

CEO's MESSAGE



Ajay Kapur
Chief Executive Officer
Vedanta Ltd., Aluminium & Power Business

"As India's largest aluminium producer, we bring together technology, innovation and expertise to develop top-of-the-line aluminium and value-added products perfectly tailored to the needs of our customers. In partnership with our customers, we fulfil critical needs of the country, triggering socio-economic transformation in areas where we operate and making India self-reliant. From space exploration to rural electrification, this partnership has been and continues to be a driving force in India's journey of growth and resilience."

PRODUCT CORNER

SLABS



Vedanta's Jharsuguda facility produces primary aluminium slabs in 1xxx, 3xxx, 4xxx and 8xxx alloy ranges, which are used by the rolling industry for manufacturing aluminium foil and sheet products. Vedanta's annual slab casting facility of 100 KTPA uses state-of-the-art Epsilon Casting technology by Wagstaff. Vedanta offers slab in 410*1270 mm2, 410*1540 mm2 and 410*1620 mm2 dimension variants, perfectly tailored to customers' requirements of dimensional tolerance, surface finish and metallurgical characteristics for ensuring complete customer satisfaction.

ALUMINIUM & INDIA'S EXPLORATION OF SOLAR ENERGY

With rapid developments in solar power technologies, it is expected that solar systems will provide 12% to 25% of global electricity by 2050.

With growing global consciousness in favour of sustainable energy solutions to meet demands of modern life and growing population, solar power has emerged as a frontrunner among renewable energy (RE) options. This is primarily due to rapid advancement in technology, continuous evolution in the solar cell manufacturing industry to lower costs, as well as promotion by various countries to harness and adopt solar power on account of its accessibility, abundance, environment-friendliness and renewability. On the back of aggressive RE targets by countries, solar power is fast growing and is poised to soon become one of the primary sources of power generation globally.



Development of solar power sector across the world is primarily driven by the energy and RE policies, environment agendas and carbon footprint measures undertaken by countries to leverage and promote this source of energy. This fact holds true for India as well. The momentum of solar power sector in India is purely driven by various government policies implemented across the years, starting 2006.

YEAR OF POLICY IMPLEMENTATION	IMPACT ON THE SOLAR POWER INDUSTRY
2006	Rural Electrification Programme - Gol recognizing the importance of solar power for India
2007	Semiconductor Policy was introduced, encouraging silicon & PV manufacturing industry in India
2008	Generation based incentive scheme was introduced by Gol to promote solar power grid connectivity
2009	Gujarat state government came up with an exclusive state solar policy
2010	Jawaharlal Nehru National Solar Mission (JNNSM) inaugurated with a target of 20 GW solar capacity by 2022 in India
2015	JNNSM revised its target to 100 GW by 2022 with 40 GW from rooftop solar sector
2018	25% safeguard duty imposed by Department of Revenue for imports of solar cell and module from China and Malaysia for two years
2020	Department of Revenue extended the imposition of safeguard duty on the import of solar cells and modules for another year from China, Thailand and Vietnam.

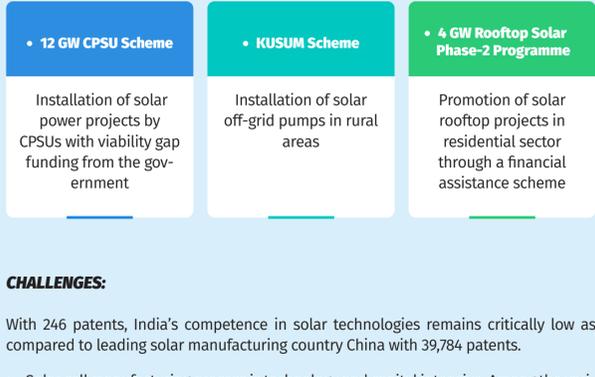
THE ALUMINIUM ADVANTAGE IN SOLAR ENERGY SECTOR



According to research, 0.4 million tonnes of aluminium is used in photovoltaic systems (PV) today. Aluminium is predominantly used in construction/mounting structures (72% of total aluminium input), followed by input to panel frames (22%) and usage in inverters (6%).

Developing a solar farm was a costly affair about a decade back due to the use of silver metal in photovoltaic cells. With silver being increasingly replaced by aluminium today, the cost of such photovoltaic cells has considerably reduced without impacting the overall productivity. Furthermore, aluminium is also being used in the solar industry for making frames of the solar panel, building the mounting structures and for support and connectors. The frame plays a critical role in protecting the edge of the laminate section housing the cells, as well as providing a strong structure to mount the solar panel in position. Extruded aluminium sections are lightweight but very sturdy and able to withstand extreme stress and loading. Mounting structures also provide durable and good support framework owing to aluminium's natural resistance to corrosion. As the industry evolves, we are likely to see emergence of new applications of aluminium in this sector.

Aluminium Mounting Structure



High strength-to-weight ratio, high resistance to corrosion, high surface reflectivity, excellent electrical and thermal conductivities, as well as special optic properties of its anodic coating are some of aluminium's exceptional properties that make it an integral part of solar power systems.

Some more advantages of using aluminium in the framework include

- Aluminium trusses provide the same strength and stability with less weight, compared to their traditional counterparts.
- Aluminium frames are lighter, making it easier to transport and assemble at site.
- Aluminium can stand extreme stress while also being more weather resistant, thereby making the structures high on durability and low on maintenance.
- Aluminium's superior malleability lends itself to flexibility in design, both expansive and intricate, tailored to practical needs on ground.
- Aluminium extrusion pipes offer more atypical and exact angles with fewer connectors compared to their metal counterparts.

THE INDIAN OUTLOOK

CAPABILITY:

- At present, India has close to 100 solar PV module manufacturers with manufacturing capacities ranging from few MW to 2,000 MW per annum.
- The cumulative manufacturing capacity in the country stands at about 10 GW per annum, which is close to double the capacity available in the country during 2016.
- The domestic industry is majorly import-dependent which can be attributed to cheaper costs.
- India also has about 3 GW per annum of domestic solar cell manufacturing capacity which supplies cells to the domestic panel manufacturing industry.

3 MAJOR GOVERNMENT SCHEMES PROMOTING DOMESTIC SOLAR PV MANUFACTURING IN INDIA:

12 GW CPSU Scheme	KUSUM Scheme	4 GW Rooftop Solar Phase-2 Programme
Installation of solar power projects by CPSUs with viability gap funding from the government	Installation of solar off-grid pumps in rural areas	Promotion of solar rooftop projects in residential sector through a financial assistance scheme

CHALLENGES:

With 246 patents, India's competence in solar technologies remains critically low as compared to leading solar manufacturing country China with 39,784 patents.

- Solar cell manufacturing process is technology and capital intensive. Among the various components of solar panel, viz. PV backsheets, EVA resins, aluminium frames, copper interconnects, junction boxes, poly film wafer ingot and tempered glass, India has no technological expertise in any of these processes and is dependent on foreign production.
- More than 80-90% of the Indian companies are engaged in module assembly, buying the above components from abroad, mostly China.
- Despite India having the second largest aluminium production capacity in the world at 4.1 million tonnes, not a single tonne of aluminium made in India is domestically used to make solar frames. Instead, they are 100% imported as on date.
- Long term visibility yet to be given by the government to promote domestic investment in solar cell and capacity increase in module manufacturing.
- Urgent need for implementation of basic custom duty structure on imported solar cells in order to regulate PV solar cells import into India.

WAY FORWARD:

India needs to increase its cell manufacturing capacity to at least 10 GW by 2023-24. Indian solar cell and module manufacturers should promote development of domestic material supply value chain by encouraging them with consistent orders for a considerable time period. The Government of India should promote domestic supply ecosystem for all government project orders.

In India, aluminium is primarily used to make solar frames for panels. It is estimated that there are 8 kgs of the metal per panel. So, in the development of 1 GW solar power capacity, about 20 KT of aluminium is required only for panel frames.

India has a vision to develop 100 GW solar power generation capacity by 2022, of which 37 GW has already been installed and balance ~63 GW will be developed in the days to come. This project has a potential to consume ~1.2 million tonnes of aluminium made in India for the rest of the capacity installation, assuming aluminium is used only to make solar frames. This is a sizeable volume that domestic solar power producers can easily source from domestic primary aluminium producers, instead of sourcing this aluminium from abroad.

ALUMINIUM MARKET OUTLOOK

Aluminium prices have strengthened during the second quarter of FY 21 with recovery in the global economy, resilient Chinese demand and a weaker US dollar. As we enter the third quarter, market experts predict that the prices shall drift lower as the global economic recovery goes back to its initial rebound phase. Analysts estimate that the upward momentum of LME shall fall as we move through Q3 FY 21 and average out at \$1,750 /t. On the demand side, outside China, North East Asia market and the US market are in rebound phase. Globally aluminium production will increase by 1% y/y in CY 2020, with a 1.6% contraction ex. China and 3% growth in China along with an estimated surplus of 3.8 Mt in CY 2020.

News Update

- According to an online statement released by the US Aluminium Association (AA), the AA's Foil Trade Enforcement Working Group has filed an antidumping and countervailing duty petition against imports of aluminium foil from five countries. The petition targets foil imports from Armenia, Brazil, Oman, Russia and Turkey stating that imports from the subject countries are being dumped at margins of up to 107.61% and that there has been a 110% increase in imports between 2017-2019.
- State-run Indian Oil Corporation (IOC) is planning to launch first-of-its-kind aluminium-air batteries, potentially a more cost-effective alternative to lithium-ion batteries, for electric vehicles (EV) and other stationary applications. IOC has said that these batteries are one-fourth the weight of lithium-ion batteries and run more than double the lithium-ion batteries on a single charge.
- The power ministry has begun deliberations on bringing electricity under Goods and Services Tax (GST). A recent study conducted by the ministry showed that this would reduce per unit cost of power to generation, distribution and transmission companies by 17 paise per unit, leading to big savings for consumers.
- The ministry of new and renewable energy has asked solar manufacturers to provide a list of machinery and capital goods that should be exempted from basic customs duty (BCD), indicating that the duty may soon be imposed.
- As per a report by McKinsey, India's global auto components trade likely to grow 5% by 2026. The report said that India has to localise and substitute imports of up to \$12 billion.

OUR CUSTOMER-FIRST APPROACH

Vedanta Aluminium is on a mission to create greater value for its illustrious global clientele. With a commitment to institutionalize customer centricity at the heart of business excellence, Vedanta is leveraging smart technologies along with technical expertise to go the extra mile for ensuring greater customer fulfilment experiences worldwide. The company recently developed a Customer Technical Services (CTS) cell for anchoring customers' quality and customization requirements from existing and new products. As aluminium is a dynamic and rapidly evolving industry with potential for greater applications in a sustainability-conscious world, Vedanta is also heavily focusing its efforts on R&D, bringing together Technical, Operations and Marketing expertise in a Centre of Excellence to invent the next big thing in aluminium.

KEY FEATURES OF VEDANTA'S CTS CELL:



DID YOU KNOW ?

Natcore Technology Inc., a company focused on significantly lowering costs and improving power output of solar cells, swaps silver for aluminium in solar cells, for phenomenal advantages:

- The elimination of high-cost silver. Natcore's Foil Cell replaces silver, and its high material costs and complicated production processes, with aluminium foils. At approximately 1/300th the cost of silver, aluminium allows for more metal to be used to maintain conductivity while also enabling high-speed, high-volume materials handling and processing.
- The potential for ultra-high efficiencies in an affordable production cell. The silicon heterojunction (SH) structure of Natcore's Foil Cell is the same basic structure used to achieve world-record silicon cell efficiencies of over 26% by major manufacturers in experimental solar cells.

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ABOUT VEDANTA ALUMINIUM AND POWER

Vedanta Aluminium & Power, a part of Vedanta Limited, is India's largest producer of aluminium, producing 1.9 million tonnes per annum (MTPA) in FY20. Vedanta Limited operates a 2 MTPA (million tonnes per annum) capacity alumina refinery in Lanjigarh (Kalahandi district, Odisha), India since 2007 and an associated 90 MW captive power plant. The refinery feeds Vedanta's Aluminium smelters at Jharsuguda in Odisha and at BALCO in Korba, Chhattisgarh. Vedanta Aluminium & Power operates two smelters in Jharsuguda, Odisha, and Korba, Chhattisgarh, with a combined capacity of 2.2 MTPA. Its power business includes the Mansa (Punjab) based Talwandi Sabo Power Limited (TSPL), a wholly owned subsidiary of Vedanta Ltd. Vedanta Aluminium & Power is a leader in value-added aluminium products that find critical applications in core industries. It prides itself in having one of the largest technically qualified, diverse and vibrant workforces in the country spread across its four assets. With its world-class smelters, power plants and alumina refinery spread across India, the company fulfills its mission of spawning emerging applications of aluminium as the 'Metal of the Future' for a greener tomorrow.

For more information please log on to <https://www.vedantalimited.com>

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