



Linde Group announces rare gas capacity expansions

The Linde Group is expanding production of the rare gases used by the [semiconductor industry](#), including xenon, which is in increasing demand for etching 3D semiconductor structures.

This quarter, Linde expects to complete a xenon expansion project at its Alpha, N.J. plant, part of a xenon supply network that spans three continents. Of the three rare gases – neon, krypton, and xenon – xenon is the rarest. Besides extracting xenon from the atmosphere, Linde provides numerous services to conserve and optimize their process use of xenon, said Matt Adams, head of sales and marketing, electronic gases & specialty products. “We have been developing specialized solutions around xenon for 30 years. Recycling xenon can actually make some applications viable that may not have been previously, because there’s not enough product in the world,” he said.

Lithography gas expansions

With increasing demand for neon from DUV (deep UV) multi-patterning lithography and other excimer laser applications, Linde is expanding neon capacity at a newly installed neon production facility in La Porte, Texas.

Linde works with its customers to supply mixtures of neon, fluorine, and other gases for excimer laser patterning applications. At SEMICON West, Linde (Bridgewater, N.J.) is discussing its expansion of lithography gas processing capacity at its Medford, Ore. facility.

“By investing in Medford for lithography gas production, it gives us another site and increases our business continuity plan. We work with the OEMs to make sure that we are changing as needed, to make sure that the tools and the fabs are working optimally,” Adams said.

Besides adding purification capacity, Adams said its continuity planning includes strengthening Linde’s supply chain in Europe and managing a portfolio of third-party sources.

With more than 60,000 employees worldwide and around \$20 billion in annual revenues, Linde leads the industry in rare gases. “We continue to invest globally in our own sources, and at the same time develop additional supply capacity with our partners,” said Andreas Weisheit, head of Linde Electronics. For example, Linde has more than 35 captive air separation units (ASUs) for rare gas production, and manages a network of external suppliers.

The major lithography equipment and chip manufacturers work with Linde engineers to develop new technologies at Linde's Centers of Excellence, including a center for laser gases in Alpha, N.J.

Linde spans the gamut of rare gas capabilities, including the design and manufacture of air separation units (ASUs) and rare gas extraction equipment, cryogenic engineering, purification capabilities for neon, krypton and xenon, and high-volume mixing and blending capabilities.

Rare gas production is a multi-stage process, Adams said. For example, a steel company that needs oxygen will have a Linde air separation unit onsite to extract the rare gases. This crude mixture, sometimes referred to as a soup of materials, is further refined — and in some cases undergoes cryogenic distillation — to extract the xenon, krypton and neon.

Because neon is the highest-volume rare gas, Linde has multiplesneon purifiers strategically located around the world. "That speaks to our business continuity planning, that we have these at separate locations. We're able to process this crude neon into semiconductor grade neon. Of course, it's similar with xenon and krypton," he said.

Adams said the neon shortage has been addressed and supply and demand has come back into balance. "That can change with new and different applications. We are starting to see some tightening in the xenon market, due to some applications that are coming online that have a high xenon demand. Which is one of the reasons why we're making the investment in Alpha, New Jersey," he said.

Linde Electronics will be exhibiting at SEMICON West, booth number 5952 in the North hall in the Moscone Center. Its focus will be on the leadership that Linde Electronics brings to the semiconductor industry through such offerings as electronic specialty gases, on-site solutions, materials recycling and recovery and SPECTRA® nitrogen plants.

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



Alpha Plant

