

Leading the Transition to Low Carbon Energy

Hydrogen is the most abundant element in the universe. Even though it is light and small, hydrogen is a powerful energy carrier and can, for example, be used to store excess renewable energy. Hydrogen is transported underground through extensive pipeline networks or by truck, as a cryogenic liquid or high-pressure gas, to be used in a wide range of applications, from mobility to heavy industries. Due to its versatility, hydrogen is proving to be a key enabler of the transition to low and zero-carbon energy (clean energy), to help meet climate change targets. At Linde, we have been harnessing the power of hydrogen for over 100 years and are making continued investments in effective and economic ways to deliver gray, blue and, ultimately, green hydrogen. We can produce hydrogen from a range of feedstocks and natural resources. Using processes like steam reforming, we generate gray hydrogen from natural gas, liquefied petroleum gas (LPG) or naphtha. This is the most common hydrogen production process today. Gray hydrogen can be converted into blue hydrogen by adding carbon capture and storage technologies to the production process. We produce green hydrogen using electrolysis powered by renewable energy. An alternative green hydrogen production method is steam reforming using biomethane as feedstock. Gray and blue hydrogen are important steppingstones on the path to green hydrogen as they allow the necessary frameworks and infrastructures to be developed in the interim while green hydrogen production reaches the necessary scale.

As the world’s leading industrial gas and engineering company, Linde covers the full spectrum of the hydrogen value chain. We can

help customers and stakeholders navigate through the complexities of the transition to a zero-carbon economy. Our engineers work with customers in identifying their path to zero emissions and Linde has become a leader in designing, building and operating plants and facilities to meet our customers’ needs. Clean hydrogen is a cornerstone of our Clean Energy strategy which is built around 1) providing solutions to mitigate and manage carbon emissions, and 2) developing clean hydrogen technologies to facilitate the transition to low-carbon fuels and applications. We are aligned with the Paris Accords and contribute to accelerating the transition to a clean energy economy. We also support the TCFD, an Index showing the alignment between Linde’s reporting and the TCFD Guidelines which is available at: <https://www.linde.com/about-linde/sustainabledevelopment/reporting-center>.

Advocacy is another way in which we actively drive the transition to clean energy: Linde is a founding member of the Hydrogen Council and participates in many other hydrogen and climate change forums and advocacy groups, such as the Sustainable Markets Initiative and the Hydrogen Forward Coalition. Today, Linde has the largest liquid hydrogen production capacity and distribution system in the world. We also operate the world’s first commercial high-purity hydrogen storage cavern, which, coupled with an unrivaled pipeline network of approximately 1,000 kilometers, enables us to reliably supply our customers. With more than 200 hydrogen refueling stations and 80 hydrogen electrolysis plants installed worldwide, we are at the forefront of the energy transition.



Linde’s Capabilities Across the Hydrogen Value Chain

Linde’s Pathway to Climate Neutrality: 2028, 2035, 2050

The next three decades will represent a period of great activity for the world and the quest to address climate change. Our strategy includes three milestones, 2028, 2035, and 2050, and that strategy is based upon a vision of the evolution across the world during this period.

2028:

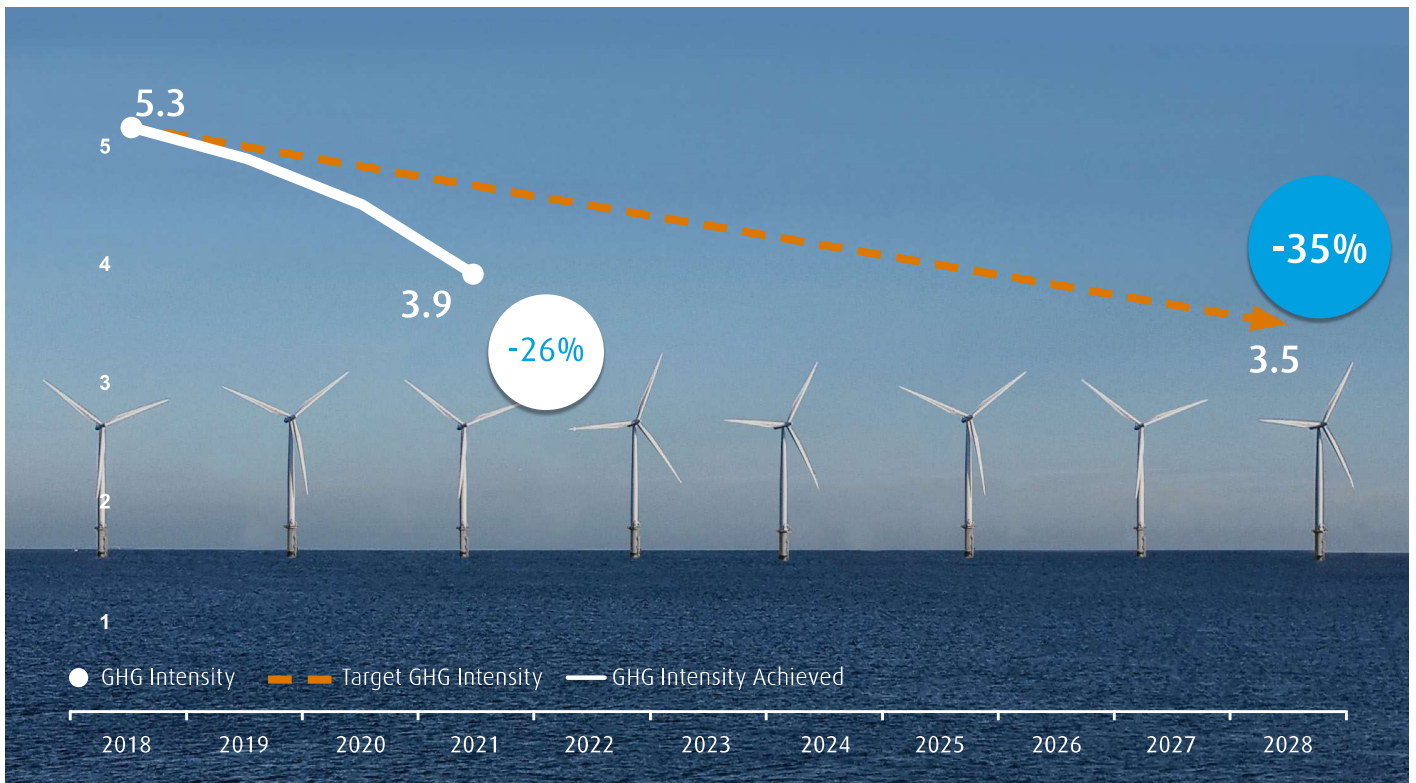
Our assumptions for this time horizon are that industrial-level decarbonization continues to accelerate. New technologies will be piloted and demonstrated. Green fuels and materials will be scaling, and the feasibility for hydrogen usage as an agent of decarbonization in multiple applications will be growing. SMRs will continue to be used for most large-scale hydrogen production. They will become more efficient, and many will incorporate carbon capture and/or use feedstocks and power from renewable sources. Electrolysis for green hydrogen production from renewable power will be available at capacities greater than 100 MW. Linde’s six climate change targets through 2028 (with a 2018 baseline) follow the full value chain from investment to customer and environmental benefits. They are consistent with Linde’s mission and are critical to continuing the company’s sustainability leadership. These are management targets; our businesses are accountable for achieving them. Linde will invest more than \$1 billion in decarbonization initiatives and triple the amount of clean hydrogen production. The company is investing across the hydrogen value chain to accelerate the clean energy transition with a higher global renewable power mix and significant operating and capital efficiencies. We will pursue

competitive low-carbon sources of hydrogen, including energy efficient SMRs and ATRs with carbon capture, electrolysis with renewable power, and pilot new low-carbon technologies. Our R&D will have a decarbonization focus. Key projects include advanced thermal barrier coatings and advanced sealing technologies; improving global plant efficiency, energy optimization, logistics and operations optimization; and flexible operations to support demand-side management and allow for higher utilization of renewably produced electrical power. It also includes the development of alternative gas separation technologies to allow alternative process concepts with higher efficiency and a lower carbon footprint. In the steel industry, projects include the decarbonization of the integrated mill, heat recovery, direct reduced iron technologies and electrochemistry initiatives.

Not all barriers to decarbonization can be overcome in the short term. However, we will continue to invest in optimizing operational efficiency to meet our commitment to substantially increase our focus on low-carbon and renewable energy to continue reducing carbon emissions.

The SD 2028 target of 35 percent improvement in Linde GHG intensity 2018 – 2028 is measured against adjusted EBITDA*. This target was chosen to show efficiency against a business denominator. EBITDA is one of the non-GAAP measures reported by Linde plc. Achieving this target will depend on a range of external variables that are not in our control, from global economic trends to government regulations to currency fluctuations. We remain committed to managing business growth while optimizing operational GHG emissions. In 2021, Linde reduced its GHG intensity by 26 percent from the baseline year; see Performance Towards Targets. In relation to Scope 1 or direct GHG

Goal of 35% improvement in Linde GHG intensity 2018–2028*



* Scope 1 and 2 emissions (in million MT) divided by adjusted EBITDA in billion USD. Calculation for 2018 uses adjusted pro forma EBITDA. Calculation for 2019 onward uses adjusted EBITDA. Adjusted EBITDA is a non-GAAP measure. For definition and reconciliation, please see Appendix to the Investor Teleconference Presentation Fourth Quarter 2021.

emissions, we target improving Scope 1 GHG intensity for hydrogen plants (HyCOs) (4 percent improvement within the target horizon) and our distribution vehicles (10 percent) and reducing our absolute GHG emissions from other sources (e.g., refrigerant filling losses, nitrous oxide [N₂O] emissions) by 10 percent. In relation to Scope 2 or indirect GHG emissions, Linde aims to improve its operational efficiency and GHG intensity at ASU plants (7 percent within the target horizon). Linde's largest medium-term opportunity to affect its GHG footprint is in Scope 2 electricity. We continue to leverage our scale and geographic distribution to procure reliable and affordable sources of renewable electricity through active procurement of new direct renewable energy contracts, Power Purchase Agreements (PPAs) or Renewable Energy Credits (RECs).

By 2028, we expect to have achieved:

- 35 percent improvement in GHG intensity versus EBITDA – from 5.31 to 3.45.
- Hold Scope 2 GHG emissions flat or reduced at the same time as we substantially increase our power use.
- More than 2x low-carbon power procured.
- Overall, renewable energy and low-carbon energy sources are projected to increase from 35 percent to more than 50 percent (all power).
- Development of blue and/or green hydrogen projects.

We have implemented several additional measures to help us better manage our carbon footprint, achieve our long-term targets, and assess the long-term risks of climate change. Linde's Clean Energy organization was launched to focus and accelerate activity in this area. The GHG emissions from new investments are calculated and integrated into considerations in Capital Investment Committee decisions for every project. They are then considered in the selection of the technology solution and project risks across the project development cycle. To help mitigate potential physical risks from climate change, Linde has developed a tool to explore future climate change scenarios that could impose additional operational costs on production processes from factors like higher ambient temperature or air quality deterioration/higher carbon dioxide parts per million (PPMs) in the atmosphere at our locations. Physical risks are considered in planning. Impacts and mitigations are considered as part of periodic business reviews.

2035:

In 2028, the target horizon for our 10-year managed climate objectives will end. Linde has recognized the degree of its stakeholders' interest in climate change and the importance of impact globally. The company responded in 2021: Teams assessed then-current targets and began working on more aggressive goals, as well as the plans to achieve.

Our 2035 target is science-based and aligned with the Paris Accords goal to reduce global warming to well below 2°C. Linde continues efforts toward validation of this target and has worked with others in

industry through the first SBT Chemicals Stakeholder Advisory Group, which is the working group that is developing guidance for the chemicals sector. (More information is available at: <https://sciencebasedtargets.org/companies-taking-action/>.) As our latest climate commitment demonstrates, we are active in advancing the world towards ambitious GHG reduction in the chemical industry using scenario analysis (utilizing Sustainable Development Scenario).

We can envision a future where hydrogen fuel cells will be widely adopted; green electricity will be available commercially; and energy and fuel markets will be linked. Low-carbon hydrogen will be cost competitive; SMRs will feature additional energy efficiency and CCS; and electrolysis will be available with renewable electricity sources at much greater capacities and will supply a significant share of new hydrogen demand. By 2035, we expect that hydrogen derivatives will become the new energy vector and an essential means to transport low-cost renewable power around the world.

Achieving this objective will require changes in societal behaviors, government regulation, industry engagement and technology development. Linde will continue to participate in the investments and technologies that will reduce global GHG emissions.

By 2035, we expect to have achieved:

- 35 percent reduction in absolute GHG emissions from our 2021 inventory.
- More than 3x low-carbon power procured.
- Execution of CCS projects at some of Linde's largest SMRs that will, with other efficiency efforts, reduce Scope 1 emissions.

2050:

The world is at the beginning of an energy transformation, and Linde's climate neutrality ambition demonstrates our long-term commitment to be an active contributor to the transformation.

Our vision for 2050 includes widespread availability of renewable and low-carbon energy and alternative technologies for production and distribution. Linde's 2050 climate neutrality ambition is based upon IEA's scenario analysis, as described in its latest 2020 ETP paper. This well-below 2 degrees Sustainable Development Scenario (SDS) recognized that the chemical sector as a whole is one that is hard to abate and projects the GHG trajectory for this industry as declining after 2030, reaching net zero after 2070.

Linde's trajectory foresees a much earlier decline in absolute emissions, reaching climate neutrality by 2050. Analysis shows that this trajectory equates to an average decline of 4 percent of emissions per year, as compared to business-as-usual emissions. Therefore, Linde considers its 2050 net zero goal to be in line with the global goal to limit warming to 1.5 degrees.

Tackling climate change is a shared and global responsibility. The long-term effects of carbon-based fuels on the environment and climate require significant changes to the energy supply chain, regulations and society. Linde is poised to contribute across all aspects of managing climate change and reducing GHG emissions.