

Dalmeia Bharat Limited (DBL), was established in 1939. The company boasts one of the lowest carbon footprints in the global cement industry and is also one of the first cement companies to commit to RE100, EP100, and EV100 (the first company to commit to all three). This highlights the company's business leadership in the clean energy transition by taking a holistic approach to decarbonisation. With a growing capacity, currently pegged at 35.9 million t, DBL is one of India's leading cement manufacturing groups by installed capacity. The manufacturer is a category leader in super-speciality

cement used for oil wells, railway sleepers and airstrips, as well as the country's largest producer of Portland Slag Cement (PSC).

DBL is paving the way for a carbon negative cement industry not just in India but across the globe as well. With a strategic roadmap to address environmental needs, the company is committed to be a carbon-negative company by 2040. The company is able to achieve its climate justice ambitions by:

Increasing the proportion of green cement

DBL is focused on manufacturing high quality 'green cement', essentially, cement made by intermixing waste material from other

industries such as blast furnace slag and fly ash. This has helped the company moderate CO₂ emissions in cement manufacturing and has made its carbon footprint one of the smallest among global cement producers. In addition to mitigating resource availability issues, there are also cost and revenue benefits to applying this strategy.

By utilising waste materials, the company acts as a waste disposal partner for power and steel plants. One example is fly ash, which is an industrial by-product of thermal power plants, and is pure waste and a pollutant. If not consumed in cement and related industries, it will go to landfill, or be stored in ash ponds, which create further pollution.



Putting sustainability in the driving seat

Mahendra Singhi, Dalmia Bharat, describes how green energy and innovation are at the forefront of a push for sustainability in the cement industry.

Replacing fossil fuels in manufacturing

DBL's sustainability approach goes beyond profitability; it has been taking rigorous steps to decarbonise its operations. The company has additionally made a target to replace fossil fuels completely by using sustainable biomass, bamboo plants, municipal waste, and plastic waste.

In the coming years it will be able to deploy superior technological improvements including CO₂ capture, sequestration and utilisation; green hydrogen, heat electrification, solar calcination, etc. All of these steps will help in building value towards climate change prevention.

By 2030, DBL aims to ensure that all of its plants across the

nation will completely shift to alternative fuel sources.

The positive impacts of using blended cement

- ▶ Lower emissions while building new structures.
- ▶ Lowering the overall cost of building as blended cement is more cost-effective compared to OPC.
- ▶ Offers sustainability and durability against carbonation, chloride induced corrosion, sulfate attacks and alkali-silica reaction.
- ▶ Reduced additional expenses on repairs/renovations due to lesser seepage and related incidents.
- ▶ Waste materials from other industries are used as input while using blended cement, thus production of

composite cement results in resource conservation, greater sustainability and lower CO₂ emissions.

Making 'greening' a way of life

DBL is committed to ensuring that it can keep pace with cement production needs while at the same time ushering in an era of progressive prosperity without harming the environment.

When it comes to adopting green fuel, DBL has already started replacing fossil fuel and is actively working towards meeting this goal. The company is co-incinerates hazardous waste from industries, bio-mining waste from municipalities, and other plastic waste at 20% thermal substitution rate, thereby contributing to a positive environment for society in





Conservation and greening efforts at Dalmia Bharat Limited's Rajgangpur plant in Odisha.



Cement kiln at Dalmia Bharat Limited's Rajgangpur plant in the state of Odisha in India.



Water conservation efforts by Dalmia Bharat Limited at its Ariyalur plant in Tamil Nadu, India.



The Eco Park at Dalmia Bharat Limited's Ariyalur plant in Tamil Nadu, India.

terms of a reduction in GHG. DBL has partnered with 3 corporations and 48 municipalities to collect and co-incinerate plant plastic waste.

The company has also installed world-class power-saving equipment and the latest technologies through various innovative ideas and de-bottlenecking projects, thereby reducing the energy consumption, being listed in the top 5 most energy efficient plants in India.

In recognition for its efforts, DBL received the 'National Energy Conservation Award' from the Ministry of Power in FY 2012 & 2013 and has won the excellent 'Energy Efficient Unit' accolade from CII nine consecutive times. In addition, it has been awarded the 'Energy Efficient Unit' from the National Council on Cement and Building Materials.

The company carried out activities under water and soil conservation, livelihood and infrastructure development through CSR and HR best practices resulting in winning the Manufacturing Today award.

All of these efforts support the circular economy as well as helping to cut costs and avoid volatile energy prices. As the company increases its usage of green fuels like industrial wastes or municipal wastes, they will decrease their exposure to volatile energy costs due to commodity prices.

Enabling the future of green buildings

Blended cements are a revolutionary product produced in an environmentally-friendly way and can help build a sustainable world. The industry needs sustainable methods of cement production that are energy-efficient and cost-optimised. Therefore, DBL has stuck to its commitment wherein the company is involved in actively advocating for the use of green cement. At last year's COP26, the company became a founding member of the 'First Movers Coalition' to solidify its commitment to raise global climate ambition and green product demand.

The company also recently signed a Memorandum of Understanding (MoU) with FLSmidth, a major supplier of engineering, equipment, and service solutions to collaborate on the research and development of disruptive solutions for next-generation cement manufacturing. This MoU is testimony to DBL's nation-building efforts and is a cornerstone of Prime Minister Narendra Modi's focus on boosting ties in trade, energy, and green technology.

All of DBL's efforts and initiatives towards using green and sustainable building materials have been recognised by policy makers. The Indian Green Building Council (A CII body) and GRIHA (Green Rating for Integrated Habitat Assessment) are two such organisations in India which are involved in green building evaluation and have commended DBL.

These bodies have robust mechanisms to evaluate buildings for their green content and certify them as green buildings on different scales. The evaluation comprises of several parameters including the building materials used in the construction of a building. DBL is

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the only cement company in India that is certified by both GRIHA and IGBC.

Commitment towards responsible environmental stewardship

DBL is already ensuring that its plants are facilitating the move from a grey to green reality. The company's Rajgangpur plant is, in fact, the first in the world to implement a kiln slope of 4.5% (with savings of 0.25 kwh/clinker). It features the biggest calciner in the world, which has a retention time of 13.7 sec. The plant boasts the lowest pressure drop of 357 mmwg at PH fan inlet at 8000 tpd with 100% petcoke and has a solar power system installed above raw material shed running at 1.6 MW. The unit has a dust suppression fog system for all transfer towers, a limestone crushing plant and a stacker and reclaimer area with a RO plant and no bag filter. By aluminising the internal and external surfaces of the complete preheater and kiln, along with extra hysil insulation, the plant is able to reduce radiation losses by 10%. The plant also has the latest JetFlex burner for kiln firing (134 MW/482 Gj/hr) and sports a kiln of 81 m in length with a 5 m diameter with a closed loop water circulation system with negligible losses. RABHs are installed for handling hot gases from the kiln

and raw mill, resulting in zero water consumption for cooling hot gases, a step towards water positivity.

In this fashion, from crusher to packing plant, DBL's Rajgangpur plant is designed to optimise power and fuel efficiency. The purpose of the unit was not only to reduce operating costs, but also to achieve the smallest possible environmental footprint through its green fuel usage. The equipment and design of the Rajgangpur plant were carefully curated to ensure improved process and energy efficiency. Attention was also provided to maximise potential alternative fuel and raw material utilisation as well as reduced heat losses. More details can be found in Table 1.

In conclusion

As a major cement company, DBL has always strived to lead the agenda when creating a holistic business ecosystem that encourages sustainable growth and by introducing a number of green initiatives and adopting green fuel, the company is confident that it will be able to achieve its ambitious sustainability goal of becoming carbon negative by 2040. At the same time, the company aspires to ensure that not just a few, but all of its plants, across India will be able to surpass global manufacturing and installation benchmarks whilst at the same time maintaining a drive towards a green transformation. ■

Table 1. Rajgangpur plant equipment specifications.

Equipment	Performance guarantees	Operational/system features	Sustainable add-ons
Kiln with a L/D ratio of 81 m x 5 m with highest slope 4.5%.	- As per equipment selection specific power consumption is less than 40K WH/t of clinker.	- Reduced power consumption by maintaining degree of filling and retention time well within the norms. - Better heat transfer and complete combustion of fuel resulting into lower specific heat.	- Every 0.5% increase in kiln slope results in power savings of 0.27 kWH/t - 130 VFDs installed.
Six stage preheater with low-pressure cyclones.	- 350 mmwg pressure at fan inlet.	- Aluminising and heat resistance painting. - Resulting reduced radiation losses by 10%.	- Waste heat recovery system installed in preheater. - Solar power panel system on all Raw material shed roofs.
Precalciner	- Biggest size precalciner with highest retention time 13.7 sec.	- Lower NOx and CO% even after maximising green fuels.	- 12 cyclones equipped with gamma ray sensors for detecting early jamming.
Multi-channel JetFlex burner	- SOx guarantees within 100 mg/nm ³ - NOx guarantees 600 mg/nm ³ @ 1% N ₂ by using of 100% petcoke without SNCR.	- Green fuel co-processing and feeding system.	- Flexibility to fire multiple/green fuels.
Automation and Robo Lab	- 14 samples per hour.	- Automatic sampling and analysis for raw meal, kiln feed and clinker.	- Offline particles size analyser. - Online calcination sampler.
ESP and bag filters.	- Dust emissions within 10 mg/nm ³ in ESP process bag filters.	- Reverse air bag house and ESP with eight fields and smart controller.	- Bagburst detectors and online flow measurement.