

Position paper Green Hydrogen for Reducing Greenhouse Emission of Fuels

According to the Renewable Energy Directive, Fuel Quality Directive and Alternative Fuels Infrastructure Directive hydrogen is accepted as a renewable liquid and gaseous transport fuel or as an alternative fuel. Unfortunately, there is currently no clear legal guideline to calculate the reduction of greenhouse gas emission by blending hydrogen, produced from renewable electricity, with fossil fuels in refineries. Industry, but also the Member States, urgently need a legally viable solution so they can contribute to the reduction of emissions in transport and to sectoral integration.

Renewable liquid and gaseous fuel of non-biological origin (Green Hydrogen) is able to immediately reduce the emissions in the fuel/transport sector without changing the vehicle fleet or other infrastructure. Through hydrogen production from renewable electricity, the greenhouse gas emissions in production of fuels can be reduced around approx. 105 g CO₂eq/MJ. That high reduction value cannot be achieved by blending of another alternative fuel.

Green Hydrogen increases the chances of an efficient integration of volatile renewable energies into our energy system and reduces the economic costs along the whole energy value chain by the efficient use of renewable electricity produced at times of low demand. In addition, the Green Hydrogen allows greater flexibility for the economic exploitation of the electricity infrastructure.

Contrary to several assertions, Power-to-Hydrogen is already mature technology and could significantly reduce the installation costs within a short period of time. Using Green Hydrogen, the refinery industry can also significantly reduce its dependence on natural gas and (imported) biofuels, which will affect the security of European refineries and have a positive effect on the European foreign trade ratio. On the other hand, an industrial market potential of about 10 GW, or 10 billion EUR in Europe can be accessed through the introduction of renewable liquid and gaseous fuels of non-biological origin. Therefore, renewable liquid and gaseous fuels of non-biological origin should play an important role in future transport and fuel strategies of the European Union.

In the interests of climate protection, the way of reducing the emissions of GHG should be open to different technologies. GHG-emissions in the fuel/transport sector can be sustainably reduced by Green Hydrogen. Green Hydrogen is intended to be supplied to refineries to replace fossil hydrogen made from a steam methane reforming process (SMR). The GHG intensity of hydrogen made from SMR is about 10 t CO₂/t of hydrogen. In total, replacing fossil hydrogen could amount to an annual reduction of approx. 20 million tonnes of CO₂ emission in the EU.

The industry has made to DG Climate and DG Energy and the relevant ministry in Germany proposals for the reduction of GHG emissions and strengthening the stabilization of the renewable energy supply at the same time.

The short-term market introduction of Green Hydrogen will

- ❖ reduce redispatch costs in the electricity sector.
- ❖ stabilize the electricity grid.

- ❖ exploit a cost-effective potential of more than 1,000 MW flexible current control capacity in Germany or in the EU exceeding 10,000 MW.
- ❖ reduce the subsidies for renewable electricity.
- ❖ avoid curtailments of volatile renewables (wind, solar) by sectorial integration.
- ❖ significantly reduce the greenhouse emissions in the production of fuels.
- ❖ reduce the environmental problems by first generation biofuels (ILUC).
- ❖ give an option to reduce the palm oil consumption in the fuel production. Green Hydrogen can contribute to the sustainable implementation of the EU Parliament's decision to reduce palm oil as biodiesel after 2020 on 04.04.2017 (2016/2222 - INI).
- ❖ increase the potential of economic growth of the European industry.
- ❖ reduce the dependency on Russian natural gas and non-European biofuels.

Moreover, all these proposals do not lead to a higher financial burden on citizens and industry but to a cost reduction by an efficient sectorial integration (sector coupling). At the same time, the proposals accelerate the development of the market of electrolyzers significantly, with electrolyzers becoming a cornerstone of a renewable energy economy.

We are convinced that under the current European regulatory framework two alternative ways are available for achieving short-term market entry of Green Hydrogen:

Option 1) Recognising the blending or processing of Green Hydrogen in the refinery operations as upstream emission reduction from the EU Commission

Green Hydrogen of the type described above constitutes a raw material which can be credited, under condition that the EU Commission recognised the blending or processing of Green Hydrogen in refineries process as upstream emission reduction. National regulations should allow (based on the EU legal basis) the use of power-to-hydrogen in refineries as an application of the so-called "Upstream Emission Reductions" (UER) which already exists. The advantage of a recognition of power-to-hydrogen as a UER is not only a reduction of the energy transition costs due to sector integration, but also a strengthening of the security of supply and climate protection.

Option 2) Equal legal treatment of green hydrogen and biofuels

In Annex to the Art. 7d FQD a calculation of life cycle GHG-Emissions for fuels without existing standard values is provided. Therefore, an individual calculation of the providers would be currently possible based on the actual directive. Taking this into account the greenhouse gas reduction using Green Hydrogen in refineries should be recognized and calculated in the same way as the blending of biofuels.

However, the FQD amendment (Directive 2015/1513) provides an establishment of standard values for the calculation of life cycle gassing emissions for "liquid gaseous non-biogenic fuels used in transport" by the EU Commission by the end of 2017. The European Commission has now the opportunity to define of a default value for Green Hydrogen, which is used for various processes in refineries (hydrotreatment, hydrocracking), to legal clarify the role of Green Hydrogen for these applications.

We believe that supporting the early market introduction of Green Hydrogen will help substantially to fulfil the EU's GHG emissions reduction targets and without any negative side effects that may counter these efforts. In addition, it is an opportunity to enable the European industry to remain the world leader in the advanced biofuels sector.

The industry is therefore asking the European Commission for guidance on how the Member States can introduce power-to-hydrogen or Green Hydrogen in refineries in the short term (before 2020) with the applicable European standards and directives.

Hannover, 24.04.2017

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The German Hydrogen and Fuel-Cell Association is the umbrella organisation promoting hydrogen and fuel-cell technology in Germany. The German Hydrogen and Fuel Cell Association currently has 91 institutional members.

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performing energy consists of representatives 19 industrial companies, research institutions and organizations. The initiative is supported by the Federal states of Brandenburg, Schleswig-Holstein and Hanseatic City of Hamburg