ZEP Advisory Council 51

13th September 2017

Agenda Item 10: ERG update

11.a ERG Update

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

11.b Final new ZEP Narrative (amended)

Appended to this paper is the final new ZEP Narrative (amended).

The AC is invited to approve the final new ZEP narrative (amended).

11.c International collaboration

Appended to this paper is the latest agenda and proposed speakers for the joint COP23 CCS event in the EC pavilion.

11.d Clean Hydrogen workshop

Appended to this paper is the latest version of the concept note for the Clean Hydrogen workshop.

11.e Summary of external engagements

Appended to this paper is a summary of the following two meetings which took place on the 30th August with the Secretariat:

- **Lineke den Ouden**, Energy Attaché at the Permanent Representation of the Netherlands to the EU
- **Mark Van Stiphout**: DG ENER (H2020 and smart funding pathway)

ZEP Advisory Council 52

13th September 2017

Agenda Item 10.a: ERG update

ERG co-chairs: Mark Downes (Shell), Jonas Helseth (Bellona)

Final new ZEP narrative (amended)

On the 4th July, the ACEC held an away day. It was agreed that the new ZEP narrative required a further update to ensure alignment with the priorities agreed at the ACEC away day.

The narrative was updated accordingly and circulated to the ACEC for final comments on the 17th August. These comments have now been incorporated and the final new ZEP narrative (amended) can be found as pre-read 11.b.

The AC is invited to approve the final new ZEP narrative (amended).

Media

New ZEP members press release

On the last ERG strategy call held on the 17th August, it was agreed that ZEP should issue a press release in the week commencing 4th September, to welcome four new ZEP members:

- Port of Rotterdam
- Heidelberg Cement
- Total
- Geo Eco Mar

Energy Post article and response

On the 3rd August, Energy Post published the article The carbon-capture dream is dying. It was felt that the article struck an unnecessarily negative tone regarding the future of CCS in Europe and that ZEP should respond. Energy Post does not have an option to submit letters to the editor, therefore ZEP submitted a comment on the article webpage instead. In addition, The Editor-in-Chief at Energy Post has offered ZEP the opportunity to develop an op-ed. It is proposed to link this op-ed to the ZEP new members press release in the week commencing 4th September.

Other editorial opportunities

On the August ERG strategy call, it was agreed that ZEP should secure another op-ed to coincide with the SET-Plan Steering Committee meeting on the 27th September.

ZEP has also received two editorial invitations; from Pan European Networks and European Energy Innovation. The ERG is considering these opportunities.

The AC is invited to note these media activities.

International collaboration

COP23

CO_2GeoNet is leading a proposal to apply for a joint CCS side event in the EC pavilion at COP23. ZEP has been invited to be a partner. On the August ERG strategy call, it was agreed that ZEP should accept this invitation as it offers an important opportunity to emphasise the new ZEP narrative and recent reports. Charles Soothill is already confirmed to give a presentation on the ME5 report and Rob van der Meer has also been invited to speak. The latest agenda (including proposed speakers) for the joint CCS side event can be found as pre-read 11.c.

It will be useful to understand which ZEP stakeholders will be attending COP23 and whether they are interested in receiving any support in the form of CCS messaging.

The AC is invited to note these developments and discuss which stakeholders are attending COP23 and whether any communications support is required.

CSLF

CCSA and CO_2GeoNet have been invited by the CSLF secretariat to lead the EU region process for developing stakeholder messages ahead of the next CSLF Ministerial meeting which will be held in Abu Dhabi in December. A discussion was held on the August ERG strategy call as to whether ZEP should also be involved in a supporting role given its link with European stakeholders. It was also agreed that ZEP should support the event and seek a speaking slot at the CSLF stakeholder meeting on the 6th October and that Graeme Sweeney will attend this meeting.

The AC is invited to note these developments.

Clean Hydrogen workshop

The secretariat has updated the Clean Hydrogen workshop internal concept note and draft agenda.

This note can be found as pre-read 11.d.

The AC is invited to note these developments.

European Zero Emission Technology and Innovation Platform

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

www.zeroemissionsplatform.eu

Final New ZEP Narrative (amended)

Weber Shandwick

August 2017

The proposed storyline

KEY MESSAGE DASHBOARD:

- The objective agreed in Paris to keep global warming to well below 2 °C and pursue efforts to limit the increase to 1.5 °C has generated a renewed momentum for CCS to be a part of the portfolio of technologies that can deliver net zero emissions . We need all the low carbon technologies we can get to achieve this objective. The good news is that the roll-out of CCS in Europe is progressing, with a range of projects in the Netherlands and Norway, and new projects continue to be launched around the globe. CCS technology is ready for deployment and the long term business case has been made, but more needs to be done in order to fully reap the benefits of CCS in the future. Long term thinking and timely action are of the essence.

- **Net Zero Emissions**: CCS is the only technology which can substantially reduce emissions in many industrial processes(e.g. steel, iron and cement production) leading to the delivery of low-carbon products, produce clean hydrogen which can be used to decarbonise power, heating and transport, and play a key role in the transition to a near zero emissions power sector. The value of CCS to these sectors is significant - ZEP's analysis shows that delaying CCS deployment to 2035 would cost power and industry sectors an extra €200 billion to reach the EU's 2050 target. At the same time, ZEP's analysis shows a strong business case for CCS, with the value of CCS for the EU exceeding €1 trillion between now and 2050 and more than €50 billion per year thereafter. The key to delivering CCS in these sectors lies in the development of CO_2 transport and storage infrastructure. The early establishment of CCS infrastructure in key European industrial regions creates a strategic asset for Europe and is the catalyst that will enable a net zero emissions future for industry, heat, power and transport.

- **A Sustainable Future for Key Regions**: To ensure regions such as the Port of Rotterdam, Teesside and Norway remain competitive, solutions must be found that lead to sustainable futures. CCS has the potential to play a crucial role in maintaining and creating low carbon industries, delivering regional jobs and growth and ensuring clean air and energy in these regions. Many of Europe's industrial and power emitters are already located in key regional clusters, and these clusters should be able to connect to regional CO_2 hubs via national and cross-border CO_2 transport and storage infrastructure. This allows such clusters to reconcile continued growth with cutting carbon emissions, transforming into drivers of sustainable economic zones and generating new jobs across the economy. The development of regional CO_2 hubs also opens up other opportunities such as Carbon Capture and Utilisation (CCU), Enhanced Oil Recovery, and links to heat and hydrogen networks.

©WEBER SHANDWICK 2017 All rights reserved

- **Meeting EU Climate Goals:** Meeting the Paris Agreement goal of limiting the global temperature increase to well-below 2°C will be incredibly challenging. Even with the current Intended Nationally Determined Contributions (INDCs) under the Paris Climate Agreement the world will very likely exceed the 1.5˚C limit significantly, implying a massive emissions gap. CCS will be absolutely critical if we are to ensure the lowest-cost route to meeting this goal and enabling the EU to reach its long-term aim of reducing CO_2 emissions by 80-95% in 2050. In particular, sustainable use of Biomass/Biofuels combined with CCS (Bio-CCS) is needed for negative CO_2 emissions. Long term thinking combined with timely action are essential if we want CCS to play its part in the net zero emission vision of Europe and enable it to lead globally in CCS innovation and deployment.
- **CONCLUSION:** CCS projects are marching ahead, and there are now 21 large-scale CCS projects in operation or under construction globally. Europe needs to take action now to develop CCS, ensuring the lowest cost route to meeting climate goals whilst delivering secure and reliable energy products and services. Without Carbon Capture Utilisation and Storage (CCUS), European competitiveness will be in doubt. We need a policy framework that incentivises the capture and storage of CO_2 and facilitates an environment in which follow-on projects and investments can develop. Above all, we need to put in place the investment and financing models to realise the cross-border transport and storage infrastructure that facilitates future hubs – which will contribute to sustainable growth in key regions across Europe. Collaboration between governments, and between government and industry, will be key to developing shared CCS infrastructure, realising cost reductions and deploying CCS at the scale required.

THE NARRATIVE:

The context

The agreement in Paris to keep global warming to well below 2 °C and pursue efforts to limit the increase to 1.5 °C has generated a renewed momentum for CCS to be a part of the portfolio of technologies that can deliver Net Zero Emissions (NZE)[1]. We need all the low carbon technologies we can get to achieve this goal. The good news is that the roll-out of CCS in Europe is progressing, with a range of projects in the Netherlands and Norway, and new projects continue to be launched around the globe. But more needs to be done to fully reap the benefits of CCS in Europe, enabling the lowest cost route to reducing Europe's emissions and helping to achieve a sustainable future for key regions such as the Port of Rotterdam. Long term thinking, collaboration between governments and between government and industry stakeholders, and timely action are of the essence.

International and European stakeholders are increasingly recognising the essential role of CCS in bringing about sustainable regional growth – both in the short-term and medium to long-term. Yet emitting CO_2 into the atmosphere is currently much cheaper than storing it safely underground. We need to change

[1] Net Zero Emissions (NZE) is the balancing of carbon dioxide released with an equivalent amount sequestered or offset. They are offset with a set of practices known as negative emissions technologies (NET).

©WEBER SHANDWICK 2017 All rights reserved

this situation and enable CCS to play a vital role in delivering NZE for our citizens, as well as economic prosperity for our industrial centres. This requires us to embed CCS in EU policies to ensure a long-term vision to 2050, including concrete measures to ensure the timely deployment of this indispensable technology.

CCS as a path towards NZE

CCS is an essential component of delivering NZE, while at the same time providing major opportunities to boost the competitiveness of Europe's economies. CCS is the only technology which can lower emissions in industrial applications, produce clean hydrogen which can enable low-carbon power, heating and transport, and play a key role in the transition to a near zero emissions power sector. (5)

Energy-intensive sectors, which make products such as iron and steel, chemicals and cement, accounted for a quarter of EU CO_2 emissions in 2010, and they cannot meet their climate objectives without CCS. (8) To realise the global warming objective agreed in Paris, Europe's industrial CO_2 emissions will need to fall even faster and further than previously foreseen, while preventing carbon leakage caused by industries moving to countries with less ambitious climate policy. (5) CO_2 transport networks and permanent CO_2 storage will be required in Europe to help deliver NZE and enable the roll-out of low-carbon products. (24)

CCS also has major potential for innovative applications. It is for example widely recognised that clean hydrogen (CCS on natural gas) can play a key role in the energy transition and could also act as an early enabler of a hydrogen economy. Low cost clean hydrogen can be leveraged to reduce emissions across the heat, power and transport sectors. Hydrogen can be produced through electrolysis or the application of CCS on natural gas to hydrogen production units. ZEP's research shows that, depending on location specifics, clean hydrogen is currently capable of delivering the same hydrogen cost as that projected to be achieved by the renewables route in 10 to 25 years. Moreover, clean hydrogen can play a major role in ensuring the future security of electricity supply by guaranteeing resource adequacy through sufficient generation and flexibility. A major advantage is that hydrogen can be stored more easily than electricity, neutralising the intermittency problems of wind and solar energy production. (23) Furthermore, the natural gas infrastructure that feeds the hydrogen production can also act as a significant energy store.

Delivering a NZE energy system for Europe will be increasingly important as the number of European citizens continues to increase. CCS can substantially reduce emissions from remaining fossil fuel electricity generation and thereby boost optionality in Europe's energy system. On the one hand, CCS facilitates the integration of renewables with lower CO_2 backup power. This complements capacity factors for solar and wind relating to the realistic limit for their deployment per country on a land-use basis and demonstrates that CCS and renewables are not in competition but complement each other. (22) On the other hand, sustainable use of Biomass/Biofuels combined with CCS is needed for negative CO_2 emissions. CCS will need to deliver 32% of the extra effort to move from a 2°C scenario to well below-2°C according to the

©WEBER SHANDWICK 2017 All rights reserved

IEA's 2017 Energy Technology Perspectives report. A substantial proportion of this effort will need to be met by sustainable Bio-CCS (BECCS). (4)

The key to delivering CCS in these sectors lies in the development of CO_2 transport and storage infrastructure. The early establishment of CCS infrastructure in key European regions creates a strategic asset for Europe and is the catalyst that will enable NZE. Collaboration between Member States will be necessary to share the cost of this initial infrastructure, realising economies of scale and ensuring deployment of CCS at the scale required.

A 'Market Maker' approach could be an effective and cost-efficient mechanism for accelerating the adoption of CCS technologies in these sectors and the deployment of the CO_2 infrastructure. Market Makers, either a state-owned or regulated private entity, can develop this necessary infrastructure, collect CO_2 from power and industrial facilities for transport and storage, and take the operational storage risk needed to safeguard the CCS value chain. (18) An example where this model could be implemented is hydrogen production equipped with CCS in low carbon industrial clusters - where several large users for hydrogen can co-exist. In addition to a Market Maker, this will require collaboration along the clean hydrogen value chain and local clusters for synergies with CCS. (23) To realise the benefits of hydrogen, it is important that Governments and the European Commission work with stakeholders to understand the steps necessary to realise hydrogen markets in the industry, transport, heating and cooling sectors.

CCS and regional growth - CCS is necessary in the short-term to ensure a sustainable future for key regions in Europe

To support regions such as the Port of Rotterdam, Teesside and the Norwegian cluster, solutions must be found that lead to sustainable futures. These regions must consider a variety of options to maintain and create low carbon industries, deliver regional jobs and growth and ensure clean air and energy for their citizens. CCS is one solution that can deliver benefits across all these aspects and through the development of CO_2 gathering networks and clusters, linked to CO_2 storage hubs, CCS enables the lowest cost route to sustainable regional growth. (9)

By developing regional CCS infrastructure that services a number of sectors (including energy intensive industries), CCS can safeguard and boost the global competiveness of these industries – enabling companies to reduce their CO_2 cost-effectively whilst creating a competitive advantage through the delivery of low-carbon products. These sectors make a vital contribution to regional growth and jobs – for example in 2013 these industries employed approximately 1.3 million people across Europe and the European Commission has previously set a target to boost the share of the industrial sector in EU GDP to 20% by 2020. (14).

Many of Europe's industrial and power emitters are already located in key regional clusters, and these clusters should be able to connect to regional CO_2 hubs via national and cross-border CO_2 transport and storage infrastructure. This allows such clusters to reconcile continued growth with cutting carbon

©WEBER SHANDWICK 2017 All rights reserved

emissions, transforming into drivers of sustainable economic zones and ensuring a sustainable future for key European regions. Developing such low-carbon zones can also generate new jobs across the economy. ZEP's own modelling shows that deploying CCS in Europe will create and secure an estimated total of 330.000 jobs in fuel supply, CCS equipment manufacture, plant operation and CO_2 storage facility operation. The development of regional CO_2 hubs also opens up other opportunities such as Carbon Capture and Utilisation (CCU), Enhanced Oil Recovery, and links to heat and hydrogen networks.

Norway and the Netherlands are already pursuing a hubs and clusters strategy to enable sustainable regional growth. Together with industrial partners, Norway is developing an industrial CCS cluster to enable low-carbon cement and chemicals production, and generate energy from waste. Norway is also mapping safe and long-term storage spaces, which could be connected with other point sources around the North Sea basin. The Dutch Government has also signalled its commitment to delivering CCS; the Port of Rotterdam for example has the potential to become a North Sea hub for CO_2 transport, receiving CO_2 from across Northwest Europe to dispatch to offshore stores. (9)

But time is of the essence. Post-demonstration costs of CCS range from €70/MWh (coal-CCS) to €95/MWh (gas CCS) and these costs must come down quickly to ensure that CCS is competitive with other low-carbon technologies in the late 2020s – helping to deliver secure and reliable energy products and services. (26) Investment in European CO_2 transport and storage infrastructure must start now in order to deploy CCS widely from 2025 – a delay of even 10 years will cost power and industry an extra €200 billion to reach the EU climate targets. It will also result in a forced doubling of the annual CCS deployment rate for power, which is unrealistic given supply constraints for the delivery of power plants, CCS infrastructure and the necessary skills. (8)

CCS and climate - CCS is necessary in the medium to long-term for Europe to achieve its climate goals

The International Energy Agency (IEA) projected that a least-cost 2°C pathway requires the capture and storage of close to 4,000 million tonnes of CO_2 per year in 2040. (3) The Intergovernmental Panel on Climate Change (IPCC) meanwhile stated that achieving 450 parts per million of CO_2 in the atmosphere by 2100 (equal to the 2°C pathway) without CCS would lead to a mitigation cost increase of 138%. (2) And the IEA Energy Technology Perspectives 2017 report concludes that CCS will need to make up 32% of the extra effort to move from a 2°C scenario to well below-2°C. (4) This shows that a 1.5˚C pathway will be even more challenging and expensive without CCS.

Meeting the Paris goals will be a major challenge. Even with the current Intended Nationally Determined Contributions (INDCs) under the Paris Climate Agreement the world will exceed the 1.5˚C limit significantly, implying a massive emissions gap (13). This makes CCS a critical component for Europe and the world to achieve long term climate goals. Long term thinking, collaboration – between governments and between government and industry – and timely action are essential if we want CCS to play its part in enabling the lowest-cost route to meeting the EU's 2050 target and ensuring the long-term competitiveness of vital European industries.

©WEBER SHANDWICK 2017 All rights reserved

Conclusion - Action is required for CCS to succeed in Europe

CCS is already a reality. 38 large-scale CCS projects are either in operation, under construction or in various stages of development planning around the world. Furthermore, there are many hundreds of pilot, demonstration-scale projects and other CCS initiatives currently being pursued. (6) While Europe is lagging behind other parts of the world, the Zero Emissions Platform is working with several European countries and other stakeholders in a 'Temporary Working Group' under the EU's Strategic Energy Technologies Plan (SET-Plan) to deliver on the SET-Plan actions agreed for CCS and CCU. Together they will present an implementation plan towards the end of 2017, translating commitments into concrete actions. This Temporary Working Group has recently proposed an ongoing work programme (beyond 2017) to ensure the SET-Plan actions are delivered.

To realise the roll out of CCS across Europe and enable a sustainable future for key EU regions, we need a **policy framework that creates the conditions for private companies to invest in the capture and storage of CO_2**. Member States should be required to consider CCS as part of their national energy and climate plans under the EU Energy Union governance process. They should ensure that their targets and measures are in line with the EU 2050 Roadmap, as there are multiple decarbonisation pathways. As part of their national plans, Member States should be encouraged to work collaboratively with other Member States to look for decarbonisation solutions at a regional level, linking countries with limited accessible CO_2 storage capacity to those that have storage opportunities. (18)

This is however only feasible if we **put in place the right financing models** needed to drive the regional and cross-border infrastructure that enables CO_2 hubs and realises cost reductions. The EU ETS should remain the central tool of EU climate policy, but the CO_2 price is currently too low and will likely remain so through the 2020s to drive the necessary investments in CCS. ZEP's analysis shows that this price would need to reach €35/tonne of CO_2 for CCS to become commercial and cost-competitive with unabated power plants. (26) Transitional measures are therefore vital to cover the incremental costs of early deployment projects which can enable the wider roll-out of CCS in Europe. This includes creating fit-for-purpose funding for CCS infrastructure development through the proposed Innovation and Modernisation Funds, regional and structural funds, Horizon 2020 and potential Projects of Common Interest (PCIs) under the Connecting Europe Facility (CEF). In fact, the first proposals for CO_2 transport projects have been submitted to the 2017 PCI list. The Innovation Fund could also be used to finance the Market Makers which can trigger early development of large-scale CO_2 storage. (18)

We know that CCS is indispensable for Europe to achieve its climate goals at least cost, that it is key to delivering lower emissions in energy intensive industries and power, and that it brings significant benefits to society. We also know that CCS can enable clean hydrogen on a large scale, which can help to decarbonise the heat and transport sectors, and that it is a key technology to achieve negative emissions – through the combination of bio-energy and CCS (Bio CCS or BECCS) – in the future. It is clear that we need the right financing mechanisms to build the regional and cross-border CO_2 infrastructure necessary to realise sustainable growth in key regions across Europe. We must now act realistically, collaboratively,

©WEBER SHANDWICK 2017 All rights reserved

and – above all – immediately to ensure that CCS becomes a key enabler of sustainable growth in Europe. This will ensure that Europe meets its long term climate targets, remains competitive internationally and delivers secure and reliable energy products and services.

***

©WEBER SHANDWICK 2017 All rights reserved

LEGEND:

1) Paris Climate Agreement, 2015.
2) IPCC, 2014. Climate Change 2014: Synthesis Report Summary for Policymakers to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Switzerland
3) IEA, 2016. Energy Technology Perspectives 2016: Towards Sustainable Urban Energy Systems. France
4) IEA, 2017: Energy Technology Perspectives 2017: Catalysing Energy Technology Transformations, France
5) IEA, 2016. 20 Years of CCS: Accelerating Future Deployment. France
6) GCCSI, 2016. The Global Status of CCS: 2016. Summary Report. Australia
7) IEA, 2016: World Energy Outlook: Executive Summary. France
8) ZEP, 2015. CCS for industry - Modelling the lowest-cost route to decarbonising Europe. Belgium
9) ZEP, 2016. Identifying and Developing European CCS Hubs. Belgium
10) UK Department of Energy & Climate Change. 2013. The potential for reducing the costs of CCS in the UK. UK
11) Watson, R., 2014. CCS Technology Powering the Future in Saskatchewan. Hitachi Review, 63(7). Canada
12) Grantham Institute, 2015. Policy Brief on Bridging the gap: improving the economic and policy framework for carbon capture and storage in the European Union. UK
13) Oxford University, 2015. Working Paper on Stranded Carbon Assets and Negative Emissions Technologies. UK
14) TUC and CCSA, 2014. The economic benefits of carbon capture and storage in the UK. UK
15) ZEP, 2013. Recommendations for transitional measures to drive deployment in Europe. Belgium
16) UNEP, 2016. The Emissions Gap Report. Kenya
17) ZEP, 2016. Carbon Capture and Utilisation. Belgium
18) ZEP, 2015. An Executable Plan for Enabling CCS in Europe. Belgium
19) CCSA & TUC, 2014. The economic benefits of carbon capture and storage in the UK. UK
20) EU, 2011. EU Energy Roadmap 2050. Belgium
21) ZEP, 2017. Future CCS technologies. Belgium
22) ZEP, 2017. CCS and Europe's Contribution to the Paris agreement - Modelling least-cost CO2 reduction pathways. Belgium.
23) ZEP, 2017. Commercial Scale Feasibility of Clean Hydrogen. Belgium
24) ZEP, 2017. Fast Track CO2 Transport and Storage for Europe. Belgium
25) IEA, 2015. Carbon Capture and Storage: The solution for deep emissions reductions. France
26) ZEP, 2011. The Costs of CO_2 Capture, Transport and Storage. Belgium

©WEBER SHANDWICK 2017 All rights reserved

ZEP Advisory Council 52

13th September 2017

Agenda Item 10.c.: ZEP Clean Hydrogen Workshop internal concept note

Workshop focus and objectives

Awareness-raising of clean hydrogen with CCS and promotion of the ZEP report:

It is clear that clean hydrogen has a prominent role to play in Europe's energy transition in the decarbonisation of the EU power, transport and heating sectors. At the same time, this potential can only be realised through coherent regulatory and financial support measures. The workshop will provide the opportunity to increase understanding of clean hydrogen within the EU institutions, review current policies and support mechanisms, and build relationships with a wider range of stakeholders within the hydrogen space. This will also be an opportunity to promote the ZEP report: *Commercial Scale Feasibility of Clean Hydrogen* and its recommendations, alongside an accompanying op-ed piece.

Identifying early enablers for clean hydrogen in Europe:

The workshop will provide the opportunity for ZEP to engage with the Commission around a number of developing policy initiatives and support mechanisms for clean hydrogen published as part of the Clean Energy Package, in particular the legislative proposal on electricity market reform (EMR) and the Communication on accelerating clean energy innovation.

There is currently some uncertainty over whether clean hydrogen projects will remain eligible for funding from the EIB under proposals for the InnovFin and the Clean Transport Facility instruments, where a significant portion of unspent NER300 funds are expected to be allocated. It is therefore important that clean hydrogen projects remain supported in an effective and flexible manner during the next stages of their design. Reference to clean hydrogen with CCS in the Finance for Innovation: towards the ETS Innovation Fund summary report is currently included under the term 'green hydrogen'. Further discussion is needed to ensure that this does not contradict guidelines for green hydrogen adopted by the CertiHy scheme (outlined further below) and to ensure that clean hydrogen remains supported under the proposals as they develop. The workshop will provide the opportunity to address this and other questions around support for hydrogen within the Innovation Fund, prior to public consultation in early 2018.

The CertiHy project established the first EU-wide Guarantee of Origin for hydrogen at the end of 2016. Under these guidelines hydrogen may be certified as 'CertiHy Low-GHG Hydrogen', where the emissions intensity of its production is lower than that of the standard route of SMR without CCS. A portion of this may also be labelled 'CertiHy Green-Hydrogen', directly proportional to the share of renewable energy

used in its production. At present there is no distinction under this scheme for clean hydrogen with CCS and the workshop provides an opportunity to evaluate potential options for clean hydrogen under this scheme.

Further opportunities for clean hydrogen may arise from it potentially being awarded European Advanced Fuel Status, with EASE recommending that hydrogen be included as an Advanced Biofuel.

The ZEP report: Commercial Scale Feasibility of Clean Hydrogen emphasises the importance of industrial regions and CCS hubs in accelerating the hydrogen economy and developing wider CO_2 transport and storage infrastructure in Europe. Speakers for the workshop could be invited to represent the following initiatives based in the Rotterdam region, which all plan to utilise existing oil and gas infrastructure for transport and storage of hydrogen:

- **Port of Rotterdam Authority:** The Port is a cofounder of the National Hydrogen Platform, and is currently exploring options to repurpose CO_2 transport and storage components from the ROAD project for industrial CCS at Rotterdam, which initially may include the Shell Pernis hydrogen production facility. Alongside this the Port is exploring options for hydrogen production through electrolysis for power-to-gas linked to offshore wind installations.

- **Statoil Magnum project:** Statoil are one of three partners (alongside Vattenfall and Gasunie) evaluating options to convert the Magnum gas plant in the Netherlands into a hydrogen-powered plant. The project will also consider CO_2 potential business models and transport and storage options.

- **TSO 2020 (electric Transport and Storage Options) Project** is one of two storage projects to receive funding through the Connecting Europe Facility. The 2.5 year project is being coordinated by the Dutch Ministry of Infrastructure and the Environment and will use existing power cables networks to connect the Danish and Dutch electricity grids, to a nearby gas network facility. Hydrogen generated will be stored in existing gas storage facilities and national gas pipelines (power-to-gas).

Building links with the wider hydrogen community:

The Platform wishes to further promote the role of hydrogen production with CCS the case for which needs to be more clearly made. Therefore a key objective of the workshop should be to engage with wider hydrogen stakeholder groups to promote collaboration along the clean hydrogen value chain and a market where both solutions are available, highlighting the potential synergies between the hydrogen production pathways. This will allow ZEP to identify common themes and interests between the two communities, highlighting opportunities for collaboration and alignment of messaging. In particular ZEP should seek engagement with the following organisations through the workshop:

- The European Commission **Fuel Cells and Hydrogen Joint Undertaking** does not currently include hydrogen with CCS under its terms of reference. FCHJU are also responsible for coordinating the CertiHy scheme and the SET-Plan TWG6.

- Commission officials working on other **SET-Plan TWGs** which include actions on hydrogen. In particular: TWG5 (cross-cutting technology for heating and cooling), TWG6 (Energy Efficiency in Industry) and TWG8 (Renewable Fuels and Bioenergy – with specific targets for RES hydrogen), which all propose actions around the repurposing of oil and gas infrastructure for hydrogen transport and storage.

- **ENTSO-E** is launching coalition on the EU energy system in 2030 and will be producing a clean hydrogen report.

- Stakeholders from the transport sector, including **Hydrogen Mobility**.

- **WindEurope**

Agenda:

- **Introduction to the event and ZEP report on clean hydrogen (30 mins)**
  - Graeme Sweeney (ZEP Chairman) and Claude Heller (Chair of ZEP Clean Hydrogen Working Group) (10 mins)
  - Hydrogen Europe spokesperson (5 mins)
  - Commission spokesperson - Tudor Constantinescu, Principal Advisor to the Director General, DG ENER (5 mins)

- **Early enablers for clean hydrogen in Europe (30 mins)**

This session will focus on some of the early business opportunities for clean hydrogen and opportunities for collaboration with other hydrogen production pathways. This will highlight two/three current initiatives in Rotterdam region.

Speakers could include:

  - Magnum project - Lamberto Eldering, Statoil
  - Port of Rotterdam – Allard Castellein, Port of Rotterdam
  - Potentially also TSO 2020 Project (if time) – EASE representative

- **Q/A and moderated discussion (1 hr)**

Total: ~ 2 hrs

Audience (30-40 pax):

Commission officials:

DGs CLIMA, ENER, GROW, RTD and REGIO

- Roman Doubrava, DG CLIMA
- Lukas Wernert – policy assistant to Mechthild Wörsdörfer

MEPs/assistants involved in the key dossiers and those who attended the GA:

- Lambert Van Nistelrooij MEP/ Marijn Verhees (assistant)
- Jan Gerbrandy MEP
- Raphael Borger – assistant to Gesine Meissner MEP

ENTSO-e spokesperson

Fuel Cells and Hydrogen Joint Undertaking:

- Representative from the Commission: Nikolaos Lymperopoulos (Project Manager, FCHJU)
- Secretariat
- Hydrogen Europe Research (European association of research organisations active in fuels cells and hydrogen (FCH), N.ERGHY)
- Hydrogen Europe (industry association under FCHJU)

TWG6 spokesperson (Energy Efficiency in Industry)

TWG8 spokesperson (Renewable Fuels and Bioenergy)

Hydrogen Mobility Europe

Wind Europe – Secretariat to ETIP Wind

Dan Sadler - Northern Gas Networks

Nigel Holmes - Scottish Fuel Cell Association

Eurelectric

Practicalities

- **Location:** To be hosted by the Commission/or Parliament
- ➢ **Host:** Aim for leading Commission official (e.g. Moedas Cabinet/ Canete Cabinet) to be the sponsor for the event in order to help convene the key Commission officials

- **Date:** October – to be arranged with Vassilios and check that JFCU are available (cannot do last week in September)
- **Other related activities taking place around that time:**
  - ROAD decision due – 15th September
  - Hydrogen for Clean Transport Conference – 22nd September, Brussels
  - Port of Rotterdam Conference – 5-7th October, Rotterdam

ZEP Engagement Programme
30 August - Recap Note
CONFIDENTIAL

Introduction and key outcomes

A meeting with a key interlocutor was organised for Dr Luke Warren and Nikki Brain on 30 August.

Meetings were held with the following EU official:

1. **Lineke den Ouden, Permanent Representation of the Netherlands to the EU**

Key outcomes of the meetings include:

- Lineke den Ouden was surprised by the string of positive developments post-ROAD. She indicated high level Dutch engagement to retain the ROAD funds, but expected it to be difficult.
- She noted various scenarios for energy and climate governance for the next Dutch government, but highlighted a sense of urgency to step up climate efforts among all parties involved.
- Lineke den Ouden stressed the importance of perception when it comes to CCS in NL. Support will be limited when connected to coal, but could surge when associated with green growth and Dutch entrepreneurship. She welcomed ZEP's new narrative.
- On the REDII, Lineke den Ouden noted that NL has been pushing back on the article restricting biomass use. It proposes to change the sustainability criteria or introduce efficiency criteria. LO agreed that the article on waste-based fuels is problematic.
- On Energy Union governance, LO stated that NL supports the 2050 perspective.
- On the EPS, LO noted that 550g/kWh is probably the lowest level politically possible

Key follow up actions stemming from the meetings include:

- WS to send information on the hydrogen workshop.

Please find below a detailed overview of the meetings.

Detailed overview of the meetings

Meeting with Lineke den Ouden, Energy Attaché at the Permanent Representation of the Netherlands to the EU

Participants:

Member State: Lineke den Ouden (LO)

ZEP: Luke Warren (LW) and Nikki Brain (NB)

 © WEBER SHANDWICK 2017 All rights reserved

Weber Shandwick: Christiaan Gevers Deynoot (CGD)

Recap of the meeting:

- This was an opportunity to provide LO with the latest updates on CCS developments in the Netherlands and at EU level. Considering that she just returned from parental leave, the meeting focused on reconnecting and informing LO of ZEP's immediate policy asks.
- LO was surprised by the string of positive developments post-ROAD. She indicated that the Dutch government will try to keep the ROAD funding and high level meetings between the Ministry for Economic Affairs and the Commission's DG ENER are ongoing. LO expected it to be difficult however, as the Commission is adverse to repurposing allocated funds without a new tender.
- Speaking about the ongoing coalition negotiations in the Netherlands, LO noted various possible scenarios for energy and climate governance. She conceded that there is a sense of urgency to step up climate efforts among all parties involved.
- LO stressed the importance of perception when it comes to CCS. Support will be limited when connected to coal, but could surge when associated with green growth and Dutch entrepreneurship. She welcomed ZEP's new narrative.
- On the REDII proposal, LO was fully aware of the discussion around biomass and CCS. She noted that the article restricting biomass use was introduced during the inter-service consultations, adding that the Dutch have opposed in from the start. It is now proposing to change the sustainability criteria or introduce efficiency criteria.
- LW noted that a focus on efficiency criteria may be to the detriment of CCS, as the technology reduces CO2 emissions, but also energy efficiency.
- On CCU-fuels under the REDII, NB noted that various Member States are keen to remove it from the proposal. LO agreed that the article is problematic.
- On Energy Union governance, LW noted that the 2050 perspective and the monitoring of negative emissions are essential. LO stated that the Dutch support the 2050 perspective, but cannot really engage as there is no government at the moment. She added that the file seems to be left last in the Council discussions on the Clean Energy Package proposals.
- LO stressed that the EU's 2030 GHG emissions reduction target is key for the Netherlands, while the renewables and energy efficiency targets should be considered as supportive.
- On the EPS, LO noted that 550g/kWh is probably the lowest level politically possible, as for some Member States this is the only real issue of relevance. She added that for Poland it is highly sensitive and a matter of industrial growth and jobs.

Next steps:

- WS to send thank you note.
- WS to send information on the hydrogen workshop.

 © WEBER SHANDWICK 2017 All rights reserved

ZEP Advisory Council 52

13th September 2017

Agenda Item 10.f: Summary note of meeting with Mark Van Stiphout, Deputy Head of Unit - New Energy Technologies and Innovation, DG ENERGY

Luke Warren and Nikki Brain attended a meeting with Mark Van Stiphout on 30 September. Also present were Michael Schuetz and Jan Steinkohl, DG ENER.

The following issues were discussed:

- Forward work programme for SET- Plan TWG9 and relationship with ETIP
- ETS Innovation Fund
- Hydrogen and CCS
- CCU in the Renewable Energy Directive
- Governance of the Energy Union

Key outcomes of the meeting were:

- Mark Van Stiphout (MVS) noted that the SET- Plan Implementation Plan CCS and CCU was one of the most advanced of the Plans being produced, and that the Commission had been impressed with the work of the TWG. He was strongly in support of the work of the SET- Plan Standing Working Group and ZEP being fully aligned. His view was that an ETIP's role was to focus on supporting member states to develop projects.

- MVS was interested in ZEP's views on recent hydrogen developments. He was enthusiastic about hydrogen's ability to contribute solutions to different vectors, which were often addressed separately within the Commission. He questioned whether hydrogen projects could dovetail with activity six of the Implementation Plan, "Developing next-generation CO2 capture technologies". He suggested organising a series of roundtables involving the relevant people within different directorates of the Commission to bring together different areas including waste, energy, and industry. MVS also requested that ZEP put him in touch with Statoil and Vattenfall to discuss their hydrogen CCS project.

- On CCU, MVS highlighted the work that DG CLIMA and the Scientific Advice Mechanism are doing on analysing lifecycles of products produced from CO2. His view was this seemed to be well aligned to ZEP's position on CCU.

- On biomass in the Renewable Energy Directive, MVS said the proposal was included to ensure biomass was being used efficiently. The Secretariat questioned Jan Steinkohl (JS) on whether the need for biomass with CCS (BECCS) to meet future energy targets had been considered when the proposal was made. JS responded that it had not been seen to be a barrier as BECCS wouldn't be needed until after 2030. MVS said that several member states are opposing this proposal, for varying reasons.

ZEP Advisory Council 52

13th September 2017

Agenda Item 10.e. International Collaboration

ZEP was recently approached by CO2GeoNet, who are hoping to bring together a group of CCS organisations to hold a side event in the European Commission tent at COP 23. The preferred dates for the event are the 6th, 7th or 9th November.

In the August ERG call it was agreed that it would be valuable for ZEP to add its name to the group of organisers and to seek involvement in the event.

ZEP Vice- Chairman Charles Soothill has now been confirmed as a speaker for the event, subject to the event being given approval.

The application as submitted by the organisers is below, for information.

Application for two consecutive side events in the EU Pavilion

Lead organiser: (max. 100 char.)
CO_2GeoNet Association

Other organisers: (max. 300 char.)
Bellona, CCSA, EERA CCS, GCCSI & IEA GHG R&D Programme

Event (working) title: (max. 100 char.) Why we need CCS (and why we need it) NOW

Thematic focus: (max. 60 char.)
Climate mitigation, CCS, CO_2 intensive power and industry, CO_2 utilisation

Description: (max. 600 char.)
Radically reducing CO_2 levels is vital to tackling climate change; in achieving the 'well below 2°C' climate target CO_2 Capture and Storage (CCS) is indispensable. CCS is the only established measure that tackles both large industrial emissions and enables the development of carbon negative solutions: developing CO_2 transport and storage networks is a crucial piece of the climate puzzle. Bottom-up initiatives in industrial regions are needed to achieve low-carbon job creation instead of high- carbon closures.
(Side event I) I. CCS indispensable for reaching climate targets
The discussion will review the rationale for CCS, provide examples of currently operating CCS installations, along with the cost-effectiveness of the technology. The role of CCS in creating negative emissions will be set out.
(Side event II complementary to Side event I) II. Realizing economy-wide deep decarbonisation in the next decades
With industries and governments as main contributors, the discussion will explore ways in creating safe, well-regulated and highly efficient CO_2 that work for communities, employers and the climate. Decarbonising the industrial inputs for the low carbon society of the future can help provide jobs and better living standards for industrial communities.

(Provisional) ***Presentation topics and speakers: (max. 500 char.)***
(Part I) Internationally acknowledged experts are sought and contacted from:
- IEA - Implementing the Paris Agreement requires CCS
- GCCSI - CCS is a reality - Examples of large-scale installations
- ETIP ZEP - CCS creates economic opportunities
- Bellona - Going to negative emissions with CCS

(Part II) Influential high-profile speakers are sought and contacted from:
- DG Energy/Clima - CCS enabling policies in the larger portfolio of climate mitigation measures
- Heidelberg Cement - Scale of utilisation in decarbonizing industry
- Sweden/Netherlands ministerial representative - Going to carbon neutral at a national level
- Oslo/Rotterdam municipal authority - Reducing emissions from industrial regions with CCS

Other info: (max. 200 char.)
This side event is one of two proposed complementary events on CCS. A break with coffee and refreshments will be held in between the two slots and an aperitif afterwards to allow informal discussions.