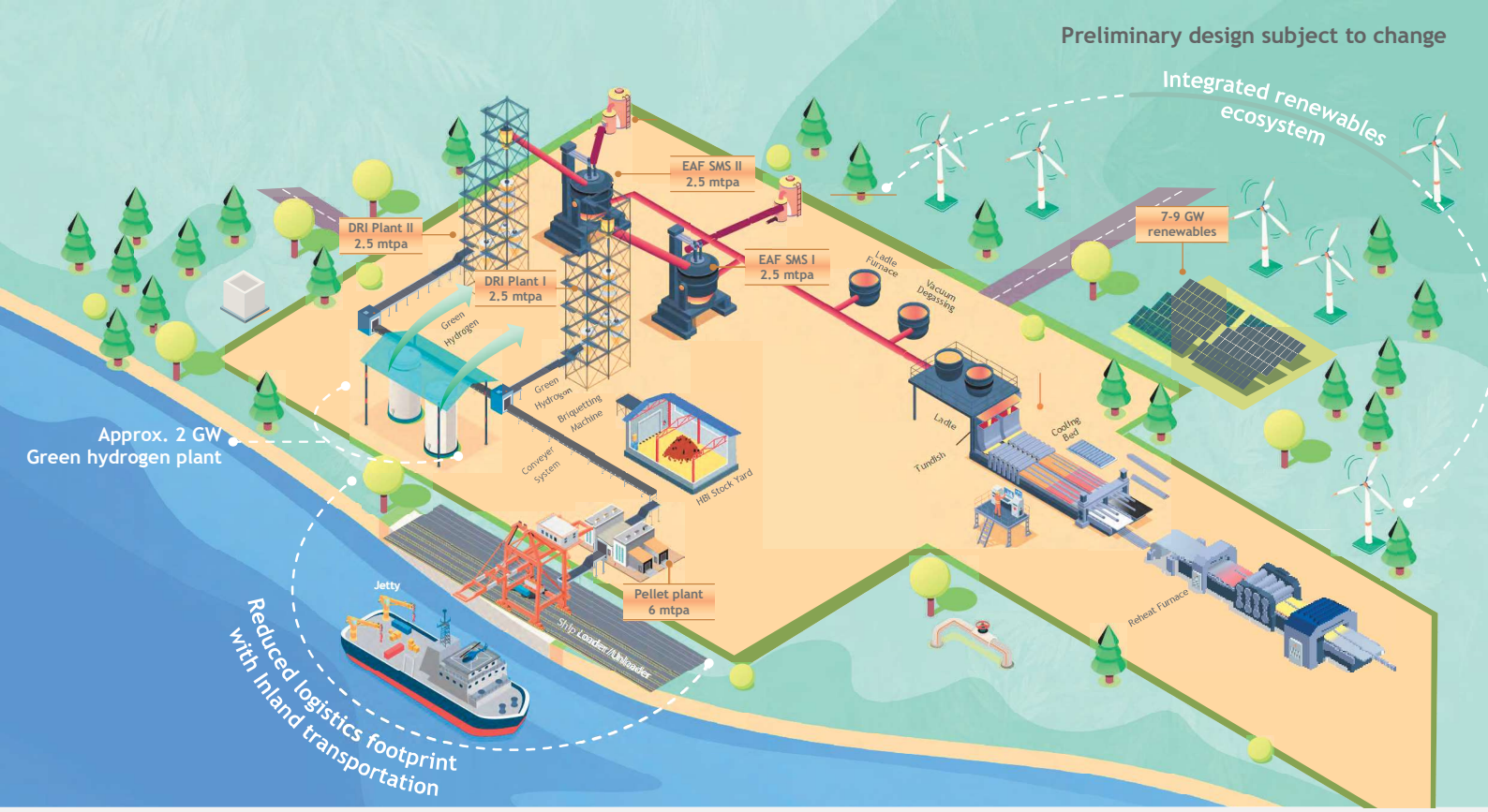


Duqm plant will run on renewable energy and will be equipped with the latest technology.

Vulcan Green Steel master plan manifests sustainability and resilience

The global race to become the green steel development hub is heating up. While Europe seems to be at the forefront of the contest, the rest of the world is catching up fast, one such example is the Vulcan Green Steel in Oman, part of the Jindal Group of Companies.

In December 2022, Jindal Group announced itself as a leading contender to develop a mega Green steel project in the Sultanate of Oman with an investment of USD 3 billion. The company selected the Special Economic Zone at Duqm (SEZAD) in Oman to set up a 5MTPA green hydrogen-ready steel plant.
In an engaging conversation with the Green Steel World, Mr Harssha Shetty, CEO, Jindal Shadeed Iron & Steel LLC (JSIS), and Executive Director Marketing, Vulcan Green, talks about the company, the upcoming plant, green hydrogen, DRI (Direct Reduced Iron), demand for green steel and much more.

(*JSIS is the sister company of Vulcan Green Steel, also situated in Oman.)

By Tanya Rudra

"There is a noble race going on and we feel privileged to be in a position to act in a way that will determine the quality of life of the future generations," said Mr Shetty, as he delved into the topic of sustainability.

Sustainability is at the core of our operations, and the speed at which we execute climate-neutral actions is equally important.

As a people-driven organisation, Jindal Group has immense faith in its human capital, and the team is equally focused on achieving the company's sustainability goals.

"We believe in our people because technology can be

bought, but you can't buy the best people to work for you. You need to attract the best and motivate them to be their best," said Mr Shetty.

Getting the basics right

Highlighting Jindal Group's commitment to the decarbonisation agenda and its strong support to Oman Vision 2040, Mr Shetty explained: "For Vulcan Green Steel, steel produced using green hydrogen generated by renewable sources of energy can only be labelled green. To be specific, the carbon footprint of the product should be less than 0.5 tonnes CO2 per tonne of crude steel. Our 5 million TPA green hydrogen ready steel project, based in Duqm, in Oman, is designed to have a carbon footprint of less than the threshold mentioned above."

The group already operates the largest privately-owned integrated steel producer in the Persian Gulf region and operates a plant with a capacity of 2.4 million tonnes annually using gas-based DRI technology.

"We are already one step ahead of steel manufacturers worldwide who are still resorting to the blast furnace. Blast furnaces have been used since the 14th century to produce pig iron using coke, iron ore and limestone.

Mr Harssha Shetty, CEO, Jindal Shadeed Iron & Steel LLC (JSIS).

Even though there have been several technological upgrades, most of the world's steel is still produced via blast furnaces resulting in over eight per cent of greenhouse gas emissions.

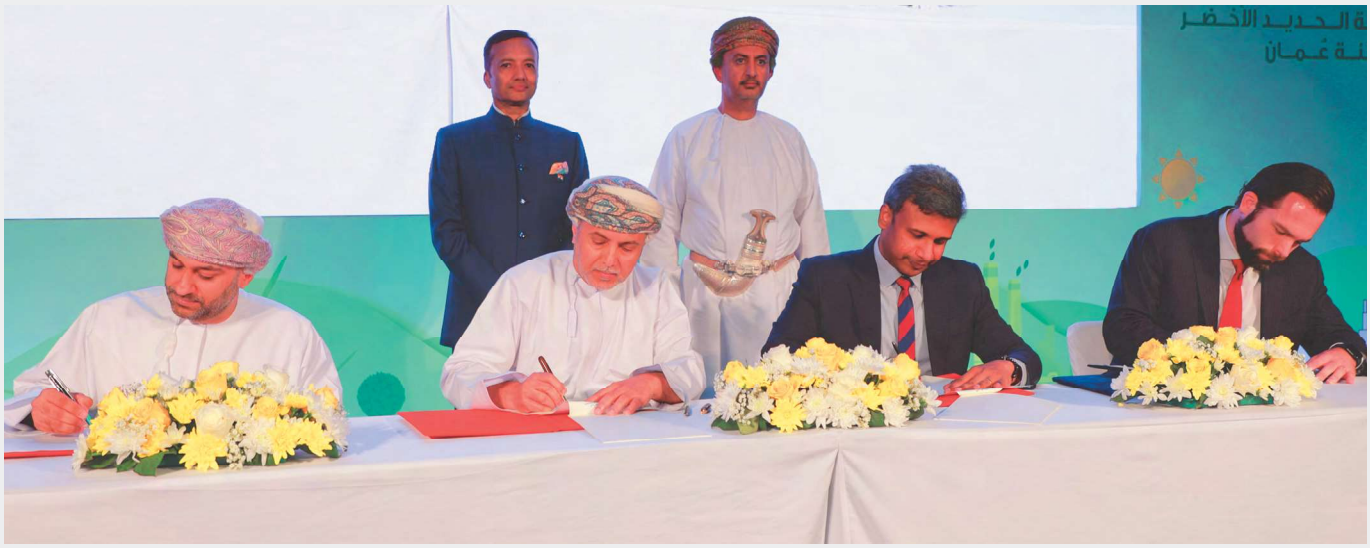
"We have received various accolades for our environment-friendly approach to steelmaking."

The global average CO2 footprint per tonne of steel is about 1.85 tonnes and we are at 1.05 tonnes. Now, we are determined to reduce it further to 0.8 or less by increasing the renewable energy generation around our existing Sohar plant," Mr Shetty elucidated.

One of the world's best bets

It is significant to note here that the government of Oman has set a net-zero carbon emissions goal for 2050 and gradually aims to further diversify its economy. The country is expected to produce 30% of electricity from renewables by 2030 and plans to achieve energy security through independent power projects within the solar, wind, and green hydrogen sectors.

To structure and accelerate the development of the green hydrogen sector in Oman, Hydrom (Hydrogen Oman) was launched in 2022. Hydrom is a central and independent entity, orchestrating the national interest in green hydrogen; it is fully owned by Energy Development Oman (EDO) and regulated



Jindal Shadeed Group has signed agreement to reserve land to produce green steel in Duqm.

by the Ministry of Energy and Minerals (MEM). Vulcan Green Steel is also actively bidding for tender in Hydrom along with other players to obtain green hydrogen block/ supply.

This master plan includes Duqm, an entirely new greenfield expansion, which is spread over an area of 2,000 square kilometers. It has several features that make it a lucrative hub for green industries and renewable energy projects investments.

"The Vulcan Green Steel project in Duqm is the world's best bet to get the first green steel," states Mr Shetty, adding that he has several reasons to validate this claim.

According to him, the following factors make a compelling case for Vulcan Green Steel to be a frontrunner in the race of producing green steel.

Experience

"Steelmaking is an art that involves a steep learning curve. Our parent group is the oldest and largest steel family in India. We are undertaking this project with 50 years of steelmaking expertise."

Abundant resources

"The availability of solar energy and wind resources throughout the year, abundant seawater and ample non-agricultural land make Duqm a strategic location for this project."

Single stakeholder

"In terms of investment, this is the best-case scenario because we are the single equity partner."

Value generation

"The best value for green hydrogen is to produce steel and there cannot be a better proposition to decarbonise the hard-to-abate steel industry. The production of green steel has the potential to provide a huge boost to Oman's industries and economy."

Proactive government

"The government of Oman is making commendable efforts towards using cleaner sources of energy to meet industrial requirements."

Green hydrogen: a game changer

Duqm has been justifiably identified as the next global player in commercially competitive green hydrogen production. Underscoring the significance of the project, Mr Shetty said, "The green hydrogen that is needed to support our operations will be locally produced in Duqm, and the green hydrogen plant will be in proximity to our steel plant, hence we will have reduced transportation costs. We are currently in the advanced stages of discussions with multiple partners to source our green hydrogen requirements."

Green hydrogen is key to climate protection and the decarbonisation of industries.

"In Duqm, we have a requirement of ~300,000 tonnes of green hydrogen but a million tonnes of green hydrogen capacity will be created in Oman by 2030. This availability of green hydrogen will attract new investments in the region, and it could prove to be a game-changer in creating a completely green value chain," states Mr Shetty.

Explaining the measures planned to further reduce carbon emissions, he said, "Vulcan Green Steel will follow a completely integrated process. Our plant is right on the port, so we are even avoiding the inland movement of raw materials as well as finished goods for export. We have renewable electricity and natural gas will gradually be replaced by green hydrogen. Moreover, with the use of hotlink technology, the DRI we produce can be fed directly into the EAF at 600 degrees plus. So, there is no need for reheating."

Mr Shetty added that he is trying to initiate ideas through GSW that when the governments are making policies to produce green hydrogen, the focus should be on attracting the best consortiums that can achieve the lowest cost of Hydrogen (LCoH) to support a thriving green value chain.

Green steel: disruption that has just begun

After carefully considering the cost-benefit analyses, potential and demand patterns, Vulcan Green Steel has zeroed in on the automobile, wind energy and consumer durables sectors as its focus amongst others. Demand for green energy is set to only enhance in the near future, and we are ready for the market.

"The worldwide demand for green steel products is likely to rise dramatically soon and it is expected that there would be a clear deficit of green steel supply in Europe alone. Also, the multinationals have plans to decarbonise their operations globally, irrespective of where they are producing. Therefore, we are looking at an extremely robust demand which is only going to increase," Mr Shetty said.

Adding further, he said: "After COP27 in Egypt, governments have declared that now is the time to convert commitments and promises into time-bound actions. End users, especially from the automobile, wind and consumer durable industries are becoming increasingly aware of the environmental impact of the choices they make. In the present scenario, it might be a company's choice to decarbonise but in 2030, end consumers will dictate the terms."

In conclusion, this is what Mr Shetty had to say: "Green steel is a disruption that has just begun. Soon, it will be a structural disruption that will shape the steel industry for the future, and the only way to respond is to collaborate and Act responsibly. Most importantly We need to act today."