Number 7/2023

****

**Presse Information.**

Press Release.

Linde MH’s Aschaffenburg plant now producing green hydrogen for its in-house material flow

**Linde Material Handling implements lighthouse hydrogen project**

**Aschaffenburg, May 11, 2023 – It is a pilot project that is unparalleled in this industry in Germany and even throughout Europe: Using its own infrastructure, Linde Material Handling (MH) is now producing green hydrogen to power 21 fuel cell forklifts of its in-house fleet. On Thursday, May 11, the new hydrogen production facility and vehicles were officially put into operation at the Aschaffenburg site. The investment is being funded by the German Federal Ministry of Digital Affairs and Transport (BMDV), coordinated by NOW GmbH and implemented by Project Management Jülich (PtJ). The goal is to gain experience and build up expertise in order to be able to provide customers with comprehensive advice and support on the use of hydrogen in material flow processes.**

“The topic of energy is emerging as one of the major challenges of this decade and beyond,” Stefan Prokosch, Senior Vice President Brand Management Linde Material Handling, said at the inauguration ceremony. “In our search for potential solutions, we identified hydrogen as an option in the energy mix of the future.” He pointed out that this applied especially to applications in intralogistics, because, in addition to potential climate neutrality, the rapid refueling of industrial trucks with hydrogen during intensive multi-shift operations posed a major advantage. “A three-minute refueling time corresponds to a comparable charging power of about 480 kW,” he explained. In addition, the energy carrier could act as an energy store with the increased use of renewable energy sources in the future, for example to temporarily store electricity generated by means of photovoltaics or wind power. “We want to have the entire range of energy supply options in our portfolio so as to be able to offer our customers the best possible solution for their specific needs. With this strategy, we will also be able to remain flexible and open to different developments. After all, no one knows exactly where this journey will actually end up,” explained the top brand manager.

**Demonstrating courage, breaking new ground**

Around 2.8 million euros have been invested in the planning and construction of the hydrogen infrastructure. The hydrogen production facility was built within a period of eleven months on a 280-square-meter area conveniently positioned within the manufacturing and assembly plant. Around 50 subcontractors were involved in building the hydrogen infrastructure under the direction of general contractor Covalion, a Framatome brand, and Linde Material Handling’s construction department.

“With the commissioning of the facility and forklifts, we ourselves are becoming hydrogen producers and users and will thus be able to further expand our technological expertise. This will eventually also benefit our customers because the experience we gain in planning, building and operating the plant and using the fuel cell forklifts will be passed on to them as part of future material flow projects,” stated Prokosch. At the same time, the decentralized on-site hydrogen infrastructure will serve as a showcase for other interested groups. “We will be demonstrating how the use of renewable energy sources can work in practice,” the brand manager added.

Kurt-Christoph von Knobelsdorff, CEO and spokesman of NOW GmbH: “Lighthouse projects like this one undertaken by Linde Material Handling are of great importance for the further ramp-up of hydrogen and fuel cell technology. They demonstrate what is already possible in the area of intralogistics and they make it clear that the transformation towards climate neutrality has gained momentum in the non-road sector as well. Companies that are leading the way in this regard and sharing their experience in networks such as the Clean Intralogistics Net are already benefiting today, ensuring their success far beyond tomorrow.”

Michael Kraus, project manager at Framatome (Covalion): “The project was a challenge, as well as an opportunity to demonstrate our skills and expertise. Planning the project and building the facility took a total of about three years – and we were able to accompany Linde Material Handling from our very first meeting to the approval process and the first fueling of the industrial trucks. We worked closely with the project management team to meet the specific individual requirements of the project and find the best possible solution.”

**State-of-the-art technology in inconspicuous containers**

The components of the hydrogen infrastructure comprise several modules. The centerpiece is a PEM (polymer electrolyte membrane) electrolyzer, which is set to produce 50 kg of hydrogen per day. Here, purified and deionized drinking water is separated into oxygen and hydrogen with the help of green electricity. In another container, the hydrogen is gradually compressed to 450 bar and then fed into high-pressure storage tanks via piping and valves. A software-controlled valve system regulates the supply line to the dispenser, the gas pump. Here, employees can connect their vehicles in just a few simple steps. The refueling process is completed within just a short time. The high-pressure storage tank is designed to store up to 120 kg of hydrogen at 450 bar so that even peak demand caused by increased refueling processes at shift changes can be covered.

A total of 21 electric counterbalanced trucks with fuel cell hybrid systems, which comprise twelve Linde E50s with a load capacity of five tons and nine Linde E35s with 3.5 tons load capacity, replaced the previously used IC models. As part of the plant fleet, they are used for loading and unloading trucks and supplying the assembly lines with large and heavy components such as counterweights, pre-assembled frames or driver cabs, among other things. “The vehicles do not produce any emissions during operation,” Prokosch emphasizes. Hydrogen and oxygen in the ambient air react in the industrial trucks’ fuel cell system. The electrical energy generated charges a lithium-ion battery that powers the forklift; water and heat result as the only “byproducts”.

The generation and use of hydrogen takes place directly where intralogistics operations are carried out. In addition to Linde forklifts, other technical solutions offered by the company are used as well. For example, the explosion-proof access control system of the Linde:connect fleet management solution ensures that only authorized and trained persons can use the hydrogen facility. Furthermore, the explosion-proof “Safety Guard” assistance solution at the dispenser and in the vehicles automatically reduces the driving speed in the vicinity of the filling station. Last, but not least, the “Linde Energy Manager” solution enables the intelligent planning and control of energy demands throughout the site, thus avoiding power load peaks and allowing for cost optimization.

**Hydrogen technology made by Linde MH**

Linde MH is considered one of the pioneers in the use of hydrogen in intralogistics, having developed the first fully operational prototype forklift with fuel cell drive as early as 2000. Since 2010, fuel cell forklifts have been integrated into the company’s series production, and as of today, 80 percent of the series, including counterbalanced forklifts, tow tractors and pallet stackers, can be ordered with this energy option as a “customized solution” with hydrogen drive. In numerous studies and projects, Linde MH and its partners from industry and science have demonstrated the conditions under which fuel cell forklifts are marketable and economical today. This is the case especially if a hydrogen infrastructure is already available on site or if highly pure hydrogen is produced as a waste product in the operational process. Fuel cell forklifts are also suitable for multi-shift operation entailing intensive use and a high number of annual operating hours indoors, or where there is limited space for charging or battery changing facilities, which are ultimately intended to be eliminated.

Along with the construction of Linde MH’s hydrogen infrastructure in Aschaffenburg, parent company KION GROUP AG is pressing ahead with the development and production of its own fuel cell systems. At the LogiMAT trade fair, Linde MH presented its first own 24-volt system for warehouse equipment, which was developed at the Aschaffenburg site. An approved funding decision has already been received for the development of a 48-volt fuel cell system, and the team is working on rapid implementation. “By bringing the development of fuel cell systems and lithium-ion batteries in-house, we will also have the opportunity in the future to design our own fully integrated fuel cell hybrid systems that are precisely tailored to the requirements of material handling equipment,” outlined Prokosch.

**Linde Material Handling GmbH**Linde Material Handling GmbH, a KION Group company, is a globally operating manufacturer of forklift trucks and warehouse trucks, and a solutions and service provider for intralogistics. With a sales and service network that spans more than 100 countries, the company is represented in all major regions around the world.

**Press contact:**Heike Oder: +49 (0)6021 99-1277 – Email: [heike.oder@linde-mh.de](mailto:heike.oder@linde-mh.de)

**Images and captions:**

****

**Press Information.**

Press Release.

Ein Bild, das draußen, Text, Fahrzeug, Rad enthält.

Automatisch generierte Beschreibung

Image no. \_S\_L9372.jpg

**Using its own infrastructure, Linde Material Handling is now producing green hydrogen at its Aschaffenburg site to supply energy to 21 fuel cell forklifts of its in-house fleet.**

Ein Bild, das draußen, Städtebau, Himmel, Fahrzeug enthält.

Automatisch generierte Beschreibung

Image no. DJI\_0003.jpg

**The production facility was built within a period of eleven months on a 280-square-meter area that is conveniently positioned within the manufacturing and assembly plant in Aschaffenburg.**

You can find these photos in printable resolution for download on:

[Press Release Overview (linde-mh.com)](https://www.linde-mh.com/en/About-us/Press/)

Photos: Linde Material Handling GmbH

Released for publication.