

## Masdar selects Linde to reduce carbon footprint of solar modules

*Adopts Linde's on-site generated fluorine to eliminate use of greenhouse gases*

Munich, Germany, 1st December 2009 – [Linde Gases](#), a division of The Linde Group, and [Masdar PV GmbH](#), a manufacturer of large-scale thin-film solar modules, have signed an agreement to qualify and adopt Linde's on-site generated fluorine – a zero global warming solution for photovoltaic (PV) module process chamber cleaning. This extension of the collaboration between the two companies is a key element of Linde's drive to help accelerate the PV industry [from grid parity to green parity](#).

Masdar PV will eliminate the use of the greenhouse gas nitrogen trifluoride (NF<sub>3</sub>), which has a global warming potential 17,200 times that of CO<sub>2</sub>, from their state-of-the-art thin-film production facility in Ichtershausen, near Erfurt (Germany). Masdar's philosophy of sustainable development and deployment of renewable energy and low carbon technologies is fully supported by Linde's mature fluorine generation technology, which provides a more productive and energy efficient alternative to the use of Per-Fluoro-Compound (PFC) gases, including NF<sub>3</sub>, for chemical vapour deposition chamber cleaning.

"Fluorine cleaning is a win-win choice for thin-film solar cell manufacturers," said Ian Travis, Manager of Linde's on-site Fluorine business. "In addition to removing any risk of unabated emissions, Fluorine reduces non-productive cleaning time and improves throughput. This is a rare situation where the interests of environmental responsibility and profit are aligned. We are delighted to be able to supply an immediate improvement on current technology to Masdar, as proof of Linde's commitment to deliver efficiency through gas technology."

"Our objectives are to deliver innovative, thin-film technology with an optimal cost-performance ratio," said Dr. Matthias Peschke, Masdar's Director of Operations & Engineering. "Using sustainable materials, hence significantly lowering the emissions in the production process, is another important differentiator for Masdar PV in a highly competitive market. Linde's efforts in offering efficient and safe on-site fluorine technology to remove NF<sub>3</sub> from our process are commendable."

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Linde has pioneered efforts to achieve the lowest carbon footprint possible for dry chamber cleaning in thin-film PV, TFT-LCD and semiconductor manufacturing by installing more than 30 Generation-F® on-site fluorine generators in the electronics industry.

Linde has established a leading position in gas and chemical supply to thin-film Si solar module manufacturers, supplying more than half of all the industry projects. The company also has a strong position in Crystalline Silicon, with nearly 40 percent market share. Linde is in a leading position in key markets such as Germany, Spain, China, Taiwan and India.

#### **About The Linde Group**

The Linde Gases Division, part of The Linde Group, is a leader in the international industrial and healthcare gases markets, providing compressed, bulk, specialty and medical gases, as well as chemicalsto virtually all fields of industry globally. The company adds value to its customers' businesses through the provision of state-of-the-art application technology, process know-how, services and equipment.

The Linde Group is a world leading gases and engineering company with almost 50,000 employees working in around 100 countries worldwide. In the 2008 financial year it achieved sales of EUR 12.7 billion. The strategy of The Linde Group is geared towards earnings-based and sustainable 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 everyone of its business areas, regions and locations across the globe. Linde is committed to technologies and products that unite the goals of customer value and sustainable development.

For more information, see The Linde Group web site at [www.linde.com](http://www.linde.com)

#### **About Masdar PV GmbH**

Masdar PV GmbH with its tandem-junction technology is a leading global manufacturer of advanced thin-film photovoltaic products and solutions in the photovoltaic's sector. Within the next years Masdar PV aims to become a top-3 global thin-film PV company. As a first step two production facilities with a total capacity of 195 MWp are put into operation in Germany and Abu Dhabi, UAE. Masdar PV GmbH is a 100% subsidiary of Masdar, Abu Dhabi's multi-faceted future energy initiative instigated from and wholly owned by the Mubadala Development Company. This is a far-reaching, trend-setting investment by the Emirate Abu Dhabi with the goal to advance the development, commercialization and deployment of renewable and alternative energy technologies and solutions.

[www.masdarpv.com](http://www.masdarpv.com)