

## Linde to launch gas facilities in Tainan

**THINKING AHEAD::** Chip production is likely to see an annual rise of 8 to 12 percent this year, requiring more of the gases used in their manufacture, the company said

By Lisa Wang / Staff reporter

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Linde AG, the world's largest supplier of industrial gases, plans to launch new gas separation facilities and gas distribution systems in Tainan next year to meet rising demand as semiconductor clients churn out more advanced chips from new fabs.

The new gas facilities primarily aim to supply gases to local memorychip makers and foundries, which operate cutting-edge fabs at the Southern Taiwan Science Park in Tainan. The science park is less than 10km from Tree Valley Park, where Linde's new facilities are.

"We do see [customer] demand continuing to grow, so we also expand accordingly," Jason Chow (周祖菴), head of Linde's local venture, Linde LienHwa Industrial Gases Co (聯華林德), told the Taipei Times on the sidelines of the annual SEMI Taiwan trade show in Taipei on Wednesday last week.

"The latest and biggest investment is in Tainan's Tree Valley Park, where we are building a big air separation village [facilities] and a distribution system [to deliver gas] through underground networks," Chow said.

The facilities are to be completed next year, he said.

Chow declined to disclose the financial details of the investment in Tree Valley Park, saying Linde LienHwa has a strong commitment to continuing its investment in Taiwan to cater to customer demand.

The Linde Group has invested a combined US\$1 billion in Taiwan and China over the past few years.

Linde LienHwa, a joint venture between the Munich-based group and Taiwan's Lien Hwa Industrial Corp (聯華實業), operates four plants and an electronics research and development center at the Central Taiwan Science Park in Taichung, with about 1,600 employees in total.

The company supplies bulk gases, such as oxygen, to facilitate the operations of fabs, as well as special gases used in most chip manufacturing processes.

Linde LienHwa has built a strong customer base in Taiwan, including almost all listed chipmakers. It also helps manage on-site gas and chemical-related facilities and in-fab piping systems for clients.

As most new semiconductor investments have been in the Asia-Pacific region, the company is "shifting a lot of investment and resources to Asia, [especially to] Taiwan and China," said Anish Tolia, Head of Global

Marketing, Linde Electronics.

“Asia overall is very important to Linde. Taiwan is the biggest region for us” by revenue, Tolia said.

Linde operates several plants in Wuhan, Shanghai and other cities in China, which ranks as one of the top three markets for the group in Asia.

Overall, industrial gases is a growing market, thanks to increasing diversity of applications for semiconductors and the increasing intensity of processing and memory requirements for applications like artificial intelligence and augmented reality, Linde said in an e-mail to the Taipei Times on Friday last week.

Excluding memory chips, the world semiconductor industry is to grow at an annual pace of between 5 and 10 percent this year by revenue, Linde said in the e-mail, citing forecasts from market researchers including Gartner Inc.

More important for material and gas producers like Linde is that the number of chips produced is forecast to increase by 8 to 12 percent year-on-year this year, the company said.

The amount of chips is directly proportional to the materials and gases required to make them, it added.

Beyond that, new technologies consume more materials and more gases than previous generations, as semiconductor manufacturing process technologies become more complicated and more layers are added to make a chip, Tolia said.

Special gases, such as those used to produce advanced 3D memory chips, are to grow by a double-digit percentage this year from a year earlier, he said.

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