

# Hydrogen Energy Network Meeting



**Sixth Meeting of the Hydrogen Energy Network – 2 December 2021**

**By videoconference**

**Minutes of the meeting**

## **Introduction and Keynote address**

**DG ENER** (Tudor Constantinescu) welcomed the participants and chaired the meeting. This event takes place in the same days of the Hydrogen Week and the annual Forum of the EU H2 Alliance. He provided a brief overview of recent and upcoming policy measures related to hydrogen and introduced the agenda and the speakers for the day.

## **Session 1: Recent European Commission's initiatives on hydrogen**

**ENER Unit C1** (L. Kolinski) explained the main provisions of REDII proposals, including on the sub targets for transport and industry, certification and new accounting provisions as well as the proposal to extend the framework for additionality. The EP and Council are now examining the revision of directive and endorsement is expected in the middle of next year, during the FR Presidency. Ongoing discussions concern the sub-targets and their level of ambitions, which stem very closely from the H2 strategy with the 40GW targets. The debate also includes low carbon hydrogen and its inclusion for the sub targets as well as the methodology for calculating the sub targets. On the Delegated Act from REDII, the aim is to have a public consultation before the end of the year. The work on the Gas and Decarbonisation package is ongoing, to be adopted by the end of the year. The interservice consultation opened on 8 November. It includes expected provisions on blending of h2 into the gas network, unbundling rules for infrastructure, horizontal unbundling, exemptions and discounts, smart meters and the definition of low carbon hydrogen.

**ENER Unit B5** (V. Berrutto & K. Gryc) provided an overview on the Annual Clean Energy Competitiveness Report published on 26 October supporting the Governance Regulation. The reports has two parts, the first on macro-economic indicators and second part focus on seven technologies: wind, photovoltaics, heat pumps, batteries, smart grids, renewable fuels for aviation and shipping and hydrogen produced through water electrolysis. General findings: EU public spending on Energy R&I while increasing again, it is lower than 10 years ago and lower as % of GDP spending of other industrialised countries. ¼ of companies owning top value patents in clean technologies are European entities. EU start-ups have difficulties to bring their innovation to the market. On hydrogen: water electrolysis accounts for less than 1% of hydrogen production in the EU followed by 2-4% of chlor alkali

electrolysis. EU industry is well positioned on Alkaline, Polymer, and Solid Oxide Electrolysers production. Anion exchange membrane is in development. Solid oxide is on demonstration phase with EU producers. Competitiveness of those technologies will depend both on increasing of operational hours and on performance and durability. The price of electricity is also a key factor for viability of investments in electrolysers and impacts on the final price of hydrogen produced by water electrolysis. General conclusions: public and private investments are necessary for EU to be forefront on clean energy research, bridge the R&I gap, support to start-ups and ensure access to raw materials. Recent EU initiatives tackles all those issues.

**SG- Recovery** (P. Braun) intervened on the Recovery and Resilience Plans; MSs have submitted 26 plans with the Commission's positive assessment on 22 countries. The assessment is ongoing for four Member States. The first payments done for a number of Member States and the implementation phase is starting. On green expenditure, out of the 22 plans with total spending of approx. EUR 500 bn, energy counts for 1/3 in addition to EUR 50 bn for environmental projects. On green hydrogen, 15 MSs included related measures in RRP, for EUR 9.3 bn (2% total allocation). Hydrogen is included in all value chain, e.g. production, RES, end users level and sustainable mobility. On production side, projects mostly concern renewable but also low carbon hydrogen. Six MSs have included IPCEI measures on hydrogen to be financed under the RRF and other two expressed interest. At the end of the presentation, it was clarified that the definition of low carbon hydrogen in this context is the fossil based hydrogen with CCS and electrolysers with nuclear power, with significantly reduced full life-cycle greenhouse gas emissions compared to existing hydrogen production (as defined in the EU hydrogen strategy).

**DG MOVE** (M. Kubicki) provided an overview of the Fit for 55 package and hydrogen provision in transport, including the objectives of the proposed Alternatives Fuels Infrastructure Regulation for roads, where 60000 heavy-duty vehicles on hydrogen are expected by 2030. Currently in Europe there are 120 stations, by implementing the regulation it will reach around 700 stations. The targets for maritime and aviation as well as the impact of energy taxation were also explained. The new ETS regulation will also apply to maritime sector. Overall, it is expected that drop-in fuels demand will increase dramatically to 90 million tons by 2050. The new "Renewable and Low Carbon Fuels Value Chain Alliance" has been endorsed by Commission last week, consultation with stakeholders is ongoing (deadline by 30 November) on its objects and management etc. It was explained that switch toward Hydrogen in the maritime sector will take time, at the beginning with focus on synthetic fuels and other solution compatible with existing infrastructure. H2 will be more relevant for roads and new trains in coming years.

**DG GROW** (H. Ehrenstein) explained that the EU H2 Alliance has now reached 1600 members. Its objective is to facilitate the creation of the EU hydrogen industry and value chain, with the main task to prepare a pipeline of projects. Recently the Alliance has presented a report on barriers to develop such value chain, with focus on regulatory clarity and missing specific regulation (incl. on infrastructure, definitions and certification). Other aspects include the increased costs due to additionality rules, missing technical norms and standards for quality and infrastructures, long term permitting procedures and complex and unclear state aid rules. At the Hydrogen Forum that the Alliance holds twice a year and that took place this week, 750 projects were presented. The location of projects is across all Europe (ranking for number of projects: ES, DE, FR, NL, IT, PT, BE etc. – no projects for IE and LT). A large share of projects (446) concerns h2 production (clean hydrogen); but also on consumption, infrastructure etc. synchronised mix. It has been calculated that the electrolyser projects to be completed by 2030 will reach over 52 GW.

**RTD** (H. Chraye) debriefed about the Hydrogen Week organised by the FCH JU with the Commission earlier this week. This year, it also included a first research gathering event to advise the new CH JU on R&I priorities, this event replacing now the previous scientific Advice Committee of the FCH JU, as the new Clean Hydrogen JU Partnership has simplified governance. Member States are consulted through the State Representative Group. The Single Basic Act, legal basis for all Joint Undertakings (9

+ the Metrology) has been adopted on 17/11 and the Hydrogen Week was officially presenting it (launching it). As a change from the previous FCH JU, the Clean Hydrogen Partnership will focus in priority on production, storage and distribution, while still keeping working on applications in transport and industry. An Interpartnership Assembly has been established for coordination and synergies purposes. The first governing board of the Clean Hydrogen Partnership will take place on 17 December. On the European Research Agenda (ERA) Pilot on Green Hydrogen, the final conference planned on 16-17 December has been postponed due to the pandemics. However, DG R&I plans to still issue its share of the work (the Commission Staff Working Document on implementing the R&I part of the Hydrogen strategy) before end of 2021. DG R&I is also preparing with ENER and JRC a Communication for revamping the SET Plan, in which Hydrogen should be more highlighted (currently split between two implementation working groups).

**FCH JU** (B. Biebuyck) explained that, as a part of its mandate, the JU supported 11 selected regions with Project Development Assistance (PDA). Its aim is to support regional and local authorities to develop and turn their concepts for regional hydrogen and fuel cell projects into detailed work plans. For those 11 projects, it delivered a total CAPEX of circa EUR 650-750 mln, and EUR 50 mln on average, which is rather impressive. The PDA was concluded in June 2021 and another PDA will be launched in Q1 2022 focussing on cohesion countries, islands and outermost territories. The JU has also created a FCH Regions' Hub to Support European Regions and Cities with info to launch investments. On ports, in coming months the FCH JU jointly with ENER will set up the EU Ports Network with the aim to share best practices amongst ports and develop a hydrogen economy. As part of this objective, the FCH JU has recently launched a study run by Deloitte on barriers for ports to deploy hydrogen. The EU Ports Network will support at EU level the objectives of the H2 Global Ports coalition recently created under CEM H2 initiatives.

### The International Dimension

The **IEA** (J.M. Bermudez) presented the "Global Hydrogen Review" published in September 2021. There is clearly a momentum for hydrogen with governments across the globe launching their strategies, industrial players have increased investments with more than more than 500 bn dollars until 2030 announced in the context of the H2 Council as well as an increasing international cooperation. On demand, in 2020 the hydrogen demand was below 100 Mt for both industry and refining. According to IEA Net-Zero emissions scenario, to reach net-zero emissions by 2050, this demand should will increase to over 500 Mt with hydrogen use expanding to new sectors and applications. In this scenario, hydrogen and hydrogen-derived fuels should meet more than 10% of the total final energy consumption. The current analysis shows that, under current trends, by 2030 the demand could increase to up to 105 Mt mostly for refining, chemicals and iron and steel. However, policies are implemented to meet government pledges, this demand could reach 120 Mt, with more than 10% of demand coming from new applications. This requires a step change in demand creation that needs to be spurred by concrete and ambitious policy action. Some government have announced some policy actions to stimulate demand creation, but most of them are not still in force. On low carbon hydrogen, if all the projects currently in the pipeline are realised, production could reach 17 Mt by 2030, growing from less than 1Mt today. The report underlines different policy recommendations, from the need to develop strategies on the role of hydrogen in energy systems, to create incentives for low carbon hydrogen as well as to mobilise investments and strong support for innovation and commercialisation of h2 technologies. Moreover, it is key to establish appropriate certification, standardisation and regulation regimes.

## Session 2: Member States' plans and programmes on hydrogen

**Luxemburg** (P. Losch) has the objective to reach climate neutrality by 2050. The total energy consumption in 2019 is 51390 GWh, the majority from solid fossil fuels. On hydrogen, the current consumption is 15 GWh per year to be replaced by renewable hydrogen by 2030. The demand side should increase from 4000 to 10000 GWh over the years. Seven measures will be put in place to support these objectives: to have a legal framework in place in parallel to the European one and collaborate on IPCEI; cooperation with other MSs and third countries (e.g. Cabo Verde); support for R&D; materialise flagship projects; priorities certain areas, such as industry, transport and integrated energy system; develop instrument to support the uptake of hydrogen; establishment of the national hydrogen taskforce.

**Austria** (M. Losch) has the objective to reach 100% of renewable electricity by 2030 and climate neutrality by 2040. The focus is on green H<sub>2</sub> production with priority: steel to reduce of ore H<sub>2</sub>; cement, hydrogen for CCU solutions and chemicals to replace grey with green hydrogen, CCU and sustainable carbon cycle. The strategy also supports the development of EU H<sub>2</sub> market with clear certification for green H<sub>2</sub>. Moreover, the use and conversion of gas infrastructure for H<sub>2</sub>, if possible without blending. Finally, there is support for the electricity system with seasonal storage and demand side network reserve. The New Renewable Expansion Act provides for funding related to hydrogen, with EUR 40 mln on investment aid for electrolyzers from 2022. Hydrogen projects are supported throughout the Austrian Climate and Energy Fund. As a second line, AU participates in IPCEI pre notification phase. Examples of projects are VIVA referring to H<sub>2</sub> valley and the participation in the Blue Danube project to create a pan European supply chain for the large-scale production and use of green hydrogen in the Danube region.

**Slovakia** (P. Pleva) is one of the most industrialised country in Europe, it has the widest natural gas network and the current energy mix is low carbon oriented (63% nuclear, 6,5% RES, 32,5% fossil). Focus on nuclear in the short term and RES in the medium and long term. The strategy underlines four objectives: contribution to the decarbonisation of society; creating conditions for intensive development of hydrogen; support the competitiveness of Slovak industry by supporting research and development; ensure production capacity from renewable source energy and prepare conditions for green H<sub>2</sub> import. Currently Slovakia is preparing the "Hydrogen action plan" including up to 40 actions to reach those objectives. Slovakia is also supporting IPCEI projects related to hydrogen production, e.g. on metalhydrid storage, H<sub>2</sub> gasolines for EU market and storage underground caverns, real time H<sub>2</sub> generation and usage etc.

**Hungary** (Z. Horvath) has the objective to support carbon neutral with domestic electricity production of 90% and RES of at least 21% by 2030. On hydrogen, in coming years the first industrial pole mainly low carbon hydrogen will be created. Overall, the main objective is to have at least 240 MW of electrolysis capacity and by 2030. New hydrogen consuming segments will also emerge after 2030. Therefore, the priorities objectives of the strategy are: production of large volume of low carbon and carbon free hydrogen; decarbonisation of industrial consumption; green transport and electricity and (natural) gas support infrastructure. Moreover, domestic hydrogen valleys will be established in the proximity of existing large hydrogen consumption and production sites. Projects also include the greening of transport sector with clean hydrogen. In this context, 20 hydrogen refuelling stations are expected in coming years (now only one) and the use of fuel cell buses and waste collection vehicles in large cities. The "Green Truck" project will also focus on green hydrogen.

**Czechia** (H. Tomas) has established a strategy based on four pillars, with focus on production, usage, transport as well as on technology to support the first three aspects. Hydrogen production is expected from RES, nuclear, waste pyrolysis and natural gas with CCU. On demand, the focus is on replacing grey hydrogen in industry as well as on transport.

**Poland** (E. Mazur) in its national hydrogen strategy has also the objective to support the climate neutrality and maintain competitiveness. It is based on technology neutrality, based on the level of CO2 emissions with low carbon hydrogen playing a role as well. The strategy has six key objectives: to support industry, transport, production in new installations, energy and heating sectors, efficient and secure hydrogen transmission, distribution and storage, creation of a stable regulatory environment. The strategic indicators by 2030 include the 2GW of low carbon production capacity installed, 800-1000 new hydrogen buses, minimum 32 hydrogen refuelling and bunkering stations, at least 5 hydrogen valleys and the establishment of the hydrogen technology centre. On the costs, until 2026 approx. EUR 800 million for electrolysis capacity, deployment of hydrogen in industry, public transport and refuelling infrastructure.

#### Tour de table – Update from Member States

A number of representatives provided an update on their national work on hydrogen. **Finland** indicated that national company has been awarded one of the seven large-scale projects financed by the EU Innovation Fund and connected to hydrogen. The project will include both green and blue hydrogen. A similar project on steel is in the pipeline but less advanced. **Croatia**, together with Slovenia and North Italy organised a kick-off event to launch a hydrogen valley on 24 November. **Ireland** published the Clean Energy Strategy in November with reference to hydrogen as well. **Denmark** has two strategies in preparation on gas and on PtX, hydrogen is part of both. The focus is on infrastructure needed. The new **German** government presented the coalition agreement recently. It also includes strong support for the existing national hydrogen strategy and for projects on large industrial scale with the objective to have 10GW projects by 2030 as well as international cooperation activities. Underlined the relevance of the delegated act on additionality in order to enable these ambitious plans.

#### Conclusions and next steps

**DG ENER** (Tudor Constantinescu) thanked all participants for their active contribution and highlighted the main messages from the panels. The next meeting will be planned before summer 2022 (physical presence or virtual participation to be confirmed).