to achieve very high capture rates (>95%) with only minor (<3%) efficiency and financial penalties compared to a capture facility capturing at 90%. Capture rates above 99% are possible, and as technologies develop through deployment, capture technology efficiencies are expected to improve.* (Source: CO_2 capture – Zero Emissions Platform) • ***How safe is CO_2 storage?*** *Storing CO_2 underground uses a natural process that has trapped CO_2, oil and gas for millions of years. Both oil and gas fields and deep saline aquifers have the same key geological features required for CO_2 storage: a layer of porous rock to absorb the liquid CO_2 and an impermeable layer of cap rock which seals the porous layer underneath, trapping the CO_2. Inside the layer of porous rock, there are three natural trapping methods which make the safety of CO_2 storage generally increase over time: (1) With residual trapping, some of the injected CO_2 is trapped in the tiny pores of the rocks and cannot move even under pressure. (2) Dissolution trapping is a process where a portion of the CO_2 dissolves into the surrounding water. (3) Mineral trapping: Over time, some of the heavy CO_2-rich water sinks to the bottom of the reservoir where it may react to form minerals such as those found in limestone or sandstone.* (Source: Storage – Zero Emissions Platform) • ***How do we ensure that captured CO_2 is safely and permanently stored?*** *(1) Continuous monitoring: All areas of the CO_2 reservoir are kept under close survey at all times: the well, cap rock and adjacent rock formations are monitored for changes in pressure and CO_2 concentration levels. This monitoring takes place during all phases of a CO_2 reservoir's life: at the identification stage and the injection stage up to and after closure. (2) Predicting CO_2*

	movement: Scientists follow the movement of CO_2 in the reservoir by comparing the monitoring data they receive from simulated predictions which show them how they can expect the CO_2 to move in the reservoir. (3) Monitoring methods: Many of the companies involved in CCS monitoring use systems that have been developed and perfected over decades – principally for the oil and gas industries. (4) EU law requires close and effective monitoring: EU law demands that CO_2 storage is closely monitored and the CCS Directive stipulates that CO_2 storage schemes can only be admitted to the EU's Emissions Trading Scheme if the monitoring and verification of CO_2 storage is carried out with complete satisfaction. *(Source: Storage – Zero Emissions Platform)*

Guide *– What to consider when criticism and/or misinformation around CCS/CCU arises and deciding how to respond*

a. *To categorise the source of criticism/misinformation*

b. *To define the severity of the criticism/misinformation*

c. *<u>When</u> and <u>how</u> to respond to criticism/misinformation – Reactive versus proactive communications*

To categorise the source of criticism/misinformation:
• First, evaluate if it is criticism. (The best promotion for CCS and CCU technologies will include both positives and negatives.)
• What is the source?
  ○ Direct academic sources (Report, study, research paper, etc.)
  ○ Media sources (Article, op-ed, interview, etc.) – Does it refer to an academic source? Is it the academic source or the article that is critical?
  ○ Criticism for political reason
  ○ Remarks that gain traction (possibly on social media) from general public, policymakers, an influential voice in the energy and climate community, etc.
Examples of recent articles/reports with CCS criticism:
• *<u>Report</u> commissioned by Global Witness and Friends of the Earth Scotland*
• *<u>Briefing</u> by Greenpeace 'Assessing the role of carbon dioxide removal in companies' climate plans'*
• *CAN <u>position</u> on CCUS*
• *<u>Article</u>: 'The Gassing Of Satartia' (Huffpost)*
• *<u>Article</u>: 'Why carbon capture on waste-to-energy facilities undermines climate action' (EURACTIV)*
	To define the severity of the criticism/misinformation, depending on:
	• The remarks made – Is there sufficient and correct evidence to support the remarks?
	• The source of criticism – Is it a reputable source?
	• The reach of the source – Is there a sizeable audience?
	• Traction – Is the criticism being shared, spreading on social media, being picked up in other news outlets, etc.?
	Defining severity of criticism – what are the trademarks of the criticism?
	<u>Neutral/slightly critical</u>:
	• A balanced argument is presented with both positive and negative remarks.
	• The statements are presented in a neutral manner, are correctly referenced and from reputable sources.
	• Balanced and well-supported arguments could be considered neutral/slightly critical regardless of the source and reach.
	<u>Highly critical</u>:
	• Highly critical or incorrect remarks made without clear references or sources to support.
	• Biased, one-sided, or false remarks.

• *Article: 'Liebreich: Capturing only 90% of CO_2 emissions in blue hydrogen production 'ain't good enough' (Recharge)* • *Article: 'Green groups dispute power station claim that biomass is carbon-neutral' (The Guardian)* • *Article: 'Les fausses promesses des technologies de captage du carbone pour réduire les émissions de CO_2' [The false promises of carbon capture technologies to reduce CO_2 emissions] (Le Monde)*	
When to respond? • Immediate follow-up – What would require an immediate reaction? • Delayed response, taking time to prepare – What would require a coordinated, well-prepared response? • Coordinated, joint response – Would a joint response from several stakeholders be suitable and/or have a greater impact? • No response? • First consider: How will a response affect the situation? • Will a response improve the situation? • Would proactive communications be an alternative option?	**How to respond?** If highly critical: • Possibility for both proactive and reactive communications. • An immediate follow-up: Contact the journalist/author/policymaker etc. to discuss concern around the critical remarks. Offer to arrange a meeting to exchange views. • A delayed response, taking time to prepare, can help to ensure the message is communicated clearly. (A joint response from several stakeholders can have a greater impact – consider the time needed to coordinate). • Press quote/press release communicating a positive message and providing clarity on the criticism. If critical: • Opportunity for proactive communications. Reactive communications is optional. • Possibility for a press quote/press release to provide clarity on the criticism. • Communicate prepared messages on CCS through channels. If neutral or slightly critical: • Reaction is optional. Opportunity for proactive communications.

Communications material *– Short, positive messages communicating the value of CCS/CCU and addressing common critical remarks*

Topics	Messages to communicate
Carbon Capture and Storage (CCS) • *Industrial decarbonisation* • *Jobs*	• ***Industrial decarbonisation:*** *CCS will be key in the industrial transition towards net-zero GHG emissions – safeguarding jobs, industrial activity and economic growth. The pathway towards climate neutrality will bring about a major transformation of energy-intensive industries, such as cement, lime, steel and chemicals, that are at the core of the European economy. For these sectors, pathways including CCS represents the lowest-cost route to decarbonisation whilst maintaining industrial activity and preserving jobs.* (Source: A CCS industry to support a low-carbon European economic recovery and deliver sustainable growth – Zero Emissions Platform) • ***Jobs:*** *CCS can help to both safeguard existing jobs and create new jobs by supporting the decarbonisation of European energy-intensive industries. By providing a low-carbon alternative, existing jobs in industries – such as cement, steel, lime, chemicals – will be preserved.* (Source: A CCS industry to support a low-carbon European economic recovery and deliver sustainable growth – Zero Emissions Platform, 2020)
Carbon Capture and Utilisation (CCU) • *CCU applications*	• ***CCU applications:*** *Carbon capture and Utilisation (CCU) applies to a wide range of applications that either use carbon dioxide (CO_2) as part of a conversion process, for the fabrication or synthesis of new products (e.g. methanol, urea, polymers, building materials), or in non-conversion processes, where CO_2 is used (e.g. as a solvent, for food & beverages or in greenhouses).* (Source: What is CCU – Zero Emissions Platform)
Carbon footprint – How can CCS contribute to mitigating climate change? • *Abatement potential*	• ***Abatement potential:*** *Commercial, full-chain CCS projects have been operational since the 1980s, with more than 260 million tonnes of CO_2 emissions from human activity captured and stored over 40 years and an overall estimation of around 40 million tonnes of captured and stored CO_2 per year at present.* (Source: 2019 Global Status of CCS Report – Global CCS Institute)
Different technologies • *Low-carbon hydrogen with CCS* • *Carbon Dioxide Removal (CDR)* • *Bioenergy with CCS (BECCS)* • *Direct air capture with CCS (DACCS)* • *Waste-to-Energy with CCS*	• ***Low-carbon hydrogen with CCS:*** *Both renewable hydrogen and low-carbon hydrogen from reformation of methane with CCS have important roles to play in an EU hydrogen economy. By fulfilling early hydrogen demand, low-carbon hydrogen will give more time to plan and build the infrastructure required to scale up renewable hydrogen. Without low-carbon hydrogen, 2030 hydrogen ambitions will not be met.* (Source: The crucial role of low-carbon hydrogen production to achieve Europe's climate ambition: A technical assessment – Zero Emissions Platform, 2021) • ***Carbon Dioxide Removal (CDR):*** *Carbon Dioxide Removal involves taking CO_2 out of the atmosphere, where it contributes to climate change, and putting it in a location where it will not affect the climate for an extended period of time. The aim is to reduce the concentration of CO_2 in the atmosphere. This can be achieved through natural and technological means.* (Source: Europe needs a definition of Carbon Dioxide Removal – Zero Emissions Platform) *CCS is a safe, scientifically proven, cost-efficient technology which can enable CDR through capture and geological*

	storage of CO_2 from biogenic sources and direct air capture and storage. (Source: Europe needs robust accounting for Carbon Dioxide Removal – Zero Emissions Platform) • ***Bioenergy with CCS (BECCS):*** *With bio-CCS, CO_2 is removed from the atmosphere by photosynthesis and bound as carbon in biomass. The biomass is combusted for energy or converted to a product or a gas with the carbon extracted. This carbon as CO_2 is captured and geologically stored. (Source: Europe needs a definition of Carbon Dioxide Removal – Zero Emissions Platform)* • ***Direct air capture with CCS (DACCS):*** *Direct Air Capture units remove CO_2 from ambient air, removing it from the atmosphere. The CO_2 is then geologically stored. (Source: Europe needs robust accounting for Carbon Dioxide Removal – Zero Emissions Platform)* • ***Waste-to-Energy with CCS:*** *Waste-to-Energy (WtE) plants burn waste of mixed biogenic and fossil origin generated by human activities to produce heat and/or power. This waste should consist of residual, non-recyclable waste fractions that would otherwise go to landfill. Applying CCS to a Waste-to-Energy plant means that CO_2 will be captured from a flue gas that contains a mixture of fossil and biogenic CO_2, for subsequent geological storage. (Source: Europe needs robust accounting for Carbon Dioxide Removal – Zero Emissions Platform)*
Public acceptance • *Safety of CO_2 transport* • *Safety of CO_2 storage* • *Where is CO_2 stored?*	• ***How is CO_2 transported?*** *CO_2 is preferably transported by pipeline, with ships being used when a source of CO_2 is too far from a suitable storage site or greater flexibility is required. (Source: Transport – Zero Emissions Platform) Transportation of CO_2 is technically feasible by pipeline and ship, as demonstrated through operating and upcoming CCS projects. Cross-border CO_2 transportation infrastructure has a major role to play in delivering a cost-efficient transition to a low-carbon economy. Developing shared, cross-border CO_2 transportation infrastructure is essential to enable the decarbonisation of core sectors of the European economy, industry, and power generation to preserve production, safeguard jobs, and create sustainable economic growth. (Source: A trans-European CO2 transportation infrastructure for CCUS – Zero Emissions Platform)* • ***Where is CO_2 stored?*** *CO_2 is stored underground using a natural process that has trapped CO_2, oil, and gas for millions of years. Both oil and gas fields and deep saline aquifers have the same key geological features required for CO_2 storage: a layer of porous rock to absorb the liquid CO_2 and an impermeable layer of cap rock which seals the porous layer underneath, trapping the CO_2. (Source: Storage – Zero Emissions Platform)* • ***Safety of CO_2 storage:*** *Storing CO_2 underground uses a natural process that has trapped CO_2, oil and gas for millions of years. Inside the layer of porous rock, there are three natural trapping methods which make the safety of CO_2 storage generally increase over time. These are residual, dissolution and mineral trapping. (1) With residual trapping some of the injected CO_2 is trapped in the tiny pores of the rocks and cannot move even under pressure. (2) Dissolution trapping is a process where a portion of the CO_2 dissolves into the surrounding water. (3) Mineral trapping is when over time, some of the heavy CO_2-rich water sinks to the bottom of the reservoir where it may react to form minerals such as those found in limestone or sandstone. (Source: Storage – Zero Emissions Platform)*

Agenda item 5: EU policy development and certificates for reductions and removals – *for information*

5.a. Updates from the European Commission

There will be several presentations from DG CLIMA at the meeting:

- The Fit for 55 package, with a focus on the revision of the EU ETS Directive.
- An update on the Innovation Fund.
- The EU Commission's work on carbon removal certification.

5.b. ZEP draft response to revised EU ETS Directive – for approval

The Commission published the Fit for 55 package on 14 July. ZEP has prepared and shared a briefing focused on CCUS (link).

On the revision of the EU ETS Directive, the two main policy asks that ZEP brought forward have been taken into account in the Commission's proposal:

- On modalities of CO_2 transport: transport of CO_2 by ship, truck and pipeline will be treated equally under the EU ETS Directive. There is now extensive work ahead to facilitate the inclusion of the different modalities in the Monitoring and Reporting Regulation.
- CCU is included when CO_2 is stored in a manner intended to be permanent, in line with ZEP's position: '*The proposal establishes that surrender obligations do not arise for emissions of CO_2 that end up permanently chemically bound in a product so that they do not enter the atmosphere under normal use*.'

The Commission has also opened a period of feedback on the proposals of the 'Fit for 55' package. After discussions with the ACEC, ZEP will provide a response to the consultation on the adopted act 'EU ETS Directive'. ZEP has engaged the ACEC and the TWG Policy & Funding to prepare a draft response. The AC is asked to approve ZEP's proposed response for a submission.

Next steps:

The Council and Parliament will begin their work on the proposals. At the European Parliament, the ENVI Committee will be leading on the EU ETS Directive, the Carbon Border Adjustment Mechanism, LULUCF, Effort Sharing Regulation; the ITRE Committee will be leading on the Renewable Energy Directive and the Hydrogen and Gas Decarbonisation Market Package.

For AC68 approval – Draft ZEP response to revised EU ETS Directive

Key points:

- Regarding the outcome on CO_2 transport – operated by pipeline, ship and truck – it should be clarified that this includes all CO_2 transport modalities, such as train and barge, for example. This is crucial for the development of CCS projects. Inclusion of all CO_2 transport modalities should also be reflected across associated European legislation.
- The phrasing on CCU is aligned with ZEP's recommendations and should be preserved.
- The EU ETS Innovation Fund is a key tool to support the development and deployment of low-carbon technologies. There should be a distinction between the current set-up of the Innovation Fund and the different set-up which will also support road and maritime transport and buildings. Ensuring that sufficient funding is available for low-carbon technologies, such as CCS and CCU, is crucial.
- Further clarification is needed regarding the setup of carbon contracts for difference under the Innovation Fund and ZEP is looking forward to giving input in this process.

The Zero Emissions Platform (ZEP) would like to share some comments in light of the revision of the EU ETS Directive.

<u>All modalities for CO_2 transport</u>

In the explanatory note appended to the revised EU ETS Directive, the European Commission highlights that CO_2 transport will likely be operated equally by pipeline, ships and trucks, thus revising the legislation to broaden the scope of eligible CO_2 transport modalities. ZEP is supportive of this proposed amendment – in line with previously-submitted input – and would like clarification that this includes all CO_2 transport modalities, such as train and barge.

While some upcoming and planned CCS projects will rely on CO_2 transport by pipeline, the role of shipping is crucial in this decade to connect CO_2 emitters across Europe to unevenly distributed storage sites. Several candidate projects on the 5th list (and previous 4th list) rely on CO_2 transport by ship. It is crucial to reflect this outcome effectively in the EU ETS Monitoring and Reporting Regulation, and to put in place an enabling policy framework that will support the development of cross-border European CO_2 infrastructure. Inclusion of all CO_2 transport modalities should be reflected across associated European legislation.

<u>Inclusion of Carbon Capture and Utilisation (CCU)</u>

The inclusion of CCU is a positive step forward. In line with ZEP's recommendation, the language adopted by the European Commission – stating that CO_2 emissions

should be stored in a manner intended to be permanent without re-entering the atmosphere. This outcome should be preserved in the Directive and be adopted across relative EU legislations.

Innovation Fund

Regarding the set-up of the Innovation Fund, ZEP understands that the Innovation Fund will have a new, broader scope and cover a wider number of low-carbon technologies, given that the sectors of building and road transport will be covered by a new EU ETS. ZEP believes that it should be further clarified how new low-carbon technologies will be integrated in the Innovation Fund. As the timelines for the current Innovation Fund and the possible integration of new technologies under the revised Innovation Fund would need to be coordinated, ZEP's preference would be to keep the current set-up separate from further additions. Ensuring that sufficient funding is available for low-carbon technologies, such as CCS and CCU, is critical.

ZEP welcomes the European Commission's proposal to set up carbon contracts for difference (CCfD), a critical instrument for the scale-up and development of low-carbon technologies, and looks forward to giving input in this process. As discussions on CCfD progress in other European countries – such as the UK and the Netherlands – finding a European approach to CCfD would address existing barriers for planned and upcoming European projects, which will support the EU's decarbonisation pathway.

About the Zero Emissions Platform

The Zero Emissions Platform (ZEP) is a European Technology and Innovation Platform (ETIP) under the Commission's Strategic Energy Technology Plan (SET-Plan), and acts as the EU's technical adviser on the deployment of Carbon Capture and Storage (CCS), and Carbon Capture and Utilisation (CCU) under Horizon2020 R&I programme (grant agreement 826051).

ZEP supports the European Union's commitment to reach climate neutrality by 2050, defined as net-zero greenhouse gas (GHG) emissions by 2050. To this end, CCS technologies represent readily available and cost-efficient pathways for the decarbonisation of industrial and energy sectors in the European Union. Some applications of CCU – where CO2 is stored in a manner intended to be permanent – can also contribute to this goal.

5.b. CCS+ Initiative

At the AC meeting, there will be a presentation by Matthias Krey, CCS+ Secretariat lead.

The CCS+ Initiative is a private initiative launched in June 2021. The aim of the initiative is "to unlock and scale-up CCS-enabled climate action in carbon markets, with an initial focus on project-based methodologies for the Voluntary Carbon Market (VCM) and Article 6".

ZEP is a member of the initiative's Advisory Group (AG). ZEP's role in the AG will be focused on compliance and provide science-based input and comments to the work.

Agenda item 6: TEN-E Regulation – *for information*

6.a. Update ahead of the ITRE vote on the TEN-E regulation

A short update ahead of the ITRE Committee vote on the TEN-E regulation will be provided by Willem van Laatum, Assistant to MEP Berendsen (TBC).

Following the summer break, negotiations have resumed in the ITRE Committee to finalise a report on the TEN-E regulation for a vote in the Committee on 27 September. Political and technical meetings have been ongoing and a set of compromise amendments has been prepared for the vote in the ITRE committee.

It is understood that the Compromise Amendments will include both CO_2 storage and all modalities for CO_2 transport, in line with ZEP's recommendations. On the hydrogen category, low-carbon hydrogen would be included together with renewable hydrogen.

Next steps:

- Vote in the ITRE Committee: 27 September.
- Vote in EP Plenary: TBC.
- Negotiations between Council, Parliament and Commission will begin.

6.b. ZEP actions on TEN-E regulation

ZEP's communications activities leading up to the TEN-E regulation vote on 27 September

Discussions on the revision of the TEN-E regulation have been ongoing over the past months within the EU Parliament's ITRE Committee, with the final vote set to take place on 27 September. ZEP's ongoing communications activities around the TEN-E Regulation revision have continued since December 2020, and ZEP is increasing outreach in the lead up to the TEN-E regulation vote.

As mentioned in pre-read *4. Updates from External Relations Group*, ZEP has prepared an article to be published in the lead up to the ITRE Committee vote. The op-ed highlights that the large-scale deployment of cross-border, European CO_2 transport and storage infrastructure is crucial for the EU to reach its 2050 target and to ensure the successful deployment of CO_2 infrastructure, all modes of CO_2 transport – pipeline, ship, barge, truck, train – and CO_2 storage should be included in the revised TEN-E regulation.

Open letter to include CO_2 storage & multiple transport modalities in TEN-E regulation

In July, an open letter for the attention of the European Council, Commission and Parliament, was sent from 27 leaders in industry, academia, and civil society,

highlighting the need to include CO_2 storage and multiple modes of CO_2 transport in the revised TEN-E regulation. ZEP signed and communicated around the letter. View the letter.

Agenda item 7: CCUS development – *for information*

7.a. Update on the CCUS Forum and continued work

Chris Bolesta, DG ENER European Commission, will give an update at the AC meeting.

It has been announced that the CCUS Forum will take place on 11 October 2021, 12:30-16:00, as an online meeting.

Being asked for input, ZEP shared input on the CCUS Forum with DG ENER before the summer break, highlighting:

- The interest to see the following topics for the annual work in the CCUS Forum working groups: '*CO_2 transport and storage infrastructure', 'Making CCUS investable', and 'Industrial decarbonisation, CDR and hydrogen'.*
- That ZEP, given its broad member base and coordination with other stakeholders in the CCUS community, is a natural partner for the European Commission and would be pleased to support the organisation of the work.
- That the CCUS Forum should be the starting point for the development of a CCUS strategy for Europe.

7.b. Update from DG RTD

There will be an update at the meeting by Vassilios Kougionas, DG RTD European Commission.

Agenda item 8: Closing remarks

8.a. Next meeting dates

- *ACEC October: 19 October 2021*
- *ACEC November: 16 November 2021*
- *69th Advisory Council meeting: 15 December 2021*