

# ASPIRE Programme

## Accelerating Smart Power & Renewable Energy in India

### SECTORAL WORKSHOP & STUDY TOUR ON **BEST PRACTICES IN ENERGY EFFICIENCY IN IRON & STEEL SECTOR: A PATH FOR DECARBONISATION**

**WORKSHOP:**      **19 April 2023**  
(09:00 – 17:30 IST /  
03:30 – 12:00 GMT)

**STUDY TOUR:**    **20 April 2023**  
(09:00 – 13:00 IST /  
03:30 – 07:30 GMT)

Hosted by:   
**HIRA**  
GODAWARI POWER & ISPAT

**Godawari Power & Ispat Limited,**  
Raipur



## CONTENTS

1. Background on ASPIRE Programme.....	3
2. Rejuvenation of Knowledge Exchange Platform (KEP) .....	4
3. Iron & Steel Sector in India .....	5
4. Decarbonisation of Indian Iron & Steel Industry.....	7
5. Potential technology interventions for enhancing energy efficiency/ decarbonisation in Indian Iron & Steel Sector .....	8
6. Iron & Steel Sectoral Workshop.....	9
7. Study Tour of Godawari Power & Ispat Limited, Raipur.....	10
Annexure – Agenda for Iron & Steel Sectoral Workshop.....	12

## 1. Background on ASPIRE Programme

India has continued to demonstrate climate leadership and a firm commitment for achieving the clean energy transition. At the COP27 in Egypt, India submitted its Long-Term Low Emissions Growth Strategy indicating low carbon transition pathways in key economic sectors. Earlier, at COP26 in Glasgow, the Prime Minister of India announced the five nectar elements or 'Panchamrit' of India's climate action to achieve net-zero target by 2070. Further, in August 2022, India updated its Nationally Determined Contributions and has embarked on far-reaching new initiatives in renewable energy, e-mobility, ethanol blended fuels, and green hydrogen as an alternate energy source. These targets shall help India reduce its total projected carbon emissions by 1 billion tonnes and lower its emissions intensity by 45% by 2020 (over 2005 levels).

As part of the '3<sup>rd</sup> India – UK Energy for Growth Partnership', an inter-ministerial energy dialogue was held on 8<sup>th</sup> October 2021 to strengthen collaboration on accelerating the move to global clean energy in the decade ahead. During this, the ministers endorsed '*Roadmap 2030 for India-UK Forward Action Plan*' on clean energy, improving energy efficiency measures, enabling use of green hydrogen, and increasing the switch to electric mobility. One of the actions under the *Forward Action Plan* was to launch the India-UK bilateral programme on Smart Power and Renewable Energy, titled '*Accelerating Smart Power and Renewable Energy in India*' programme (**ASPIRE**). ASPIRE is being implemented by the Foreign Commonwealth and Development Office, Government of UK in association with Ministry of Power and Ministry of New and Renewable Energy, Government of India. KPMG is the lead delivery partner for the ASPIRE programme. Idam Infrastructure Advisory Private Limited (India) and Carbon Trust (UK) are the key consortium members.

One of the thematic areas of ASPIRE is **industrial energy efficiency and decarbonisation (IEED)** with the objective of catalysing increased investment in IEED in India. The programme aims to catalyse increased investment that supports sustained & inclusive economic growth, low carbon and leads to poverty reduction including through the promotion and empowerment of women and other socially weaker groups.

## 2. Rejuvenation of Knowledge Exchange Platform (KEP)

Under the ASPIRE programme, a rejuvenated Knowledge Exchange Platform (KEP) titled “iDEEKSHA (Industrial Decarbonization and Energy Efficiency Knowledge Sharing Platform)” has been developed in collaboration with the Bureau of Energy Efficiency (BEE). The iDeeksha platform was launched by Shri R.K. Singh, Hon’ble Cabinet Minister for Power, New and Renewable Energy, during the 21st Foundation Day Event of BEE on March 1, 2023 in Delhi.

The iDeeksha platform is a one-stop shop for all energy efficiency needs of large industries covered under BEE's PAT Scheme and would facilitate promotion & sharing of best practices and energy-efficient technologies among large-scale industries. The iDeeksha platform includes new features to facilitate Designated Consumers (DCs) in adopting new and emerging IEED technologies offered by Indian and global technology suppliers.

The iDeeksha platform would comprise database of proven and emerging technologies available in India and globally. Further, the database would also provide details of technology suppliers and financial institutions, updated at regularly intervals.

The iDeeksha platform would thus facilitate:

- Exchange of knowledge and information to enhance peer to peer learning
- Exchange of energy management best practices across sectors
- Access to IEED tools, technologies & technology providers available in India and globally
- Access to data sources and knowledge repositories to support knowledge translation
- Organise sector/ industry specific workshops/ seminars to enhance EE measures
- Enable knowledge and commercial partnerships

### 3. Iron & Steel Sector in India

India is currently the world's second-largest steel producer, and second-largest steel consumer<sup>1</sup>. As with any industrializing economy, the steel sector is of vital importance to India, contributing around 2% to the country's GDP and employing around 2.5 million people in the steel and related sectors<sup>2</sup>. The Indian Iron and Steel segment offers a product mix that includes hot rolled parallel flange beams, columns rails, plates, coils, wire rods, and continuously cast products such as billets, blooms, beams, blanks, rounds, slabs, metallic, and ferroalloys. In FY 2018, India's crude steel production crossed 100 MT for the first time, reaching 106.5 MT and registering a 4.5% year-on-year growth rate, and becoming the 2nd largest producer of steel in the world after China. India was also the largest producer of Sponge Iron (Direct Reduce Iron or DRI) in the world in 2020.

In 2017, the Ministry of Steel (MoS) launched the National Steel Policy (NSP), which laid down the broad roadmap for encouraging long-term growth for the Indian Steel Industry, both on the demand and supply sides, by 2030-31 including an increase India's steel making capacity to 300 Mt by 2030. This policy also encompasses targets to reduce energy consumption per tonne of steel, by adopting the latest energy efficiency measures. India is also among the largest iron ore producers in the world, ranking 4th globally. Iron ore is a key input product for manufacturing steel and primary iron. More than 85% of the iron ore reserves in the country are of medium or high grade and are directly used in blast furnaces and Direct Reduced Iron (DRI) plants, in the form of sized lumps, sinters, or pellets.

India has 285 units with production capacity in the range of 0.06 MTPA and 2 MTPA. The per capita consumption of finished steel for the year 2019-20 was 74.7 kg, against the world average of 229 kg.

The energy efficiency and decarbonization potential of the iron & steel sector under the PAT scheme are presented in Table 1 below.

**Table 1: Energy efficiency & decarbonization potential of Iron & Steel sector under the PAT Scheme (Cycle I to VI)**

Total Number of notified DCs	Energy Efficiency Potential (MTOE)	Decarbonization Potential (MTCO <sub>2</sub> )
163	4.475	18.635

While integrated steel plants in India have a higher specific energy consumption in comparison to steel plants abroad<sup>3</sup>, Tata Steel Jamshedpur has demonstrated notable progress in

<sup>1</sup> World Steel Association, 2020

<sup>2</sup> Ministry of Steel, GoI, 2020

<sup>3</sup> Decarbonising the Indian Steel Industry, RMI Report, 2023

achieving energy efficiency. In the fiscal year 2021-22, the company attained a commendable 5.433 Gcal/tcs, which is 0.554 Gcal/tcs higher than the World Steel Association's average of 4.88 Gcal/tcs. This achievement is indicative of the potential for further enhancements in energy efficiency in the steel industry. The specific energy consumption of coal-based rotary kilns utilized in DRI production ranges from 4.10 to 5.26 Gcal/tcs, with an average of approximately 4.51 Gcal/tcs. This observation suggests that there is significant room for the integration of energy-efficient technologies in coal-based DRI plants.

In general, specific energy consumption in steel plants has been declining over time due to the adoption of waste heat utilization, technological advancements, and the adoption of best practices such as the use of Best Available Technologies (BAT).

## 4. Decarbonisation of Indian Iron & Steel Industry

The Indian steel industry is committed to minimize impact of its operations on global climate change and reduce carbon footprint. India's commitment to achieve Net Zero emissions by 2070 is akin to not just walking the talk on the climate crisis but running the talk. Few initiatives undertaken by Indian Steel industry to decarbonize steel sector are presented below:

- **Tata Steel**: The Tata Steel Jamshedpur plant has set a new standard in the steel industry with its innovative 5-tonnes-per-day (TPD) carbon capture plant. It is the first of its kind in the world and represents a significant step towards reducing carbon emissions in the steelmaking process. This ground-breaking technology allows for the direct extraction of CO<sub>2</sub> from Blast Furnace gas and marks Tata Steel as the first steel company in the country to adopt such a carbon capture technology. By reusing the captured CO<sub>2</sub> on-site, Tata Steel is promoting a circular carbon economy and contributing to sustainable practices. The Carbon Capture and Utilization (CCU) facility utilizes amine-based technology to capture and recycle the carbon, making it available for onsite reuse. The recovered CO<sub>2</sub> is also sent back into the gas network, increasing its calorific value, while reducing emissions and promoting sustainability.
- **JSW Steel**: aims to cut emissions to 1.95t of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) per tonne of steel produced by 2030. Presently, it operates a 100 t/d CCU project in Salav, Maharashtra. With the capture of generated CO<sub>2</sub>, the process then undergoes purification and compression to form an easy-to-transport product, which can be used as a raw material in other industrial processes, such as in the Food and Beverage industry.
- **Jindal Steel and Power**: working on a Hydrogen project through Syngas which is used to reduce the iron to produce DRI while also bringing down the CO<sub>2</sub> emission levels.

In addition to the above, iron & steel industries in India have adopted the following key operational best practices and technologies as part of their IEED measures:

- Installation of Top Recovery Turbine and Pulverized Coal Injection in Blast Furnace.
- Commissioning of LD Gas Recovery Plant in Steel melting shop.
- Use of Hydrogen in steel-making reheating furnaces.
- Use of Plastics to replace PCI in Blast Furnaces.
- Direct rolling in mini steel plants.
- Hot charging of DRI in EAF.



## 5. Potential technology interventions for enhancing energy efficiency/ decarbonisation in Indian Iron & Steel Sector

Some of the potential areas for technology intervention in the Indian iron & steel sector to reduce carbon intensity & facilitate a rapid transition to net-zero have been identified below:

- Use of Top pressure Recovery Turbine (TRT –energy-saving equipment) in blast furnace of steel plants to control the top pressure of a blast furnace, and to generate electric power using gas generated in blast furnaces.
- Use of coke dry quenching (CDQ) to recover waste heat to produce steam and power other than environmental benefit on dust, SO<sub>x</sub>, and NO<sub>x</sub> emission reduction.
- Waste heat recovery and utilization technologies for different fuels (e.g., Hydrogen) including options for industrial symbiosis with low-grade heat technologies (ORC).
- Benchmarking and developing options for the valorization of waste and options for industrial symbiosis including non-metallic wastes (e.g., sludges).
- Carbon Capture technology benchmarking.
- Fuel Switching (Hydrogen).
- Digital technologies for process optimization for increased efficiencies and yields.
- Developing supply chain solutions to increase the recycling of mixed scrap metal when using a different technology (e.g., electric arc furnace) balancing scrap quality versus product quality.

### *Leverage UK Iron & Steel Sector's strengths and capabilities*

UK's iron & steel sector offers some key technologies, solutions, and best practices in the areas of:

- Advanced blast furnace technologies
- Improved furnace and re-heating furnace performance & optimization
- Electric arc furnace
- Improved process control & automation
- Ultra-high-power transformers
- Technology for scrap densification for shredding
- Fuel switching (including in coking plant) - biomass, hydrogen, and electrification

Strengths and capabilities of UK iron & steel sector can be leveraged to facilitate rapid transition of Indian iron & steel sectors' journey to net-zero, through adoption of best practices, technologies, and solutions.



## 6. Iron & Steel Sectoral Workshop

A one-day workshop on “**Best Practices in Energy Efficiency in Iron & Steel Sector: A Path for Decarbonisation**” is being organised by **Godawari Power & Ispat Ltd.** on **19<sup>th</sup> April 2023** at **Babylon Capital, Raipur**. The workshop will cover various aspects of the iron & steel sector such as the PAT scheme, best practices and new & emerging low-carbon technologies to enhance industrial energy efficiency and decarbonisation (IEED) measures. The workshop is designed to provide national and international organisations with a platform to present their best practices and technologies in the above areas. The workshop would provide an opportunity for stakeholders to understand the iron & steel sector in India and connect with key stakeholders for potential partnerships. The workshop would thus enable in capacity building of iron & steel sector stakeholders.

ASPIRE programme promotes gender equality, and the sectoral workshop is expected to deliver GESI (Gender Equality and Social Inclusion) through the participation of women and stakeholders from marginalised groups from large energy-intensive industries.

The detailed agenda for the iron & steel sectoral workshop has been provided in [Annexure](#).

## 7. Study Tour of Godawari Power & Ispat Limited, Raipur



Godawari Power & Ispat Ltd. (GPIL) is the flagship company of Raipur-based HIRA Group. GPIL was incorporated in 1999 with the objective of setting up an integrated steel plant that included captive power generation. Commercial operations began in 2001 with the commissioning of the first Sponge Iron plant. In 2004, GPIL undertook the first phase of its expansion plan, which involved increasing the capacity of sponge iron (130,000 tonnes), steel billets (100,000 tonnes), and captive power generation (10 MW). As part of this phase, the company also established new facilities to manufacture ferro alloys (16,500 tonnes) and HB (Hard Bright) wire (60,000 tonnes), marking a significant step towards moving up the value chain. The company is currently in the second phase of its expansion plan, which entails increasing the capacity of sponge iron (260,000 tonnes), steel billets (200,000 tonnes), and captive power generation (25 MW). GPIL has scaled up its capacity five-fold in recent years and is now India's third-largest producer of coal-based sponge iron.

### Product Portfolio:

Pellets	Sponge Iron / DRI	Billets	Wire Rod	HB Wire	Silico Manganese
					
2.7 MTPA	0.495 MTPA	0.4 MTPA	0.4 MTPA	0.1 MTPA	16,500 TPA

GPIL is also the largest manufacturer of iron ore pellets in central India and has production facilities for Sponge Iron, billets, Ferro alloys, wire rods, steel wires, and a Captive power Generating Facility that uses WHRB, AFBC, Biomass & Solar Power.

GPIL's first WHRB captive power plant (7 MW) was the world's first to be registered with the Clean Development Mechanism (CDM) Executive Board for carbon credits under the Kyoto Protocol. The plant achieves 75% recovery of waste heat from the flue gas of the sponge iron kiln, using it to produce steam and generate power. GPIL is an EMS company that adheres to all necessary environmental compliances and has a comprehensive program for eco-friendly operations to serve its stakeholders.

On August 6th, 2022, GPIL commissioned and synchronized its 70 MW captive solar PV power plant in Rajnandgaon, Chhattisgarh. The power generated will meet the enhanced electricity requirements of its integrated steel plant and help reduce the high cost of energy purchased from state discoms.

**RR Ispat** is a company that specializes in forward integration and is a unit of Godawari Power and Ispat Limited. The company has two divisions: **Consoul** and **Hira Pipes**. Their goal is to become the most trusted brand of Steel in Central India. RR Ispat's diverse portfolio of products and services embodies the very essence of its group tagline "**GROWING STRONGER TOGETHER**". From manufacturing HR Coil ERW Steel Pipes, TLT (Transmission Line Tower) Structures, and Railway OHE (Over Head Equipment) Structures to designing and constructing Unipole, Octagonal Poles, High Masts, and Street Light Poles, as well as Control Panels, Solar Dual Pump Structures, Mega Structures, and Metal Crash Beam Barriers, RR Ispat is committed to fostering growth and collaboration within the industry.

The study tour/ plant visit offers a unique opportunity for diverse industry players to engage in dialogue and knowledge exchange. Participants will have the chance to learn about Godawari Power & Ispat Limited's cutting-edge sustainable development initiatives, as well as the best IEED technology and procedures currently implemented by the plant. Through this experience, participants will gain valuable insights and practical knowledge that they can apply to their own operations. Moreover, this study tour/ plant visit will facilitate the sharing of best practices and technologies between industries. By fostering collaboration and communication, we can create an ambitious, mutually beneficial, and outcome-focused relationship.

## Annexure – Agenda for Iron & Steel Sectoral Workshop

**Theme:** Best Practices in Energy Efficiency in Iron & Steel Sector: A path for decarbonisation

**Date:** Wednesday, 19 April 2023

**Time:** 09:00 – 17:30 IST / 03:30 – 12:00 GMT

**Venue:** Babylon Capital, Raipur

Time (IST)	Name of Session	Presenter
<b>Inaugural Session</b>		
08.45 - 09:15	Registration	
09:15 – 09:25	Lighting of Lamp	
09:25 – 09:30	Welcome Address	Mr. Anurag Singh Sirola, Manager, KPMG (ASPIRE Team)
09:30 – 09:40	Introduction of ASPIRE Programme	Ms. Sanyukta Das Gupta, Smart Power Advisor, British High Commission
09:40 – 09:50	Brief overview of industrial energy efficiency (IEE) theme of ASPIRE Programme	Mr. Balawant Joshi, MD, Idam Infra (ASPIRE Team)
09:50 - 10:00	Special Address by SIMA	Mr. Deependra Kashiva, Executive Director, Sponge Iron Manufacturers Association *
10:00 – 10:10	Keynote Address by BEE	Mr. Sunil K. Khandare, Director, BEE
10:10 – 10:20	Special Address by CREDA	Mr. Alok Katiyar, CEO, CREDA (tbc)
10:20 – 10:30	Special Address by Godawari Power & Ispat	Mr. Vivek Agarwal, COO, Godawari Power & Ispat Limited
10:30 – 10:45	Inaugural Address by the Chief Guest	Mr. Abhishek Agrawal, Executive Director, HIRA Group
10:45 – 10:50	Vote of Thanks	Mr. K. K. Chakarvarti, Sr. Advisor, IDEEKSHA (ASPIRE Team)
10:50 – 11:00	Group Photograph	
11:00 – 11:20	Tea Break and Networking	
<b>Technical Session I: Perform Achieve and Trade Scheme for Iron &amp; Steel Sector</b>		
11:20 – 11:25	Moderator	Mr. Sunil K. Khandare, Director, BEE
11:25 – 11:45	Perform Achieve and Trade (PAT) Scheme for the Iron & Steel Sector	Mr. Himanshu Choudhary, Sector Expert, BEE
11:45 – 11:55	Q&A	
<b>Technical Session II: Sharing of best practices by Indian Iron &amp; Steel Units</b>		
11:55 – 12:00	Moderator	Mr. K. K. Chakarvarti, Sr. Advisor, IDEEKSHA (ASPIRE Team)
12:00 – 12:15	Energy Efficiency and decarbonisation –Iron and steel sector –Today and Tomorrow.	Vivek Agrawal COO & M. Sudhakar (GM-System improvement), Godawari Power and Ispat Ltd.

12:15 – 12:30	Energy efficiency improvements - A Path for Decarbonisation of Bhilai Steel Plant	Ms. Tripti Verma, Asstt. Manager, Energy Management Department, Bhilai Steel Plant.
12:30 – 12:45	Energy efficiency and Decarbonisation Projects by Jindal Stainless Ltd	Mr. Jyoti Ranjan Tripathy, Sr. Manager, JSL, Jajpuri Odisha
12:45 – 13:00	Decarbonisation initiatives - Jaideep Ispat & Alloys Pvt. Ltd	Mr. OP Malviya, Mr. Dinesh Bharati, Mr. Kapil Jat
13:00 – 13:10	Q&A	
13:10 – 14:00	Lunch Break and Networking	
<b>Technical Session III: Low Carbon &amp; Digital Technologies for Iron &amp; Steel Sector – by UK Technology Suppliers</b>		
14:00 – 14:05	Moderator	Mr. Iain Meager, Associate Director, Carbon Trust (ASPIRE Team) *
14:05 – 14:20	Presentation by UK Technology Suppliers	Sustain Steel, UK *
14:20 – 14:25	Q&A	
14:25 – 14:40	Presentation by UK Technology Suppliers	Mr. Niraj Singh, Carbon Clean, UK
14:40 – 14:45	Q&A	
14:45 – 15:00	Presentation by UK Technology Suppliers	CarbonRE, UK *
15:00 – 15:05	Q&A	
15:05 – 15:20	Presentation by UK Technology Suppliers	Carbon8, UK *
15:20 – 15:25	Q&A	
15:25 – 15:40	Presentation from UK	University of Cambridge*
15:40 – 15:45	Q&A	
15:45 – 16:00	Presentation by UK Technology Suppliers	Carbon Upcycling (Pre-recorded Video)
16:00 – 16:05	Q&A	
<b>Technical Session IV: Case Studies and Low Carbon &amp; Digital Technologies for Iron &amp; Steel Sector – by Indian Technology Suppliers</b>		
16:05 – 16:10	Moderator	Mr. Rajiv Shukla, Executive Director, Idam Infra (ASPIRE Team)
16:10 – 16:25	Best Practices on Energy Efficiency in Iron and Steel Sector	Mr. Baljeet Singh, Associate Vice President, Aarti Steel Limited
16:25 – 16:40	Best Practices Adopted in Iron & Steel Sector	Mr. Moolchand Jain, National President, Society of Energy Engineers & Managers (SEEM)
16:40 – 16: 55	Latest Energy Efficient Technologies & Approaches for Steel Melting, Forging & Rolling Operations	Mr. Milind Chittawar, CEO, SEE-Tech Solutions Pvt. Ltd.
16:55 – 17:10	Energy Efficiency Optimisation by Reducing Process Fluctuations – Steel Plant Case Study	Mr. Nagesh Nayak, AKXA Tech Pvt. Ltd.
17:10 – 17:30	Q&A	
<b>Discussions, Feedback and Concluding Remarks</b>		
17:30 – 18:00	Mr. Abhishek Agrawal, Executive Director, HIRA Group Mr. Vivek Agarwal, COO, Godawari Power & Ispat Limited Mr. Sunil K. Khandare, Director, BEE Ms. Sanyukta Das Gupta, Smart Power Advisory, British High Commission	

	Mr. Balawant Joshi, MD, Idam Infra, ASPIRE Team Mr. K. K. Chakarvarti, Senior Advisor, Idam Infra (ASPIRE Team) Mr. Anurag Singh Sirola, Manager, KPMG (ASPIRE Team)
18:00 Onwards	Tea and Networking

*\*Virtual presentation*