



# Natural capital

## Optimising resources for a brighter future

Steel is a fundamental requirement for infrastructure augmentation and hence, plays a key role in overall economic development and nation building. We are committed to using the most efficient routes, minimising waste generation and mitigating impact on natural capital.

### Impact on SDGs



### FY 2019-20 Highlights

3.11 m<sup>3</sup>/tcs  
Specific water consumption

0.38 kg/tcs  
Specific dust emission

₹283 cr.  
Capital spend on environment

>4.5 lakh  
Trees planted across locations using the eco-restoration methodology and Miyawaki plantation techniques

### Strategic linkage

SO2 SO4

### Material issues addressed

- CO<sub>2</sub> emission
  - Water consumption and effluent discharge
  - Waste management
  - Renewable and clean energy
  - Biodiversity
  - Energy efficiency
  - Air pollution
  - Circular economy
  - Supply chain sustainability
- Achieve <2 tCO<sub>2</sub>/tcs GHG emission intensity by 2025
  - Achieve specific water consumption <3 m<sup>3</sup>/tcs by 2025
  - Sustain LD slag utilisation at 100%
  - Ensure no net loss of biodiversity at our mining locations

SO2 - Consolidate position as a global cost leader SO4 - Industry leadership in Corporate Social Responsibility, and Safety, Health and Environment

The traditional method of steel production through the blast furnace route is resource-intensive and has significant carbon footprint. We aspire to take our carbon emissions to <2 tCO<sub>2</sub>/tcs for our India operations, attain zero waste and reduce specific water consumption to <3 m<sup>3</sup>/tcs by 2025.

We continue our pursuit of establishing best-in-class facilities and constantly invest to upgrade manufacturing and distribution facilities to improve operational and environmental performance. In FY 2019-20, ₹283 crore was invested on environmental management system upgradations focussed on improvement in air emissions, water management, imbibing circular economy principles and conservation of biodiversity.

We have implemented environmental management systems in accordance with ISO 14001, which provides the necessary framework for managing compliance and improving environmental performance. We maintain accredited laboratories for environmental performance assessment.

### GHG MANAGEMENT

We recognise our obligation to work towards mitigation of climate change related risks and are committed to addressing the challenges of transitioning to a lower carbon regime. We believe that steel is an integral part of the solution for the transition due to its unique property of infinite recyclability, albeit with some risk of downcycling.

Our integrated steel works at Jamshedpur is the most efficient steel plant in India. A Centre

of Excellence with cross-functional members is working to identify and implement projects for CO<sub>2</sub> reduction. In FY 2019-20, integrated steel operations at Jamshedpur and Kalinganagar abated 0.5 MnT of CO<sub>2</sub> by implementing process improvements and energy conservation projects.

The R&D team is collaborating with technology companies and academia to work on a wide range of technologies, which includes carbon capture, use and storage (CCUS), hydrogen-based steelmaking and new smelting technologies.

With an objective of greening the power mix, a study was undertaken with the help of The Energy and Resources Institute to assess the deployment potential of renewable energy across all our sites. A significant renewable energy potential (~180 MW) has been identified and projects are being undertaken to deploy the same in a phased manner.

We continue to work on developing Hlsarna, a new smelting reduction technology for which we own the intellectual property rights. This technology will facilitate steelmaking without the need for coke making or agglomeration processes, thereby improving efficiency, reducing energy consumption and lowering CO<sub>2</sub> emissions. The pilot plant is located at the Tata Steel Group's IJmuiden site in the Netherlands. We are now exploring options to scale up Hlsarna in India with a view of developing a strategic roadmap to achieve a quantum reduction in emissions over 2030 and 2050.

### DUST AND GASEOUS EMISSION

Air pollution (specially dust emissions) is a material issue for Tata Steel. As our Jamshedpur unit is in the midst of the city, our efforts in upgrading air pollution control equipment and better environment management have resulted in a 25% reduction in dust emission since FY 2016-17. With the crude steel production ramping up to 3 MnTPA at the Kalinganagar unit, established operations of pollution control system have resulted in a 56% reduction in dust emissions from the first year of operations in FY 2016-17.

### WATER MANAGEMENT

Water is a critical resource in steelmaking and is used extensively as a coolant. Since our operations in India are located near rivers (Subamarekha for Jamshedpur plant and Baitarani for Kalinganagar plant), it provides a strategic advantage. In FY 2019-20, specific consumption of freshwater at Jamshedpur was at an all-time best at 2.8 m<sup>3</sup>/tcs, which is also an Indian steel industry benchmark.

While there is a huge manmade water reservoir, Dimna Lake in Jamshedpur, which supplements the drinking water requirement of the township, a river basin study was undertaken in FY 2019-20 with the help of CII Triveni Water Institute to assess watershed level risks for long-term supply of water for the Jamshedpur plant and the communities residing in the vicinity. The findings will be used to plan and implement water conservation initiatives at the river basin level to sustain river flow in the long term.

## OUR CAPITALS — NATURAL CAPITAL (contd)

### SOLID WASTE MANAGEMENT

We have been pioneering value creation from the industrial by-products in our quest to contribute to a sustainable ecosystem in the iron and steel industry. The use of by-products has contributed to material efficiency rate in the steel industry. We handle about 14 MntPA of by-products spanning across 20+ product categories comprising more than 250+ SKUs. In FY 2019-20, material efficiency saw a significant improvement to 98.9% at Jamshedpur and 100% at Kalinganagar. We achieved industry benchmark of 100% solid waste utilisation at our facilities in Jamshedpur and Kalinganagar. With the objective of harnessing 'Value from Waste & By-Products', we are committed to becoming a knowledge-driven business unit leveraging digital and innovation as the key pillars. We commissioned India's first steam ageing facility at Jamshedpur for accelerated weathering of LD slag to develop environment-friendly aggregates for road construction replacing natural aggregates. We have created two brands, Tata Aggreto and Tata Nirman, which have found a wide range of applications in national highway projects and the construction industry in India. We achieved benchmark of 100% steel slag utilisation at our facilities in Jamshedpur and Kalinganagar. We won the Environmental Stewardship award at ET Now and World CSR Congress, for our sustainable usage of steelmaking slag in road applications.

### CIRCULAR ECONOMY

Steel has a unique property of being infinitely recyclable with some risk of downcycling. Primarily, the Electric Arc Furnace (EAF) method for steelmaking, with lower carbon footprint, is used for re-melting of steel. Higher usage of scrap in India is currently limited due to lower availability of scrap and a fragmented scrap supply chain. As an initiative to be future ready and establish the supply chain for scrap, we set up our Steel Recycling Business in FY 2018-19. The first steel scrap processing unit is being commissioned at Rohtak in Haryana, with an initial capacity of 5 lakh tonnes per annum.

### LIFE CYCLE ASSESSMENT

We developed an in-house Life Cycle Assessment (LCA) model for our TSJ and TSK Works in FY 2019-20 in alignment with ISO 14040 and ISO 14044. This LCA study, its

approach and the model was critically reviewed by an external subject matter expert. This has ensured that the environment impact of all the products being manufactured at Jamshedpur and Kalinganagar from cradle to gate using the LCA methodology is now available. In order to extend the scope of our LCA work and to cover the products manufactured through our Steel Processing Centres (SPC), a separate study was also carried out covering the SPCs in Jamshedpur. The LCA study was completed along with the development of dedicated LCA models for the steel wire products of Tata Steel's Tarapur Wire Division. Going forward, we plan to cover all our operating sites and also include the products under our New Material Business through the LCA study. We are collaborating with a leading industry association to develop Type 1 Ecolabel Standard for TMT rebars in India, which will assess the life cycle sustainability impact of TMT rebars.

### BIODIVERSITY MANAGEMENT

We have been a pioneer in undertaking biodiversity initiatives at our raw material

locations with the help of International Union for Conservation of Nature (IUCN). To further augment efforts across all our sites, a Centre of Excellence for Biodiversity Management has been constituted to strategically formulate and implement Biodiversity Management Plans (BMPs). The larger objective is to ensure no net loss of biodiversity in the areas that we operate. Our current operations in India are not located in any of the identified biodiversity hotspots or protected areas. In FY 2019-20, more than 4.5 lakh trees were planted across locations using the eco-restoration methodology and Miyawaki plantation techniques.

In FY 2019-20, a 100-hectare Tata Biodiversity Park was developed in West Bokaro in Jharkhand by reclaiming mined-out areas. The Park has seven smaller areas including a butterfly park and a niche reptile park. The Park also has a rainwater harvesting structure with a catchment area of 152 hectares and can conserve 1,500 million gallons of rainwater. It has a dedicated 2-acre patch for the development of native forest species.

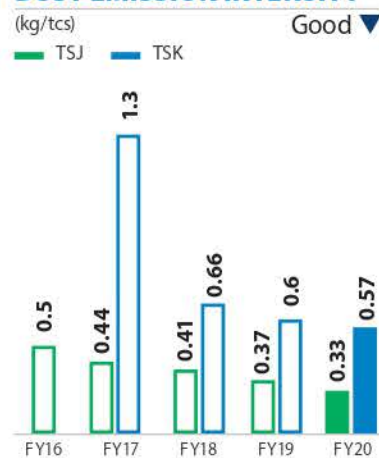
### GHG EMISSIONS FROM INDIAN STEELMAKING OPERATIONS

(million tCO<sub>2</sub>)

Steelmaking Sites	Scope	FY16	FY17	FY18	FY19	FY20
India (TSJ+TSK)	Scope1	21.02	25.53	26.52	27.14	26.53
	Scope 1.1	2.31	3.69	3.96	4.53	4.53
	Scope 2	0.74	1.11	1.17	1.17	1.08
	Scope 3	-1.19	-2.21	-1.99	-1.81	-1.75
	Overall	22.89	28.11	29.66	31.03	30.39

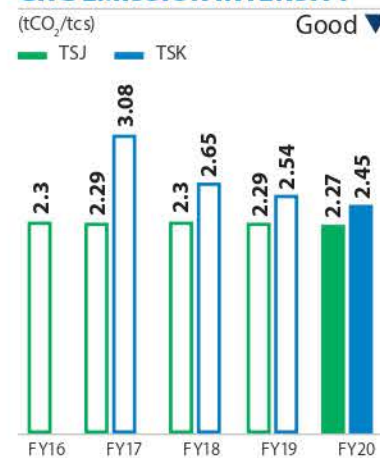
Emissions based on CO<sub>2</sub> data collection user guide, version 9, World Steel Association

### DUST EMISSION INTENSITY\*

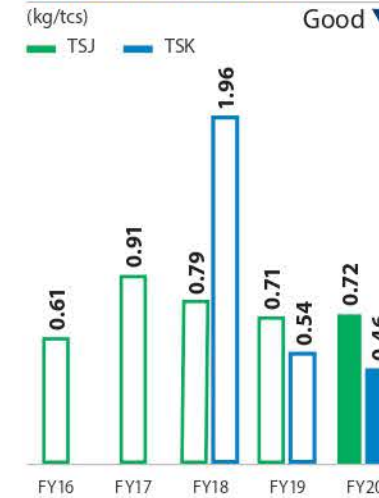


\* Defined as amount of dust (in kilograms) emitted from stacks for producing one ton of crude steel

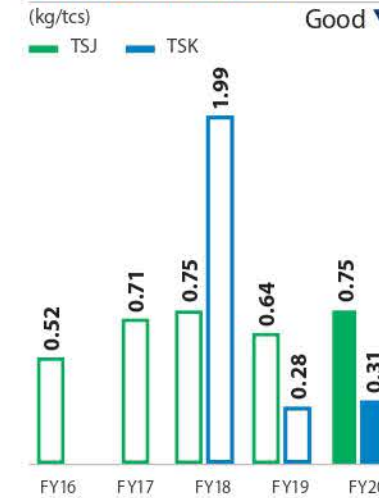
### GHG EMISSION INTENSITY



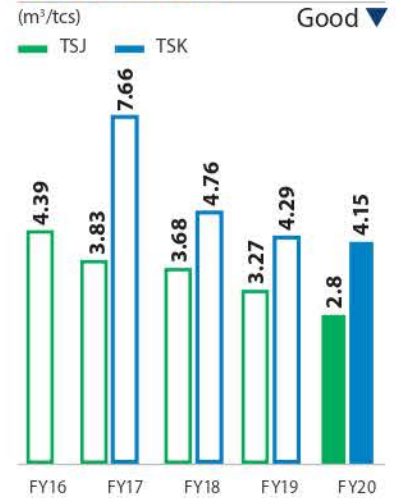
### NITROGEN OXIDES (NO<sub>x</sub>) EMISSION INTENSITY#



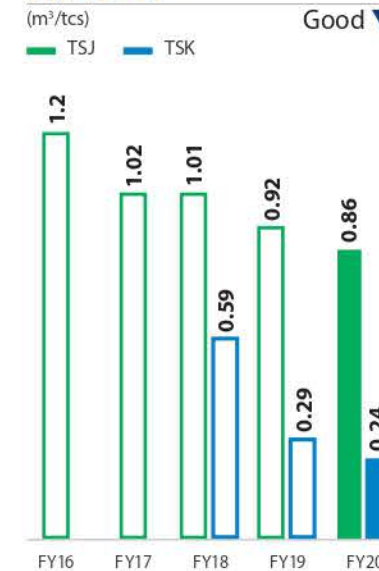
### SULPHUR OXIDES (SO<sub>x</sub>) EMISSION INTENSITY##



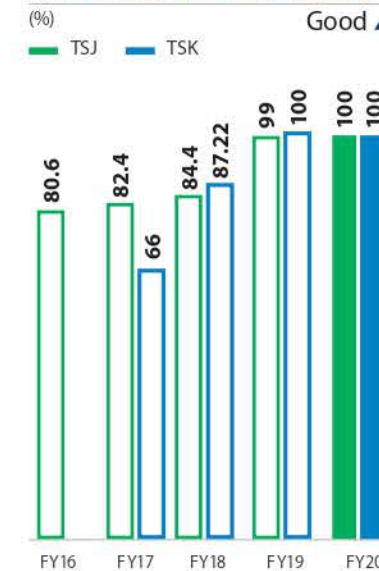
### SPECIFIC WATER CONSUMPTION#



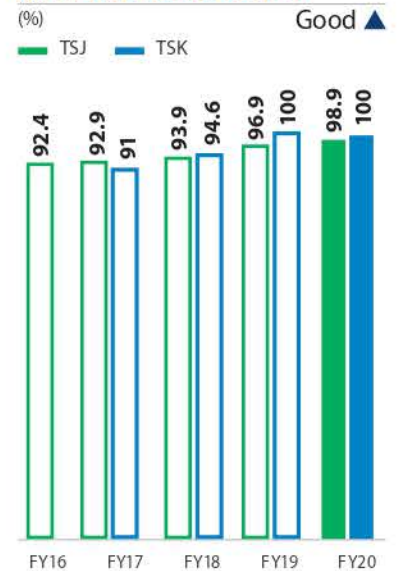
### EFFLUENT DISCHARGE INTENSITY\$



### SOLID WASTE UTILISATION®



### MATERIAL EFFICIENCY



### WAY FORWARD

In line with our strategic goal of being the industry leader in environmental management, we will continue investing in technologies and processes to further improve our performance in GHG emissions, water management, waste utilisation and biodiversity management. We are also accounting for possible regulatory, market and climate changes in the future by continually evaluating risks and opportunities and adapting accordingly through various interventions such as expanding our steel recycling business, improving by-product business, carrying out life cycle assessments and embedding the principles of circular economy.

#Defined as amount of nitrogen oxides (in kilograms) emitted from stacks for producing one ton of crude steel

##Defined as amount of sulphur oxides (in kilograms) emitted from stacks for producing one ton of crude steel

#Defined as freshwater consumption per tonne of crude steel produced (at TSK, water loss at clarifier is excluded in the calculation)

\$Defined as effluent discharged (in cubic metres) from operational premises for producing one ton of crude steel

®Defined as amount of solid waste used internally or externally + sold outside as a percentage of total solid waste generation