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2024 年 7 月 18 日

水素キャリア技術に関するポジションペーパー発行について

千代田化工建設株式会社（本社：横浜市、社長：太田　光治、以下「当社」）は、政府支援を含む国際的な公的支援スキームに液体有機水素キャリア（LOHC）*1 などの水素キャリア技術を含めることの重要性を示したポジションペーパー（声明文）*2 を共同発行しましたのでお知らせいたします。

本ポジションペーパーは、日欧を含む世界各国の企業（10 社*3）によって取りまとめられ、水素キャリア技術の普及と公的政策支援への適用を推進することを目的としています。本ポジションペーパーの要点は以下の通りです。

- 欧州の水素支援プログラムにおいて水素キャリア輸送技術がコストや規制面において適正な評価を獲得することの重要性
- 水素キャリアの種類として、液体有機水素キャリア（LOHC）、液体無機水素キャリア（LIHC）、および固体水素キャリア（SHC）が存在すること
- 水素輸送貯蔵における、水素キャリアの効率性と高い安全性

当社は、この国際的な活動を通じて、MCH（メチルシクロヘキサン）を活用した水素バリューチェーン事業への取り組みをさらに加速化させるとともに、持続可能なカーボンニュートラル社会の実現に貢献してまいります。

*1　Liquid Organic Hydrogen Carrier の略称で、水素キャリアのうち有機ハイドライドを指す。当社が水素の輸送・貯蔵技術として開発、事業化を進める水素キャリアの MCH は LOHC の一種。
*2　添付参照（英文のみ）
*3　Axens、千代田化工建設株式会社、Electriq Global、ENEOS株式会社、Evos、Honeywell、HSL Technologies、Hydrogenious、三菱商事株式会社、Vopak

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Position paper on including hydrogen carrier technologies in existing and future public funding schemes

Integrating hydrogen carrier technologies into existing and future public funding schemes is paramount for advancing the global transition to a clean energy landscape. This position paper advocates for the deliberate inclusion of hydrogen carrier technologies in funding schemes designed to support scale-up projects, emphasizing the need for comprehensive and forward-thinking approaches.

Context

The Fit-for-55 framework and associated measures are paving the way towards a clean hydrogen economy for which imports are needed. The transportation and storage of hydrogen plays an essential role in achieving these targets Hydrogen Carriers offer sustainable and safe solutions to transport and store hydrogen. Carrier technologies must play a significant role in achieving the EU's decarbonisation goals by connecting supply and demand centres, both intercontinental and intra-EU.

Defining Hydrogen Carrier Technologies

Hydrogen Carriers include:

- Liquid Organic Hydrogen Carrier (LOHC), e.g., Toluene or Benzyltoluene
- Liquid Inorganic Hydrogen Carrier (LIHC), e.g., silica-based
- Solid Hydrogen Carrier (SHC), e.g., potassium borohydride/KBH4

Hydrogen Carriers can utilise (existing) conventional (liquid fuel) infrastructure for large-scale transportation and storage of hydrogen. These carriers serve primarily to store and deliver hydrogen and are not used as an energy product on their own like hydrogen derivatives (e.g., NH3, MeOH). The hazard potential is similar to, or, in some cases, less than that of most conventional liquid fossil fuels or petroleum-based products[1]. Clear advantage of carrier technologies is the safe and efficient storage and transportation of hydrogen along with its flexibility, due to the fungibility with existing infrastructure and safety practices it offers. As the hydrogen is no longer handled in its molecular form, the hazard potential significantly decreases. Due to their properties, these carrier technologies are handled under ambient conditions regardless of their hydrogen load. Some of these carriers, such as Liquid Organic Hydrogen Carriers (LOHCs) already have a high technology readiness level (TRL 7 or higher as defined by the IEA), of the full value chain including hydrogen conversion and reconversion.[2]

Technology neutral scale-up funding

Recent acknowledgement of amongst other the German Hydrogen strategy that a significant amount of hydrogen will need to be imported into the European Union reinforces that programmes like H2Global or the expected international leg of the European Hydrogen Bank should also focus on the import of molecular hydrogen, allowing the tender applicants to choose the most economical transport technology for their individual supply chain. Tender designs, that only include Hydrogen Derivatives (e.g., NH3, MeOH) as eligible product, lead to the exclusion of the above-mentioned hydrogen carrier technologies, especially of LOHCs, inadvertently impacting technology competitiveness and the European Union’s ability to reach its targets. Fallback options for the delivery of Hydrogen Derivatives instead of hydrogen would delay the facilitation of hydrogen imports and related infrastructure. Therefore, H2Global tenders and the European Hydrogen Bank import leg should prioritise tenders for delivering hydrogen to the offtaker or for direct grid injection. This allows for competition among different hydrogen transport technologies and should be reflected in upcoming tender terms and conditions.

By pursuing a technology-neutral stance, funding initiatives can effectively foster innovation and competition while allowing broader chances to timely import and deliver molecular hydrogen to European offtakers. The signatories call for international collaboration in establishing robust supply chains for molecular hydrogen, recognizing that a global effort is essential for the successful deployment of maritime hydrogen import supply chains. Highlighting the readiness of hydrogen carriers to deliver molecular hydrogen, strategic investments will not only accelerate technological advancements but also contribute to the broader goal of achieving a sustainable and decarbonized future are needed.

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[1] As example: *HYS2171 Bulk Scale Storage and Transportation of Hydrogen using LOHC: Phase 1 Feasibility Report (publishing.service.gov.uk)*

[2] As described at: ETP Clean Energy Technology Guide – Data Tools - IEA. Note that TRL definitions should be considered in context as a qualitative measure as opposed to a definitive guideline.

About the supporting companies

This group of international pioneering companies has collaboratively initiated efforts to drive the widespread adoption of hydrogen carrier technologies and their incorporation into public policy support frameworks worldwide. Through strategic partnerships and pooled expertise, they aim to fast-track the implementation of hydrogen carrier technologies and actively contribute to global decarbonisation efforts.