

## JSW STEEL LTD. & ENVIRONMENT MANAGEMENT

Managing the environment plays a vital role in the assessment and mitigation of strategic risks associated with the environment, ensuring regulatory compliance, as well as identification of business opportunities. Reduction in the generation of various wastes, and their reuse and recycle comprise the key working philosophy of the Company.

Protection of the environment is intrinsic to the JSW Group's vision "to bring positive transformation to every life we touch" as well as to the Purpose, and Values. This aspect is perhaps more explicit in the Environment Policy for JSW Steel Ltd. Guided by this approach the Company has always placed environment and sustainability as equal and complementary to profitability and competitiveness. Further, the Group's over-arching motto of "Better Everyday" relates to everything by all businesses.

Environment management has long been accorded top priority by the management of JSW Steel. The Company has established systems, processes and practices to integrate environment management in its operations, activities, goods and services. This is demonstrated by the fact that it adopted third party certified management systems in an Integrated Quality, Environment, and Occupation Health & Safety Policy in 2002, to guide its activities. This is reinforced by the recently added Energy Management System, having a direct bearing on the wider topic of the environment.

Considering global as well as local environmental concerns, its ever-increasing scale of operations, and expectations of various stakeholders, the Environment Policy was revised in 2017 to address the material aspects from an environmental perspective, and is available separately on the JSW website.

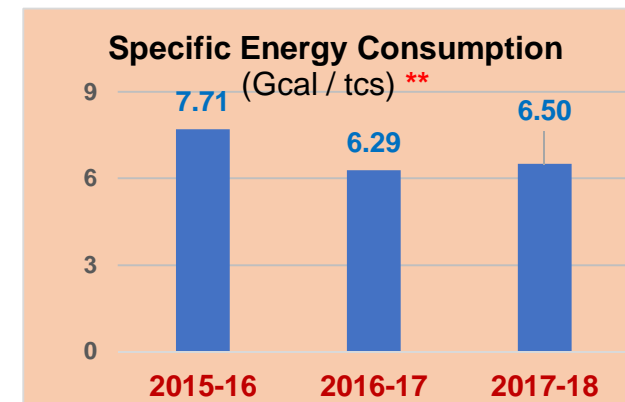
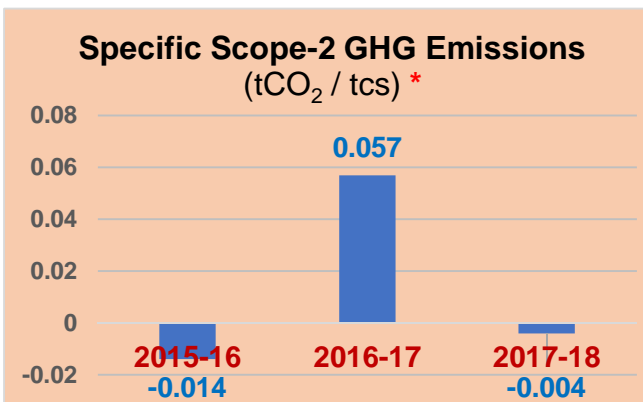
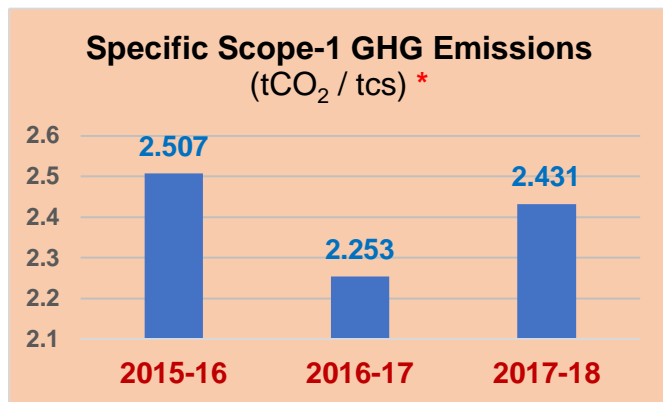
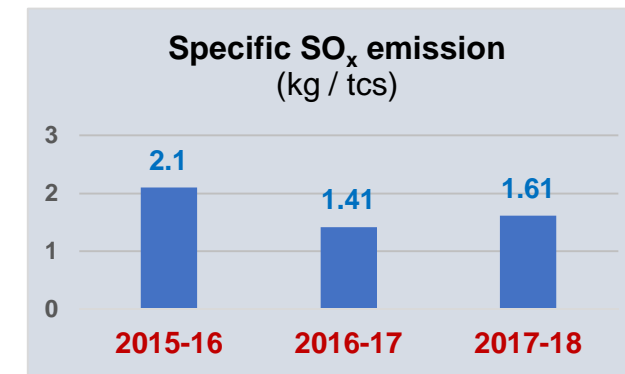
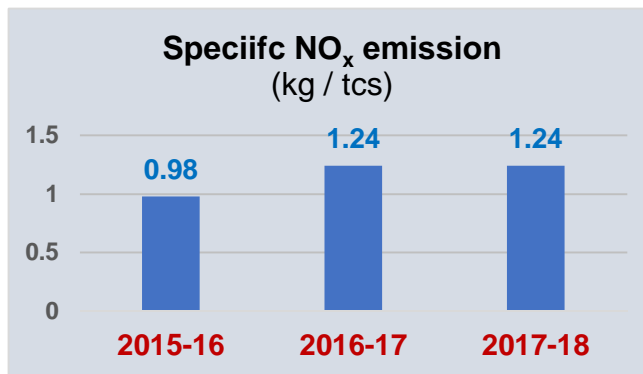
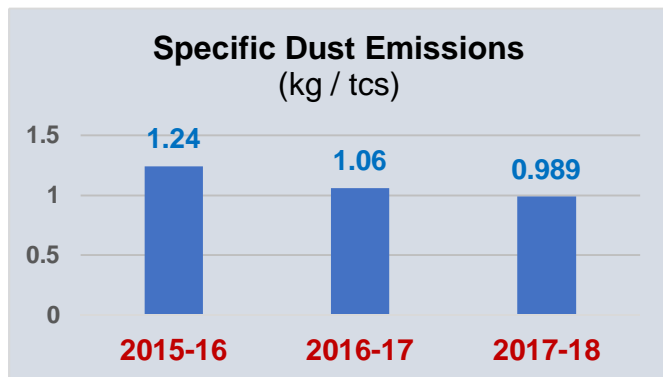
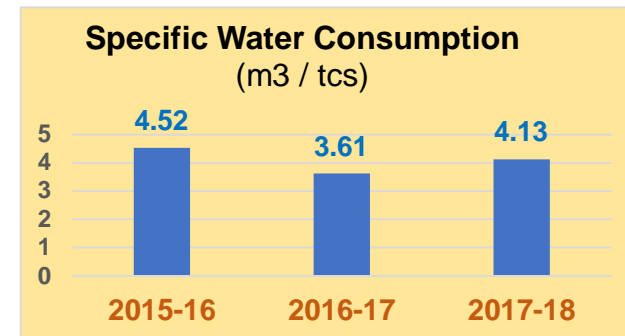
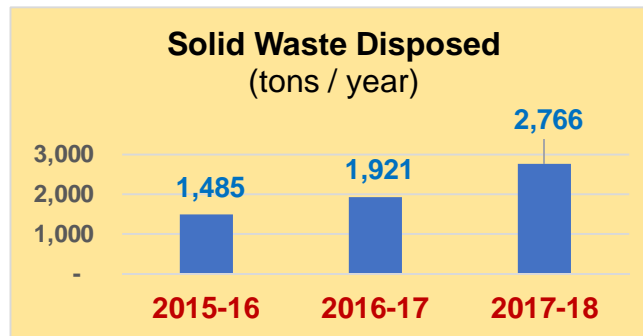
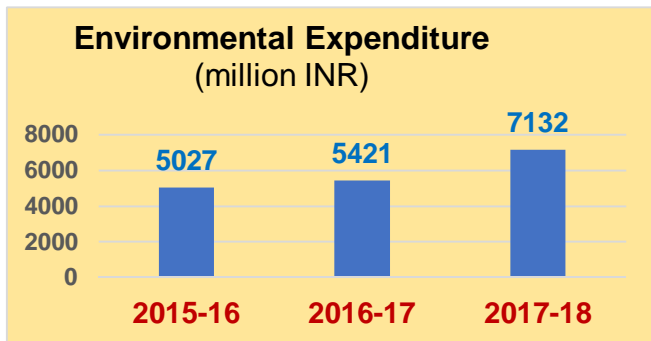
### Environmental Performance Targets

A key component for any management system to be effective is to set targets. The table below summarises targets for key performance indicators, followed by trends in performance for the last three financial years.

| # | Key Performance Indicator         | Unit of Measure          | Target | Target Year |
|---|-----------------------------------|--------------------------|--------|-------------|
| 1 | Specific energy consumption*      | Gcal / tcs               | 6.513  | 2018-19     |
| 2 | Specific dust emission            | kg / tcs                 | 0.390  | 2020-21     |
| 3 | Specific SO <sub>x</sub> emission | kg / tcs                 | 0.520  | 2020-21     |
| 4 | Specific NO <sub>x</sub> emission | kg / tcs                 | 0.530  | 2020-21     |
| 5 | Specific water consumption        | m <sup>3</sup> / tcs     | 2.55   | 2018-19     |
| 6 | Specific waste disposal           | kg / tcs                 | 0      | 2020-21     |
| 7 | Specific GHG emission             | tCO <sub>2</sub> e / tcs | 2.447  | 2018-19     |

\* As per the target by Bureau of Energy Efficiency, Ministry of Power, Govt. of India under the Perform, Achieve & Trade (PAT) scheme

## Key Environmental Performance Trends



\* GHG emissions calculated as per methodology of the WorldSteel Association

\*\* SEC calculated as per the methodology of the Bureau of Energy Efficiency

## **Climate Change Strategy**

### **Risks**

In India, integrated iron and steel manufacturing accounts for about 6-7% of the total greenhouse gas (GHG) emissions by industry, ranking second to those originating from electricity generation from coal. Thus, there will be considerable pressure on the steel industry to reduce GHG emissions. As per the Ministry of Steel, Government of India, the target for the steel industry as stated under the Nationally Determined Contribution (NDC) is 2.5 tons of CO<sub>2</sub> per ton of crude steel produced (tCO<sub>2</sub> / tcs) by 2020, and 2.0 tCO<sub>2</sub> / tcs by 2030; this has been voluntarily agreed by the steel majors.

The current value for specific Scope-1 CO<sub>2</sub> emissions is 2.507 tCO<sub>2</sub> / tcs, which is considered higher than the best figures achieved in developed countries. This is mainly due to the use of poor quality raw materials, viz., coal and iron ore, especially at Vijayanagar and Salem. Only with superior quality of raw materials, combined with improvements in operational practices, and enhanced energy efficiency, it is possible to reduce to 2.1 tCO<sub>2</sub> / tcs by 2030. The situation in other steel companies is expected to be similar.

Going ahead, it is expected the Government will introduce further measures to reduce GHG emissions, ostensibly to meet the declared climate change targets through the NDCs. While the targets would be challenging, the opportunities to meet those would be even more challenging. One likely option is more market-based financial instruments to drive the objective. This is expected to lead to the phasing out of energy inefficient units, followed by a structural rearrangement in the steel sector. Further, in this period, the relatively inefficient secondary steel producers may face mergers or acquisition by the large integrated iron and steel plants. While the availability of high quality iron ore at an economical value may become a constraint, the options of utilising steel scrap and direct reduced iron (DRI) are also likely to increase. Consequently, steel manufacturing may witness a shift towards blast furnace and electric arc furnace (BF-EAF) route, leading to greater reduction in GHG emissions. Further, tightening of the norms on GHG emissions may well lead to some sites exploring and adopting technologies for carbon capture and storage or utilisation (CCSU), albeit at high costs.

The climate change strategy of JSW Steel Ltd. would be to progressively leveraging raw material quality improvements, enhancing energy efficiency, increasing steel-making through EAF, and considering CCSU as an eventual step.

### **Opportunities**

With continuous development of wastewater treatment technologies, JSW Steel Ltd. has gained an edge over other technology suppliers for water treatment. Some of the technologies implemented are being replicated in other steel plants. This can be taken forward in order to become a knowledge expert in the area of water and wastewater treatment.

There is also the opportunity to capture CO<sub>2</sub> and utilising or selling it. JSW Steel Ltd. is actively contemplating sequestration of CO<sub>2</sub> emissions biologically and converting to ethanol, a process developed by a global scientific company.

JSW Steel Ltd. is also considering foraying into the domain of electric cars in collaboration with top international technology players. The idea of an electric car by a business house that also manufactures steel demonstrates synergy since this would lead to the use of light weight steel in large quantities.

## **Water Management**

Predictions based on available climate change data indicate increasing instances of enhanced or deficit precipitation in the areas covered by the plant operations of JSW Steel Ltd. While overall total rainfall is likely to be normal or higher, the number of rainy days is expected to reduce. These spatial and temporal variations will bring new challenges of managing water security for steel plants on one hand, and managing high intensity short duration precipitation leading to potentially large scale floods, or even lack of precipitation causing droughts.

Currently, the units at Salem and Vijayanagar are located in water stressed areas, further increasing the risks. A comprehensive exercise to measure the water footprint across the three major manufacturing locations in India has been initiated. Further, the following initiatives are being taken to improve water utilisation:

- a. Enhance efficiency in using water in all sites
- b. Introduce dry steel-making technologies and processes
- c. Use of blow-down water in other areas
- d. Recovery of good quality water through reverse osmosis
- e. Pursue zero discharge policy.

Additional measures implemented, being implemented or planned to ensure water security are:

- a. Allocation of additional fresh water of 10 MGD
- b. Building a reservoir of 30 million m<sup>3</sup> at Vijayanagar
- c. Installed a 4 MLD zero liquid discharge (ZLD) facility at Salem
- d. Roof top rain water harvesting to conserve 16,898 m<sup>3</sup> / year at Dolvi.

Finally, it is relevant to note that an integrated and holistic approach has been adopted on the use of water even in the interventions the Company makes for the community under its corporate social responsibility initiatives. This not only reduces the dependence of the communities on the Company, and the consequent lowering of the social risk, it also makes more water available for the use of everybody. JSW Steel Ltd. plans to invest INR 800 crore over the next five years to address the issue of water scarcity.