

Press release

Linde showcases its extensive hydrogen expertise at HANNOVER MESSE 2016

- Linde covers all steps in the hydrogen chain – from production based on renewable energies to application in fuel-cell cars
- Advances in fuelling technology drive infrastructure expansion
- Lower Saxony's first hydrogen fuelling station to be built in Hanover

Munich, 22 April 2016 – The technology company The Linde Group is highlighting its pioneering role in enabling zero-emissions mobility powered by hydrogen at this year's HANNOVER MESSE trade show. The gases expert will be showcasing in particular its innovative fuelling technology.

"Customers who drive fuel-cell cars don't want to know how hydrogen is handled behind the scenes," explains Markus Bachmeier, Head of Hydrogen Solutions at Linde. "This 'hidden' technology is exactly where Linde's expertise comes into play. We need smart, cost-efficient fuelling technologies in order to successfully build out a network of filling stations."

As a result, Linde will be putting two technical highlights centre stage at its exhibition stand in Hall 27: the ionic compressor and the cryopump. Ionic compressors replace most of the functionality of conventional metal pistons with liquid salts. This design eliminates the risk of hydrogen being contaminated by lubricant. It also reduces wear and tear, energy consumption and the pump's footprint. This proprietary solution was first deployed at a public hydrogen fuelling station back in 2006. Linde continues to evolve this technology and it can now be found in the majority of the 100-plus fuelling stations Linde has helped to set up across the globe.

The cryopump also enables hydrogen for fuelling to be compressed up to 900 bar. In contrast to the ionic compressor, it works with cryogenic liquid hydrogen cooled to minus 253 degrees Celsius. This makes it particularly suitable for applications where space is at a premium and large amounts of hydrogen have to be delivered while keeping energy consumption low. Linde is launching the latest version of its cryopump at the 2016 HANNOVER MESSE.

Linde is showcasing two further highlights at its exhibition stand, this time aimed at end customers and people who are curious about the many possibilities of hydrogen: a fuel-cell vehicle sporting the colours of the new BeeZero car-sharing service and the Linde H₂ bike. With this prototype fuel-cell electric bicycle, Linde is demonstrating yet another novel application that benefits from the silent, zero-emissions performance of hydrogen as a drive concept. While there are no plans for the bike to go into series production, the “Hyundai ix35 Fuel Cell” is already a series product. The fuel-cell car is one of 50 vehicles that Linde's new affiliate, Linde Hydrogen Concepts, will be offering under the BeeZero car-sharing scheme as of this summer. This is the first car-sharing fleet to exclusively offer hydrogen-powered fuel-cell cars. BeeZero fills a gap in the existing service landscape by offering customers the option of travelling greater distances in zero-emissions mode. Linde expects to gain valuable information from day-to-day fleet operations, which it will channel into further development of its hydrogen technologies and ongoing expansion of the infrastructure.

Linde's custom-developed mobile refuelling unit “trailH2™ gas” has proven a reliable means of supplying hydrogen in areas where there is no stationary supply infrastructure. This unit will be used in Hanover, where Linde will once again be the exclusive supply partner for the fuel-cell cars used by the Clean Energy Partnership (CEP). Visitors will have the opportunity to test drive the cars developed by CEP partners Daimler, Honda, Hyundai and Toyota on an outside area at the trade show.

By the time the next HANNOVER MESSE takes place, it will be much easier for drivers to fill up on hydrogen in the city. Plans are well underway to build a fuelling station equipped with the latest cryopump technology in Hanover. The facility is planned to go into service this year.

Linde has also made some great leaps forward at the other end of the value chain, in the field of hydrogen generation. It has been nine months now since the largest power-to-gas plant of its kind went on stream at Energiepark Mainz. In that time, the facility has produced around 18,000 kilograms of 'green' hydrogen by means of electrolysis. This is enough to travel around 1.8 million kilometres using fuel-cell technology. The required electricity can be sourced directly from four neighbouring wind turbines, for example. The project is a joint collaboration between

Linde, Siemens, Stadtwerke Mainz and the RheinMain University. In the initiative, Linde is responsible for purifying, compressing, storing, filling and distributing the hydrogen. Thanks to this facility and other sources of certified green hydrogen, Linde is already able to supply enough sustainable hydrogen to cover demand from the entire mobility sector.

From 25 to 29 April, 2016, visitors to the trade show in Hanover are invited to stop by the Linde stand (B71) in Hall 27 and find out more about the fascinating possibilities of hydrogen technology. They will also be able to experience the practical benefits first hand thanks to the compact "HYMERA™" fuel-cell generator, which will be available for users to recharge mobile devices without requiring any connection to on-grid power supplies.

In the 2015 financial year, The Linde Group generated revenue of EUR 17.944 bn, making it one of the leading gases and engineering companies in the world, with approximately 65,000 employees working in more than 100 countries worldwide. The strategy of The Linde Group is geared towards long-term profitable growth and focuses on the expansion of its international business with forward-looking products and services. Linde acts responsibly towards its shareholders, business partners, employees, society and the environment in every one of its business areas, regions and locations across the globe. The company is committed to technologies and products that unite the goals of customer value and sustainable development.

For more information, see The Linde Group online at www.linde.com

Further information:

Media

Stefan Metz

Phone: +49.89.35757-1322

Investor Relations

Dr Dominik Heger

Phone: +49.89.35757-1334

Dr. Thomas Hagn

Phone: +49.89.35757-1323

Bernard Wang

Phone: +49.89.35757-1328