A Little Bit About Us

Overview of
JSW Steel

The story of JSW is one of passion, grit and an insurmountable determination to work hard and win against all odds.

It is, in many ways, the story of India itself. What began as one man's dream has evolved into one of India's leading business houses, with a workforce of over 40,000. Over the years, JSW has grown beyond steel, expanding into sectors such as cement, infrastructure, energy and paint, helping to build the very fabric of a new nation.

'JSW has been and always will be, known as the "strategic first mover", keen to venture away from the status quo thanks to its willingness to make fundamental changes and its conviction to drive excellence.

Today, JSW is more than just a billion-dollar conglomerate. It has become a partner in India's progress, and a firm believer in the importance and value of giving back to the society and the people that have been instrumental in making it what it is today.

Our Purpose

- Building world-class infrastructure, products and solutions
- Deploying world-class capabilities
- Nurturing our communities
- Empowering our People

Our Vision

Bring Positive Transformation to every life we touch

JSW is about building, transforming and giving back. Every act of ours is focused upon building something new or bettering something that already exists.

Our Values

Commitment

Courage

Agility

Collaboration

Compassion

JSW Steel

JSW Steel is the flagship business of the diversified US$ 23 billion JSW Group.

Over the last three decades, it has grown from a single manufacturing unit to become India's leading integrated steel company with a capacity of 29.7 MTPA of crude steel in India & USA (including capacities under joint control).

Our three integrated steel plants (ISPs) at Vijayanagar, Dolvi and Salem continue to be our mainstay with a combined capacity of 23.5 MTPA and the upstream and downstream capacity augmentations are enabling them to cater to present and future demand. The boundary of this Climate Action Report are the three ISPs and we will go on extending our boundaries to cover our other entities in our subsequent reports.

Manufacturing Units

Vijaynagar Works (ISP)

Key products

Hot Rolled (HR), Cold Rolled (CR), Galvanised (GI) and Galvalume (GL), wire rods, TMT, slabs, billets

Capacity

12.5 MTPA crude steel, with addition of 7 MTPA crude capacity in the next 3 years

Highlights

+ World's sixth-largest steel plant
+ India's largest single-location and most productive steel plant
+ Awarded Deming Prize for operational excellence in 2018

Dolvi Works (ISP)

Key products

Hot Rolled (HR), Thermomechanical treated (TMT), Billets

Capacity

10 MTPA crude steel

Highlights

+ Strategically connected to a 30 MTPA capacity jetty
+ Setting up 175 MW Waste Heat Recovery Boilers (WHRB) and 60 MW power plants to harness flue gases and steam from coke dry quenching

Salem Works (ISP)

Key products

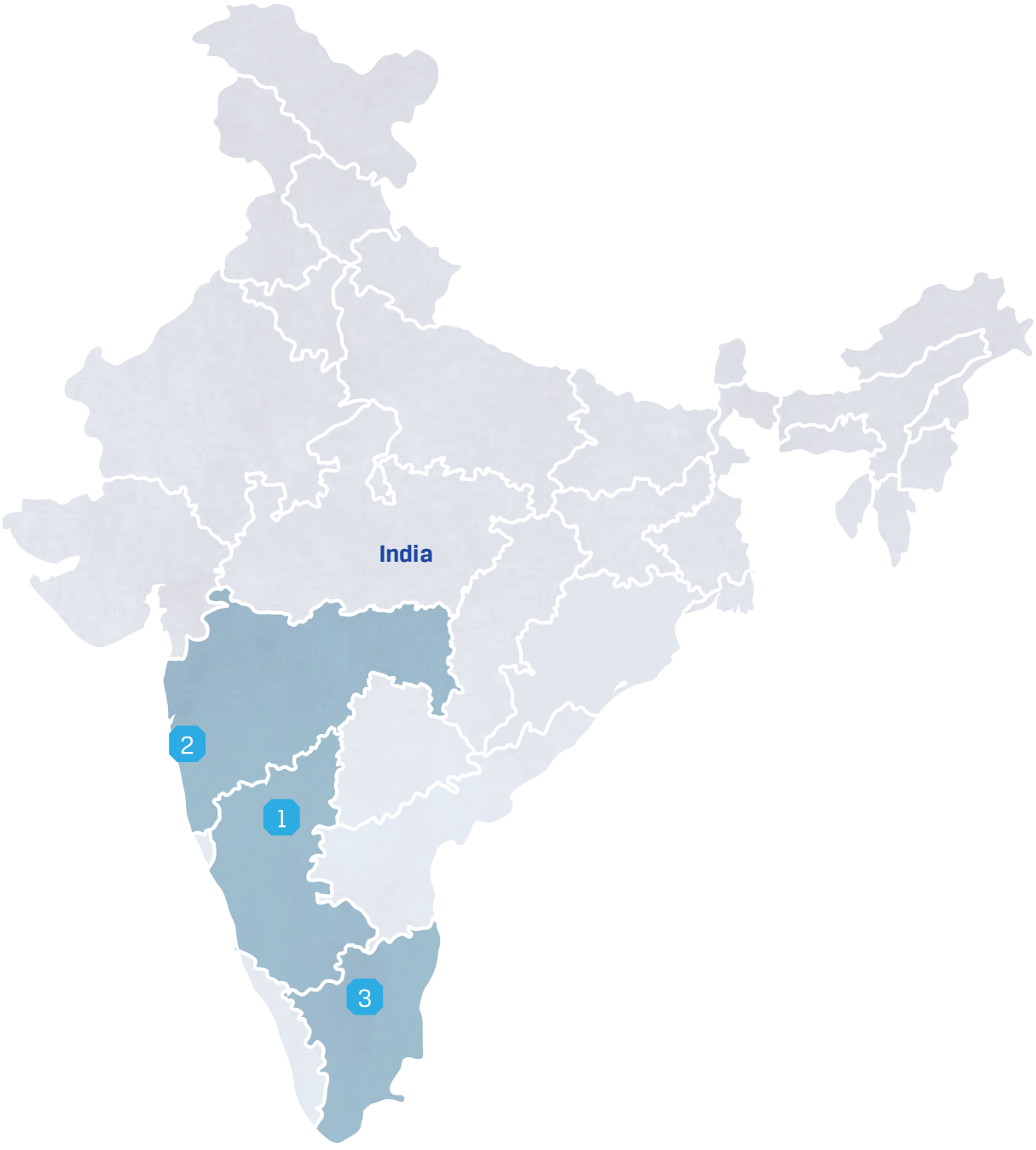
Wire rod, alloy long products, billets/ blooms.

Capacity

1 MTPA crude steel

Highlights

+ India's largest special alloy steel plant
+ Awarded Deming Prize for operational excellence in 2019
+ Became the first steel plant in the world to receive British Safety Council's Five-star rating



1. Vijayanagar Integrated Steel Plant
2. Dolvi Integrated Steel Plant
3. Salem Integrated Steel Plant

Note: Map not to scale

Acclaimed Leaders in the Climate Change Journey

SUSTAINABILITY CHAMPION

Recognized as the worldsteel Sustainability Champion for the sixth consecutive year in 2024

CDP Rating

JSW Steel is in the 'Leadership' band for both Climate Change and Water Security, which acknowledges that the Company is implementing current best practices

STEELIE AWARD WINNER

Honored with the Steelie Award in Life Cycle Analysis (LCA) Category by the worldsteel Association in 2021

Dow Jones Sustainability Indices 2023

JSW Steel included in DJSI World Index & DJSI emerging markets Sustainability Index

Two Competing Pressures

Climate Change Versus Economic Development

In keeping with our aim of making this first Climate Action Report both informative and engaging, we thought it would be worthwhile to put the issue of climate change within the wider context of another hugely significant (and largely competing) societal pressure: **economic development**

India is a rapidly developing nation and home to both the world's fifth largest economy and the world's largest population. That population, like many others around the world, hope to experience for themselves the many benefits that a successful, modern and dynamic economy can deliver. In relation to homes, appliances and connectivity, there is a growing expectation amongst millions of people that their personal standard of living will continue to improve significantly over the coming decades. There is also a similar expectation that the standard of national infrastructure in areas such as health, transportation and utilities will continue to improve, providing people with growth opportunities and cementing India's emerging position as one of the world's leading social and economic powerhouses.

But such optimism may need to be tempered, as there is now a growing body of evidence that demonstrates that unfettered economic development can, and does, come at a price in terms of the serious impacts that such development has on the natural world; impacts such as the loss of habitats, rivers and oceans polluted with plastic waste, and, of course, climate change.

So can these two competing pressures be reconciled?

Unfortunately, there are many who now believe they cannot and that further climate change can only be prevented by curtailing the ongoing development of the world's many emerging economies; conversely, many believe that the further, equitable economic development of those emerging economies can only occur at an unacceptable cost to the climatic stability of the planet.

But we at JSW do not agree with that view.

We believe that whilst it will undoubtedly be challenging, both intellectually and economically, it is possible for India, and indeed for other emerging economies, to continue the economic development that is so transforming (and extending) the lives of its people.

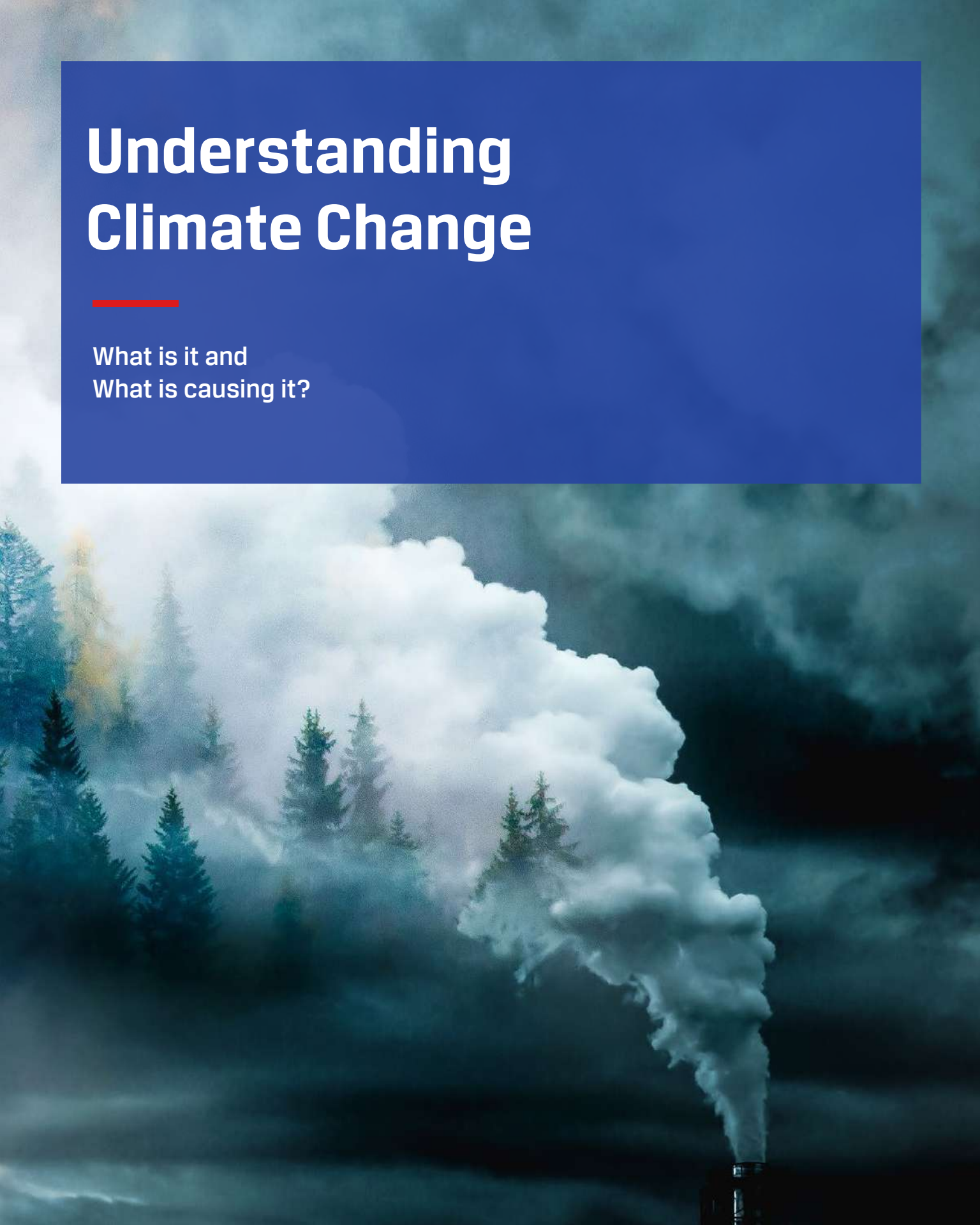
But this can only be done if, at the same time, we recognise and take true ownership of the impacts of that development so that we become part of the solution and do all that is necessary and possible to:

- help deliver the collective global aims regarding greenhouse gas emission reductions;
- mitigate the many and often negative impacts of climate change that so many of us are already having to contend with; and
- help individuals and communities adapt to the changed and increased threats that they now face.

This initial Climate Action Report, and the subsequent Climate Action Reports that will come after it, are our way of demonstrating how our belief in the potential for climate change and economic growth to be reconciled, will actually be delivered.

Understanding Climate Change

What is it and
What is causing it?



We recognise that there are probably few people reading this Report who are unaware of what climate change is and what's causing it, but we thought it worthwhile to include a brief summary of both, if only for completeness.

1.1°C
warmer

According to the United Nations

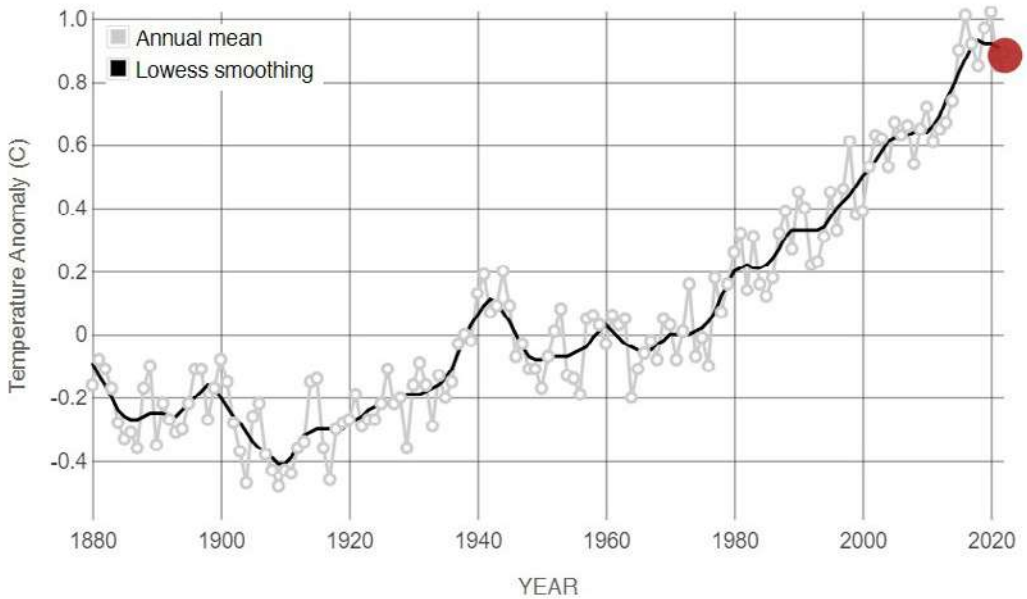
Climate change refers to the long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar cycle. But since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil and gas.

Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the Earth, trapping the sun's heat and raising temperatures. The Earth is now about 1.1°C warmer than it was in the late 1800s.

The last decade (2011-2020) was the warmest on record. Many people think climate change mainly means warmer temperatures. But temperature rise is only the beginning of the story.

Because the Earth is a system, where everything is connected, changes in one area can influence changes in all others.

The consequences of climate change now include, among others, intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms and declining biodiversity.



Source: climate.nasa.gov

How will this impact India?

There is also another reason for including this section in our Climate Action Report - it gives us an opportunity to talk about impacts. After all, it's the impacts of climate change, on people, on homes, on livelihoods and on our world and the countless species we share it with, that really matters.

The rapid changes in India's climate projected by climate models will place increasing stress on the country's natural ecosystems, agricultural output, and fresh water resources, while also causing escalating damage to infrastructure. These climate models predict serious consequences for the country's biodiversity, food, water and energy security, and public health. Higher temperatures, extreme weather events, and higher climate variability have been associated with an elevated risk of heat strokes, cardiovascular and neurological diseases, and stress-related disorders.

Warmer, higher moisture conditions, on average, are also more favourable for the spread of vector-borne diseases such as malaria and dengue fever. In addition, a decrease in the availability or affordability of food and potable water caused by climate change may lead to reduced nutritional intake, particularly among economically weaker sections of the population.

India's long coastline, where some of its largest cities are located, is among the most densely populated regions of the planet, making it exceedingly vulnerable to the impacts of sea-level rise. The potential impacts of climate change on India's human population also extend to India's incredibly diverse habitats and iconic species. Pressures from climate change increase the risks of human-wildlife conflicts, threatening further the Bengal Tiger and the One-horned Rhinoceros.

Rapidly changing habitats threaten the Snow Leopard and the Nilgiri Tahr in their high-altitude homes. It is these many impacts from climate change, to ourselves and to the natural world we share with countless other species, that have made us recognise the moral duty we have, to this generation and to the generations that will come after us, to work tirelessly on measures to mitigate those impacts.

Projected physical and Economic impacts of climate change in India

Rainfall patterns

Increase of about two heatwaves and 12–18 days in heatwave duration during each year by 2064.[i]

Higher temperatures

Water flow in the Ganges and Brahmaputra to fall by 17.6% and 19.6% respectively by the end of this century.[ii]

Sea-level rise

Sea levels to rise by 20-30 cm by the end of this century (compared to current levels).[iii]

Storms and cyclones

Cyclones in the Bay of Bengal are projected to nearly double by 2070-2100, compared to 1961-1990.[iv]

GDP in 2100 to be reduced by:

10% at 3°C of global warming due to declining agricultural productivity, sea-level rise and increased health expenditure.[v]

2.6% at <2°C global warming and up to 13.4% at over 4°C of global warming due to declining labour productivity from temperature and precipitation changes.[vi]

90% at 3°C of global warming, based on the historical relationship between temperature and GDP.[vii]

Note: The source studies each adopt different methods, baselines and timeframes. GDP = gross domestic product. (i) Kjellstrom et al., 2017; (ii) Immerzeel et al., 2010; (iii) Swapna et al., 2020; (iv) Sarthi et al., 2014; (v) Kompas et al., 2018; (vi) Kahn et al., 2019; (vii) Nixon (2020).

Source: https://cdn.odi.org/media/documents/ODI-JR-CostClimateChangeIndia-final.pdf

Impact of Steel

How does steelmaking contribute and why?

Steel is fundamental to the modern world. The construction of homes, schools, hospitals, bridges, cars and trucks – to name just a few examples – rely heavily on steel.

Steel is also an integral ingredient in the technologies of tomorrow. At the moment, it is not possible to produce steel without producing carbon dioxide. And as we know, carbon dioxide is the principal greenhouse gas emission contributing to climate change. To understand why CO_2 is produced when making steel, we feel it's useful to provide an overview of how the production of steel at an integrated iron and steel plant (such as our plants at Vijayanagar, Dolvi and Salem) takes place.

The major processes associated with primary steel production (where iron ore is the main input) are:

Coke Production

Metallurgical coke is primarily used in the Iron blast furnaces to reduce Iron ore to Iron. This coking process consists of heating coal in the absence of air to drive off the volatile compounds. The resulting material is a carbon mass called coke and this process is also responsible for around 20% of total CO_2 emissions.

Sinter and Pellet Production

These are two of the agglomeration units in the Iron and Steel industry, the output of which are used as a Fe (chemical name for Iron) feed in furnaces. The Iron ore fines, fluxes and fuels are mixed together and heated in a controlled process to produce these agglomerates. Together, these processes typically contribute around 15% of the total CO_2 emissions.

Hot Metal Production

This is the most important stage in the iron making process. Iron oxide is heated to react with the carbon in the furnace to reduce it to Iron and as a result, CO_2 is liberated in the process. The steel industry is often referred to as a 'Hard to Abate' sector because the process, itself requires the generation of CO_2. While the hot metal is traditionally generated in blast furnaces, some of the hot metal today is also produced using COREX (a smelting-reduction process for cost-efficient and environmentally less-impactful production of hot metal from iron ore and low grade coal). More than quarter of the total CO_2 emissions in the crude steelmaking can be attributed to the hot metal production.

Direct Reduction of Iron (DRI)

This is also known as sponge iron and is produced by the reduction of iron ore (in the form of lumps or pellets) by either non-coking coal or a reducing gas produced by the reforming of natural gas. This reduction process happens at high temperature but substantially below the melting point of iron. The produced DRI is widely used as a coolant as well as used in Electric Arc Furnace (EAF) for crude steel production.

Crude Steel Production

This is the process where the actual production of steel takes place. The additional carbon and other impurities in hot metal are oxidized in this process to produce steel. While Basic Oxygen Furnace (BOF) is the predominantly used route for steel production, Electric Arc Furnace (EAF) is also used to produce steel from DRI and Scrap. This process, together with secondary metallurgy and continuous casting, is responsible for around 15% of total CO_2 emissions in the steel production.

Ladle Metallurgy

After tapping of steel from a primary steelmaking furnace such as BOF, EAF or EOF, molten steel for high quality or specialty applications is subjected to further refining in a number of alternative processes collectively known as ladle metallurgy. Ladle metallurgy is sometimes also called ladle refining or secondary steelmaking.

Continuous Casting

This is the process where the liquefied steel is solidified into semi-finished products for subsequent rolling in the finishing mills.

Rolling

Steel slabs from the casters are further rolled into flat products in a Hot Strip Mill and the billets from the casters are sent to bar and blooming mills to produce long products.

Finished Product

This is the final stage of product manufacturing where the products from the rolling are customized as per the end use customer demand. Hot Rolled Coils from HSM are further treated with Zinc and Aluminum to produce Galvanized/Galvalume coils and sheets which are further added with color coating for further applications.

The entire process from rolling to finished products produces around 15-20% of total CO_2 emissions mostly due to the use of electricity and heating fuels to run the equipment.

THE PROCESS OF MAKING STEEL

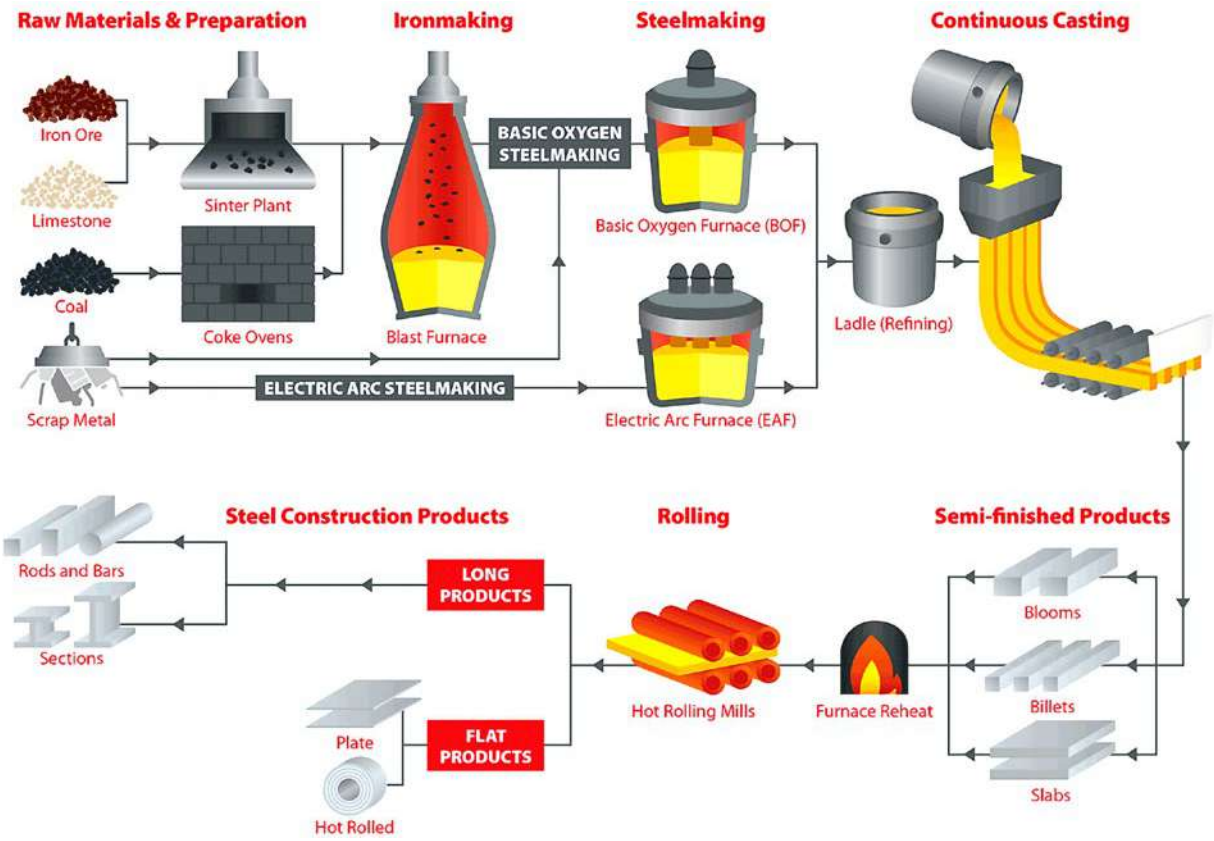


Image Credit: New Steel Construction

Carbon monoxide and hydrogen are used in the primary steel making process as reducing agents that help cleave the oxygen from the iron ore molecules. Virtually all of the carbon monoxide and hydrogen used to reduce iron ore today is generated from fossil fuel energy inputs, mainly coal and its derivative coke (and to a much lesser extent natural gas).

So, in summary, the greenhouse gas emissions associated with steel making are generated in one of the following ways:

1. **As process emissions, where the combustion or transformation of raw materials that go into the steel making process result in the emission of carbon dioxide;**
2. **Emissions from combustion sources on site burning fossil fuels such as coal and natural gas; and**
3. **Indirect emissions from the consumption of electricity that has been generated in other places.**

There are three main production routes for which emission intensities are provided by worldsteel.

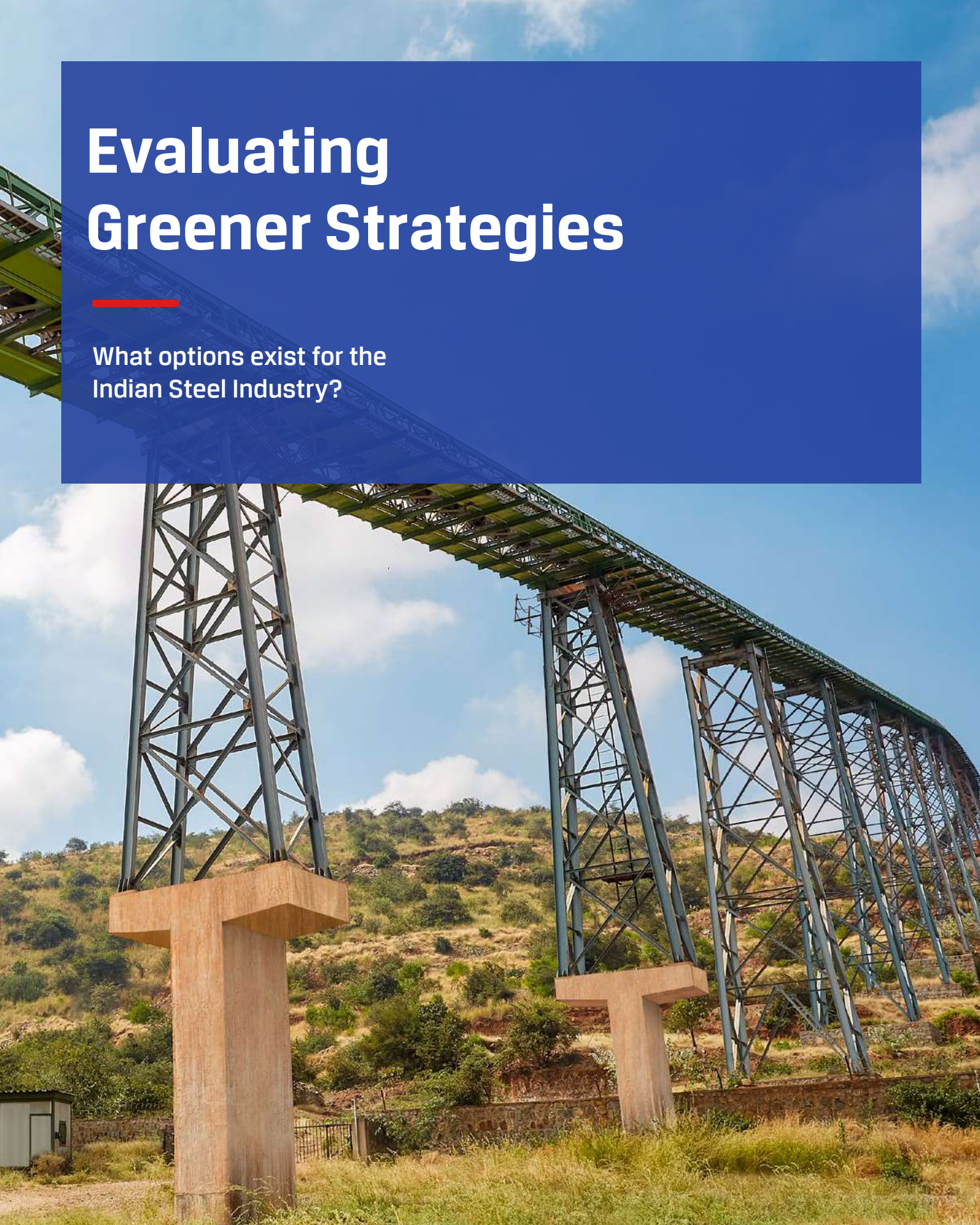
Global Average CO_2 emission intensities of main production routes:

Parameter	GHG Intensity (tCO_2/tcs)	Percentage of Global Production by Production Method
Global Average	1.91	
BF-BOF	2.32	71%
Scrap based EAF	0.67	22%
Natural Gas Based DRI-EAF	1.65	7%

Source: IEA - Iron and Steel Technology Roadmap
https://worldsteel.org/steel-topics/sustainability/sustainability-indicators/
https://www.iea.org/data-and-statistics/charts/global-crude-steel-production-by-process-route-and-scenario-2019-2050

Evaluating Greener Strategies

What options exist for the Indian Steel Industry?



The steel sector in India has been an integral part of our country's emergence as a self-sufficient, developing economy.

The sector has grown rapidly over the course of the last thirty years from a total capacity of 22 million tonnes (MT) in the financial year of 1991-92 to becoming the world's second largest steel producing country with an annual output of crude steel, in the 'in the financial year 2021-22, equal to 120 MT and a capacity of 154 MT. The demand for steel is expected to grow further.

300 MT in 2030 • • • • • **500 MT** by 2047

The 300 MT per year production capacity was set out under the National Steel Policy (NSP), unveiled in 2017 and, within the Vision 2047, there is an expectation that the capacity will quadruple from current levels to about 500 MT by 2047 in order to meet the nation's ever-growing demand for steel.

Against this backdrop, it is essential that Indian steel manufacturers such as ourselves innovate in order to transition away from carbon - a process we are calling 'Decarbonization'. And it makes good business sense too.

We need to innovate and significantly reduce our carbon footprint not only to make our activities more environmentally sustainable, but also to ensure we continue to have a viable business model that allows us to maintain and develop our strategic position in the future and so ensure the business continues to be economically sustainable.

But there is a challenge.

As we have seen in the previous section of this report, steel is a hard to abate sector, and carbon dioxide emissions from the Indian steel industry are expected to increase massively and reach 837 million tonnes over the next thirty years in a business-as-usual scenario. This re-emphasizes the challenge that India faces in balancing the competing pressures of climate change and economic development, as discussed earlier. And it is a challenge that is complicated further by India's commitments under the Paris Agreement, where its previous commitment (to reduce its emissions intensity by 33-35% by 2030 from the 2005 levels) has been revised upwards, following COP26, to 45% by 2030. We also need to be mindful of measures being taken by others to tackle climate change. For example, the EU Commission has introduced the world's first carbon border tax in the form of Carbon Border Adjustment Mechanism (CBAM) on imported goods. This tax will be levied in a phased manner from 2026 and will require non-EU companies exporting to Europe, like JSW Steel, to pay the same price for their carbon footprint in Europe as European companies. This will likely have a significant economic impact on steel companies in India who export to the EU. Given the scale of carbon dioxide emissions associated with steelmaking, the expectations for growth in the sector to support the nation's ongoing economic development, and the many other external pressures outlined above, the challenge for the Indian steel industry may appear to be insurmountable.

But we at JSW Steel don't believe that.

Of course, we are under no illusions as to how difficult a journey lies ahead, but we, like many across the steel industry in India, have confidence that, by pursuing the range of initiatives we have outlined later in this report, we will able to contribute towards the sustainable reduction in carbon emissions that the steel sector has to achieve. Additionally we are ready to take bold decisions on new technologies and rapidly build out enabling infrastructure, supported by domestic policy and international finance.

We at JSW Steel have been conscious for some time of the increasing threat of climate change and of the need to tackle our greenhouse gas emissions. Over the last decade, we have undertaken a large number of initiatives that have, collectively, resulted in a significant reduction of 30% in our emissions intensity from our baseline value of 3.39 tCO_2 /tcs in financial year 2005-2006 to 2.36 tCO_2/ tcs in financial year 2022-2023.

A quick word about the term 'emissions intensity'. We regard 'emissions intensity' as a particularly relevant and material metric to use to monitor our carbon emissions because it captures the need to balance our role in supporting the economic and social development of India with the imperative of improving our carbon footprint. Our emissions intensity is measured in tCO_2/ tcs (which is tonnes of carbon dioxide per tonne of crude steel produced).

How have we achieved this substantial reduction in our emissions intensity over the last fifteen years? In the next chapter, you will see a few of the projects that have contributed: