

ZEP input to ‘Roadmap on Strategy for Energy System Integration’

The Zero Emissions Platform (ZEP) is a European Technology and Innovation Platform (ETIP) under the Commission’s Strategic Energy Technology Plan (SET-Plan), and acts as the EU’s technical adviser on the deployment of Carbon Capture and Storage (CCS), and Carbon Capture and Utilisation (CCU) under Horizon 2020 Research and Innovation programme.

CO2 infrastructure, CCS and hydrogen should be at the core of a truly integrated, climate neutral energy system.

ZEP supports the EU’s objective of climate neutrality by 2050. While designing a strategy for a net-zero compliant energy system, ZEP believes that a technology-neutral approach should be privileged. All low-carbon technologies, such as CCS and CCU, that are scientifically proven and readily available, should be deployed to support a cost-efficient trajectory to climate neutrality.

Through the upcoming strategy for energy system integration, the European Commission should especially support those projects that will underpin the development of cross-border CO2 transport and storage infrastructure, thereby supporting projects along the CCS industrial chain. ZEP emphasizes the importance of the strategic development of CO2 infrastructure to ensure the large-scale decarbonisation of European industrial and energy sectors, while continuing to invest in the scale up of renewable energy sources. CO2 transport and storage infrastructure is also instrumental in delivering early, large-scale volumes of low-carbon hydrogen produced from reformed natural gas¹ with CCS, which will enable many industrial processes to be redesigned to avoid CO2 emissions.

There is no doubt that electrification will become an increasingly important feature of future energy systems. Any pathway to climate neutrality by 2050 in the European Union will require a deep electrification of our economy, with renewable energy sources as primary source of power generation². Large-scale electrification will be a lengthy process that will happen over a considerable period of time. EU’s energy demand is roughly supplied for 20% with electricity and 80% by molecules. The reason for this lies in the natural characteristics of molecules, since they have a higher energy density and are easier to transport and store. With a legally binding target of climate neutrality by 2050, electrification alone will not a viable pathway for energy-intensive industries to decarbonise. Therefore, complementary methods of decarbonisation must be deployed

¹ By Steam Methane Reformers and Auto Thermal Reforming

² Shell Scenarios (based on IEA data), [A Climate Neutral EU by 2050](#), 2020; European Commission, [A Clean Planet for All](#), 2018

- such as CCS and CCU - which can provide real emissions reduction and abatement and ensure a cost-efficient transition³.

Unlocking the opportunities for clean hydrogen in an integrated energy system

Hydrogen has the potential to be applicable across many sectors. Today, the majority of it is produced from reformed natural gas, with CO₂ vented to the atmosphere⁴. In the shorter term, hydrogen produced with CCS can be applied on a large scale as a climate-neutral energy carrier before 2030 as part of the energy supply for heat-intensive and energy-intensive industries. This will deliver early emission reduction across several sectors and will allow for hydrogen production from renewables to develop and scale up as renewable generation capacity increases. In the longer-term, the already-existing hydrogen infrastructure - based on frontrunner projects - will support and encourage the development of electrolysis-based hydrogen, underpinning the establishment of a clean hydrogen economy.

The establishing of a hydrogen economy will be outlined in the upcoming Hydrogen strategy. Given that there are multiple objectives where clean hydrogen can play an important role, it is key that a European clean hydrogen strategy is coherent, consistent and technology neutral. In this regard, the revision of the TEN-E regulation for hydrogen transportation is critical. Not only the development of hydrogen infrastructure, but also retrofitting of existing natural gas infrastructure – an activity that is compliant with the European Taxonomy for Sustainable Finance⁵ – for clean hydrogen transportation should also be considered when discussing strategic infrastructure.

The European Commission can use and review national energy and climate plans with a view to assess the role and potential of decarbonised gases in the whole energy system in a credible way. To ensure a coordinated approach at the European level, it will be crucial to coordinate member states' initiatives among each other in order to support the development of cross-border infrastructure.

The role of decarbonised gases in an integrated energy system

The upcoming Strategy for energy system integration presents opportunities for a range of decarbonised gases to be considered. While the role of hydrogen in a net-zero economy is generally acknowledged, the European Commission should consider all options that would support the achievement of EU's climate goals by 2050, creating a favourable policy framework for their production, transportation and use. In this regard,

³ ZEP report, [Climate Solutions for EU Industry](#), 2017. The report argues that “while electrification can reduce CO₂ emissions in some industries and locations, the abatement potential is limited in sectors where CO₂ emissions are a product of chemical processes and not the combustion of fossil fuels. The amount of electricity required for large scale electrification of Europe's energy-intensive industry would necessitate levels of new low-carbon electricity generation that stretch the concept of feasibility”.

⁴ Hydrogen Council, [Path to Hydrogen competitiveness](#), 2020

⁵ European Commission, [Report on European Taxonomy for Sustainable Finance](#), 2020

ZEP recalls the outcomes of the European Taxonomy for Sustainable Finance, which acknowledges the role of CCS as an economic activity delivering climate change mitigation⁶.

ZEP stresses that the screening criteria's third threshold for electricity grid-connected hydrogen manufacturing sites – proposed in the Annex to the Technical Report on European Taxonomy for Sustainable Finance⁷ - is redundant and that it should be removed.⁸ It would effectively exclude any electricity grid-connected manufacturing of clean hydrogen, regardless of the technology, and thus negatively impact the action required to deliver climate goals as put forward in the European Green Deal. If this third threshold will be preserved in the delegated act, ZEP recommends to introduce guarantees of origin to ensure that grid-connected manufacturing of clean hydrogen (and aluminium) receives renewable electricity, and thus can be deemed as sustainable by the Taxonomy. RED II allows for several options for origin of electricity for production of renewable fuels of non-biological origin, of which one is electricity from the grid, if it can be proven that it is fully renewable.

A European Strategy for energy system integration should therefore consider the use of low-carbon gases, providing clear definitions about carbon intensity that would be compliant with climate neutrality and enabling a favourable policy landscape for their deployment.

⁶ European Commission, [Report on European Taxonomy for Sustainable Finance](#), 2020

⁷ European Commission, [Annex to the Technical Report on European Taxonomy for Sustainable Finance](#), 2020

⁸ Zero Emissions Platform, [CCS enables early and cost-efficient clean Hydrogen at scale](#), 2020