

## **ZEP Advisory Council 56**

**19<sup>th</sup> September 2018**

### ***Agenda Item 1: Introduction and welcome***

#### ***1.a. AC56 Agenda***

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Appended to this paper is the agenda for the 56<sup>th</sup> meeting of the Advisory Council.

#### ***1.b. AC55 Draft Minutes***

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Appended to this paper are the draft minutes for the 55<sup>th</sup> meeting of the Advisory Council, which took place on 13<sup>th</sup> June 2018.

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

#### ***1.c. ACEC July Meeting Minutes***

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

#### ***1.d. ACEC August Draft Meeting Minutes***

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

#### ***1.e. Chair's update***

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Appended to this paper is a summary of the Chair's external meetings since the AC55 in June, and an update for SET-plan IWG9 CCS and CCU activities.

## ZEP Advisory Council 56

### Meeting Agenda: 19<sup>th</sup> September 2018

CCAB Room 1.B., Rue Froissart 36, Brussels

10:30 – 17:00 CET

Item		Lead Presenter	Time
1	Introduction and welcome: <ul style="list-style-type: none"><li>• Adoption of Agenda</li><li>• Approval of AC55 minutes and review of actions</li><li>• ACEC minutes (July, August)</li><li>• Chair's update</li></ul>	Graeme Sweeney	10:30 – 11:00
2	Secretariat Update	Luke Warren	11:00 – 11:10
3	Commission updates: <ul style="list-style-type: none"><li>• DG CLIMA</li><li>• DG RTD</li><li>• DG ENER</li><li>• DG GROW</li></ul>	Maria Velkova Vassilios Kougionas Peter Horvath Achim Boenke	11:30 – 12:00
4	European Cement Research Academy	Martin Schneider	12:00 – 12:30
5	Overview of European Parliament, Council & other relevant activities	Marine d'Elloy	12:30 – 12:45
	<i>Lunch</i>		12:45 – 13:30
6	OGCI - Investment Mechanisms for CCUS	Emrah Durusut Alex Kazaglis	13:30 – 14.15
7	UK CCUS Developments <ul style="list-style-type: none"><li>• Presentation of the Cost Challenge Taskforce report</li><li>• Cadent HyNet project</li><li>• Discussion</li></ul>	Luke Warren  Andrew Lewis	14.15 – 15.30
8	Network Policy and Economics update: <ul style="list-style-type: none"><li>• TWG Policy and Funding</li><li>• TWG PCIs</li></ul> Network Technology update: <ul style="list-style-type: none"><li>• TWG Collaboration across the CCS chain</li><li>• TWG Role of CCS in below 2°C scenario</li><li>• TWG CCU and Sink Factor Methodology</li></ul>	Lamberto Eldering, John MacArthur & Jonas Helseth  Filip Neele & Arthur Heberle	15:30 – 16:30
9	External Relations Group (ERG) update	Jonas Helseth, Jonny Stokes	16:30 – 16:45
10	AOB and closing remarks		16:45 – 17:00

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ZEP AC 56 19.09.2018  
Agenda item 1.a.  
AC 56 meeting agenda

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## **ZEP Advisory Council 55 – 13<sup>th</sup> June 2018**

### **Draft Minutes**

#### **Attendance**

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##### Advisory Council members

Didier Bonijoly	BRGM
Dominique Copin	Total
Mark Driessen (alternate)	Port of Rotterdam
Lamberto Eldering	Statoil
Ward Goldthorpe	Sustainable Decisions
Pierre le Thiez	IFP Energies Nouvelles
Filip Neele	TNO
Philippa Parmiter (alternate)	SCCS
Nils Røkke	Sintef
Graeme Sweeney	ZEP Chairman
Keith Whiriskey (alternate)	Bellona

##### Observers and other attendees

Rafal Bernat	Warsaw University of Technology
Amelie Carron	Air Liquide
Niels Peter Christensen	Gassnova
Eric de Coninck	ArcelorMittal
Caterina de Matteis	IOGP
Charlotte Elvsaas	Norwegian Ministry of Petroleum and Energy
Gearóid FitzGerald	Ervia
Paal Frisvold	Consultant
David Hanstock	Progressive Energy
John Macarthur	Shell
Enrico Maggio	Sotacarbo
Valentin Moëns	European Turbine Network
Jean-Xavier Morin	CO2 H2
Alberto Pettinau	Sotacarbo

##### ZEP Secretariat

Nikki Brain	ZEP Secretariat
Luke Warren	ZEP Secretariat

### ***Item 1: Introduction***

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GS gave apologies from Rob van der Meer and Charles Soothill.

GS welcomed AC members and observers, and the agenda for the meeting was adopted.

WG noted a correction to the AC54 minutes.

LW provided an update on the actions arising from AC54. PP agreed to follow up with Stuart Hazeldine on the action to share data with Achim Boenke, DG GROW. NR confirmed he had represented ZEP on the CCUS roundtable at Mission Innovation, but that there had been no possibility for ZEP representation at the Clean Energy Ministerial side event. All other actions had been completed.

The minutes for AC54 were approved.

There were no matters arising from the April and May ACEC minutes.

#### Chair's update

GS fed back on the engagement programme for April and June.

The Governance Directive was a key focus; including meetings with EPP MEPs. Currently the Parliament's position on 2050 climate plans is much stronger than that of the Council, which seeks to remove requirements for any obligatory plans for 2050. The potential for some parliamentary questions and an own-initiative report were discussed.

On the Mid-Century Strategy (MCS), GS said the Commission intends to make a statement prior to COP outlining the level of ambition to be pursued. There may be some modelling undertaken between now and then, but this is likely to be limited. GS said that mid-century modelling will include macro-economic input, which is welcome. ZEP was advised to remain engaged with those working on this; in particular at Cabinet level, Isaac Valero in the Canete Cabinet.

WG said the impression from the meeting notes is that a lot of individuals are not familiar with CCS, and asked whether this was an accurate assessment, and whether ZEP needed to do more on outreach. GS said this was a fair assessment. In the case of the EPP MEPs the level of understanding was relatively low, but they engaged and wanted to know more. GS said ZEP had provided a lot of material and will follow up on questions to Parliament. The MEPs had a good understanding of why it was important to get the long-term perspective in the Governance Directive right.

GS said that as an ETIP, ZEP had limits to what it could do in terms of outreach as this was the scope of giving expert advice. He said outreach should be a priority for the Coordinated Support Action for the SET-Plan Implementation Working Group (IWG).

GS met with Peter Handley, DG GROW. There was a useful discussion on what a counterfactual to CCS should look like for the MCS. GS said it was clear that the High Level Group for Energy Intensive Industries will be influential in setting the level of ambition on CCS for industry.

GS also met with the ETUC who are members of the AC but have not actively been engaged. GS said this was due to resource as Philip Pearson from the TUC had been the main participant in ZEP and had retired. It was agreed that while ETUC did not have resource to actively contribute to working groups ZEP would instead ask them for commentary on specific areas of interest.

## ***Item 2: Secretariat update***

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### Finance

LW provided an update on ZEP-C finances. Forecast income for 2018 is €180,000. Total income received to date is €122,500. A further €42,500 of invoices have been issued and it is expected that the outstanding invoice can be issued in the 3/4Q 2018. ZEP-C started 2018 with a net equity position of -€36,650; the forecast outturn shows ZEP-C returning to a budget surplus in 2018 of €39,858 by year end.

LW said that the call for support under H2020 for ZEP closed on April 19<sup>th</sup>. The CCSA has submitted a proposal to provide the Secretariat service for 36 months. Notification of the grant award is expected soon. If the CCSA proposal is successful EC has indicated that may be possible to backdate the grant. Given these arrangements the CCSA is continuing to provide Secretariat services to ZEP while it awaits the outcome of the evaluation process.

### Membership

LW said that at the last AC it was agreed to develop a structured process to recruit new members to ZEP.

The Secretariat previously developed a pack of information on ZEP shared with organisations inquiring about membership. The Secretariat will now hold a record of engagement with potential member organisations and review this periodically to potential to re-engage or approach new organisations. The Secretariat has drawn up a provisional list to be shared with the ACEC for input, and proposes this is reviewed every six months. The AC agreed with this approach.

LW said John MacArthur had been nominated to the ZEP AC and invited the AC to vote.

### ZEP review

LW said that at the 2017 ACEC Away Day it was agreed to review ZEP's longer-term structure and funding to ensure that the Platform remains effective and sustainable.

The Secretariat proposed to undertake a survey of a wide range of stakeholders to understand their priorities, and to hold a more targeted workshop in Autumn to review feedback and consider how ZEP might respond. Conclusions would be presented to the AC in December.

GS said that engagement with Member States should be a priority; and understanding how ZEP could support the SET-Plan process going forward.

WG said there was a difficulty currently in engaging a broader set of stakeholders for whom CCS would be part of future including the industrial community and end users, so this should be an area of focus.

PH asked whether the work would be undertaken by an independent expert or internal review. LW said the proposal was for the Secretariat to lead the process, with anonymity for participants. However if a case is made for using experts and the resource is available, this could be possible.

## ***Item 3: ZEP-C AGM***

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ZEP-C members agreed that as a non-member GS could chair the AGM. GS confirmed the meeting to be quorate.

GS asked for approval of the finances and particularly for members to acknowledge the paragraph on emphasis of matter. This was noted and the finance paper and budget approved. The budget is annexed to the meeting minutes.

### AOB

NR asked whether ZEP-C members were liable with regards to the budget. GS said members do not have any matters of liability, but Directors may be and this should be looked into further.

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#### ***Item 4: Commission updates***

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##### DG RTD

VK gave an update on proposals for Horizon Europe (formally FP9). 35% of the budget will be allocated to addressing climate change.

There are three pillars to the new framework- Open Science, Global Challenges and Industrial Competitiveness. CCUS sits under climate, energy and mobility for which the budget is €15bn.

It is anticipated that ERA will continue to be funded under Open innovation.

VK said that Parliament and Council negotiations on the budget were ongoing. Q3&4 of 2018 would be used for strategic planning, and the new programme would begin on 1 Jan 2021.

VK thanked the ZEP participants who represented the EU at the Mission Innovation workshop in Houston.

WG asked whether projects could be undertaken which encompassed different work packages, given that development of CCS could serve multiple areas. VK said this would be possible.

VK said there would be an official consultation on Horizon Europe towards the end of the year.

GS said that given the split between CCU and CCS for industry under the proposals, it needs to be clear to the energy cluster that CCS for industrial activity is an energy activity. ZEP has also submitted a position on the treatment of hydrogen under the new framework; currently electrolyzers are considered innovative whereas SMR/ATR is not. VK said ZEP should keep engaging on the issue including a follow up meeting to the workshop held in 2017. GS said there had been considerable efforts to progress the discussion with little success; however in the context of the Horizon Europe proposal perhaps some momentum could be gained.

NR pointed out that large-scale hydrogen production from fossil fuels with CCS was identified as a Priority Research Area under Mission Innovation; furthermore a separate hydrogen Mission had been launched.

##### DG ENER

GS welcomed Peter Horvath to ZEP.

PH gave an update on the PCIs on CO<sub>2</sub> transport, saying currently two of the four projects had applied for funding through the Connecting Europe Facility (CEF). The second call of CEF is now open until October 2018.

PH shared the agenda and registration details for the stakeholder event on the Mid-Century Strategy taking place on the 10<sup>th</sup> & 11<sup>th</sup> July.

PH said two proposals had been received for the support to the successor for the Project Network. The contract will be signed in the second half of 2018.

On the Clean Energy Ministerial, PH said an initiative on CCUS had been launched, although it had been difficult to engage finance community in the launch event and therefore this a priority for the initiative between now and CEM 10.

PH said the European Sustainable Energy Week had 64 sessions and 2500 participants. Energy Technologies Europe held an event on CCUS, which had been a good exchange with some differences of opinion and strong participation from the renewables community.

DC asked whether ZEP would be involved as speaker at the event. PH said he would pass the question to Maria Velkova at DG CLIMA.

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#### DG GROW

TDF fed back on GROW's project over the last year on gaseous industrial effluents which looked at how CO<sub>2</sub>, CO, NO<sub>x</sub>, H<sub>2</sub>, could be exploited for production of chemicals. The second phase would be to look at the use of these gases as raw materials, and to what extent regional authorities can support and boost use of these gases.

Consultancy firm Ecofys have provided analysis and mapping of where gases could be exploited, identifying geographical "hotspots". This analysis will be published soon, and roadmaps will be produced for these regions by October, followed by a conference in Brussels.

WG said there was a parallel with the ALIGN project which is looking at five CCUS clusters and there could be scope for joint meeting after the work finished. TDF said it would be possible to provide space to explain ALIGN project at the conference and how these initiatives could be joined up.

#### ***Item 5: Mission Innovation***

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FN and NR gave an update on the Mission Innovation programme.

30 Priority Research Directions (PDRs) for CCUS were defined at the workshop in Houston. The report from the workshop was released in May, and describes these areas in detail. FN said the report had been open for review to national representatives, but that the Commission had also volunteered comments which had largely been taken on board.

FN said the UK had taken over from the U.S. as co-leader of the CCUS Mission.

FN explained that MI was aimed at lower Technology Readiness Level (TRL) technologies, with CSLF targeting higher TRLs. CCUS activity has a roof of TRL-4; the discussion ongoing in Europe around business models may therefore be detached from this. It was noted that the recent ERA-NET ACT call takes into account the PRDs but is aimed at high TRLs. However FN said that while overall CCS may be high TRL but elements of a project may not be; for example monitoring of storage is lower TRL.

WG said there is a disconnect between low TRLs in MI and ERA-NET ACT philosophy and suggested that the formation of consortia for the new ACT call should be such that dominant EU countries continue the efforts of the first round to deliver at a large scale, even if the projects need to include low TRL elements.

NP asked whether ERA-NET would continue under Horizon Europe. VK said he hopes so but this was not confirmed. GS said ZEP should ensure this is part of the Platform's input to the consultation on Horizon Europe design.

It was noted that CCU was discussed in the report in the context of cement and other energy intensive industries as useful processes which can create a business case but have a marginal climate effect.

GS said that development of clusters should enable CCS and CCU to operate side by side and that the ALIGN work would be useful in demonstrating this. GS said that ZEP's position has been that if businesses benefit from climate related incentives for a process, there needs to be clear mitigation. However there was no objection to supporting these projects for industrial policy reasons if funded through other means. The focus should be on what infrastructure is common- to CCS and CCU, as this is the "public good".

PF said there was concern from Norwegian industries about the support mechanism not being able to apply for CCU projects without clear and immediate mitigation. He noted that many first projects being considered had a strong EOR component as a key enabler. PF said if we are to get clusters, CCU should be included as the pathway to a possible CCUS full chain. GS said that CO<sub>2</sub> Value Europe's position was consistent with the idea that there is plenty of space for clear mitigation alongside other benefits for progress to be made.

NR said there was an interesting discussion on bio-CCS in IPCC models; noting that biomass storage (i.e. natural sinks from forests) is also included and that there is a danger of double counting of bio-CCS.

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## ***Item 6: Overview of European Parliament, Council & other relevant activities***

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### Multiannual Financial Framework

NB said the Commission had released its proposal for the Multiannual Financial Framework 2021-2027 (MFF) on 2 May. The proposal increased climate-related spending in the EU budget from 20% to 25%. The EP has previously called for 30%, and a comprehensive, continuous source of funding for energy investments including CCU and CCS, especially for carbon-intensive regions.

NB said an InvestEU Fund had been announced to replace European Fund for Strategic Investments (EFSI); this will provide loans and guarantees to support four policy areas including up to €11.5 billion for sustainable infrastructure.

The Connecting Europe Facility will be renewed with €8.7 billion for energy projects over the 7 year period. This is an increase on the €5.3bn allocated from 2014-2020

### Mid-Century Strategy

NB said the Commission plans to be able to present its Mid-Century Strategy at COP 24 in December, which will be followed by a period of scrutiny in 2019.

Mauro Petriccione, new DG for Climate Action, mentioned in a speech that CCS featured heavily in the 2011 Roadmap but has not yet emerged. He said net zero by 2050 would be assessed, with modelling and economic analysis, but would only be the Commission's proposal if it was seen to be cost-effective and feasible.

It was agreed that the argument for CCS cannot be confined to cost-effectiveness but needs to build on the "feasible" part. WG noted the UK's Committee on Climate Change were clear on the need for CCS in their response to the Clean Growth Strategy.

GS said "cost effective" means taking a broad economic perspective, as opposed to simply the cost of one activity vs another. The objective needs to be defined in order to assess the best route and work out the option that creates most value while achieving this target.

### Sustainability Taxonomy

NB shared the proposed criteria from the Commission for a "sustainability taxonomy" to inform what can be classified as a sustainable investment. It was noted that there were a few areas which could be problematic depending on the detail, including requirements around energy efficiency (due to the energy penalty associated with CO<sub>2</sub> capture.) It was agreed ZEP should provide a response in time for the August deadline. GS asked the Network Chairs to confirm who would lead the work.

## ***Item 7: Port of Rotterdam***

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MD gave an overview of the Port of Rotterdam "Porthos" project. The Netherlands has an ambition to reduce emissions by 49% by 2030. MD said that the ambition for CCS had been reduced from 20Mt CO<sub>2</sub> stored by 2030 to 7.2Mt.

MD said the Port was home to heavy fossil-based industries, and produces 20% of the Netherlands' CO<sub>2</sub> emissions. Therefore if the 49% target is to be met, it needs to be met in the Port, or there will need to be much higher ambition on other areas to compensate. CCS forms part of four decarbonisation pathways produced for the Port by the Wuppertal institute; MD said that CCS is one of few things that can make big difference which is available today.

The Porthos project is based on building T&S infrastructure that is open and independent; separated from capture. The Port is working with Gasunie & EBN on the T&S. The Port has identified its 15 biggest industrial emitters. MD said that some are very enthusiastic, others more hesitant; some have cheap CO<sub>2</sub> available. By 2030 the port hopes to store 5Mt CO<sub>2</sub>/year, starting with 3Mt/year in the early 2020s. The port has identified 37Mt of storage that will be filled over 10-15 years.

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MD said the Port is well placed to expand its T&S infrastructure, and is looking at a new PCI linking to Belgium and North Rhine-Westphalia.

The Port completed a feasibility study last year that was positive; now the business case needs to be developed and an agreement on liability for CO<sub>2</sub> storage.

MD said that public-private partnership was essential, with a role for state-owned companies developing infrastructure, and funding required from the private sector and public authorities.

MD said that Porthos is part of a national discussion on the new climate agreement. Discussions have centred on cost per tonne compared to other solutions, with pressure on the port to reduce costs. There has been lots of discussion on competition between CCS and renewables. MD said there is strong support for a regional approach. Separating out T&S is not easy as capture needs to move at the same time for government to provide support.

MD said Greenpeace had released a report and article, which expressed concern about safety of storage. MD said the Port did not want to be the national defender for why CCS is needed, and that national industry needed to speak out about its necessity.

MD said there are three taskforces under way with the Dutch Ministry on financing, permits and communication.

GS asked where ZEP could be of help. MD said access to EU funding sources would be important, and broader support in Brussels. Spreading the word about the project could be helpful. Also pushing for a higher carbon price to stimulate CCS. MD asked whether it would be possible for ZEP to put the Port in touch with German and Dutch MEPs.

LE- said there was some misinformation in the Greenpeace study which said a rift in a Norwegian field was enhanced by CO<sub>2</sub> injection. Equinor would be responding as there is a rift 25km away from the field that was there before injection, and the CO<sub>2</sub> would not migrate towards the rift. MD said it would be helpful if projects and member states could coordinate on evidence on safety of storage.

LE asked how important identification of secondary storage and operation was for feasibility. MD said this is very important and TNO and EBN are identifying the best possible next fields.

PP said that the University of Aberdeen published paper in Nature Communications modelling long term CO<sub>2</sub> storage over 10,000 years, demonstrating a 98% storage rate.

GS said the Port must be clear about the political economy levers, including having something clear to say about the potential for linking with North Rhine-Westphalia early.

GS said these issues for implementation need to be addressed in SET-Plan IWG meetings.

### ***Item 8: Update on Norwegian CCS developments***

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NPC said the Norwegian Parliament had the ambition for one full-chain project to be complete by the early 2020s. Equinor, Shell and Total are undertaking a joint concept and FEED study, to be completed in 2019. The current forecast cost of the full-chain project is €1.3-2.3bn euros depending on how many capture projects are progressed. It is expected that the proposal put forward by the finance committee to Parliament to progress FEED for the Norcem plant, and to end the Yara project will be accepted. NPC said Yara had demonstrated the lowest potential for learning which is important for state funding. The waste-to-energy project is under study and may be granted FEED if the cost and risk factors can be reduced.

NPC said Norway's ambition is for the project to contribute to cost-effectiveness globally. FID will be costly for Norway and some amount of cost-sharing with industry and others needed. External quality assurance

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currently says the project is socio-economically unfavourable from a state investment perspective as it focuses solely on the domestic context.

NPC then fed back on work by SINTEF that looked to highlight the value of the project to the Norwegian economy. This includes safeguarding 30,000 jobs in processing industries in Norway. Production of low carbon hydrogen could generate 220bn NOK per year by 2050 and 25,000-35,000 jobs. The total labour force is 2.5million in Norway. EOR could increase export value by 8bn NOK per year.

### ***Item 9: Innovation Fund Expert Group***

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GS fed back on the Expert Group meeting on the Innovation Fund. The terms of the Fund will be decided by a Delegated Act by the Commission.

The meeting comprised 50 experts who were given three minutes each to speak; therefore ZEP would also be making a written submission. It was also suggested that ZEP could write its own mock up of a Delegated Act, and that this would be undertaken by TWG Policy & Finance.

GS said the way the questions were posed by the Commission amounted to a choice between the NER300 or something else. There was a high consensus something different was needed but GS said he expected wide variation on the detail.

GS said that cross- border projects were not really addressed, or the value of projects which have benefit for multiple MS. The written response would reinforce the position that a Market Maker needs to be eligible under the fund as if this is not clearly stated, there is a danger it may not be.

GS said the contribution from key Member States at the meeting did not reflect the need for projects to access the Innovation Fund. GS said ZEP should engage with the Dutch and Norwegian industries to ensure they also include things projects will need within their input. GS said the Irish and Swedish made good contributions on CCS.

NPC highlighted the potential complexity created by fixed calls as projects would need to match this timeline. GS said a high frequency of calls would be preferable, and the agency dealing with administering the fund should keep track of projects in development.

WG said some of the recommendations from the fast track T&S report would be relevant for the Innovation Fund discussion.

### ***Item 10: Network Policy & Economics update***

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LE gave the update from Network Policy & Economics. There had been no meeting between this and previous AC. Upcoming items of work for the Network include:

#### TWG Policy and Finance

- Response to the Mid-Century Strategy consultation due in July.
- A piece of work on linking EU funds for CCS, as requested by the Canete Cabinet. The AC did not approve the pre-read and requested more time to review; however as the request came from the Commission it was agreed the Network could progress the work in the interim.

#### TWG PCIs

- WG said the governance structure and a coherent narrative highlighting the need for transport corridors were a more important issue than the London Protocol.
- The PCI paper presented in the pre-reads was approved.

### **European Zero Emission Technology and Innovation Platform**

### ***Item 11: Network Technology update***

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FN said the next meeting is scheduled for 31 October.

#### TWG CCS in a Below 2 degrees scenario

The TWG had produced a draft report which was attached to the pre-reads. It was felt this was not yet ready for AC approval, and as the co-chairs could not attend the AC, it was agreed a follow-up call should be scheduled with the co-chairs.

It was agreed that the ACEC could approve the report on behalf of the AC once revisions had been made. WG said that the study undertaken by auditors in Norway demonstrated a negative benefit from developing the full-chain project, due to it only measuring domestic impact. WH said it would be useful if the section on Norway in this report could challenge that finding.

DC said he found the report interesting and valuable and that OGCI would like to contribute.

#### TWG Collaboration across the CCU Chain

WG explained that work was progressing in two parts. Workstream 1 seeks to quantify storage-related risks using data from operators. This group aims to deliver its contribution by 1<sup>st</sup> July.

The second workstream looks at risks and liabilities which need to be shared across the CCS chain. This group is looking at investment barriers and business risks and potential solutions. Once catalogued, the group will hold a joint workshop with the ERA-NET ACT projects in September before the next AC.

#### TWG CCU

FN said work was progressing on the follow-up report on CCU and Sink Factor methodology, with the next meeting planned on 21<sup>st</sup> June in Brussels. The group aims to deliver a high-level report by the autumn.

EdC said he thought the Sink factor methodology was redundant as it was clear the commission would be using Lifecycle Analysis. EdC said that as well as the initiatives under CLIMA looking at methodology, DG ENER was to set up a group of industry experts to produce their own analysis of LCA methodology.

LE said the report from the Scientific Advice Mechanism had been clear on the need to demonstrate CO<sub>2</sub> reduction from both CCS and CCU.

DB said that Club CO<sub>2</sub> would also be holding a workshop on LCA.

It was suggested by AC members that events had overtaken this piece of work and ZEP would be better placed to feed in to the Commission's processes, rather than try to create its own methodology.

It was agreed ZEP would engage in the process with DG ENER.

### ***Item 12: External Relations Group (ERG) update***

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GS said that Johnny Stokes had been nominated as a new co-chair to replace Sarah Kempe from Shell. The AC approved Johnny's nomination.

GS said he would be meeting with Mauro Petriccione on 19 July, which would be a key opportunity to discuss the Mid-Century Strategy.

GS said that Weber Shandwick's contract had ended, so the Secretariat had agreed to take on external engagement support until the new ZEP contract was in place.

ZEP is holding a joint workshop with IOGP on 12 July to discuss collaboration on CCS engagement.

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### ***Item 13: Any other Business and closing remarks***

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LW confirmed that John MacArthur of Shell was elected to the AC.

### ***Actions***

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<b>Action</b>		<b>Owner</b>	<b>Deadline</b>
2	Secretariat to progress review of ZEP with survey and August workshop	Sec	August
3	Look into Directors liability for ZEP-C	GS/Sec	September
4	Follow up with hydrogen stakeholders on Horizon Europe proposals	Sec	September
6	Submit response to Sustainability Taxonomy	NWPE	August
11	Schedule call on B2DS report	Sec	June
11	Engage with DG ENER on LCA work	NWT	July

## **Advisory Council Executive Committee**

### **Draft Minutes: Conference Call – 10<sup>th</sup> July 2018**

#### ***Attendance***

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Gardiner Hill	BP (Chair)
Kim Bye Brunn	Shell
Arthur Heberle	Mitsubishi Hitachi Power Systems
Jonas Helseth	Bellona
Rob van der Meer	Heidelberg Cement
Filip Neele	TNO
Charles Soothill	ZEP vice-Chair
Jonny Stokes	Shell
Luke Warren	ZEP Secretariat

- \* Jonas Helseth acted as Frederic Hague's proxy
- \* Kim Bye Brunn acted as John MacArthur's proxy

#### ***Introduction and general update (open session)***

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##### Introduction & actions from last meeting

The meeting agenda was adopted.

The draft meeting minutes of the AC55 were reviewed. There were comments on the minutes. The AC55 actions were reviewed, these were largely still open with the exception of the last two on the B2DS and the LCA work. GH asked if a record of actions was maintained to monitor progress. LW noted that progress on these actions will be continued and formally reviewed at the AC56 meeting in September.

#### ***Network and Temporary Working Group updates (open session)***

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##### a. Network Technology

FN introduced the work of TWG Collaboration across the CCS chain, chaired by Ward Goldthorpe, Filip Neele and Hallvard Høydalsvik. Two work streams have been set up. Work stream 1 (storage-related risks) which aims to deliver a report by the end of June and Work stream 2 (risk sharing across the CCS chain) which plans on delivering a report by the end of the year.

The first report is around risk quantification. AH noted that the language around the dangers to people of CO<sub>2</sub> leakage must be handled carefully and that we need to carefully balance how we characterise the maturity of CO<sub>2</sub> storage. GH also noted that issues of risk and allocation of risk is a very important and live topic. Given the importance of this work it was agreed that first report should be circulated ahead of the AC meeting in September so that there is adequate time to review.

Charles Soothill and Karen Turner are co-chairs of the TWG Role of CCS in below 2 degrees scenarios. CS provided an update on the report. This was presented to the AC55 in June and also had subsequent feedback from both the IEA and OGCI.

The report reviews the contribution of CCUS to the Paris climate agreement and reviews the evidence developed by external organisations. In particular it is focussed on socio-economic modelling of impacts and notes that CCUS is part of the lowest cost path to decarbonisation. It also looks at this from a regional perspective and the contribution that CCUS can make to a just transition of jobs and economic activity to a low carbon economy. The intention is to release this in the next week to 10 days.

AH asked whether the jobs numbers on the coal industry and make less negative as important regionally. Also asked whether we can use more EU numbers rather than global numbers, e.g. ExxonMobil Energy Outlook 2017? GH noted that the ExSum language needs working up as challenging and also asked for clarification on relative versus absolute energy growth. KBB liked the report, case studies and recommendations on quantifying the socio economic benefits. It was agreed that CS would amend language on energy, jobs, minimum changes to infrastructure, and consider EU energy scenarios work.

RvdM provided an update on TWG CCU and Sink Factor Methodology. There have been good discussions in the group, however progress is slow as these are challenging issues. The next steps is to compile the good input received into one paper and see how to progress. AH noted that important that keep group alive as need it if we are to provide input to the EC processes that are ongoing in this area.

The following actions were agreed; RvdM will combine the input from the group with Marine d'Elloy and review. Hope to have a document produced in September / October. GH noted that the National Petroleum Council is doing a lot of work on CCU and LCA. We should try and submit any ZEP response to them as part of their evidence base. There will be further opportunities to feedback on the conclusions of the group to the AC.

b. Network Policy and Economics

LW provided an overview of the NWPE. It was noted that the NWPE will be meeting after the summer break. Four new areas of work have been identified for the TWG:

- EC consultation on the long-term strategy: The EC will publish a draft strategy ahead of the COP24 on options to deliver net zero-emissions. This should also consider macro-economic impacts of decarbonisation and is aligned with ZEP views. It was agreed that ZEP will develop a response to the consultation.
- Linking EU funding for CCS: There was interest from the EC on developing a paper which looked at how different sources of funding can be combined. This was not approved by the AC and will be further discussed at the NWPE.
- Expert Group on Innovation Fund: Graeme Sweeney is the ZEP representative on the Expert Group and it is expected that the next meeting of the group will be held in September. ZEP will continue to input and is considering developing a draft delegated act as an input.



- Sustainability Taxonomy: The AC55 agreed that ZEP should make an input to this consultation as there is a risk that this could create future barriers to CCUS. It was agreed that ZEP should follow the circular economy debate and consider whether it should be more active in the growing area of policy.

A discussion has been held on whether the SET-Plan IWG9 could be an appropriate organisation to provide strategic direction to the development of CO<sub>2</sub> infrastructure. This was raised with the North Sea Basin Task Force which currently holds a strategic plan. The NSBTF initial reaction is that this should remain with them and not the IWG9. This will be discussed at the next NSBTF meeting.

c. ERG

JH gave an update on the recent meeting with Peter Handley, DG Grow. DG Grow has not engaged actively in CCUS historically and so it was an important opportunity to discuss with them. There is a general view that CCS had a clear chance to progress and this was not grasped. This could limit how much appetite there is put a lot of emphasis on CCUS in the new long-term strategy.

The ETUC has historically been supportive of CCUS but have been less active recently as national union bodies are not raising this with them. This makes it hard for them to allocate resources to CCUS. It was agreed that ACEC members should seek to engage with the Norwegians and UK TUCs and see if they can push at the ETUC level. LW agreed to contact the UK TUC.

A short review was made of the forthcoming ZEP - IOGP workshop. This is an important opportunity to identify opportunities for greater collaboration between the two organisations. Feedback on the workshop will be provided at the next ACEC call.

An overview was provided on the proposed dissemination activities for the B2DS report. No addition comments were received.

### ***Brussels Advocacy***

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An update was given on the Chris Davies advocacy proposal and IOGP JIP. There was a question raised on whether Chris Davis should be invited to speak to ZEP about his proposal? It might be helpful for ZEP to take a view on his work. It was agreed to have a discussion item on the August ACEC agenda and consider whether to discuss at next AC meeting.

### ***AC56 agenda***

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A draft of the agenda was reviewed. It was agreed that it would be interesting to hear about recent UK developments (Conclusions of the Cost Challenge Task Force and HyNet project). It was also agreed that the ECRA should be invited to speak as it is important to understand more about the cement sector. In the future a utility perspective would also be helpful.



### ***Finance update (closed session)***

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LW gave a summary of ZEP finances. There are two outstanding invoices due for payment and one invoice expected to be issued later in the year. KBB asked whether there was any issues expected with payment of the outstanding invoices. LW said that none are expected.

### ***AOB***

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No other matters were raised and the meeting closed.

### ***Actions***

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Actions		Owner
2.a.	CS to amend B2DS language based on feedback.	CS
2.b.	ZEP to develop response to long-term strategy consultation	Secretariat
2.c.	LW to contact UK TUC to understand opportunities to encourage ETUC to become more active in EU CCUS conversation	LW
3.	Brussels advocacy to be discussed again at the August ACEC	Secretariat
4.	Invitations on UK developments and ECRA presentations to AC56 to be issued.	Secretariat

## **Advisory Council Executive Committee**

### **Minutes: Conference Call – 14<sup>th</sup> August 2018**

#### ***Attendance***

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Gardiner Hill	BP (Chair)
Kim Bye Brunn	Shell
Arthur Heberle	Mitsubishi Hitachi Power Systems
Jonas Helseth	Bellona
Lamberto Eldering	Equinor
Graeme Sweeney	ZEP chair
Luke Warren	ZEP Secretariat
Marine d'Elloy	ZEP Secretariat

- \* Jonas Helseth acted as Frederic Hague's proxy
- \* Kim Bye Brunn acted as John MacArthur's proxy

#### ***1. Introduction and general update***

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##### Introduction & actions from last meeting

The meeting agenda was adopted.

The draft meeting minutes of the July ACEC were approved.

#### ***2. Network and Temporary Working Group updates***

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##### a. Network Technology

AH introduced the work of TWG Collaboration across the CCS chain, chaired by Ward Goldthorpe, Filip Neele and Hallvard Høydaalsvik. Two work streams have been set up. Work stream 1 (storage-related risks) which aims to deliver a report by September and Work stream 2 (risk sharing across the CCS chain) which plans on delivering a report by the end of the year. A joint ZEP and ERA-NET ACT workshop will take place in Brussels on 18<sup>th</sup> September.

AH said that the TWG Role of CCS in a below 2 degrees scenario produced a report, which was approved and published in July.

AH updated the ACEC on the TWG CCU and sink factor methodology. The next meeting is planned on 29<sup>th</sup> August. GH said the group should focus on the LCA as it is clear that the Commission will be using the LCA. GS supported this suggestion.

It was agreed that the TWG will not provide a full LCA comparison or define a new methodology but discuss challenges with current LCA methodologies. AH added that the TWG will decide how to take its work forward when the Ramboll study commissioned by DG CLIMA will be published.

b. Network Policy and Economics

LE updated the ACEC on the NWPE. The next NWPE meeting will take place on 11<sup>th</sup> October. LE mentioned the following work priorities:

- EC consultation on the long-term strategy: The EC will publish a draft strategy ahead of the COP24 on options to deliver net zero-emissions. This will also consider macro-economic impacts of decarbonisation. The Secretariat prepared a draft consultation response which was circulated to the TWG, and will be shared with the ACEC and the wider network.
- Linking EU funding for CCS: There was interest from the Commission to develop a paper which looks at how different sources of funding can be combined. This was not approved by the AC and will be further discussed at the NWPE meeting.
- Sustainability Taxonomy: ZEP will input to this consultation as there is a risk that this could create future barriers to CCUS. It was agreed that ZEP should follow the circular economy debate and consider whether it should be more active in the growing area of policy. ZEP will submit a response, which will be shared with the ACEC and the wider network.

LE said that the Secretariat and chairs agreed on the need to extend the membership and participation of the TWG Policy and Funding. ToR will be revised ahead of the next AC.

A discuss has been held on the Commission's long-term strategy for emissions reductions. It was agreed that ZEP will organise an event after the summer and engage with a wider audience of stakeholders. GS said that Gassnova showed appetite to provide funding for such event.

A discussion has been held on the answer to the first question of the consultation for the long-term strategy for emissions reduction on the level of ambition for 2050. GS said a net zero ambition is the most likely to deliver substantial CCS. It was agreed that the Secretariat would formulate an answer to the first question and circulate it to the ACEC for review.

It was agreed that NWT could look at assumptions around capture rates. LW said that an IEAGHG report on capture rates is expected to be published. It was agreed that ZEP should take a position after the publication of the report.

LE updated the ACEC on the TWG PCIs. LE said the work on the London Protocol is developed through direct engagement of projects with ministries. LE said that positive actions are being taken within different ministries, with Norway taking the lead.

c. ERG

JH gave an update on the meetings with Kostis Sanellaris, Maria Velkova and Mauro Petriccione at the European Commission.

JH said the meeting with Petriccione was very good. Petriccione showed significant interest in blue hydrogen, capture costs and the market maker concept. He asked further input, which has been prepared and circulated. GS said that Petriccione did not see CCS as a moral hazard, but said that

negative emissions could represent one. It was agreed that it would be necessary to engage further on the long-term strategy and the legacy of the Commission.

It was agreed that LW will follow-up with DG ENER regarding Commissioner Cañete's attendance to the Global CCS Conference.

JH updated the ACEC on the IOGP-ZEP joint workshop. It was agreed during the workshop that both organisations should establish a closer dialogue. JH said that the COP24 would be an opportunity to align on key messages.

GH said that ExxonMobil is increasing its ambitions regarding CCUS and is interested in advocacy in the U.S. and Europe. The Secretariat and GS agreed to reach back out to ExxonMobil.

There was a discussion on the dissemination of the Role of CCS in a below 2 degrees scenario report. There was very good feedback on the report. It was agreed that ZEP should consider how to be more assertive in its messaging to increase its reach.

### **3. ZEP Review**

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MD updated the ACEC on the progress of the ZEP Review and presented the draft survey, which was well-received by the ACEC. KBB suggested establishing a list of external stakeholders and considering how to engage with them. There was a concern that without a follow-up mechanism there will be poor response rates. It was agreed that the Secretariat will revise the survey and send it to the ACEC for comment.

### **4. Brussels advocacy**

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GS and LW said there have been limited developments on the topic since the last ACEC.

### **5. Draft AC 56 agenda**

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LW presented the draft agenda. External presentation will include a presentation on the Cost Challenge Taskforce (CCTF), the HyNet project, the OGCI investment mechanisms for CCUS and the European Cement Research Academy. All speakers need to be confirmed.

LW said that Charlotte Morgan will not be able to present on the CCTF. LW will reach out to Patrick Dixon instead.

KBB asked whether the Secretariat could include a session on the Netherlands in relation to the Joint Fact Finding Process. LW agreed to contact Joelle Rekers from the Dutch Government.

### **6. ZEP membership review**

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LW presented the ZEP membership review table. The spreadsheet will be sent to the ACEC for comment. It was agreed that the spreadsheet should be updated every six months.

GS said it will be important to reengage with ExxonMobil and follow-up with the European Turbine Network.

## **7. ZEP Finances**

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LW gave a summary of ZEP finances. One outstanding invoice is due for payment.

JH asked about the progress of the new ZEP grant. LW said ZEP is waiting for formal approval from the Commission to process the new grant.

## **AOB**

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JH presented the INSPIRE project and asked whether ZEP would be interested in joining the project's board. JH and GS agreed to discuss during the next ERG call.

## **Actions**

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Actions		Owner
2.b.	Secretariat to revise ToR of the TWG Policy and Funding and extend membership	Secretariat
2.b.	Secretariat to circulate response to the consultation on long-term emissions reduction strategy	Secretariat
2.c.	LW to contact DG ENER and the IEA to discuss Commissioner Cañete's attendance at the Global CCUS Conference	LW
2.c.	Secretariat to circulate ToR of the IOGP study on hydrogen when available	Secretariat
2.c.	Secretariat and GS to reengage with ExxonMobil	Secretariat, GS
3.	Secretariat to send a revised survey to the ACEC for comment	Secretariat
5.	LW to contact Joelle Reker with regards to the Joint Fact Finding process and a potential presentation at the AC	LW
6.	Secretariat to send the ZEP membership review spreadsheet to the ACEC for comment	Secretariat

## ZEP Advisory Council 56

19<sup>th</sup> September 2018

### *Agenda Item 1.e: Chair's update*

#### ***1.e.I. External meetings***

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The ZEP Chair has participated in a number of meetings with external stakeholders and processes since the last AC55 meeting:

##### 7 June

- **Peter Handley**, DG Grow
- **Montserrat Mir and Benjamin Denis**, ETUC

A summary of these meetings can be found as pre-read 1.e.I.

##### 19 July

- **Maria Velkova** and **Kostis Sanellaris**, DG CLIMA
- **Mauro Petriccione**, Director-General, Climate Action

A summary of these meetings can be found as pre-read 1.e.I.

#### ***1.e.II. SET-Plan IWG9 CCS and CCU update***

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An update on the SET-Plan IWG9 can be found as pre-read 1.e.II.

## ZEP Engagement summary June 2018

### ***Peter Handley, DG GROW***

*Attending: Peter Handley, DG GROW; Graeme Sweeney, ZEP; Nikki Brain, ZEP Secretariat*

- The discussion focused around the Commission's Mid-century Strategy. Peter Handley said this would be launched in November followed by a year of scrutiny from EP and stakeholders. The November Strategy will be the start of a process, not the end.
- PH said that the Strategy will take into account Paris Agreement target; the exact level of ambition is yet to be decided. Could be net-zero by 2050, or later in the century. Junker may say yes to net-zero by 2050 to make a clear political statement about EU leadership.
- PH said that cost-effectiveness "will no longer be enough" in determining solutions; the 2030 strategy was modelled on cost effectiveness and things have happened since to contradict this- fall in price of renewables for example.
- PH said that Energy Intensive Industries have been brought together in an expert group to look at a combined decarbonisation strategy. Previously these had been sector-specific roadmaps. Commission services are supporting the work. PH said that hydrogen, CCUS, and a regional "hub" approach are all being brought up by stakeholders.
- The work of this group is also being input to CLIMA and ENER which want sectoral input.
- PH gave some suggestions of others to speak to regarding the MCS:
  - Lucas Viseck & Tom van Ierland, CLIMA
  - Andrea Tilch, DG RTD
  - Carsten Bermig, Bieńkowska Cabinet

Key people to contact from industry side:

- Axel Eggert EUROFER
- Marco Mensink, CEFIC
- PH said he thought the next roadmap needed to not rely on CCS to solve 25% of emissions; need to be "more creative". He said CCS needs to be demonstrated to be achievable before it can be relied on in roadmaps- "Netherlands and the UK walked away" from their CCS projects.
- GS responded that the design of NER 300 made CCS projects difficult to progress; splitting out T&S key. ZEP shared the "market maker" paper with Peter.
- GS mentioned the prospect of a PCI which would offer a decarbonisation solution for NR-W; PH said this was an interesting development.
- PH said the Commission consultation on the MCS will come out in July alongside expert workshops.

**Action: Secretariat to arrange engagement with those recommended by PH**

European Zero Emission Technology and Innovation Platform

ZEP Secretariat,  
Carbon Capture and Storage Association  
6<sup>th</sup> Floor, 10 Dean Farrar Street, London, UK  
[www.zeroemissionsplatform.eu](http://www.zeroemissionsplatform.eu)

### ***Montserrat Mir and Benjamin Denis, ETUC***

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- ZEP met with the ETUC to understand why they were not currently active within ZEP, and whether there were ways they could become more active going forward.
- Benjamin Denis explained that ETUC work within ZEP had been led by Philip Pearson from the TUC; since he retired no one replaced him. Demand for ETUC involvement in ZEP had previously been driven by the TUC and the Norwegians.
- BD said that ETUC is a membership-led organisation and does not see pressure from members at the moment to focus on CCS. However, it is still an issue- for example Poland still expects to use coal for 50% of its energy in 2050.
- GS said that the Norwegians had been very quiet on CCS in Europe prior to their Parliamentary announcement on the Budget; this may now change.
- GS agreed to speak to the Dutch government about trade union involvement in their climate strategy and CCS programme.
- BD confirmed that IndustriALL were participating in the work being undertaken in DG GROW on industrial roadmaps.
- It was agreed that while ETUC may not have capacity to actively contribute to the Working Groups, work of particular interest could be shared for comment.

**Action: GS to follow up with Dutch government regarding trade union views on CCS**

**Action: Secretariat to share "Below 2 Degrees" work with ETUC**



# **ZEP Engagement Programme**

## **19 July - Recap Note**

### **CONFIDENTIAL**

#### ***Introduction and key outcomes***

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Graeme Sweeney, Jonas Helseth and Nikki Brain met with Maria Velkova and Kostis Sanellaris, DG CLIMA and Mauro Petriccione, Director-General DG CLIMA.

#### **Key outcomes:**

- Maria Velkova and Kostis Sanellaris made ZEP aware that responses to the Long Term Strategy consultation should be submitted as soon as possible to ensure they are taken into account by the consultants.
- Maria Velkova told ZEP that DG ENER is about to complete a project called ASSET which studies among other things the potential for SMR with CCS for hydrogen production.
- Kostis Sanellaris said that public perception is still seen as a limiting factor for CCS; ZEP discussed the growing understanding of the need for CCS for industry especially in EU countries
- The opportunity for reuse of gas networks for hydrogen was explored; ZEP agreed to send DG CLIMA some work on statutory instruments to facilitate a switch to hydrogen in countries with gas networks for heat.
- Mauro Petriccione said that CCS continued to be of interest, and that he saw negative emissions, not CCS, as the “moral hazard”.
- Mauro Petriccione said that the previous roadmaps for the EU relied too heavily on CCS and the long term strategy will explore alternative routes.
- Mauro Petriccione was particularly interested in ZEP’s ideas around funding T&S separately to capture, and how T&S could be developed as a regulated asset. ZEP agreed to follow up with further information. He was also very interested in the opportunity for “blue” hydrogen with CCS.

#### **Key follow up actions:**

- ZEP to produce a piece of work on statutory instruments to facilitate the switch to hydrogen for heat
- ZEP to share with Mauro Petriccione a proposal for funding T&S through a RAB-based model
- ZEP to share Market Maker proposal and Executable Plan with Mauro Petriccione

Please find below a detailed overview of the meetings.

***Maria Velkova and Kostis Sanellaris, DG CLIMA***

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- Tom Van Ierland was called away at the last minute; Maria and Kostis passed on his apologies
- MV and KS stressed that the sooner the long term strategy response was received, the more likely it is to be taken into consideration by the consultants undertaking analysis.
- KS said that modelling will be part of the work of work but the LTS will take account other evidence. KS said the previous roadmaps were too heavily focused on modelling.
- It was agreed that publication in November would be the beginning of a conversation, and allow the process to be continued in a new Parliament and Commission.
- GS said that ZEP's Market Economics 5 (ME5) report had modelled weather and land footprint of renewables, which demonstrated that space for renewable generation is a significant constraint to a fully electrified energy system. KS said that Tom van Ierland liked the graph in ZEP's CCU report on renewable demand for electrification of industry.
- KS and MV said that DG ENER would publish its final report on its ASSET project on modelling assumptions by the end of July. MV said that electrolysis and SMR were discussed during the ASSET consultation, and it was concluded that the cost of renewables would determine what will be most cost-effective. MV said that CLIMA wants to discuss these options with modellers as extensively as possible
- GS said lack of certainty around future technology options makes retailing the option of CCS highly valuable. MV said it has been slow to deliver CCS; it will be possible to build a green hydrogen steel plant at full-scale by 2050. Time is needed to put these new technologies in place.
- MV asked whether ZEP can find/ create a study to look at feasibility to actually replace existing steel plants, for example as this is a limitation in current models.
- KS also raised public acceptance of CCS as a potentially limiting factor. GS said that in Germany the conversation was shifting, as BMU studies demonstrated CCS would be needed for industry. Public opposition is to onshore storage; offshore storage would remove much of this problem; for example shipping CO2 from North-Rhine Westphalia to the Port of Rotterdam.
- KS said that CCS is always present in the PRIMES modelling, but that in 2011 it was overdone in the roadmaps. KS said this work would look at alternative options including hydrogen, electrification and efficiency of heat.
- The opportunity of hydrogen through SMR for large-scale heat was discussed. KS questioned whether it is feasible in most countries if they have not planned conversion of the gas networks to new materials as in the UK. JH pointed out that upgrades could be factored in to maintenance if a statutory instrument was used. He said boilers were being changed out in Belgium to move to Norwegian gas; such opportunities could be used to enable hydrogen. KS said this was interesting. GS agreed ZEP could produce some work on statutory instruments for hydrogen for heat.

### ***Mauro Petriccione, Director-General, Climate Action***

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- MP outlined the timetable for the long-term strategy, saying that following the initial proposal in November, there will be a political process towards the Council in May next year; and a technical process by the end of 2019.
- MP said that a fully decarbonised energy supply is conceivable objectively but that the picture may change when looking at industry. Paths go through a drastic increase in energy supply. There isn't enough evidence yet to articulate the issue for public debate.
- MP said that he saw negative emissions as a moral hazard, rather than CCS itself, as negative emissions are a reason to delay action.
- On CCS MP said there is a degree of disappointment in the lack of deployment we have seen compared to what was expected in the last roadmap. The roadmap also didn't see the rapid deployment of renewables. MP said he continues to be interested in CCS.
- MP agreed with ZEP on the rigidity of NER 300, and said it was set up to reward successful innovators rather than sharing risk with innovators. He said that this is a way the Innovation Fund will be significantly different. MP said he was very interested in funding credible CCS projects.
- MP asked several questions of ZEP; firstly on the feasibility of creating part-chain projects for industry; secondly on cost; thirdly on ZEP's concept of T&S as a regulated utility; and lastly on the viability of using infrastructure for both CO<sub>2</sub> and hydrogen. MP said he had little interest in gas as a "lesser evil"; however if used for hydrogen production, he was sceptical but more interested.
- GS said that if infrastructure is to be available at a cost that is acceptable to industry, it largely removes the incentive to build it as a private investment. Therefore creation of infrastructure as a public good on a regulated basis can overcome this problem.
- MP said he thought storage would be difficult to fund under the Innovation Fund. ZEP agreed to share the "Market Maker" paper and follow up with further information on RAB-based funding in the coming months.
- On infrastructure, GS spoke about the value of creating clusters, potentially with hydrogen included, to maximise value. JH said that alongside the Port of Rotterdam and the UK, the industrial roadmaps in Sweden have concluded CO<sub>2</sub> storage will be needed.
- On cost, JH said that industrial costs for capture for cement and steel have been inflated, and this can be done between €20-30/tonne with existing tech. However there is no incentive to do. MP said there was a question around profit levels in a business as usual scenario. The long-term strategy aims to inject a "dose of reality" to demonstrate that some activities simply won't be investible by 2040 without a low-carbon solution. JH said the Port of Rotterdam has been clear about this to the industries operating in the Port.
- MP said he wants a clear set of options on the long term strategy which he can hand to his new commissioner, and to hand the next Commission a plan of action to 2050 which will enable them to begin looking at intermediate regulation (post-2030).
- MP asked ZEP to send reading material on the topics covered. GS said ZEP would produce something on hydrogen to share in the coming months.

## ZEP Advisory Council 56

19<sup>th</sup> September 2018

### *Agenda Item 1.e.II: SET-Plan IWG9 update*

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The 'Implementation Working Group' IWG 9 has been established to support delivery of the research and Innovation (R&I) activities required to achieve the targets for CCS and CCU for 2020 agreed by the European Commission, SET-Plan countries and industry. The IWG9 is co-Chaired by William Christensen, Norway; Joelle Rekers, Netherlands and Graeme Sweeny, ZEP.

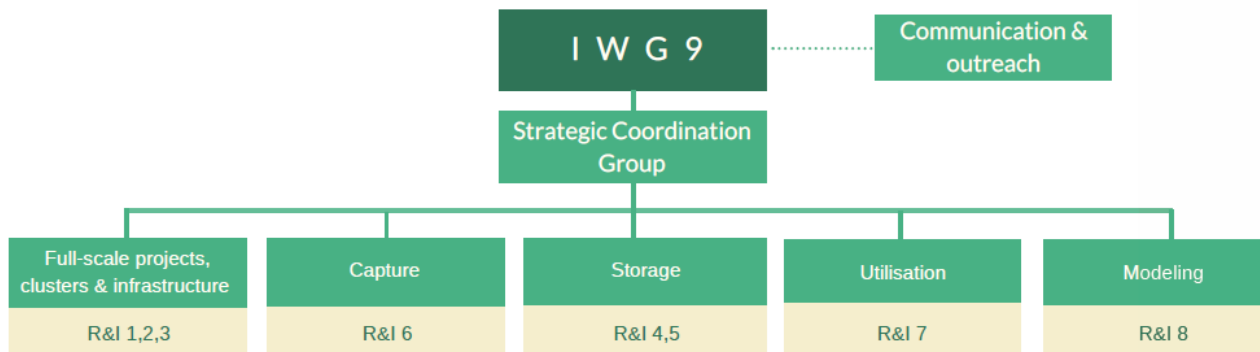
Full details on the R&I activities can be found in the CCUS Implementation Plan:

[https://setis.ec.europa.eu/system/files/set\\_plan\\_ccus\\_implementation\\_plan.pdf](https://setis.ec.europa.eu/system/files/set_plan_ccus_implementation_plan.pdf),

The IWG9 has established five thematic subgroups to help support delivery of the R&I activities (see figure below). Each of the subgroups will be populated by experts in that thematic area – e.g. from national governments, industry and the research community – that can help realise delivery of the R&I activities. Where R&I activities are in related areas these will be combined under the subgroups. Two co-leads are sought for each of the IWG9 subgroups and are in the process of being identified. Subgroup draft terms of reference and work plans will be discussed and reviewed during the next IWG9 plenary meeting which takes place on the 20<sup>th</sup> September in The Hague. The objectives of the plenary meeting on 20<sup>th</sup> September are to initiate the work of IWG9 and develop the subgroup terms of reference, membership and forward work plans.

The Commission opened a call under H2020 to provide resources to support and coordinate the IWG9's activities. This call closed on 11<sup>th</sup> September and if a successful bid is received then this would result in significantly more resource being available from around the turn of the year to support delivery of the activities. To date the support to the IWG9 has been provided by the ZEP secretariat.

A consortium led by CCSA as well as CO2 Value Europe, British Geological Survey, Sintef have submitted a proposal to H2020 to provide the support to the IWG9. It is not known if other proposals have been submitted to provide these services. The Commission is expected to share its decision in Q4 2018 / Q1 2019.



## IWG 9 Subgroups

### 1. Full-scale projects, clusters & infrastructure

Confirmed co-leads: Lamberto Eldering & Brian Murphy

- **R&I Activity 1:** Delivery of a whole chain CCS project operating in the power sector (target 1)
- **R&I Activity 2:** Delivery of regional CCS and CCU clusters, including feasibility for a European hydrogen infrastructure (target 2, 3, 10)
- **R&I Activity 3:** EU Projects of Common Interest for CO2 transport infrastructure (target 4)

### 2. Capture

Confirmed co-lead: Marie Bysveen

- **R&I Activity 6:** Developing next-generation CO2 capture technologies (target 6)

### 3. Storage

Confirmed co-leads: Jonathan Pearce & Ton Wildenborg

- **R&I Activity 4:** Establish a European CO2 Storage Atlas (target 5)
- **R&I Activity 5:** Unlocking European Storage capacity (target 7)

### 4. Utilisation

Confirmed co-lead: Damien Dallemagne

- **R&I Activity 7:** CCU Action (target 8, 9)

### 5. Modeling

Confirmed co-lead: ZEP Secretariat / Luke Warren

- **R&I Activity 8:** Understanding and communicating the role of CCS and CCU in meeting European and national energy and climate change goals (target 10)

## **Targets for CCS and CCU under the SET-Plan Action 9**

The agreed specific targets addressed in this Implementation Plan have been defined in the Declaration of Intent under SET Plan Action 9:

**Target 1:** At least one commercial-scale, whole chain CCS project operating in the power sector.

**Target 2:** At least one commercial scale CCS project linked to an industrial CO<sub>2</sub> source, having completed a FEED study.

**Target 3:** SET Plan countries having completed, if appropriate in regional cooperation with other MS, feasibility studies on applying CCS to a set of clusters of major industrial and other CO<sub>2</sub> sources by 2025-2030, if applicable involving cooperation across borders for transporting and storing CO<sub>2</sub> (at least 5 clusters in different regions of the EU).

**Target 4:** At least 1 active EU Project of Common Interest (PCI) for CO<sub>2</sub> transport infrastructure, for example related to storage in the North Sea.

**Target 5:** An up-to-date and detailed inventory of the most suitable and cost-effective geological storage capacity (based on agreed methodology), identified and accepted by various national authorities in Europe.

**Target 6:** At least 3 pilots on promising new capture technologies, and at least one to test the potential of sustainable Bio-CCS at TRL 6-7 study.

**Target 7:** At least 3 new CO<sub>2</sub> storage pilots in preparation or operating in different settings.

**Target 8:** At least 3 new pilots on promising new technologies for the production of fuels, value added chemicals and/or other products from captured CO<sub>2</sub>.

**Target 9:** Setup of 1 Important Project of Common European Interest (IPCEI) for demonstration of different aspects of industrial CCU, possibly in the form of Industrial Symbiosis.

**Target 10:** By 2020, Member States having delivered as part of the Energy Union Governance their integrated national energy and climate plans for after 2020, and having identified the needs to modernise their energy system including, if applicable, the need to apply CCS to fossil fuel power plants and/or energy and carbon intensive industries in order to make their energy systems compatible with the 2050 long-term emission targets.