

Linde ATZ Technology Overview

THE LINDE GROUP



International H2 Conference
Santiago de Chile

The Linde Group



In the 2015 financial year, The Linde Group generated revenue of EUR 17.944 bn, making it the largest gases and engineering company in the world with approximately 64,500 employees working in more than 100 countries worldwide.

The Group comprises three Divisions:

- Industrial Gases & Healthcare
- Engineering
- Gist



Agenda

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The Linde logo, featuring the word "Linde" in a white, elegant script font, set against a dark blue background with a light blue wavy graphic above it.

1. Linde Vienna ATZ
2. ATZ Technology Innovations
3. Hydrogen Refueling Stations
4. Reference Projects

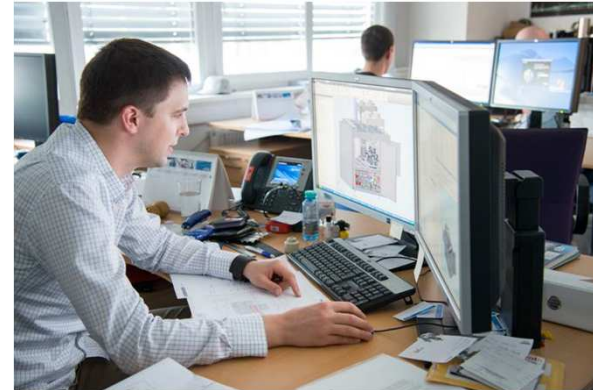
Linde - ATZ Advanced Technology Center

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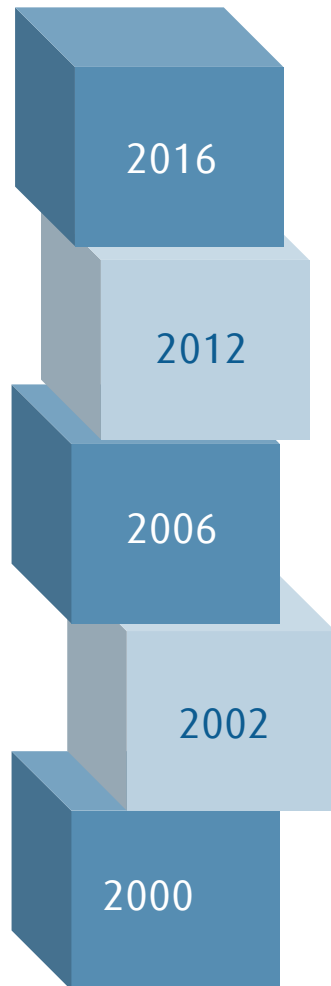
Linde

Linde

Advanced Technology Center



Advanced Technology Center



Constant Pressure Tube

ATZ issued the patent for the constant pressure tube, an innovative storage system with a small footprint

Small Serial Production

A new production hall was inaugurated for small serial production of compressors and H₂ refuelling stations

Ionic Compressor

ATZ issued a patent for the ionic compressor, which is the groundwork for all future stations and systems

First H₂ Refuelling Station

The first H₂ refuelling station was developed for Daimler and installed in Sindelfingen, Germany

ATZ Founded

The ATZ was founded by Robert Adler as a Linde R&D center for high pressure gas applications

Linde - ATZ

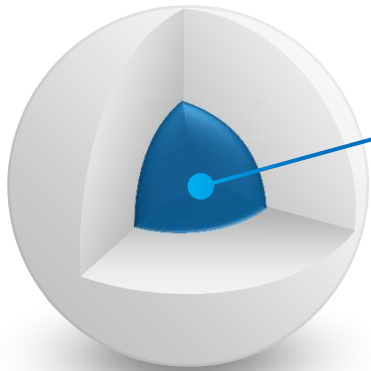
Core competency

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Core Competency

Linde ATZ's core competency is **Turnkey Solutions** for **gas compression** and **gas storage** with a focus on **hydrogen**.



Industrial Gas
Applications

Hydrogen
Applications

Research &
Development
Projects

Linde - ATZ Hydrogen Applications

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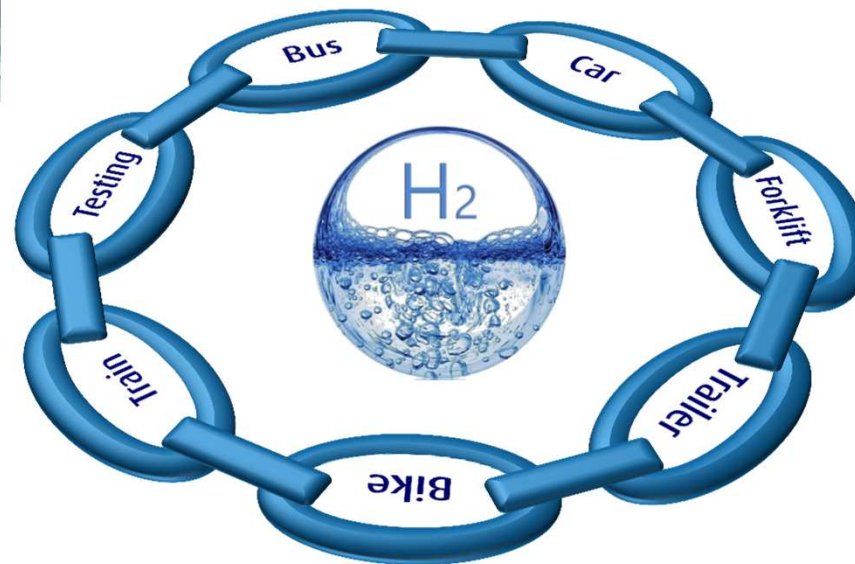
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H₂ Bus Station, Italy



H₂ Truck, Switzerland



H₂ Forklift Station, USA

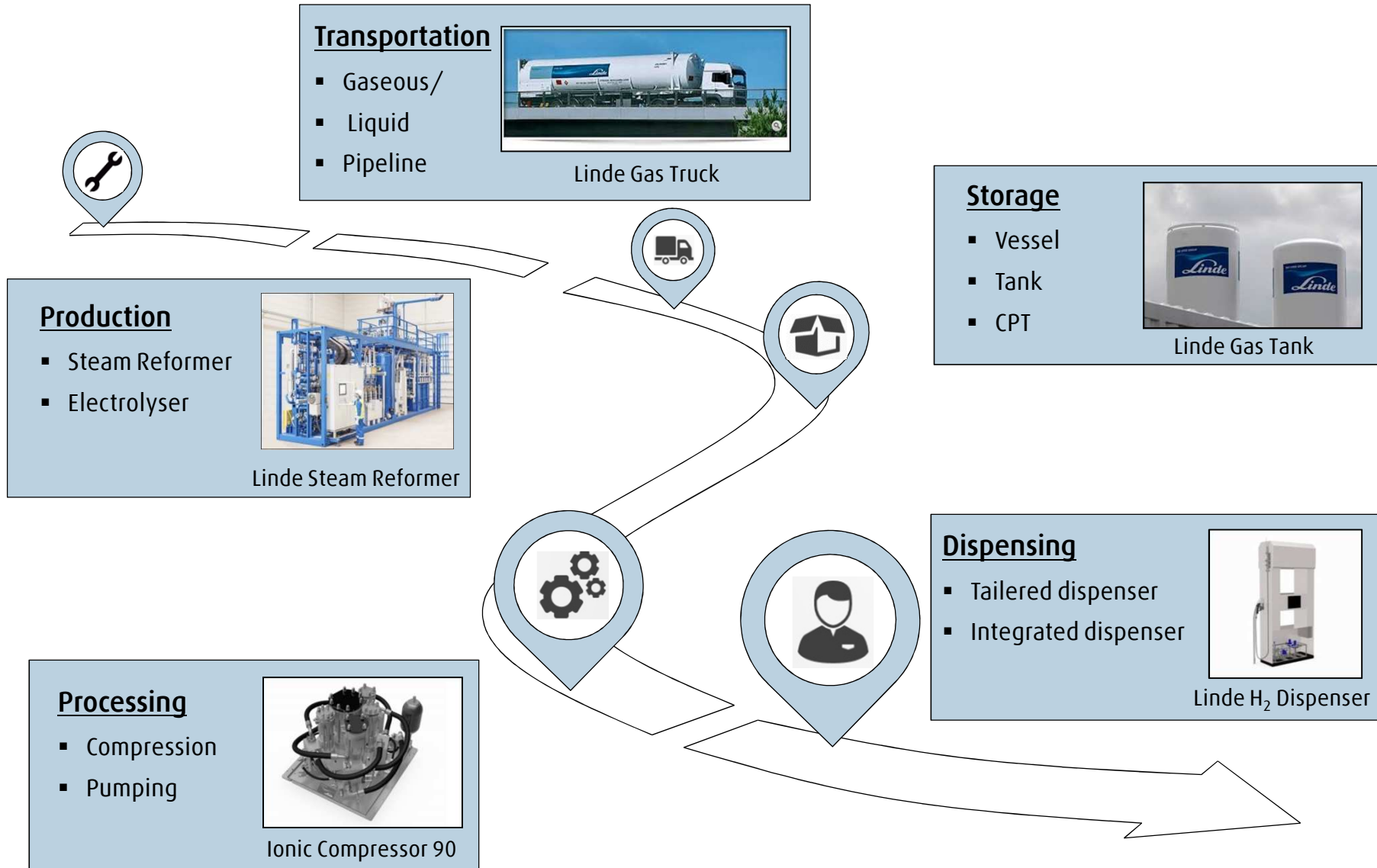


H₂ Trailer Refuelling,
Germany

Linde ATZ provides refuelling and compressor solutions for all kinds of hydrogen applications

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Hydrogen value chain



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Industrial applications and R&D

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Industrial Gas Applications

- Natural gas projects CNG/ LNG
- Ultra Low Temperature Compression
- Oil in Gas
- Industrial Gas stations



ULTC Station, Austria

Research & Development Projects

- Studies for gas applications
- Research projects
- Development requests for specific application problems

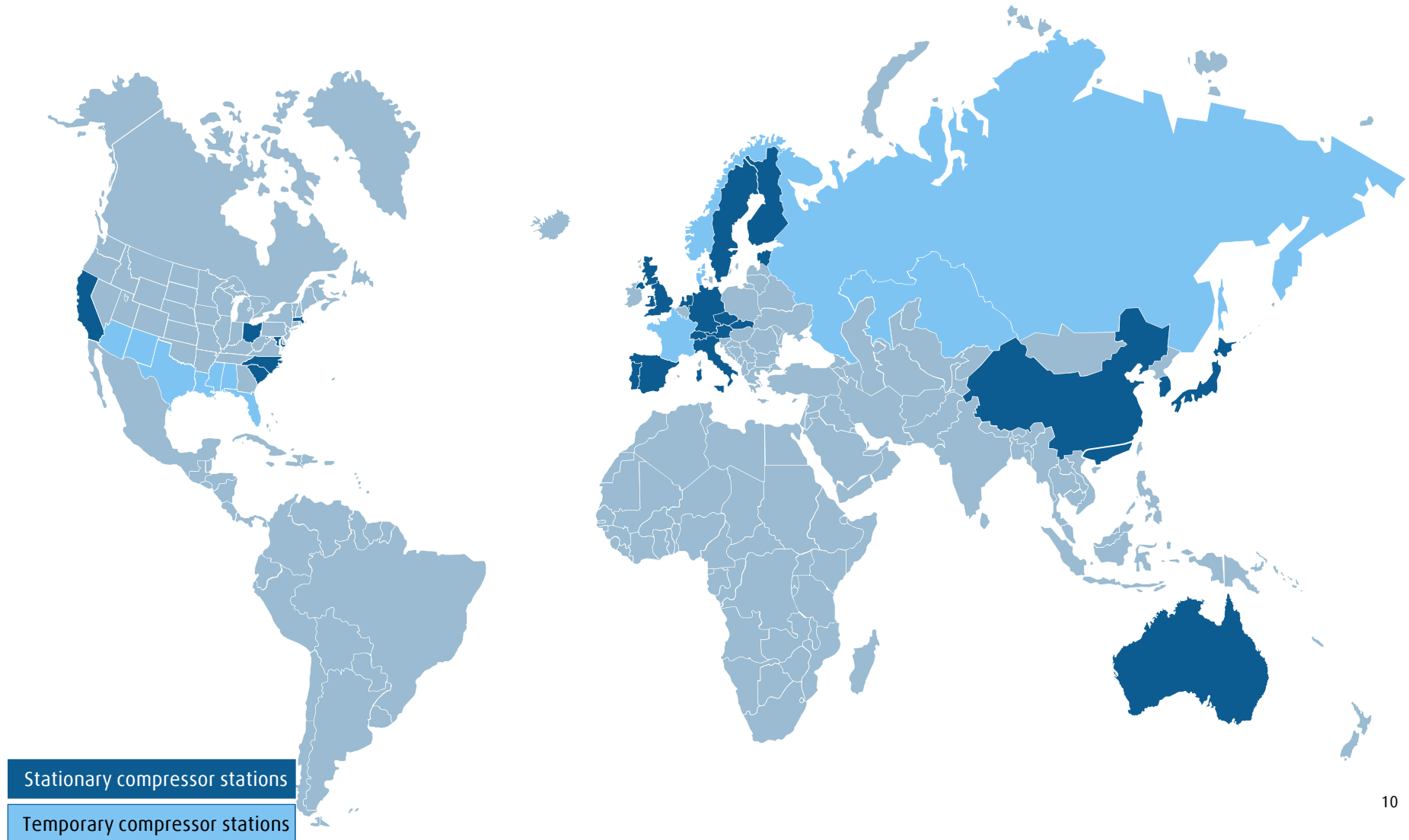


Development of first H₂ bike

Linde - ATZ Projects worldwide



More than **160 H2 compressors** and over 400 compressors for other gases like CNG, Ar or N2 worldwide



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Small serial production of hydrogen fueling stations

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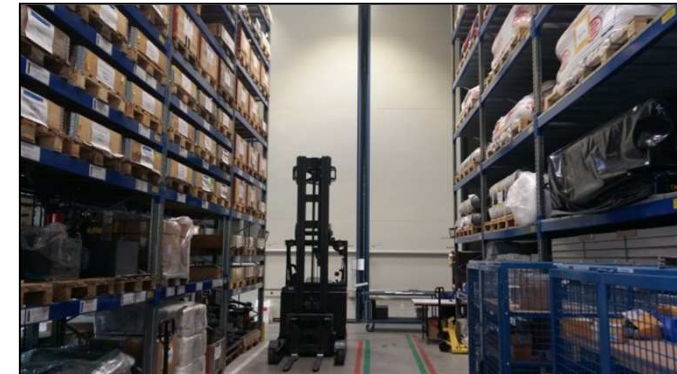
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Serial Production since 2012

- Current production of approx. 60 stations per year
- Average lead time of 8 months
- Every station is extensively tested before delivery
- Possibility to work night shifts for peak delivery



Work shop and assembly area



Ware House



Delivery of IC 90 container