The EU Hydrogen Strategy – Another remarkable step towards creating a hydrogen industry at a European-wide level

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In line with a series of hydrogen-focused initiatives of the EU and its member states, the European Commission published the "Hydrogen Strategy for a climate-neutral Europe" on July 8, 2020.

Up to €470 billion in investments into renewable hydrogen by 2050

The strategy proposes a clear road map to boost the hydrogen sector in three phases, combined with a multi-billion euro investment agenda. During the three phases, the Commission expects investments amounting to €180 billion to €470 billion in renewable hydrogen by 2050. Hydrogen shall not only become the key technology to reach the goals set out by the European Green Deal – to become the first climate neutral continent in the world by 2050 – but shall also serve as an essential instrument to mitigate the economic effects of the COVID-19 pandemic in Europe. The promotion of the hydrogen sector, as well as investing in new technologies, are part of the Commission's recovery plan. Up to one million people could be directly or indirectly employed along the hydrogen value chain, covering various industrial sectors with numerous use cases for hydrogen.

While renewable or "green" hydrogen is a clear priority of the Hydrogen Strategy and the ultimate goal in the long term, the Commission recognizes the importance of using low-carbon hydrogen, fossil-based hydrogen with carbon capture or "blue" hydrogen, during a transitional phase to kick-start the hydrogen industry. A main objective of the Hydrogen Strategy is the decarbonization of sectors depending on fossil fuels, as well as boosting the demand and production in end-use application sectors. Key areas are:

- energy generation;
- fuels in transportation, such as heavy transport, shipping, trains, aviation;
- industry, especially fertilizers, steel, chemicals and cement;
- the heating and building sector.

Three phases to scale renewable hydrogen production

The scale-up of renewable hydrogen production is divided into three phases.

- **Phase 1**: In its first phase from 2020 to 2024, at least 6 GW of renewable hydrogen electrolyzers are to be installed

in the EU, providing up to 1 million tons of renewable hydrogen. The aim is to decarbonize existing hydrogen production by for example retrofitting existing production plants with carbon capture and storage technologies. A regulatory framework and appropriate state aid rules will be implemented to kick-off the hydrogen market.

- **Phase 2**: Generation capacity shall be increased in the second phase from 2025 to 2030, in which renewable hydrogen electrolyzers are to reach at least 40 GW, with a production of up to 10 million tons. In this phase, cost-competitive renewable hydrogen shall become an instrumental part of an integrated energy system. In this period, the aim is to establish large-scale infrastructure as well as international trade.
- **Phase 3**: The last phase, from 2030 to 2050, aims to apply renewable hydrogen technologies to sectors that have no feasible means or no alternatives at all to decarbonize. Special attention will be paid to establish hydrogen as an alternate fuel for aviation, shipping and hard to decarbonize industrial and commercial buildings.

To unlock the full potential of hydrogen, renewable and low-carbon hydrogen is not yet cost competitive compared to fossil based hydrogen. The cost of fossil-based hydrogen amounts to around €1.5 per kg, while the cost for renewable hydrogen ranges between €2.5 to €5.5 per kg. The EU Hydrogen Strategy aims for a comprehensive framework to drive hydrogen developments past the tipping point. Success factors are: investments beyond a critical mass, a tailormade and enabling regulatory framework, breakthrough technologies and the relevant large-scale infrastructure.

Market and carbon contracts for difference

To ensure a non-discriminatory market, which is open for new producers of hydrogen, all market players should have access, including third-party access to hydrogen infrastructure in a non-discriminatory way. However, it remains to be seen if such third-party access provides enough incentives to invest in new hydrogen infrastructure and if the interests of third-party access and incentives to create new infrastructure are in balance. The Commission envisages creating a market that reflects the production, carbon and external costs of the energy carrier, where hydrogen is treated equal to other carriers. Price signals should allow energy users to make informed and efficient decisions, but should also reward electrolyzers for the benefits they offer to the energy system, such as flexibility services, augmented renewable production levels, and reducing the burden of renewable incentives.

Measures to promote the use of hydrogen include support policies for the demand side, for example renewable hydrogen quotas for specific end-use applications. Additionally, the strategy plans for a “carbon contracts for difference program”, especially for the chemical and steel industry. Such a program has already been proposed by the German National Hydrogen Strategy (for more information please click here).

Infrastructure

An infrastructure that connects supply and demand is crucial for the expansion of the hydrogen sector. Means of transportation and storage can include non-network options such as trucks and ships docking at adapted LNG terminals, pipelines and cyclical and seasonal storage e.g. in salt coverns. To ensure its success, the Commission proposes in a second phase the revision of the Trans-European Networks for Energy (TEN-E) and a review of the internal gas market legislation for competitive decarbonized gas markets, potentially to include common quality standards and cross-border operational rules. The Alternative Fuels Infrastructure Directive and the Trans-European Transport Network (TEN-T) should be reviewed to establish a network of refueling stations.

Additionally, the Commission identifies the repurposing of existing pan-European gas infrastructure as a fast and cost-effective option to provide the hydrogen sector with transport infrastructure and storage infrastructure. On the regulatory side, this requires the review of the existing unbundling rules that apply to the he network or storage

owners and that often do not allow to own, operate and finance hydrogen pipelines Repurposing hast the economic advantage to help stranded assets in pipelines and storage being avoided.

Investment agenda

The boost of the hydrogen sector cannot be achieved without a comprehensive investment strategy which profits from synergies and provides for a coherent system across the different EU funds and EIB financings.

In Phase 1 and 2 of the strategy, investments towards electrolyzers worth €24 billion to €42 billion will be required, as well as another €220 billion to €340 billion of investments for the necessary solar and wind power generation. Additional heavy investment areas will be:

- Retrofitting existing plants with carbon capture and storage: €11 billion covering half of the existing plants;
- Infrastructure: Hydrogen transport, distribution and storage and refuelling stations: €65 billion; and
- Transformation of end-use sectors: e.g. 400 small-scale hydrogen refuelling stations amounting to €850 million to €1 billion.

European Clean Hydrogen Alliance

At the center of the investment agenda is the European Clean Hydrogen Alliance, which was launched in the Commission's New Industrial Strategy that was announced along with the Hydrogen Strategy. The Alliance facilitates collaboration between the public sector and authorities, industry and civil society, creating "interlinked, sector-based CEO round tables and a policymakers' platform". By the end of 2020, an investment agenda to support the kick-off of hydrogen production and application is to be developed alongside a robust pipeline of projects.

Further investment guidance will be provided by the renewed sustainable finance strategy, which is expected to be adopted by the end of 2020, as well as the EU sustainable finance taxonomy.

Research and innovation

While the EU has supported research and innovation on hydrogen for some while, further research and innovation efforts are required and supported and driven forward by the EU.

An important element to boost innovation is the ETS Innovation Fund. The Fund, which has been set up to pool around €10 billion, supports low carbon technologies over the period 2020-2030. The ETS Innovation Funds focuses on innovative low-carbon technologies, processes and products, e.g. in energy intense industries, that have a significant potential to reduce greenhouse gas emissions. The first call for proposals for large scale projects has been made. Please reach out to Thomas Schubert and Gabriele Haas for further information.

International partnerships

The Commission declared the Eastern Neighborhood, in particular Ukraine, and the Southern Neighborhood to be priority partners. Cooperation should be reached in the field of research and innovation, regulatory policy, direct investments and undistorted and fair trade in the hydrogen sector. These global partnerships are essential to ensure sufficient supply of renewable energy for the production of green hydrogen – partner countries are therefore selected

according to their natural resources, physical interconnections and technological development. The Commission is willing to offer support through investment platforms and co-financing programs.

Remarks

The EU hydrogen strategy points it out: "**As investment cycles in the clean energy sector run for about 25 years, the time to act is now**." The efforts of the EU and the member states combined boost the development of a large scale hydrogen sector. The opportunity for an economic recovery from the COVID-19 pandemic towards a cleaner and more sustainable Europe is there. We help you to take that chance.

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