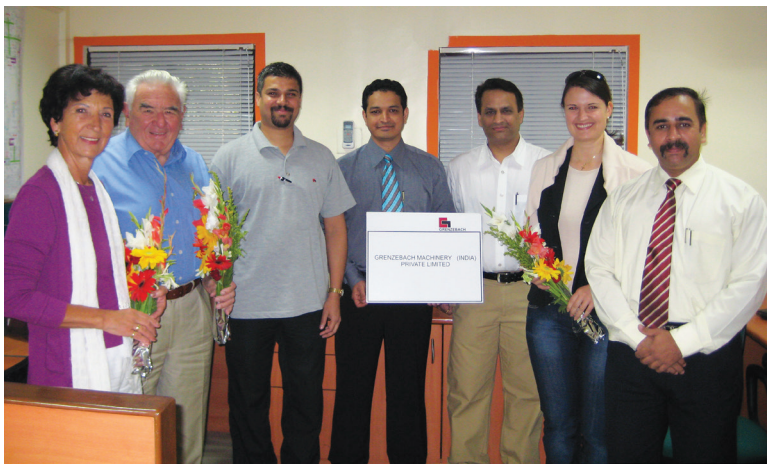
Solar glass for an ecological and economic upswing

India is currently pushing the development of renewable energies and looking to strengthen its economy further with the production of photovoltaic modules. A partner of the glass industry in India for decades, Grenzebach is supporting the solar power boom with innovative production technology for patterned glass. *Glass Worldwide* (preferred international AIGMF journal) reported.

India's economy has provided strong growth impulses in the last years. In the long term, experts expect a growth corridor of 4–8% for the economy. Almost 1.4 billion people live in India (the second-largest population after China) and the country, which stretches from the Indian Ocean to the Himalayas, is increasingly striving for economic independence from neighbouring states and has also set ambitious climate targets. Images of New Delhi smothered by smog are set to be a thing of the past; solar power instead of coal-fired power is the driver.

With its 'Incredible India' campaign, the subcontinent has been showcasing its diversity for several years now. The economic and ecological upswing is being intensively promoted by the Indian government. While around 75% of solar panels installed in India have so far been supplied by China, the amount of domestically-produced solar panels is expected to rise rapidly. The Indian government has added photovoltaic (PV) modules and battery storage for solar power to the list of the Production-Linked Incentive (PLI) schemes.



Maria and Rudolf Grenzebach (left), the company founder couple, and Sonja Grenzebach-Proeller (second from the right), today the main shareholder of the Grenzebach Group, visit experts at the Indian site in Poona. This archive photo is from 2007. Source: Grenzebach.

High demand for drawing and float glass

Photovoltaic applications (such as solar panels) require ultra-clear glass with high light transmission, a light-focusing structure and low light reflection. Drawing glass, also called patterned glass, meets these requirements.

"At the moment, we are seeing an increased demand for drawing glass lines because the patterned glass is used in PV modules. The production of float glass will also increase further in order to supply the automotive and construction industries with glass products, for example," explains Jan Lukassek, Senior Sales Manager in the Business Unit Glass at Grenzebach. Since 2005, he has been in regular contact with Indian partners and customers, advising on the design of glass manufacturing plants and supporting customers with his expertise through all communication channels until the start of production and beyond. "So far, compared to the country's population and growing economic strength, there are relatively few glass manufacturing plants in India. I reckon that around 70% of the current capacity and the now growing capacity will be used for products for the Indian market. The rest will be exported," he believes.

Supporting manufacturers in India

Grenzebach took its first step into India in 1996 with the installation of a stacking system at the cold end of an existing float glass line. In 2006 Grenzebach opened its own subsidiary in Poona in western India, around 50 miles from Mumbai. From there, Grenzebach employees maintain plants throughout India and also neighbouring countries. "The glass industry in India and in our neighbouring countries has gained great momentum since the Grenzebach team started a quarter of a century ago. Solving day-to-day issues together with our customers and also strategically supporting the companies is a great pleasure," says Prasanna Hedge, Managing Director at Grenzebach Machinery (India) Pvt. Ltd in Poona. As an example of this momentum, in 2009, the drawing glass line premiere in India took place together with Borosil Glass Works Ltd., in 2019 a second line was commissioned and in 2022, another two drawing glass lines for patterned glass will be installed for the newly founded company Borosil Renewables Ltd. Today, a total of six float glass lines from Grenzebach are in operation in India, with a daily capacity of almost 3,800 tons. With the two new plants at Borosil, four ▸

Producing for the energy transition: the second drawing glass line at Borosil was set into operation in 2019. Source: Grenzebach.

drawing glass lines will then produce up to 1,000 tons of patterned glass per day.

Fine-tuning technology

In order to reduce CO_2 emissions and drive the energy transition forwards – improving the quality of air and thereby the quality of life for the people living in India's 28 federal states, protecting the environment and making a significant contribution to the international efforts for climate protection – the government is relying in particular on the power of the sun.

Grenzebach is prepared for the additional installation of drawing glass lines, which are specifically designed for the production of glass for photovoltaic modules. To meet the increasing demand for solar glass – currently also occurring in China – Grenzebach experts comprehensively revised the company's portfolio for drawing glass and added new technologies; a state-of-the-art product line.

Early adopter

Indian glass manufacturer Borosil anticipated the great demand for solar modules as early as 2009 and put its first drawing glass line into operation with a daily output of 180 tons per day. Another drawing glass line, commissioned in 2019, generates additional 240 tons per day. Borosil continues to expand to meet the increasing demand for drawing glass for PV modules as a result of the international energy transition. In 2022, a further two patterned glass lines will be installed, each with a daily output of 275 tons. They will be located in Bharuch in the federal state Gujarat.

Grenzebach took its first step into India in 1996 with the installation of a stacking system at the cold end of an existing float glass line. Source: Grenzebach.

Borosil Renewables Ltd., part of the international Borosil Group, has doubled its capacity in India for patterned glass to five gigawatts of photovoltaic modules by expanding in Bharuch. The company now meets about 40% of the demand for drawing glass on the domestic market. The remainder is imported from China and Malaysia.

"Investing in green power technology early on has proven to be the absolutely right strategy," states Ramaswami Velayudhanpillai from the Management of Borosil Renewable Ltd. "We knew that drawing glass for solar modules would be of great importance on the Indian market. We will resolutely continue going on this path. The investment in the two additional drawing glass lines is an important step so that we can meet the increasing demand and in addition expand this strategically important business."

The company is also exporting heavily. Borosil Renewables exports about 20% of its patterned glass to the USA and Europe – in particular to Germany, Spain, Portugal, Turkey and Russia.

New Borosil site in Bharuch

Flexibility in production is important to Borosil. Drawing glass for solar modules has a thickness of 1.6mm to 4mm. The formats of the glass sheets depend on the order but range within the parameters of 1–2m^2. "In the area of photovoltaic, bigger glass formats are on the rise. Borosil anticipated that already and the line is designed to allow maximum gross widths. This promotes flexibility," explains Jan Lukassek from Grenzebach. The maximum glass width is defined by the length of the structure roller. The two new lines each have three robots to stack the glass sheets at the line. Flexibility is also an important aspect of this: two single sheets can be picked simultaneously (double pick) or individually (single pick).

The cold end at Borosil's plant is supplied by Grenzebach; the annealing lehr by CNUD EFCO GFT. Following the motto 'from hot to cold', Borosil uses integrated solutions from a single source. With 300 systems installed worldwide, both Grenzebach and CNUD EFCO GFT have immense application knowledge. Together, they cover a large part of the subsections of a glass line and customers benefit from their joint expertise in the hot and cold areas.

Booming potential

Borosil, with its additional expansion, is one of the drivers of India's growing importance in the global energy transition. India has the potential to become an important hub for the enormous international demand for photovoltaic technology.

Although the Indian economy was hit by a slump as a result of the Covid-19 pandemic and the country will have to struggle with the effects of the pandemic for a long time, by 2030 India could become one of the top three economies in the world. The boom in renewable energies and the boom in glass production are significantly contributing to this. ●

(L–R) Pradeep Kheruka, Chairman of the Borosil Group and Jan Lukassek, Senior Sales Manager in the Business Unit Glass at Grenzebach with Sorab Singhal from DGM Glass Service at Borosil meeting at a solar exhibition in 2014. Source: Grenzebach.

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