Confederation of Indian Industry

Catalysing Demand for Green Steel through Public Procurement in India

Insights from 28 Steel Producers and 12 Public Buyers on Scaling Readiness

With support from

Climate Catalyst

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- **Integrated Steel Plants:** SAIL, RINL, JSW Steel, Tata Steel, AM/NS India, Jindal Steel & Power, ESL Steel, Jaiswal Neco, Arjas Steel
- **Secondary Steel Plants:** Godavari Power & Ispat, Shri Bajrang Ispat, MSP Steel, Vandana Global, JSL, Prakash Industries Ltd., Shyam Steel & Power, Rashmi Ispat, MS Life Steel
- **Steel Processing Units:** Arjas Modern Steel, Shree TMT, ARS Steels, RL Steels & Energy, Tulsyan NEC

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Confederation of Indian Industry

The Confederation of Indian Industry (CII) is a non-government, not-for-profit, industry-led and industry-managed apex organisation that plays a proactive role in India's development process. CII works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society through advisory and consultative processes.

With a legacy of 130 years, CII has been instrumental in shaping India's development journey by transforming industry's engagement in national progress charting change through close collaboration with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness, innovation, and business opportunities via specialised services, Centres of Excellence, strategic global linkages, and platforms for consensus-building and networking. Representing approximately 9,700 direct members from the private and public sectors including SMEs and MNCs along with an indirect reach exceeding 365,000 enterprises through over 300 national and regional sectoral bodies, CII serves as a cornerstone for advancing India's economic aspirations, societal well-being, and global integration

CII – Sohrabji Godrej Green Business Centre (CII – GBC) was established in the year 2004, as CII's Developmental Institute on Green Practices & Businesses, aimed at offering world class advisory services on conservation of natural resources. The Green Business Centre was inaugurated by His Excellency Late Dr. A. P. J. Abdul Kalam, the then President of India on 14 July 2004.

Fostering green practices and businesses through its services in energy management, green buildings, green companies, renewable energy, green product certification, green mobility, green cooling, waste management, and cleaner production processes, the Green Business Centre facilitate India's emergence as a global leader in green business by 2030.

Disclaimer

This whitepaper should be viewed as a directional snapshot rather than a fully representative industry or government survey. Participant selection was based on access and existing industry relationships, primarily through CII, rather than scientific sampling. The companies, public agencies and PSUs engaged for this study contributed through a mix of stakeholders, including business leaders, bureaucrats, operational managers, sustainability teams, technical specialists and procurement professionals.

Respondents participated based on relevance of the study to their work and their own individual willingness to share insights. As official organisational statements often require multiple layers of internal approval, the insights captured here should not be interpreted as formal institutional positions of either a steel company or a public sector undertaking. The perspectives are informed viewpoints of individuals with direct knowledge of operational realities, sustainability priorities and procurement processes.

The supply-side sample draws on the perspectives of experts from most of India's major integrated steel producers. Secondary producers are not fully represented due to the scale, dispersion and practical challenges of engaging the entire segment. To partially address this gap, the study sought geographical diversity across major secondary clusters and included mills that have recently received green steel certification. Even so, perspectives may differ across firms or regions that may not be fully captured here.

Several producers provided sensitive cost and operational information, confidentially. Accordingly, care has been taken to ensure no company-specific confidential like cost or pricing information have been included. Emission and capacity data also rely on published or self-declared sources that may change as verification and certification systems mature. The analysis thus focuses on aggregated sectoral insights that provide a broader ecosystem view. Where perspectives from individual companies or public sector agencies are referenced, they are included solely to illustrate their approach to decarbonisation and their journey towards India's Green Steel Taxonomy compliance.

A best effort has been made to reflect all responses shared during stakeholder interviews. However, many ongoing or planned decarbonisation initiatives may not have been captured. This analysis should therefore not be taken as a complete picture of any company's decarbonisation journey or any public agency's procurement plans. For a full and up-to-date view, readers are encouraged to refer to the respective organisations' annual reports or engage with them directly.

Despite these limitations, this whitepaper provides a consolidated overview of India's green steel landscape by bringing together supply-side and demand-side perspectives in a single assessment. For readers seeking greater technical depth, more detailed studies and policy papers are referenced at the end of this report.

Foreword

India's pathway to net-zero will be determined as much by how we build as by what we build. Steel is the backbone of our infrastructure and industrial growth and sits firmly at the center of this challenge. With public procurement accounting for nearly one-fifth of India's GDP, and approximately 38 percent of national steel consumption, government demand has the scale and credibility require to re-shape markets. During my time as the Chairperson of Demand-Side Taskforce on Green Steel, I have engaged closely with public procurers and implementation agencies. A key takeaway was that demand-side institutions are broadly supportive of green steel. However, they were constrained by existing procurement systems and uncertainty around cost treatment. If we address these constraints, public agencies can be well positioned to lead this transition.

This timely report by the Confederation of India Industry (CII) and Climate Catalyst makes an evidence-based case for deploying Green Public Procurement (GPP) as a level to accelerate the decarbonization of India's steel sector. The report is grounded in primary data from both steel producers and some of the largest public procurers. The study therefore offers key insights on India's operational readiness and institutional constraints.

The findings underscore that Indian steel producers are technically prepared and commercially willing to supply certified low-carbon steel at scale, provided demand is visible and supported by transparent cost-recovery mechanisms. On the demand side, public agencies already procure steel at volumes sufficient to anchor a national green steel market. The constraints lie in procurement architecture, including L1 tendering practices, unamended schedules of rates, fragmented specifications, and the absence of standardised monitoring tools. These are solvable constraints, and the report clearly sets out how they can be addressed.

India has already demonstrated across sectors that early public demand can catalyse change. The transition to green steel should follow similar principles by setting clear standards, aggregate demand, ensuring time-bound fiscal support, and supporting institutional capacity-building.

I commend CII and Climate Catalyst for this rigorous and policy-relevant contribution, and I hope it informs the next phase of India's journey towards a low-carbon steel sector.

Dr. Aruna Sharma
Former Secretary,
Ministry of Steel,
Government of India

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List of abbreviations

AM/NS	ArcelorMittal Nippon Steel
BAT	Best Available Technology
BF-BOF	Blast Furnace–Basic Oxygen Furnace
BIS	Bureau of Indian Standards
BoQ	Bill of Quantities
BMRCL	Bangalore Metro Rail Corporation Limited
CBAM	Carbon Border Adjustment Mechanism
CCUS	Carbon Capture, Utilisation and Storage
CCTS	Carbon Credit Trading Scheme
CDM	Clean Development Mechanism
CII	Confederation of Indian Industry
CPPP	Central Public Procurement Portal
CPWD	Central Public Works Department
CRC/HRC	Cold Rolled Coil / Hot Rolled Coil
DFC	Dedicated Freight Corridor
DFPR	Delegation of Financial Powers Rules
DMRC	Delhi Metro Rail Corporation
DRI	Direct Reduced Iron
DSR	Delhi Schedule of Rates
EAF	Electric Arc Furnace
EPC	Engineering, Procurement and Construction
EPD	Environmental Product Declaration
ESG	Environmental, Social and Governance
FY	Fiscal Year
GFR	General Financial Rules
GeM	Government e-Marketplace
GHG	Greenhouse Gas
GPP	Green Public Procurement
H_2-DRI	Hydrogen-based Direct Reduced Iron
IF	Induction Furnace
IREPS	Indian Railways E-Procurement System
ISP	Integrated Steel Producer
JSPL	Jindal Steel and Power Limited
JSW	JSW Steel Limited
LCA	Life Cycle Assessment
LD	Linz-Donowitz
LGS	Light Gauge Steel
L1	Lowest Bidder Criteria
MMT	Million Metric Tonnes
MRV	Measurement, Reporting and Verification
MoRTH	Ministry of Road Transport and Highways
MoHUA	Ministry of Housing and Urban Affairs
$MtCO_2$	Million tonnes of Carbon Dioxide
NHAI	National Highways Authority of India
NHPC	National Hydroelectric Power Corporation
NISST	National Institute of Secondary Steel Technology
NTPC	National Thermal Power Corporation
PAT	Perform, Achieve and Trade
PLI	Production Linked Incentive
PMAY-U	Pradhan Mantri Awas Yojana – Urban
PPAs	Power Purchase Agreements
PSU	Public Sector Undertaking
QCBS	Quality and Cost Based Selection
RDSO	Research Designs and Standards Organisation
RE	Renewable Energy
RINL	Rashtriya Ispat Nigam Limited
SAIL	Steel Authority of India Limited
SIDBI	Small Industries Development Bank of India
SoR	Schedule of Rates
SPU	Steel Processing Unit
SSP	Secondary Steel Producer
TMT	Thermo-Mechanically Treated Bars
tCO_2/tfs	Tonnes of CO_2 per tonne of finished steel
tCO_2/tcs	Tonnes of CO_2 per tonne of crude steel
USD	United States Dollar

Executive summary

India's public procurement, valued at approximately INR 45-50 lakh crore (approx. US$ 600 billion) annually, or nearly one-fifth of GDP, represents one of the most potent yet underutilised instruments for decarbonising the steel sector. In FY 2024, government-linked infrastructure projects accounted for 22% of the country's total steel demand, equal to 30.6 million tonnes of steel. This generated approximately 78 million tonnes of CO_2 emissions, roughly equivalent to 21% of the India's total steel-sector emissions.[1]

Given the scale of steel consumption and emissions concentrated within public infrastructure, procurement policy has a direct and material influence on the pace and direction of the sector's decarbonisation. Strategic adoption of Green Public Procurement (GPP) for steel could thus create India's first credible, large-scale demand signal for low-carbon steel and substantially accelerate the industrial transition already underway.

This whitepaper presents one of the first integrated assessments of India's readiness for GPP in steel, examining both supply- and demand-side dynamics. It addresses a critical evidence gap at a moment when policy momentum around green steel procurement is accelerating, but the on-the-ground readiness of producers and public buyers remains insufficiently understood. By anchoring policy discussions in primary market evidence, the study aims to support a pragmatic and scalable GPP design.

The analysis draws on in-depth interviews and primary data from **28 steel producers representing 88 MTPA of crude steel capacity**, or roughly **60% of India's current national output**. On the demand side, the study incorporates perspectives from **12 of India's largest public buyers of steel**, including the National Highways Authority of India (NHAI), Indian Railways, Metro Rail Corporations, the National Thermal Power Corporation (NTPC), the National Hydroelectric Power Corporation (NHPC), the Power Grid Corporation of India Limited (PGCIL), and the Central Public Works Department (CPWD).

The analysis evaluates the sector's technical, operational, financial and institutional preparedness within the context of the emerging Indian Green Steel Taxonomy and the Carbon Credit Trading Scheme (CCTS)[2], providing a grounded view of how prepared India is to implement GPP at scale.

---

1 Total steel demand during FY 24 is 139.2 MMT. Average Emissions intensity of Indian Steel industry during FY 24 is 2.54 tCO2/MT.

2 India's Carbon Credit Trading Scheme (CCTS) sets emission targets for industries; companies earn or buy Carbon credits based on performance. The Green Steel Taxonomy defines "green steel" by carbon intensity, using a star rating to promote low-emission production. Steel emitting under 2.2 t CO_2e/tonne qualifies as "green," with a star-rating system: three-star (2.0–2.2 t CO_2e), four-star (1.6–2.0 t CO_2e), and five-star (< 1.6 t CO_2e).

Supply-side readiness: Key findings from surveying steel producers

Producer responses to the survey indicate that India's current readiness to supply green steel is highly uneven across production routes, with near-term availability concentrated almost entirely in the scrap-based secondary sector. Readiness is driven less by scale and more by process characteristics, access to scrap, and the ability to decarbonise electricity inputs. Key findings include:

- Scrap-based secondary producers predominantly Electric Arc Furnaces (EAFs)/Induction Furnaces (IFs) units located in Chhattisgarh, Punjab, Maharashtra, Gujarat and West Bengal, currently comprise almost all of India's certified green steel today, as per the Ministry of Steel's taxonomy.
- Leading integrated producers such as **Tata Steel Jamshedpur, AM/NS Hazira, JSW Vijayanagar and Dolvi** demonstrate the highest decarbonisation maturity among the Integrated Steel Plants (ISPs) and are on track to achieve < 2.2 tCO_2 per tonne of finished steel by FY 2030, with Tata Steel Jamshedpur and AM/NS Hazira even potentially reaching below 2.0 by 2030.
    - **AM/NS is likely the first ISP to come into the 3-star green steel category by FY 2027** with annual crude steel production volume of 7.7 MMT.
    - **TATA steel – Jamshedpur and Kalinga Nagar** together having an annual production volume of 1**4.17 MMT, are projected to come under the 3-star green steel category in FY 2028**.
    - **JSW Steel Ltd – Bellary, Dolvi and Salem** together comprise an annual crude steel production volume of **21.76 MMT** and are **projected to come under the 3-star green steel category in FY 2030**, subject to ambitious emission intensity reduction measures.
    - PSU steel producers like **SAIL and RINL** are advancing decarbonisation through efficiency improvements and renewable energy adoption. SAIL targets reducing emission intensity to 2.19 tCO_2/tcs by 2030. Initial compliance with the taxonomy appears feasible for select PSU plants in the 2030-2032 period, with deeper reductions likely requiring major technology shifts thereafter.
- The top **three constraints to decarbonisation** cited by surveyed steel producers were:
    - **Domestic scrap shortage:** India's current scrap consumption is approximately 42 MT per year, falling well short of what is required to scale up EAF-based steelmaking. By 2030, this is expected to lead to an annual scrap import gap of 20-30 million tonnes. The core challenge lies in domestic scrap availability. India currently generates only 30-35 MTPA of processed scrap. Imports can bridge a part of this shortfall but are constrained by quality limitations, logistics costs, import duties, and export restrictions imposed by supplying countries.
    - **High cost of green feedstocks:** Green hydrogen priced at around US$ 4.1-5/kg in 2025 remains nearly four times more expensive than grey hydrogen, while rising natural gas prices add 15-20% to Direct Reduced Iron (DRI) production costs, undermining the near-term economic viability of low-carbon routes.

- **Non-disclosure of upstream emissions:** More than 80% of iron ore miners, coking coal suppliers, and electrode manufacturers do not publicly report their Scope 3 emissions. This lack of transparency makes it difficult for steel producers to calculate and verify full life-cycle carbon footprints under the Green Steel Taxonomy, preventing steelmakers from preparing accurate inventories for certification or taxonomy compliance.

- All surveyed producers already supply steel to public-sector or government-linked projects. Notably, **93 percent (26 of 28) confirmed unequivocal readiness to deliver certified green steel at scale, provided two essential conditions are met:**

  1 Clear, long-term demand visibility through notified procurement mandates, framework agreements, or preferential treatment in public tenders.

  2 A transparent economic mechanism such as an acceptable price premium, Goods and services tax (GST) concession, carbon-credit offset, or equivalent cost-recovery instruments that covers the incremental expense of decarbonised production.

A detailed summary of the ten key insights from the supplier perspective is presented between page 28-40.

Demand-side readiness: Key findings from surveying public sector buyers

Almost all public agencies interviewed for this study procure large volumes of steel with **eight out of twelve agencies procuring more than 100,000 tonnes annually.** However, procurement across all continues to rely almost entirely on lowest-price (L1 criteria) through Engineering, Procurement, and Construction (EPC) contractors, with no mandatory sustainability or emissions-related requirements. Key findings from the survey include:

- **Schedule of Rates (SoR) inclusion key to institutionalising demand:** Current public procurement frameworks in India are not yet fully equipped to enable the scaled uptake of low-carbon steel. A central bottleneck is SoR, which serves as the primary reference for pricing and technical specifications in public tenders and contracts. Unless SoRs across procuring agencies are explicitly updated to recognise certified low-carbon steel and allow for approved price premiums, institutional buyers will remain constrained in their ability to procure such material at scale.

- **Fragmented procurement frameworks may hinder consistent green steel uptake:** Several public procurers noted that dispersed authority across central, state, and PSU buyers, combined with differing technical specifications and pricing norms, makes it difficult to uniformly incorporate green steel into tenders. In the absence of harmonised guidelines, aligned Schedules of Rates, and demand aggregation, national mandates risk translating into patchy compliance rather than sustained, scalable demand.

- **Local availability likely to constrain adoption:** Public procurers report that current green steel availability in the short-term remains limited, with minimal commercial volumes meeting Green Steel Taxonomy thresholds. In some instances, the absence of local supply means that applying a procurement mandate would further increase project costs, as green steel must be transported

from outside the region. The resulting increment in logistics costs make green steel more expensive than locally available conventional steel. This constraint will likely ease over time as more producers meet Green Steel Taxonomy thresholds post FY 2030.

- Every procuring entity interviewed, including NHAI, Indian Railways, Metro corporations, NTPC, NHPC, PGCIL and CPWD, confirmed they can enforce green steel procurement at scale provided the following **four enablers** are established:

  1 A notified national mandate with clear percentage thresholds

  2 Ready-to-use tender clauses and Monitoring, Reporting, and Verification (MRV) templates

  3 Brief training for their procurement teams

  4 Modest, time-bound fiscal support for the first three years, such as a predetermined green margin in the SoR, GST relief or a carbon-credit offset

A detailed summary of ten key insights from the demand side is presented between page 41-52.

Green steel availability: Scenarios and scale-up pathways

The Carbon Credit Trading Scheme (CCTS) covers 253 obligated entities across **Integrated Steel Plants (ISPs), Secondary Steel Producers (SSPs), and Steel Processing Units (SPUs).** Together, these account for about 91% of India's 144.3 MT crude steel production in FY 2023–24, including 84.3 MT from ISPs, 23.8 MT from SSPs, and 22.9 MT from SPUs. The remaining ~13 MT, largely lower-emission scrap-based and downstream rerolling units, is outside the current CCTS framework.

Green steel volumes in this study were estimated by applying draft CCTS emission intensity thresholds alongside the Green Steel Taxonomy star ratings. CCTS targets were used to project trajectories through FY2027, with annual taxonomy-based categorisation applied to estimate eligible volumes. **On a full-system basis, including SPUs and scrap-based downstream units, about 36.3 MT already qualifies as green under the taxonomy.**

However, since most sectoral emissions and decarbonisation efforts are concentrated in primary steelmaking, this report narrows projections to ISPs and SSPs. These segments are most relevant for large-scale public procurement. **On this boundary, green steel capacity was approximately 4.68 MT in FY2024–25.**

This explains the difference from the Ministry of Steel's reported **10MT+** of green steel certificates issued by NISST to date, which includes SPUs and scrap-based downstream units. Public procurement volumes are expected to come mainly from primary steelmaking, making ISP and SSP projections more material for demand assessment.

For FY2028 to FY2030, three annual emission reduction pathways were modelled: 2% as low, 4% as medium, and 6% as high. The resulting estimates for green steel availability, in MT, are presented in the table below.

Table 1: Projected Green Steel availability across Low, Medium and High scenarios

Total Green steel capacity		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Low scenario: 2% Y-O-Y Emission intensity reduction	**Total**	**4.68**	**4.68**	**4.95**	**12.58**	**12.75**	**23.77**	**28.22**
	3 Star	2.36	2.16	2.35	9.24	9.24	19.29	23.57
	4 Star	1.91	2.11	2.19	2.93	3.05	3.50	3.67
	5 Star	0.41	0.41	0.41	0.41	0.46	0.98	0.98
Medium scenario: - 4% Y-O-Y Emission intensity reduction	**Total**	**4.68**	**4.68**	**4.95**	**12.58**	**23.77**	**29.01**	**30.50**
	3 Star	2.36	2.16	2.35	9.24	19.29	17.16	17.37
	4 Star	1.91	2.11	2.19	2.93	3.50	10.65	11.41
	5 Star	0.41	0.41	0.41	0.41	0.98	1.20	1.71
High scenario: - 6% Y-O-Y Emission intensity reduction	**Total**	**4.68**	**4.68**	**4.95**	**12.58**	**28.22**	**30.50**	**55.17**
	3 Star	2.36	2.16	2.35	9.24	23.57	17.37	27.16
	4 Star	1.91	2.11	2.19	2.93	3.67	11.41	25.69
	5 Star	0.41	0.41	0.41	0.41	0.98	1.71	2.32

Note: *Projected Green Steel availability includes only ISPs and SSPs. Doesn't include SPUs and downstream scrap units.*

- The analysis reveals a two-stage transition: **green steel output remains limited between FY 2024–FY 2026 owing to slow technology adoption, higher costs and weak infrastructure, before accelerating sharply from FY 2027 onwards as the first integrated producer (AM/NS) enters the green steel segment and broader industry momentum builds.**
- Near-term gains come from energy efficiency, renewable electricity, and scrap use, while deeper decarbonisation beyond 2028-30 depends on route shifts to gas DRI/EAF, hydrogen-based ironmaking, and CCUS hubs.
- Against this backdrop, three plausible scenarios were developed to assess how quickly green steel capacity could scale by FY 2030 under different rates of emissions intensity reduction.
    - **Low scenario –** Characterised by incremental retrofits, plant modernisation, limited renewables (RE) uptake, slow scrap growth: In this scenario, **green steel capacity grows gradually, reaching 28.22 MT by FY 2030.**
    - **Medium scenario –** Characterised by plantwide optimisation, meeting RE consumption obligations, organised recycling and EAF clusters: In this scenario, **following FY 2028, green steel capacity ramps up sharply to 30.50 MT by FY 2030.**
    - **High scenario –** Characterised by near 100% RE for non-process loads, high scrap availability, multi-plant H_2DRI deployment, and CCUS integration: This scenario results in **green steel capacity ramping up aggressively to 55.17 MT by FY 2030.** However, Low and Medium scenarios are likely to be more realistic over the near term.

Projections of green steel availability through FY30 are detailed between page 53-61.

Testing GPP mandates against green steel availability

The Ministry of Steel had reportedly initially proposed a mandate requiring 37% green steel in government projects. Following concerns raised by the Ministry of Finance around procurement complexity and cost implications, a phased approach is now under consideration.[3] The revised proposal under inter-ministerial review would mandate 26% green steel in public projects valued at ₹1 crore and above for an initial eight-year period, comprising 20% 3-Star, 5% 4-Star and 1% 5-Star steel, based on lifecycle emissions benchmarks defined under the Green Steel Taxonomy.[4]

To evaluate areas for strategic alignment between supply and demand, a comparative analysis of a **26% GPP mandate (Scenario-1)** and a **37% GPP mandate (Scenario-2)** proposals was undertaken across Low, Medium, and High green steel availability scenarios.

Figure 1: Comparative Assessment of GPP Scenarios – Supply vs Demand

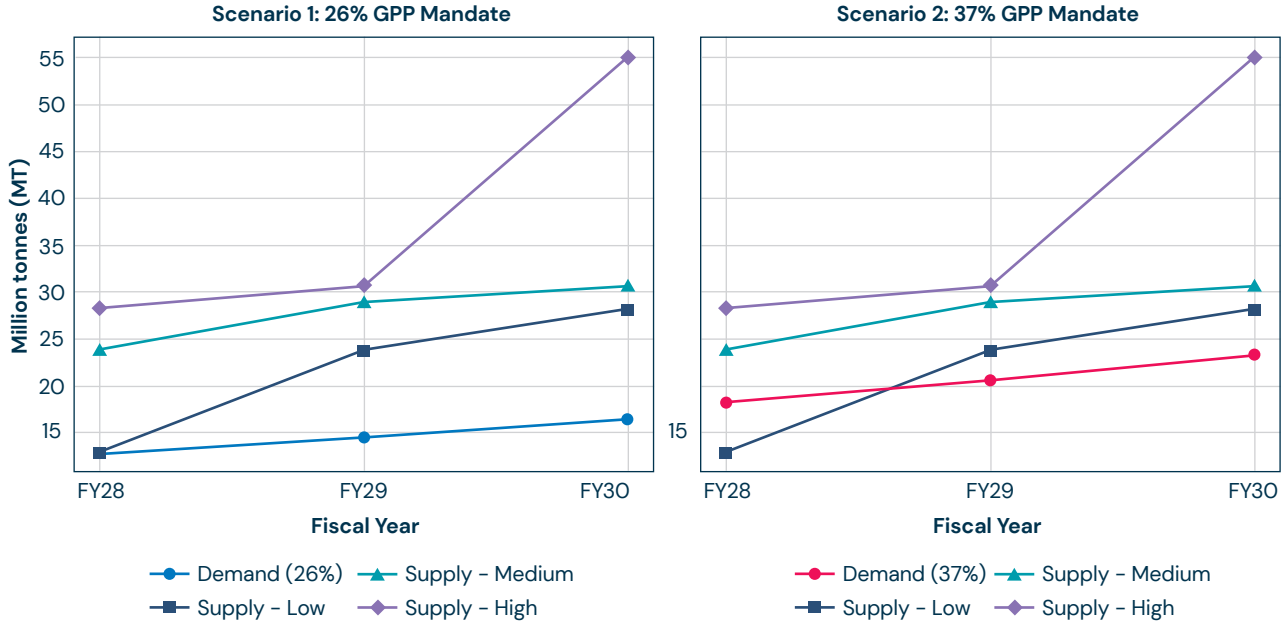


Table 2: Projected Green Steel Availability

Year	Green steel capacity (in MMT) - Scenarios		
	Low	Medium	High
FY28 e	12.75	23.77	28.22
FY29 e	23.77	29.01	30.50
FY30 e	28.22	30.50	55.17

3 Steel Ministry proposes 37% purchase preference to green steel in government tenders

4 Green steel mandate in works for government projects

The analysis indicates that demand for green steel rises steadily under both mandate scenarios, increasing in line with expanding public infrastructure pipelines and demonstrating how even modest procurement mandates can generate durable demand signals over time.

1 **26% mandate:** from **12.8 MMT in FY 2028** to **16.35 MMT in FY 2030**

Table 3: Demand analysis – Scenario 1

Scenario 1: Govt. proposal of mandating 26% GPP (20% 3 Star, 5% 4 Star and 1% 5 Star steel in govt. projects for a period of 8 years from FY 28 (all values in MMT)				
Estimated green steel demand from govt. projects				
	Total demand	3 Star	4 Star	5 Star
FY28 e	12.75	9.81	2.45	0.49
FY29 e	14.45	11.11	2.78	0.56
FY30 e	16.35	12.57	3.14	0.63

2 **37% mandate:** from **18.15 MMT in FY 2028** to **23.26 MMT in FY 2030.**

Table 4: Demand analysis – Scenario 2

Scenario 2: Govt. proposal of mandating 37% GPP (25% 3 Star, 10% 4 Star and 2% 5 Star steel in govt. projects from FY 28 (all values in MMT)				
Estimated green steel demand from govt. projects				
	Total demand	3 Star	4 Star	5 Star
FY28 e	18.15	12.26	4.91	0.98
FY29 e	20.56	13.89	5.56	1.11
FY30 e	23.26	15.72	6.29	1.26

- **Scenario 1 (26% mandate - market activation floor):** A rise in demand from ~13 MMT in FY 2028 to ~16 MMT by FY 2030 can be met across all supply scenarios, even under low supply. In parallel, efficiency improvements are expected to continue delivering 3-star compliant steel through incremental process upgrades. This level can comfortably serve as a starting floor to operationalise procurement systems and certification but should not be treated as the long-term ambition.
- **Scenario 2 (37% mandate - investment-shaping ambition):** Demand increases to ~18 MMT in FY 2028 and ~23 MMT by FY 2030, creating near-term pressure under low supply but closing gaps under medium and high supply pathways by FY 2029. Crucially, this level begins to influence new build and retrofit decisions, incentivising investment in deeper decarbonisation pathways required for 4- and 5-star steel, rather than reliance on incremental efficiency gains alone.

- **Recommended mandate design:** The mandate should be anchored at **26% only as a starting floor**, with an **explicit pathway** to scale toward **37% post-FY 2030** as supply expands. Where higher volume mandates are constrained in the near term, ambition must be preserved by **increasing share of 4- and 5-star steel procurement**, ensuring that GPP actively shapes investment decisions, unlocks new low-carbon capacity, and avoids entrenching incremental efficiency pathways. **The modelling clearly indicates that while a 26% mandate enables the market in the short-term, a 37% mandate can fundamentally reshape investment and supply outcomes.**

An assessment of demand drivers and available volumes for low-carbon steel is detailed between page 62-70.

Green steel adoption: Cost implications for public sector buyers

To assess the practical implications of both mandate options, **three case studies** were developed to evaluate impacts on demand generation, procurement costs and emissions reduction in government projects. Given that green steel reflects structural and technology-driven improvements, it carries a price premium over conventional steel, making its effect on overall project costs a key consideration in mandate design.

Table 5: Impact of Green Steel adoption on public projects

	Proposed 26% GPP Mandate				Proposed 37% GPP Mandate			
Government Projects	Increase in Steel cost per MT	Estimated project cost increment	Green steel demand creation	Emission reduction	Increase in Steel cost per MT	Estimated project cost increment	Green steel demand creation	Emission reduction
Central gov. housing scheme (PMAY)	5.6%	0.3%	Upto 2.6 MMT	0.94 $MtCO_2$	8.1%	0.5%	Upto 3.7 MMT	1.43 $MtCO_2$
Metro rail projects	5.6%	1.08%	Upto 0.22 MMT	0.805 $MtCO_2$	8.1%	1.22%	0.317 MMT	1.226 MtCO2
Indian Railways – East Coast Dedicated Freight Corridor (DFC)	5.6%	0.2%	Upto 0.09 MMT	0.031 $MtCO_2$	8.1%	0.4%	Upto 0.122 MMT	0.047 $MtCO_2$

Across the three projects analysed, introducing green steel into government procurement from FY 2028 is estimated to increase overall project costs by 0.2-1.2%, suggesting that the associated price premium is marginal. In contrast, the emissions reductions achieved are substantial, making green public procurement a high-impact and cost-effective lever for aligning India's steel sector with global climate commitments.

These findings are consistent with the findings of Ministry of Steel's *Greening the Steel Sector in India (GSI)* roadmap, which shows that even with 100% green steel uptake, the average total budget of infrastructure projects rises by only 1.83-5.50%. Under a more realistic scenario of a 20% green steel procurement mandate, the increase in project costs is limited to just 0.37-1.1%, depending on the assumed premium.[5]

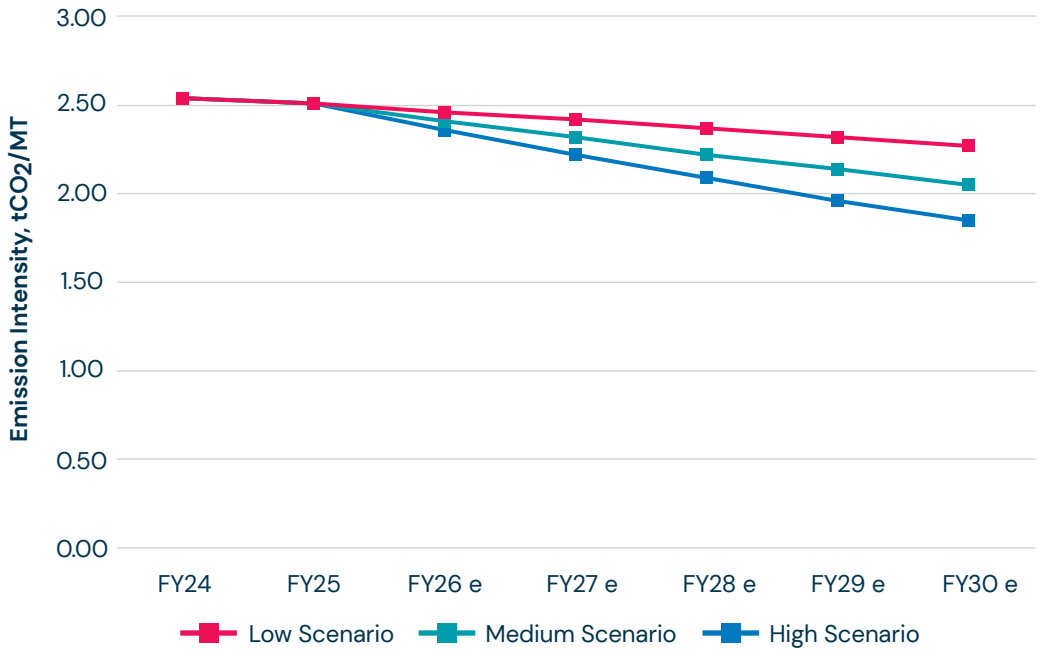
A deep dive into the three case studies and the resulting analysis is provided between page 71-82.

Avoided emissions under GPP mandates

Emission intensity in India's steel sector is shaped by technology choices, energy mix, raw material quality, and policy signals on both the supply and demand side. While the sector has significant decarbonisation potential, realising this potential depends on how quickly low-emission steel production scales and whether demand-side policies create assured markets.

The emission intensity trajectories under Low, medium and High decarbonisation scenarios form the basis for estimating avoided emissions from a GPP mandate.

Figure 2: Emission intensity projection across Low/Medium/High scenarios



5 https://steel.gov.in/sites/default/files/2025-03/GSI%20Report.pdf

Key findings from the analysis include:

- **Emission intensity declines across all scenarios between FY 2024 and FY 2030**, though the pace of reduction varies substantially. **By FY 2030, emission intensity falls to 2.27 tCO_2/MT in the low scenario,** broadly aligned with the government's own target**, and to 1.85 tCO_2/MT in the high scenario**. While the high scenario is ambitious and unlikely to be fully realised, it demonstrates the scale of what is technically possible**, with up to 156 $MtCO_2e$ of cumulative emissions potentially avoided from a 2025 baseline**. Beyond the climate impact, such reductions would materially improve the global competitiveness of India's steel sector, lower exposure to carbon-related trade barriers such as the EU's CBAM, and position domestic producers more favourably in export markets increasingly sensitive to embedded emissions.
- Existing supply-side measures, including CCTS compliance and renewable electricity obligations, provide a foundation for emissions reduction. However, on their own, they are insufficient to drive rapid sector-wide transformation.
- **Demand-side intervention through Green Public Procurement is a critical missing lever.** A GPP mandate creates assured demand for certified green steel, improves bankability of low-carbon investments, and accelerates the uptake of cleaner production routes.
- Under a proposed GPP mandate starting FY 2028, avoided emissions by FY 2030 are estimated at:
    - **4.5-20.9 $MtCO_2$ under a 26% mandate**
    - **6.4-29.7 $MtCO_2$ under a 37% mandate**
      The wide range reflects differences in supply-side decarbonisation speed across scenarios.
- **At the upper end, avoided emissions are equivalent to roughly 8-10% of India's current annual steel-sector emissions, or removing approximately 6-9 million passenger cars from the road for a year**. Even the lower-bound scenarios deliver material and policy-relevant emissions reductions.

Estimated avoided emissions under GPP mandates are detailed between page 67-70.

Five priority actions for 2026-27

India's steel sector is at a turning point, and a robust GPP policy could play a decisive role in accelerating its transition. The core policy architecture is already in place through the General Financial Rules (GFR) 2017, CCTS baselines, and the National Institute for Secondary Steel Technology (NISST) certification framework.[6] Timely action can unlock investment in low-carbon technologies, accelerate certification adoption, and position Indian steel producers to remain competitive in an increasingly carbon-constrained global market. To translate this policy readiness into real market demand, the following near-term actions are critical:

6 As of 15 January 2026, NISST has certified 60 units as Green Steel–producing facilities, together accounting for a total of 9.17 million tonnes of certified production.

1 **Notify and sequence a credible GPP mandate to shape investment decisions:** Formally notify a time-bound green steel procurement framework by March 2026, with implementation from FY 2028, anchoring an initial mandate at 26% certified green steel as a market-entry floor. This should be accompanied by an explicit, pre-committed pathway for post-FY 2030 escalation toward higher mandate levels and progressively greater shares of 4- and 5-star steel. Early and credible signalling is essential to influence technology choices and align upcoming capacity additions with deep decarbonisation pathways rather than marginal efficiency gains.

2 **Harmonise procurement rules, specifications, and MRV to enable system-wide adoption:** Standardise green steel procurement through harmonised tender clauses, Bills of Quantities, EPD templates, and MRV guidelines applicable across central ministries, PSUs, EPC contractors, and states. Integrate certified green steel categories into public procurement portals and Central and State Schedules of Rates with explicit cost pass-through provisions. Inter-ministerial coordination, particularly with the Ministry of Finance, is critical to clarify sustainability-based procurement under GFR 2017 and provide audit confidence to procuring agencies.

3 **Use high-visibility pilots to translate policy intent into operational confidence:** Launch a small number of large, high-profile pilot procurements under flagship programmes such as PMAY-Urban 2.0, metro rail projects, Dedicated Freight Corridors, and Indian Railways. Drawing on SECI-style procurement models, these pilots should test specifications, pricing treatment, documentation, and supplier response, and be used to refine standard procurement templates ahead of full-scale rollout. A voluntary pilot phase in FY 2026-27 will be critical to de-risk implementation and build confidence across agencies.

4 **Deploy time-bound fiscal and financial enablers to manage early premiums and risks:** Introduce clearly defined, transitional fiscal instruments to bridge early green steel price premiums during market formation, including limited-duration GST relief, preferential margins, viability gap funding, or carbon-credit-linked compensation. These mechanisms should be explicitly time-bound, linked to star-rating progression and mandate escalation, and designed to taper as costs converge. Complement demand-side support with targeted supply-side enablers, including streamlined renewable energy access, enforcement of scrap policies, and extension of PLI and blended-finance support for low-carbon steel technologies.

5 **Strengthen governance, transparency, and upstream readiness to sustain scale-up:** Establish a dedicated inter-ministerial GPP Steel Task Force under Ministry of Steel leadership to oversee rollout, resolve bottlenecks, and coordinate across procurement, finance, and industrial policy. Mandate upstream emissions disclosure across iron ore, pellets, scrap, and energy inputs to enable credible product-level accounting under the Green Steel Taxonomy. Invest in sustained capacity building for producers, auditors, and procurers, and publish a transparent public dashboard tracking certified supply, procurement uptake, premiums, and emissions impact. Align domestic standards with global frameworks to preserve export competitiveness and access to ESG-linked capital.

Implementing these measures, along with other key actions outlined in the report, would enable public procurement to absorb 25-30 million tonnes of taxonomy-aligned green steel by FY 2030.

This would represent 15-20 percent of current public-sector steel consumption, while catalysing substantial decarbonisation investment in the private sector.

Based on six months of research and engagement with producers and public buyers, the study reached an **unequivocal conclusion**: an ambitious and implementable **Green Public Procurement mandate is the single most effective near-term lever** to translate India's steel-sector climate ambition into measurable emissions reductions. A government-backed demand signal provides steelmakers with the confidence to invest in cleaner technologies and enables a structured shift toward low-carbon production pathways, especially critical considering the new capacity expected to be installed in the coming years.

A detailed set of 10 recommendations to maximise avoided emissions under GPP mandates is presented between page 83-85.

1 Public procurement as a market-shaping lever

Public procurement is one of the most influential levers available to governments for shaping markets. Globally, it accounts for an estimated 13 to 20% of GDP and is associated with nearly 15% of greenhouse gas emissions.[7] The scale of public spending means that purchasing choices can influence how industries produce, how technologies evolve and how climate goals are met. In India, procurement is estimated at around INR 45.65 trillion, close to one fifth of GDP, making it one of the largest public procurement markets in the world. If environmental objectives are incorporated into future procurement systems, the government can become an anchor buyer and help steer markets toward lower carbon materials.

1.1 Framework for public procurement in India

Public Procurement in India operates within a layered system guided by a combination of rules, manuals and departmental procedures rather than a single overarching law.

At the core are the General Financial Rules (GFR) 2017, issued by the Ministry of Finance's Department of Expenditure, which set out the primary principles governing public spending. These rules emphasise transparency, competition, value for money and accountability. They also allow procuring agencies to consider environmental characteristics and lifecycle cost elements while designing tender specifications and evaluating bids, although application of these provisions remains limited at present.

Figure 3: Framework for public procurement in India

7 Public Procurement Statistics 2024 – 25 Key Figures

Supporting the GFR are procurement manuals for goods, works, consultancy and services, which provide step-by-step operational guidance on procurement planning, vendor selection, bid evaluation and contract management. The Delegation of Financial Powers Rules (DFPR) complement this by assigning specific financial authority to ministries and departments for sanctioning procurement contracts.

Most procurement processes follow common steps: preparing tender documents, listing specifications, issuing bids on online procurement portals, evaluating technical and financial criteria and awarding contracts. E-procurement platforms have also expanded significantly, including the Government e Marketplace (GeM portal) and dedicated portals used by railways, metro projects and other large agencies. These platforms have standardised processes and improved transparency but have not yet systematically included sustainability criteria in the procurement of materials such as steel and cement.

Although the procurement framework permits environmental criteria, current practice continues to prioritise price, quality and timely delivery. Procurement officers often rely on established cost norms and SoRs, but do not currently use emission intensity or life cycle performance as part of material evaluation. While the enabling provisions under the GFR exist, capacity-building and clear operational guidance would be necessary before environmental criteria can be integrated consistently across tenders.

In recent years, there has been a gradual shift in policy thinking. Discussions have begun on the possibility of including sustainability considerations in procurement for infrastructure and construction sectors. A taskforce was constituted in 2020, to identify priority product categories for Sustainable Public Procurement,[8] and early efforts have begun within sectors such as railways and metro systems to understand how future tendering could accommodate environmental parameters. These developments indicate that the procurement ecosystem has the basic institutional structure to integrate sustainability, provided standards are clear and mechanisms for cost and verification are defined.

It is against this backdrop that green steel procurement is being explored. There are currently no formal requirements to procure low carbon emission steel, but the existing procurement system already includes the tools and procedural elements through which such criteria could eventually be introduced. The question, therefore, is not only whether policy will push for greener procurement but also whether producers and procurers are operationally prepared to engage with it in practice. This study seeks to assess that readiness.

8 Task force on Sustainable Public Procurement constituted

1.2 Steel in public procurement

Steel is a core material for nation building and is also one of India's most emission-intensive industries. It is essential for building highways, bridges, housing, metro rail corridors, power infrastructure and logistics networks. Government linked projects are significant consumers of steel. In FY 2024, approximately 31.6 million tonnes of steel were consumed across such projects, resulting in roughly 79 million tonnes of carbon dioxide emissions. This represents nearly 21% of total emissions from the steel industry.

As infrastructure demand grows, so will steel consumption in public projects. This creates both a challenge and a window of opportunity. If procurement systems begin to incorporate environmental criteria, even gradually, it can help lay the foundation for a market in which lower emission steel has a place as a recognised and purchasable product. This requires clarity on standards, predictable price signals and realistic mechanisms for procurers to assess and adopt new categories of material.

1.3 Policy signals for green steel procurement

Important steps have already been taken to build a foundation for green steel procurement. The Green Steel Taxonomy and the CCTS baseline provide a clear methodology to assess emission intensity. The NISST has been mandated as the certifying body for green-rated steel producers. As per an Economic Times article, a government proposal is also reportedly under consideration to require central government projects, above a procurement value of INR 1 crore, to use a minimum percentage of green-rated steel beginning from FY 2028. The proposed structure includes 20% 3-star steel, 5% 4 star and 1% 5-star.

These signals indicate growing intent to use procurement as a demand-side policy tool. They also raise key questions that remain largely unexamined. As domestic carbon regulations evolve and global trade norms increasingly reward low-carbon production, there is a growing need to assess how prepared the sector is for change and whether public procurement can act as an effective early-stage catalyst. What volume of green steel could realistically be offered to government buyers? What price conditions may be needed? How would existing procurement systems incorporate emission criteria? And are producers and procurers ready to work with green steel categories in practice?

1.4 Purpose and methodology of the study

This whitepaper examines the feasibility and strategic value of GPP of low-carbon steel in India, drawing on direct inputs from steel producers, public procuring agencies and EPC contractors involved in large government projects. The analysis sits at the intersection of policy intent and operational reality, assessing not only whether green steel procurement is viable under current conditions, but also what changes are required across production, certification and procurement systems to enable scale.

Specifically, the study aims to:

- Assess the technical, operational and financial readiness of steel producers to supply certified low-carbon steel;
- Understand how public agencies currently procure steel, and whether sustainability criteria can be integrated into existing tendering and contracting frameworks;
- Evaluate realistic pathways for pilots and phased adoption, including demand thresholds that can influence investment decisions; and
- Provide grounded inputs into ongoing policy and industry discussions on green steel procurement design.

The study does not seek to present an exhaustive sector mapping or a detailed cost model. Instead, it offers an early integrated assessment that brings supply- and demand-side perspectives together, identifying where readiness already exists and where targeted support, sequencing or policy clarity will be required.

Insights are based on primary engagement with 28 steel producers representing approximately 88 million tonnes of installed crude steel capacity, complemented by interviews with 12 major public procuring agencies and PSUs.

These findings were further refined and validated through a focused group discussion at the CII Green Steel Summit in Raipur (July 2025), which brought together producers, EPC contractors and institutional stakeholders to test assumptions, surface implementation challenges and assess the practical relevance of GPP as a policy tool. The analysis is further reinforced through secondary research, analytical modelling and three sectoral case studies (housing, metro rail and Indian Railways), chosen for their scale of steel use and established procurement systems.

As the Ministry of Steel advances work on a national green steel procurement framework within inter-ministerial constraints, this study is intended to complement ongoing government efforts, offering evidence-based insights to support pragmatic design, phased implementation and future tightening of ambition.

2 What producers say: Assessing supplier readiness and constraints

To assess how prepared India's steel sector is for a green transition, the study examined steel producers' readiness across technology choices, operational practices, and management systems through a survey. The survey captured differences in decarbonisation potential across BF-BOF and DRI-IF/EAF routes, by analysing production pathways, raw material profiles, and feedstock constraints. It also assessed fuel and energy systems, including coal dependence, renewable electricity uptake, and early hydrogen trials, to evaluate the feasibility of future transition pathways.

Producers were also asked about their GHG inventories, MRV practices, ISO 50001 implementation, and availability of third-party verified emissions data to assess transparency and data robustness. Further, the survey probed pilot readiness, investment priorities, capital constraints, and familiarity with emerging policies such as taxonomy thresholds, CCTS, and green steel certification.

Together, these questions were intended to reveal the sector's technological maturity, operational preparedness, circular resource potential, and alignment with India's upcoming green steel regulatory and market landscape. These responses have been compiled into 10 key findings from steel producers:

2.1 Dominance of BF-BOF and fragmented technology pathway adoption across the sector

Survey responses indicate a continued structural reliance on the BF-BOF route within India's steel industry, particularly among integrated steel producers, despite its higher emissions intensity. Most of the participating ISPs reported ongoing or planned expansion through new blast furnaces. Respondents cited technological maturity, a diversified and reliable equipment supplier base, operational stability, and economies of scale as the primary reasons for favouring BF-BOF investments over lower-carbon alternatives in the near term.

Structural drivers of BF-BOF dominance

Producers also attributed the continued dominance of BF-BOF to a range of other structural factors shaping investment decisions, including access to high-grade domestic iron ore, historically competitive imported coking coal prices prior to recent disruptions, lower specific capital costs for large integrated plants, legacy public-sector plant designs, captive mining advantages for major producers, and sustained demand for flat products best suited to BOF steel. Several respondents also noted that past policy emphasis on rapid capacity expansion during the 2005-2015 growth phase, combined with limited availability of high-quality scrap (approximately 30-35 MTPA) and historically high industrial power tariffs, reinforced long-term lock-in to the BF-BOF route.
At the same time, some survey responses reflect an emerging shift in new announcements, driven

by rising coal costs, declining renewable power tariffs, and growing decarbonisation pressure, with increased interest in DRI-EAF and scrap-based EAF pathways.

Implications for GPP: Long versus flat products

In contrast, survey responses from secondary producers highlight the central role of EAF and IF routes in India's long-product segment. While flat products remain concentrated among integrated BF-BOF producers, long products are manufactured across both primary and secondary segments. This production split has direct implications for GPP.

Survey evidence suggests that initiating GPP with long products, particularly TMT bars, is the most immediately implementable pathway. It allows procurement frameworks to draw on an existing base of relatively lower-emissions, scrap-based EAF and IF producers, many of whom already fall within the higher star-rating categories and are closest to green steel readiness. Flat products, which remain closely tied to BF-BOF production, are better suited for phased inclusion as transition technologies mature and supporting infrastructure develops.

2.2 Early but uneven alignment with global sustainability frameworks

The survey revealed that alignment with global sustainable frameworks remains uneven, particularly among mid-sized secondary producers that lack the financial and technical capacity to comply with global reporting and verification requirements.

The role of global frameworks for export-oriented producers

Global frameworks such as ResponsibleSteel continue to play an important role for export-oriented producers. Companies such as Tata Steel, JSW Steel and AM/NS India actively pursue international certifications to meet EU CBAM requirements, satisfy multinational buyers, and access global ESG-focused capital. For these firms, international accreditation is not optional, but a commercial necessity tied to export competitiveness.

For India's public-procurement market, however, NISST is likely to be the decisive label determining access to government orders. As a result, leading integrated producers intend to pursue a dual strategy: securing NISST certification to unlock potential domestic procurement opportunities while maintaining ResponsibleSteel or equivalent credentials to preserve and expand premium export channels. Greater interoperability between domestic and global certification systems could similarly reduce compliance costs and administrative burden for Indian producers over time. A similar approach has been adopted in China, where ResponsibleSteel has worked with producers and government-linked actors to align its international standard with domestic regulatory and market requirements, enabling firms to retain export credibility while complying with national frameworks.

Uneven adoption and emerging gaps

However, this dual-track model is not equally accessible across the sector. Adoption remains limited among mid-sized and secondary producers, which often lack the financial resources, technical capacity and verification readiness required for either international certification or advanced domestic reporting. This divergence is beginning to create gaps in data quality, comparability, and credibility across the sector. Left unaddressed, these asymmetries could slow alignment with the Indian Green Steel Taxonomy and complicate the consistent rollout of a GPP policy at scale.

2.3 Structural raw material constraints limit decarbonisation gains

Across both primary and secondary producers, survey responses and stakeholder interviews point to a clear conclusion: raw material constraints around iron ore quality and scrap availability are now the binding limits on steel-sector decarbonisation. Incremental efficiency gains through beneficiation alone are insufficient to deliver the scale of emission reductions required.

Iron ore quality and pellet dependence

Producers consistently reported that pelletised iron ore is preferred over lump ore and fines because of its higher metallisation efficiency and lower impurity levels. While India has abundant iron ore reserves, most domestic ore is medium- to low-grade, typically containing 55-62% iron ore (Fe). As a result, extensive beneficiation is required to raise Fe content to around 63-65% by removing silica and alumina, after which the concentrate is agglomerated into pellets or sinter for blast furnace use.

Industry data shared through the survey shows pellet production reaching 105 Mt in FY 2024-25, a 5% year-on-year increase, against an installed capacity of 164 Mt. Pellets now account for roughly 41% of the hot metal charge, up from about 31% a few years ago. Producers attribute this shift to better blast furnace performance, lower slag volumes and a reduction of 10-15 kg of coke per tonne of hot metal.

However, respondents highlighted a structural trade-off. The beneficiation and agglomeration required to produce pellets from low-grade ore are highly energy intensive. While pellets improve furnace efficiency, these upstream processes lock in significant emissions and reinforce long-term reliance on the BF-BOF route rather than enabling a step-change in decarbonisation.

Scrap availability as the binding constraint

Respondents were even more explicit that scrap availability represents the more severe long-term constraint. India generates only around 32 Mt of scrap annually through a largely informal collection system, with recovery rates of roughly 25%, compared to 70-90% in mature markets. Total scrap consumption stands at approximately 42 Mt, with the shortfall met through imports of 8-10 Mt or substitution with domestic DRI.

Scrap intensity across producers remains in the 20-30% range, well below both the stated 2030 target of 30-40% and the global average of around 45%. With steel demand expected to rise sharply, producers projected scrap requirements of nearly 65 Mt by FY 2030, implying a deficit of 20-30 Mt.

Implications for decarbonisation strategy

Taken together, producer inputs underline a consistent message: improving ore beneficiation alone will not solely deliver the emissions reductions the sector needs. Respondents emphasised the need for parallel, system-level reforms, particularly the rapid development of organised scrap collection and processing centres, stronger quality standards, full implementation of the 2019 Steel Scrap Recycling Policy and the 2021 Vehicle Scrappage Policy, and targeted incentives for modern shredding and sorting infrastructure. These measures are essential to unlock higher scrap utilisation, which remains the most cost-effective and scalable decarbonisation lever available to India's steel sector.

2.4 Green feedstock transition is minimal and far from scale

Evidence from the survey and interviews shows that India's transition to green feedstocks in steelmaking is still at a very early stage. Green hydrogen deployment is limited to five government-supported pilots with a combined capacity below 5,000 tonnes per annum, alongside a small number of private initiatives such as JSW Steel's 25 MW electrolyser targeting 3800 tonnes per annum (TPA) of Hydrogen by end-2025. At current costs of ₹300-400 per kg, producers reported that hydrogen-based steelmaking carries a premium of ₹15,000-20,000 per tonne, with the absence of dedicated hydrogen transmission and storage infrastructure consistently flagged as the main barrier to scale.

Bio-carbon applications are narrow and incremental

Bio-carbon pathways show a similar lack of maturity. Surveyed producers indicated that coke substitution with biochar or charcoal in blast furnaces remains confined to laboratory or bench-scale trials. In the secondary sector, the only material deployment identified is in captive power boilers, where a small number of mini-mills in Punjab, Chhattisgarh and West Bengal substitute 20-40% of coal with rice-husk briquettes and agro-residue pellets. While these measures deliver savings of ₹1,500-2,500 per tonne and emissions reductions of 0.15-0.25 tCO_2 per tonne of finished steel, they affect less than 10% of induction-furnace capacity and do not address core process emissions.

Limited impact on sector-wide emissions

As a result, respondents largely viewed both green hydrogen and bio-carbon as peripheral to current production strategies. Combined deployment across public pilots and private demonstrations accounts for less than 0.1% of national steel capacity. Interviewees emphasised that hydrogen's high cost and bio-carbon's confinement to partial fuel substitution yield only marginal emissions reductions without altering the underlying metallurgical routes.

Implications for the transition timeline

In the absence of dedicated hydrogen infrastructure, scaled and sustainable biomass supply chains, and much stronger fiscal or regulatory incentives, stakeholders expect the sector to remain overwhelmingly dependent on coal-based reductants through the remainder of the decade. Survey findings therefore suggest that production of truly low-carbon steel (≤0.5 tCO_2 per tonne of finished steel) is unlikely to exceed 1-2% of total output until at least 2030-31, pushing meaningful progress toward India's 2070 net-zero goal further out.

2.5 Absence of data disclosures by upstream suppliers will slow down green steel certification

A major gap highlighted in the survey is that more than 80% of key input suppliers, including iron ore miners, coke manufacturers, electrode suppliers and refractory companies, do not publish ESG or carbon-emission data. Input materials account for a substantial share of total steel-sector emissions, typically 35-45% of embedded emissions. The absence of reliable upstream data makes it difficult for steel producers to prepare accurate emission inventories, which are essential for green steel certification and compliance with the Indian Green Steel Taxonomy.

As a result, even steelmakers that are technically prepared at the plant level are likely to face delays in certification, simply because their upstream suppliers are not reporting emissions. Until supplier-level disclosure becomes standard practice, India's green steel transition and the verification processes that support it will progress more slowly than expected.

2.6 India's steel energy mix: Faster gains from electricity than fuels

Coal continues to dominate core thermal processes such as iron reduction and heating across India's steel sector. However, evidence from the survey shows that emissions reductions are currently being driven less by fuel switching and more by changes in how electricity is sourced. Electricity decarbonisation is advancing far more quickly than transitions away from coal-based fuels, making it the most effective near-term lever for lowering sectoral emissions.

Renewable power uptake is scaling across producers

Producers are increasingly integrating renewable electricity through open-access and captive solar and wind projects. Twenty-one surveyed companies already have renewable capacity in operation. While renewables currently account for only about 7% of the sector's electricity consumption, many producers reported internal targets of up to 43% of renewable electricity by 2030-31. This reflects both falling renewable costs and improving policy support.

Electric-route steelmaking amplifies the impact of clean power

The pace of electricity decarbonisation is closely linked to the gradual expansion of electric-route steelmaking. As scrap-based production increases, EAFs and IFs can directly run on cleaner

electricity. Each additional unit of renewable power therefore delivers proportionately larger emissions reductions in electric routes than in coal-based processes. Electrification and renewable energy adoption are reinforcing each other, accelerating near-term decarbonisation even in the absence of fuel switching.

Policy measures are improving the economics of electric routes

Several policy measures have strengthened this trend by lowering costs and reducing risk for electric-route producers. These include interstate transmission charge waivers for renewables, round-the-clock renewable power obligations, the CCTS, and the Steel Scrap Recycling Policy. Together, these instruments improve access to clean electricity and scrap, making lower-emissions electric steelmaking more commercially viable. In practical terms, they are shifting investment and operational decisions toward routes with inherently lower carbon intensity.

Sector-wide emissions intensity is already declining

These shifts are reflected in aggregate performance. Average emissions intensity in India's steel sector has fallen from around 3.1 tCO_2 per tonne of crude steel in 2005 to about 2.55 tCO_2 in 2022. This decline is closely linked to the rising share of secondary steelmaking, with EAF and IF routes now accounting for roughly half of total production, combined with incremental improvements in electricity sourcing. As electric furnaces increasingly draw power from cleaner grids and captive renewables, further near-term reductions are achievable.

Priorities for the next phase

Industry perspectives converged around three immediate priorities:

- Fully electrifying existing EAF and IF capacity with 100% renewable electricity by 2030
- Rapidly expanding scrap availability to sustain growth in electric-route steelmaking
- Front-loading public and concessional funding for green hydrogen pilots to prepare for deeper fuel-side decarbonisation beyond 2030

Taken together, these actions allow India to unlock electricity-led emissions reductions in the near term while laying the groundwork for the more complex transition away from coal-based reductants in the next phase of steel-sector decarbonisation.

2.7 Operational maturity is strengthened by ISO 50001 and CCTS/PAT participation

Eighteen of the 28 participating companies reported having ISO 50001-based energy management systems in place, reflecting a relatively high level of operational discipline, data availability, and senior management oversight of energy performance. Most of these firms are also covered under

the Government of India's Perform, Achieve, Trade (PAT) scheme, now subsumed into the CCTS and forming the backbone of the upcoming Indian Carbon Market.

MRV readiness lowers the barrier for early adoption

Together, this indicates that a significant share of the sector already operates with robust MRV systems, internal benchmarking practices, and experience responding to regulatory efficiency targets. These producers therefore represent the most immediate candidates for early green steel adoption, certification uptake, and participation in pilot procurement programmes, as incremental requirements can be layered onto existing systems rather than built from scratch.

2.8 Sector is willing to decarbonise but is capex-constrained and policy-dependent

The findings point to a high level of stated willingness within India's steel industry to decarbonise. Of the 28 companies covered, 26 already supply steel to government projects, and all indicated readiness to produce green steel if enabling conditions are in place. However, this intent has not yet translated into large-scale investment or deployment.

Barriers to scale-up

A consistent set of constraints emerged across producers. High upfront capital costs for mitigation and transition technologies remain the most significant barrier. This is compounded by uncertainty around demand-side acceptance of green premiums, limited in-house technical capacity among smaller producers, and restricted access to genuinely concessional green finance. Several respondents noted that many instruments currently marketed as "green finance" offer little differentiation from standard commercial lending in terms of pricing or risk-sharing.

What producers are asking for

Producers emphasised the need for practical, execution-focused support rather than broad policy signalling. Priority measures identified include concessional lending and targeted viability gap funding, potentially through the upcoming National Mission for Sustainable Steel; government-backed credit guarantees to de-risk commercial lending; expansion of production-linked incentives to cover green steel pathways; dedicated technical and financial assistance to help MSMEs develop bankable projects; and faster operationalisation of the carbon credit market expected in October 2026.

Readiness for pilots, pending clear signals

Taken together, the findings suggest that the sector is technically and operationally prepared to move into pilot and demonstration phases, particularly for hydrogen-based DRI, renewable-powered electrification, and low-carbon fuel substitution. What remains missing are clear, durable policy signals and financing frameworks that can convert intent into sustained action.

2.9 PSUs will need a longer time frame to meet Green Steel Taxonomy norms

The assessment highlights a clear divergence in decarbonisation trajectories across India's steel sector. Large private integrated producers such as Tata Steel, JSW and AM/NS are progressing on a faster pathway towards Green Steel Taxonomy compliance in the 2027-2030 window. This momentum is driven by announced expansions in EAF capacity, growing renewable electricity procurement, stronger balance sheets, and earlier investments in transition technologies aligned with global market and export pressures.

Public-sector producers on a phased pathway

Public-sector steel producers are advancing more cautiously. SAIL's transition strategy reflects a deliberately phased approach, focused on incremental measures such as hydrogen-injection pilots, CCUS exploration, biochar substitution, and the planned addition of around 2.5 GW of renewable capacity. Taken together, these initiatives point to a longer compliance horizon, likely in the 2035-2040 timeframe. RINL, meanwhile, is prioritising operational stabilisation following its ₹11,440 crore revival package approved in January 2025, while evaluating partnerships for EAF modernisation and hydrogen-based routes that could support a gradual transition over the next decade.

Implications for policy design

This variation in pace underscores the need for differentiated policy instruments aligned to the priorities of different producer segments. Private-sector frontrunners may benefit most from demand-side certainty, green premium pass-through mechanisms and accelerated certification and export alignment. Public-sector producers, by contrast, may require longer-tenor concessional finance, risk-sharing instruments and targeted pilot funding to navigate legacy assets and capital constraints.

A one-size-fits-all approach risks either slowing early movers or overstretching laggards. Policy support will therefore need to be calibrated to reinforce momentum where it already exists, while enabling a credible and orderly transition for public-sector plants that remain central to India's long-term steel capacity and employment base.

2.10 Government procurement will be the single strongest demand driver

Almost all surveyed companies (26/28) already supply steel to major public buyers such as NHAI, Indian Railways and other central and state agencies, and there is near-unanimous agreement that a GPP policy could create immediate, predictable demand for green steel. Given the scale and sustained demand created by public procurement, respondents viewed even partial mandates, graded thresholds or preferential scoring as sufficient to underwrite long-term investments in low-carbon technologies. Several producers noted that demand certainty, rather than absolute price premiums, is the missing signal for committing capital.

Demand certainty, not technology, is the binding constraint

At the same time, supply-side readiness for compliance is advancing faster than often assumed. Twenty respondents already undertake third-party emissions verification, and most maintain internal energy and emissions tracking systems aligned with PAT/CCTS requirements. This is contributing to the emergence of a two-tier market: early movers with verified data, lower emissions intensity and certification readiness are positioning themselves to access preferential procurement, financing and export opportunities, while slower adopters remain exposed to policy and market risk. The findings suggest that the binding constraint is no longer technical feasibility or data availability, but the absence of a clear procurement framework that rewards verified emissions performance at scale.

Decarbonisation pathways of major steel producers

Tata Steel's Jamshedpur plant currently amongst the most advanced ISPs in adopting sustainability measures and pioneering the latest in decarbonisation technologies:

Tata Steel Jamshedpur stands out as the most advanced domestic producer in terms of green steel readiness. With an installed capacity of 10.75 MTPA and an emissions intensity of 2.34 tCO_2 per tonne of crude steel, it ranks among the most efficient BF-BOF operations in India. This performance is underpinned by strong coke quality management, high Pulverised Coal Injection (PCI) rates, and well-integrated circularity practices, including extensive Linz-Donowitz (LD) process slag utilisation and by-product gas recovery.

The plant is supported by one of the most sophisticated monitoring and control ecosystems in the sector, with real-time energy dashboards, granular process-level data, and mature material flow management. These capabilities place Tata Steel Jamshedpur ahead of peers in meeting transparency, MRV, and certification requirements linked to emerging green steel frameworks.

Achieving deep decarbonisation, however, will require a new phase of investment focused on green hydrogen pilots, higher scrap charging ratios, scaled CCUS deployment, and a faster shift to renewable electricity for auxiliary and downstream loads. The site is already aligned with international standards such as ResponsibleSteel and has committed to a net-zero target by 2045. Its leadership position was further reinforced by recognition as the National Energy Leader (steel category), at the CII Energy Efficiency Awards 2025.

JSW Steel Vijayanagar accelerates decarbonisation with renewables, circularity and a clear road to green-steel taxonomy compliance by 2030:

JSW Steel's Bellary operations, with an installed capacity of 19.5 MTPA and an emission intensity of 2.692 tCO_2 per tonne of crude steel, are central to the group's decarbonisation pathway. The company has committed to CO_2 intensity reduction targets by 2030, and net zero by 2050, supported by a portfolio of over 100 initiatives with an estimated annual abatement potential exceeding 9 $MtCO_2$. The plant is targeting alignment with India's Green Steel Taxonomy between FY 2028 and FY 2030, anchored around four operational levers: large-scale renewable power integration under JSW's 10 GW roadmap, higher scrap charging enabled through EAF expansion, blast furnace burden optimisation and energy-efficiency upgrades, and pilot-scale deployment of emerging technologies such as green hydrogen and carbon capture and utilisation.

However, grid integration challenges are slowing the increase in renewable electricity usage beyond the current 30-40% range, constraining faster decarbonisation of auxiliary loads. Notwithstanding these challenges, JSW demonstrates strong financial preparedness, including

a US$ 500 million sustainability-linked bond and committed internal capex for decarbonisation initiatives. Continued collaboration with technology providers and research institutions underpins its roadmap toward taxonomy compliance and sustained emissions reduction.

SAIL's Bhilai slowly but steadily shifting toward cleaner steelmaking:

SAIL's Bhilai Steel Plant (BSP) is a key facility in India's public-sector steel industry, with an installed crude steel capacity of approximately 5.84 MTPA (though recent expansions have pushed effective capacities higher in line with SAIL's overall modernisation efforts). It produces a diversified product mix, including rails (a primary supplier to Indian Railways), structurals, plates, and semis.

Its current emissions intensity stands at around 3.1 tCO_2/tcs, driven by its legacy BF-BOF configuration, high reliance on coal, ageing infrastructure, and grid electricity factors. This compares to India's BF-BOF route average of about 3.83 tCO_2/tcs and the national steel sector average of ~2.55 tCO_2/tcs.

Operational improvements have included optimisation of pulverised coal injection (PCI), deployment of top pressure recovery turbines (TRT), waste heat recovery systems, coke dry quenching (CDQ) applications, and enhancements in rail and structural mill productivity. These measures have contributed to reductions in specific energy consumption and incremental gains in material efficiency. Renewable energy adoption is progressing through phased commissioning of new capacities.

Under India's Green Steel Taxonomy (released in December 2024), which defines green steel as production with emissions below 2.2 tCO_2e/tfs (with star ratings: five-star <1.6, four-star 1.6–2.0, three-star 2.0–2.2 tCO_2e/tfs), BSP's BF-heavy setup poses challenges for rapid compliance. Efficiency measures and renewables may yield 5-15% reductions by 2030, partially supporting SAIL's corporate target of 2.19–2.30 tCO_2/tcs by 2030 (aligned with India's NDC commitments).

Achieving deeper alignment with taxonomy thresholds or meeting potential green public procurement criteria would require substantial further investments, including increased scrap charging, scaled substitution with low-carbon fuels (e.g., green hydrogen), expanded renewables and CCUS deployment, and possible process retrofits. Efficiency improvements alone are unlikely to enable transformative change. Attaining initial Green Steel Taxonomy compliance (e.g., approaching three-star rating) appears realistically challenging before the mid-2030s without accelerated adoption of disruptive technologies beyond current incremental pathways.

Inside India's secondary steel transition: Progress and constraints in Chhattisgarh's steel cluster

Secondary steel producers in Chhattisgarh, particularly sub-1 MTPA plants using coal-based DRI with EAF or IF routes, report emission intensities of around 2.58–2.9 tCO_2 per tonne of crude

steel. This reflects heavy reliance on coal as the primary reductant in rotary kiln DRI processes, where emissions typically range from 2.3–3.1 tCO_2/tcs depending on plant efficiency, scrap mix, and energy inputs.

Ongoing sustainability efforts

Despite structural constraints, these producers demonstrate strong sustainability intent. Many have integrated renewable energy through on-site solar installations (operating at ~18% PLF) and biomass-based power plants. Incremental efficiency measures are widespread, including improved char recycling, kiln heat recovery, refractory upgrades, dolochar reuse, improved turbine heat rates, digital monitoring of furnace power demand, electrification of internal transport, and evaluation of low-temperature waste heat recovery systems (up to ~7 MW at 270–300°C). Producers are also open to piloting new technologies through partnerships with academic institutions and solution providers, while preferring proven and scalable options over first-of-a-kind deployments.

Limits to deeper decarbonisation

More transformative pathways, such as shifting from coal-based DRI to gas-based DRI using shaft furnace technologies (e.g. MIDREX or HYL), could reduce emissions by approximately 60–70%. However, these options face significant economic barriers. Production costs are estimated to be 15-20% higher than current coal-based routes due to volatile and high natural gas prices in India, limited domestic supply, and import risks. In addition, imported GDRI technologies are up to four times more expensive than established domestic rotary kiln systems.

Raw material and system-level constraints

Raw material quality further constrains transition. Locally available iron ore typically falls in the 58-60% Fe range and requires beneficiation and pelletisation to reach >62% Fe, increasing both energy use and operating costs. Other challenges include limited renewable electricity in some energy mixes, uncertainty around scrap availability, weak demand visibility for green steel, misalignment between CCTS-based emissions accounting (per tonne of crude steel) and the Green Steel Taxonomy (per tonne of finished steel), unclear policy timelines, and the absence of strong incentives, carbon pricing, or preferential procurement mechanisms.

As a result, secondary producers are adopting a cautious and pragmatic approach. The focus remains on operational efficiency, reliability, and incremental emissions reductions, while major transition investments are deferred until clearer market signals, stable policy pathways, and improved economic viability emerge. This underscores the need for targeted policy support to bridge the gap between decarbonisation ambition and feasibility in India's secondary steel sector.

AM/NS India effectively navigating multi-route steelmaking in its move towards becoming first ISP to produce green steel starting 2027:

AM/NS India is a private integrated steel producer with an emissions intensity of 2.27 tCO_2 per tonne of crude steel, placing it among the more efficient primary producers in the country. It is currently the only Indian steelmaker operating across three distinct production routes: gas-based DRI (GDRI), Corex, and the blast furnace route. This multi-route configuration provides operational flexibility and resilience but also heightens exposure to raw material availability and cost volatility, particularly for high-quality iron ore, pellets, and gas supply.

As per CCTS draft notifications the company is poised to achieve compliance with the Green Steel Taxonomy by FY 2027. Key decarbonisation measures underway include expanded waste heat recovery across sinter plants, higher scrap charging in the steelmaking process, greater integration of renewable electricity, and incremental efficiency improvements across core operations. Green hydrogen pilots are being pursued at the group level, and select downstream products have already received GreenPro certification, signalling early progress toward market-facing green attributes.

At the same time, the pace of transition is shaped by several external constraints. Uncertainty around the timing and stringency of green steel mandates, evolving standards, the absence of a clear carbon floor price, and limited support for pilot-scale demonstrations continue to influence investment decisions. High upfront costs for first-of-a-kind projects and concerns around intellectual property protection further temper risk appetite. While AM/NS is actively building partnerships with industry and academia and exploring blended finance structures to support decarbonisation, greater policy clarity and targeted support for early deployment would be critical to accelerate progress and unlock larger-scale investments.

3 Procurement readiness and constraints: Insights from public sector buyers

The demand-side survey engaged 12 major public-sector procuring agencies, including officials from NHAI, Metro Rail Corporations, PGCIL, NTPC, NHPC, CPWD and other large government engineering and infrastructure buyers, to understand how green steel could be incorporated into existing procurement systems and where constraints currently lie.

The engagement examined prevailing procurement practices, technical manuals governing procurement specifications, tender evaluation frameworks, and the extent to which sustainability considerations are already embedded in steel sourcing. Interviews focused on levels of familiarity with green steel definitions, CCTS and the upcoming taxonomy thresholds, the ability to manage or pass through price differentials, and the procedural changes required across SoRs, technical specifications, vendor empanelment and contract design to enable green steel procurement in practice.

The objective was to surface systemic bottlenecks and implementation realities, including policy, budgetary and coordination challenges. It also aimed to identify enabling conditions such as mandate design, certification clarity, pricing treatment and supply availability that would be required for public agencies to generate a credible and scalable demand signal for low-carbon steel across India's infrastructure pipeline.

3.1 Steel dependence across public procurement remains very high

Public sector agencies such as the NHAI, Indian Railways, Metro corporations and CPWD account for about 22% for the of demand for steel produced in India. All 12 agencies and PSUs covered use structural and long products as a core input, and 8 to 12 of them also procure sheet, plate or specialised steel for specific applications. In most cases, procurement is EPC-led, i.e., with contractors retaining control over steel sourcing. This often limits the ability of procuring agencies to directly specify or enforce green steel requirements, even where there is institutional interest.

At the same time, the sheer scale of public procurement remains a powerful lever. Several agencies procure more than 100,000 tonnes of steel annually, indicating that even incremental changes in tender design, technical specifications or contractual requirements could have an outsized impact on market behaviour and supplier investment decisions.

3.2 Awareness is no longer the barrier - technical specifications are the major gap

India's major public-sector steel procurers demonstrate high awareness of the Green Steel Taxonomy, and most also have internal sustainable procurement policies in place. Over the past two

years, all surveyed entities have tested low-carbon materials, primarily through pilots and supply chain collaboration rather than through formal procurement mandates.

These efforts have largely focused on production-side pilots supported by the National Green Hydrogen Mission, which has allocated ₹455 crore for steel sector pilots. These pilots are generating low-embodied-carbon intermediates such as hydrogen-reduced DRI and lower-emissions hot metal, with potential downstream use in infrastructure steel applications including TMT bars, structural sections for highways and bridges, and rails.

A key example is SAIL's sanctioned 3,200 tonne/day vertical shaft DRI pilot with green hydrogen injection, approved in October 2024. This is part of a broader set of three pilots with a combined outlay of approximately ₹347 crore, aimed at validating reduced-CO_2 hot metal production at Rourkela and Bokaro, with commissioning expected by 2027.

Absence of binding procurement requirements

Despite this level of awareness and pilot engagement, none of the surveyed agencies currently mandate the use of low carbon steel in tender specifications. Sustainability considerations are typically addressed through optional clauses or references in technical manuals, rather than as binding eligibility or evaluation requirements in procurement processes. As a result, pilot learnings have not yet translated into systematic demand creation for certified green steel across public projects.

Lack of standardisation in tender specifications

The primary gap lies in the absence of standardised tender clauses across agencies, particularly with respect to EPDs and consistent greenhouse gas reporting frameworks. Suppliers report that compliance with varying agency-specific requirements creates administrative burdens and increases transaction costs. The lack of consistency also creates uncertainty around the level of decarbonisation expected, weakening investment signals for producers.

The General Financial Rules (GFR) 2017 establish a neutral and enabling framework for public procurement, designed to ensure probity, efficiency, and value for public expenditure. Consistent with this approach, GFR does not mandate technology- or attribute-specific procurement outcomes, including low-carbon criteria. Consequently, the uptake of climate-aligned procurement has progressed through parallel policy instruments, pilot initiatives, and agency-level guidelines, leading to differentiated levels of adoption across public procurers. This highlights the importance of complementary sectoral guidelines, standardised specifications, and cost-discovery mechanisms to support procuring entities in operationalising low-carbon procurement within the existing GFR framework.

Emerging GPP proposals and institutional constraints

Recent draft discussions around GPP have indicated an intent to require a minimum share of steel used in public projects, potentially around 26%, to meet star-rated, low-carbon benchmarks under the Green Steel Taxonomy. At the same time, recent deliberations within government have suggested reservations around adopting a centralised bulk procurement mechanism, underscoring the institutional and procedural complexities involved in operationalising GPP at scale.

Lessons from international procurement frameworks

Aligning GFR-compliant procurement specifications with mandatory EPD and GHG disclosure requirements would significantly strengthen market credibility, create clearer demand signals, and enable more consistent adoption of green steel across public agencies, while remaining compatible with existing procurement frameworks.

Comparable approaches in the United States through Buy Clean programmes, and in countries such as Sweden and the Netherlands, require EPD-based embodied carbon disclosure and benchmarking for materials such as steel in public infrastructure procurement. In these markets, emissions performance functions as a clear eligibility and competitiveness criterion in public tenders, providing producers with greater confidence to invest in low-carbon steel capacity.

3.3 Current procurement rules disincentivise production of green steel

At present, there is no meaningful preferential procurement framework for green steel, and existing procurement rules often disadvantage lower-carbon options. Higher upfront costs are not offset through any compensatory mechanism, as carbon reductions are neither monetised nor reflected in bid evaluation criteria. As a result, procuring agencies lack practical tools to recognise, reward, or signal demand for green steel through formal procurement processes.

Fragmented pilots without scale

Several public agencies have undertaken pilot initiatives, but these efforts remain fragmented and ad hoc. NHAI has tested recycled-steel crash barriers and fly-ash concrete on the Delhi–Mumbai Expressway. Indian Railways has trialled higher-scrap head-hardened rails. Metro projects have used 70-80% recycled TMT in non-critical structures, and NTPC has experimented with certified structural steel in boiler supports. While these pilots indicate institutional interest in green procurement, they have not translated into formal procurement reforms or scalable demand signals, limiting their impact on supply-side investment decisions.

Absence of fiscal and regulatory enablers

In the absence of explicit enablers such as GST concessions, pre-defined green margins of 8-12 % in SoRs, carbon-credit compensation mechanisms, or mandatory minimum procurement thresholds,

most agencies report being institutionally constrained from prioritising green steel. Consequently, the current procurement framework continues to lock in high-carbon supply, despite growing readiness and interest among producers to transition toward lower-emissions steelmaking pathways.

3.4 Monitoring and reporting needs standardisation

A key constraint highlighted by procurement professionals is that, while agencies can report having undertaken "green procurement," they are currently unable to quantify the actual climate impact of these actions. Harmonised carbon reporting aligned with national GPP frameworks is therefore essential to establish credible benchmarks and enable outcome-based accountability.

In the absence of standardised MRV tools and clear reporting obligations, even formally notified procurement rules risk remaining procedural rather than transformational. Large-scale capacity building will be critical to ensure consistent implementation across agencies, including structured training on ISO 20400 and related sustainable procurement frameworks.

Need for interoperability with global standards

Equally important is interoperability with international standards. Alignment between India's green steel certification and global frameworks would reduce duplication, strengthen credibility, and support export competitiveness. Embedding such interoperability within GPP-linked MRV systems would allow Indian green steel to compete effectively in international markets while also strengthening domestic procurement outcomes.

3.5 Demand-supply misalignment in the emerging green steel market

The Indian green-steel market is trapped in a chicken-and-egg dilemma: producers hesitate to invest the required monies in low-carbon capacity without firm demand, while public procurers who account for about 22 % of domestic steel consumption hold back because formal demand signals remain un-notified and unenforceable.

To break this deadlock decisively and in the right sequence, the survey revealed that the below five interlocking actions from the procurer's perspective are likely to be the most effective:

1. **Issue a binding national mandate:** Consider notifying a GPP policy with mandatory minimum percentages of taxonomy-compliant green steel, across all central ministries, Central Public Sector Enterprises (CPSE), and state projects above a threshold value.
2. **Align General Financial Rules (GFR) 2017 to steel GPP polices:** Consider amending relevant General Financial Rules and related provisions to explicitly allow or require sustainability criteria and green-steel premiums in public tenders, removing current ambiguity.
3. **Revise standard bidding documents (SBDs) and EPC clause templates:** Consider updating MoRTH, CPWD, NHAI, and metro SBDs to include pre-approved green-steel line items in the SoRs and Bill of Quantities (BoQ).

4 **Incorporate weighted green scoring in Quality-and-Cost-Based Selection (QCBS) tenders:** Consider mandating 10-20% technical weightages for verified low-carbon steel in QCBS evaluations, alongside fast-track empanelment windows for NISST-certified and Taxonomy-compliant suppliers.

5 **Support a GPP mandate with short-term incentives:** Provide transitional support through viability-gap funding, GST rebates, or green-price preferential margins for the first 3-5 years until production scale brings costs down.

This sequenced, top-down approach, starting with a notified mandate and followed by GFR and contractual enablers, can potentially convert latent intent into bankable offtake, unlock industry investment, and accelerate India's green-steel transition.

3.6 Public works and infrastructure agencies identify SoR as the big missing link for green steel adoption

Major procurers such as the NHAI consistently emphasise that green steel can only be adopted at scale once it is formally incorporated into state- and agency-specific SoRs. The SoR is the officially approved unit-price list that underpins almost all public civil works in India. Prepared and periodically updated by state public works departments, housing boards, irrigation departments, and central agencies such as CPWD, NHAI and metro corporations, it determines how contractors are reimbursed. Any material or process not included in the SoR is treated as a "deviated" or "extra" item, requiring case-by-case approvals that delay payments and significantly increase execution risk.

How the constraint plays out in practice

This constraint is already visible on the ground. The DMRC, for example, follows the Delhi Schedule of Rates (DSR) issued by CPWD, supplemented by limited internal addenda. During Phases III and IV, even when DMRC sought to deploy low-carbon cement or recycled steel, separate rate analyses and technical sanctions were required because these materials were not embedded in the base DSR, leading to prolonged negotiations with contractors. NHAI faces similar challenges in national highway projects, where standard Bills of Quantities and SoRs notified by the Ministry of Road Transport and Highways recognise only conventional TMT bars. Low-carbon or green steel can currently be reimbursed only through the "extra item" route under Clause 12 of standard contracts, a process that is cumbersome and actively discourages adoption.

Why this blocks scale

In the absence of formal SoR integration, contractors have no certainty of cost recovery, and procuring agencies are unable to systematically pass through green premiums. This administrative gap keeps low-carbon steel outside mainstream public procurement even where producers are technically capable and willing to supply. It also creates a misalignment for integrated steel producers that remain empanelled with public agencies but currently exceed Green Steel Taxonomy thresholds, limiting their ability to participate in early demand creation.

A pathway to unlock demand

Addressing this bottleneck will require coordinated action across ministries and agencies. A model SoR amendment, issued jointly by the Ministry of Steel and key line ministries such as Road Transport, Railways and Housing, could introduce certified green steel categories with predefined rate uplifts aligned to the Indian Green Steel Taxonomy, for example steel below 2.2 tCO_2 per tonne of finished steel. Such a reform would provide an immediate, transparent and nationwide demand signal, enabling green steel to move beyond pilots and into scaled deployment across public infrastructure.

3.7 Local availability constraints of low carbon steel may limit adoption

India's public procuring agencies are broadly ready to specify low-carbon steel, yet adoption remains severely constrained by the limited domestic availability of material that meets the Indian Green Steel Taxonomy. Construction-grade rebar and structural sections are supplied predominantly by thousands of small and medium induction-furnace-based secondary mills clustered in Raipur-Durg, Mandi Gobindgarh-Ludhiana, Durgapur, and Salem-Coimbatore. As of late 2025, none of the major primary producers have achieved the taxonomy threshold of less than 2.2 tCO_2 per tonne of finished steel required for star-rating eligibility, and only a small number of mills currently hold NISST green steel certification. Procuring agencies view the NISST label as a credible, India-specific verification mechanism that complements the Green Steel Taxonomy.

Practical barriers faced by procuring agencies

This supply gap creates several practical barriers that limit the ability of public agencies to shift toward green steel.

First, approved supplier lists used by agencies such as NHAI, state road development departments, and metro corporations are often outdated. These lists have not been revised to include newer producers, including smaller secondary mills that are beginning to supply certified green steel. As a result, even where compliant material exists, agencies are procedurally unable to procure it.

Second, green steel is not readily available through local stockyards, which are the primary procurement channels for construction-grade TMT bars. Stockyards typically carry conventional steel in large volumes, while green steel is naturally scarce and, where available, priced at a premium. This reinforces a default preference for cheaper, readily available material at the project level.

Third, sourcing green steel from distant primary producers adds both cost and emissions. Transporting steel over long distances increases delivered prices and generates additional logistics-related emissions, partially eroding the climate benefit of lower-carbon production and reducing buyer willingness to switch from local suppliers.

Implications for procurement outcomes

Until these constraints are addressed through targeted upgrades of secondary mills in regions such as Chhattisgarh, Odisha, and Punjab, rapid scaling of NISST certification, and requirements for local dealers to stock verified green steel, procurement decisions will continue to favour steel that is locally available and competitively priced rather than lower-carbon alternatives.

3.8 Bridging the gap between pilot ambition and procurement readiness

There is strong interest among steel producers in piloting low-carbon technologies such as hydrogen-ready DRI and renewable-powered EAFs. Public procurers are broadly open to these innovations, but adoption is constrained by the absence of standardised definitions, clear verification protocols, and confidence that pilot outcomes can be scaled and replicated within existing procurement systems.

This hesitation is partly shaped by the structure of India's secondary steel sector, which accounts for roughly half of national output and has historically relied on induction furnaces. IFs are spread across more than 1,000 small, decentralised plants and remain attractive in public procurement because of their lower capital requirements, smaller batch sizes (typically under 20 tonnes, compared with 150-200 tonnes for EAFs), and operational simplicity. These characteristics align closely with fragmented scrap and DRI supply chains, as well as the tight cost and delivery constraints that govern government tenders.

EAFs face higher perceived risk despite stronger decarbonisation potential

EAF-based routes, while offering significantly lower emissions potential, require larger-scale infrastructure and reliable access to high-quality scrap. For procuring agencies operating under the Ministry of Finance's GFR, this translates into higher perceived financial, execution, and supply risks. As a result, even technically mature pilot technologies often struggle to move beyond demonstration into mainstream public procurement.

Bridging this gap will require targeted policy intervention. Priority actions include preferential support for early demonstrations, such as viability gap funding to de-risk EAF transitions, alongside focused capacity-building for procurers. Harmonised measurement, reporting and verification systems aligned with the Green Steel Taxonomy would further build confidence and enable low-carbon technologies to be credibly and consistently integrated into public procurement frameworks.

3.9 Implementation challenges in decentralised procurement systems may hinder consistent green steel uptake

Several public procurers highlighted that India's decentralised procurement architecture can create structural barriers to the consistent uptake of green steel. Procurement authority is spread across

central agencies, state departments, urban local bodies, and PSUs, each operating with distinct technical specifications, empanelment processes, approval hierarchies, and budget controls. This fragmentation makes it difficult to apply sustainability criteria uniformly, even where national policy intent and awareness of the Green Steel Taxonomy and CCTS frameworks exist.

In practice, many procuring entities continue to rely on legacy specifications and risk-averse systems. Introducing green steel often requires revisions to Schedule of Rates, vendor empanelment lists, and contract conditions, while also justifying price premiums under audit and vigilance scrutiny. As a result, adoption frequently depends on individual agency leadership rather than being embedded as a standard procurement requirement, leading to uneven outcomes across similar projects.

Implications for GPP rollout and market signals

This decentralisation is likely to complicate the rollout of a national Green Public Procurement mandate, including proposed requirements for 26-37% low-carbon steel procurement from FY 2027-28. Agencies must reconcile national directives with state-notified prices, local budget ceilings, project timelines, and administrative priorities. In the absence of harmonised specifications and clear implementation guidance, compliance risks being delayed, partial, or limited to pilot procurement rather than bulk adoption.

The lack of centralised or aggregated procurement further weakens demand signals to producers. Without coordinated tendering or pooled purchasing across agencies and states, demand for green steel remains fragmented, limiting scale benefits and reducing producer confidence to invest in low-carbon capacity. Public procurers therefore emphasise the need for harmonised guidelines, aligned Schedule of Rates, stronger inter-agency coordination, and targeted capacity building to ensure decentralisation does not dilute the effectiveness of GPP as a market-creation tool.

3.10 GPP offers the single strongest demand signal

All 28 steel suppliers surveyed currently supply to government agencies, and 26 indicated readiness to supply green steel. This level of alignment suggests that public-sector procurement by large buyers such as NHAI, Indian Railways, CPWD, metro rail corporations and other infrastructure agencies is uniquely positioned to create an immediate and credible demand pull. Even partial or phased mandates could help stabilise early markets, reduce price volatility, and unlock investment decisions for low-carbon technologies that are otherwise being deferred.

Public procurement as the primary market catalyst

If combined with harmonised certification, standardised tender clauses and targeted financial levers such as GST rebates, carbon-credit absorption or preferential scoring in bid evaluations, public procurement could move beyond isolated pilots and become the primary catalyst for a nationwide shift toward green steel adoption.

Public procurers' readiness and perceptions on low-carbon steel

NHAI signals openness to green steel but awaits clear mandate and pricing framework

NHAI is one of the country's largest public buyers of steel, accounting for an estimated 12–13% of total public procurement. While the agency recognises the relevance of green steel, it notes that adoption can only begin once a formal mandate is issued. Survey responses indicate that green steel must first be incorporated into the SoRs so that any premium is transparently captured in government notified pricing. This would need to be accompanied by updates to NHAI's technical manuals and procurement procedures.

NHAI primarily sources steel from the top five producers to ensure quality and supply reliability, though capable secondary producers are also part of the supply mix. New suppliers undergo an empanelment process before being eligible for inclusion in EPC contracts. Since sustainability or carbon benchmarks are currently optional, the agency stressed the need for clear guidance on definitions, standards and availability before any new specifications are introduced. Logistics and lead time must be accounted for, especially when sourcing from certified providers near project sites.

Vendor selection continues to follow a combined technical and financial evaluation, typically using L1 criteria. NHAI expressed willingness to align with green procurement requirements once national mandates, taxonomy thresholds and pricing structures are formalised. However, procedural revisions and bid documentation changes can only begin after clear policy direction is provided.

Green steel procured for the Indian Railways will need to fulfil both technical and environmental criteria

Indian Railways is one of India's largest public sector steel consumers and is well positioned to catalyse green steel adoption through its procurement systems. With ongoing projects such as the Dedicated Freight Corridors, high speed rail initiatives and station redevelopment under PM Gati Shakti, the Railways consistently procures large volumes of structural and long steel. Sustainability is reflected in its reporting frameworks through climate alignment, energy efficiency and resource conservation, but current procurement processes do not yet include environmental performance requirements such as life cycle assessments, EPDs or disclosures on scrap content.

Survey findings indicate readiness to integrate green steel once national definitions and verified emissions data are formalised. All steel supplied to Railways must meet strict quality standards verified by the Quality Department under the Railway Board's Materials and Stores division

and Quality Control wing. Any green steel variant will therefore need to fulfil both technical and environmental criteria before being accepted. They were also clear that changes to procurement will only follow once guidelines and mandates are formally issued by the government. Given its scale and recurring infrastructure demand, the Indian Railways has the potential to create a stable market pull that accelerates the production and adoption of low carbon steel across the country.

Delhi Metro's procurement will have to align with Ministry of Housing and Urban Affairs (MoHUA) regulations but open to green steel adoption

The DMRC operates under the administrative oversight of MoHUA and aligns its procurement procedures fully with the Ministry's regulations. Survey responses indicate that DMRC primarily procures steel from established Class I producers such as SAIL and Tata Steel to ensure consistent quality and secure large volume supply for ongoing metro projects. While DMRC does not independently mandate green steel at present, it has indicated readiness to adopt it as soon as MoHUA issues a directive.

Metro projects are executed through detailed technical specifications and procurement guidelines provided to EPC contractors. These standards align with frameworks such as the Standardisation and Indigenisation in Metro Rail Systems initiative, under which the contractors must source steel only from approved suppliers. Sustainability measures are already part of DMRC's operations, with around 25 MW of on-site and off-site solar capacity currently in use and expansion plans underway. The agency has previously participated in carbon market mechanisms, having monetised credits under CDM projects such as regenerative braking.

Survey insights indicate that financial measures such as GST waivers, cost reimbursements, or carbon credit compensation could help offset the higher cost of green steel and support early adoption. DMRC's procurement structure is technically robust and closely aligned with policy directives, suggesting that green steel procurement could be integrated quickly once national mandates and fiscal incentives are clearly established.

Bangalore Metro (BMRCL) signals readiness for policy-led green steel uptake but Schedule of Rates inclusion is critical

BMRCL sources steel primarily from SAIL, Tata Steel and JSW for structural and rail applications. Survey findings reveal that BMRCL follows both state and central procurement policies while adhering to sustainability guidelines that include material quality checks and energy efficient project planning. Green steel is not currently required in procurement, but BMRCL indicated that any adoption would depend on its inclusion in the SoRs by the relevant committee.

Procurement volumes vary across project types, with distinctions between overground, underground, and mixed-use alignments. An average steel usage of around 13,000 tonnes per

kilometre has been noted in public records and indicates substantial opportunity for green steel integration, once regulatory clarity and supply visibility are in place. The agency's high-volume sourcing of long products across multiple lines suggests a clear pathway for early adoption provided pricing transparency, certification structures and supply availability are established.

NTPC can specify green steel once taxonomy and pricing are in place

NTPC, India's largest power generation enterprise, procures substantial quantities of structural and long steel for power plant construction, transmission networks and auxiliary infrastructure. Survey responses indicate that NTPC already incorporates sustainability considerations into its procurement processes through energy efficiency criteria, vendor ESG assessments and preference for suppliers aligned with ISO 50001 standards. Green steel is not currently mandated, but NTPC recognises the potential role of carbon credit offsets or preferential pricing mechanisms to bridge cost differentials.

Renewable energy integration across NTPC's operations, including captive solar and wind capacity, reflects a broader institutional commitment to emission reduction and aligns with the objectives of green procurement. Most steel purchases are routed through EPC contractors, but NTPC has indicated that low carbon steel could be specified directly in tender requirements once national taxonomy definition and carbon pricing frameworks are formalised.

Renewable infrastructure positions NTPC Hydro for future green steel uptake

NTPC Hydro's procurement approach aligns with its focus on low carbon hydropower infrastructure and sustainability objectives. Steel is primarily sourced from established integrated producers for dam structures, penstocks, and auxiliary facilities. Survey insights suggest that NTPC Hydro is prepared to adopt green steel once national mandates are issued, provided there is clarity on fiscal incentives, supply availability, and local sourcing feasibility.

The organisation already operates infrastructure supported by renewable energy, including hydro and solar components, which positions it to integrate green steel without compromising execution timelines. EPC contractors follow defined technical and financial criteria during procurement, creating an opportunity to introduce sustainability parameters into future steel sourcing once policy direction and pricing mechanisms are established.

Right policy frameworks can unlock green steel adoption at NHPC

NHPC, as a major hydropower developer, procures steel primarily for civil, structural and mechanical components in dams, powerhouses and associated infrastructure. Survey feedback indicates that suppliers are evaluated based on quality, delivery capability and adherence to environmental standards, although green steel is not yet a formal criterion in procurement.

NHPC procures up to 100,000 tonnes of steel annually depending on project activity and places strong emphasis on local availability and logistical readiness for large volume requirements.

Current sustainability efforts include energy efficient design practices and partial integration of renewable energy into operations. These provide a foundation for future green steel adoption once national mandates and standardised MRV frameworks are issued. NHPC's procurement systems therefore present a feasible entry point for green steel, provided policy guidance and pricing structures are clearly established.

CPWD has scale and systems to drive green steel, pending policy clarity

The Central Public Works Department is a major public sector procurer of steel for government buildings, bridges and infrastructure projects. It sources an estimated 1.2–1.5 lakh tonnes of steel annually from producers such as SAIL, Tata Steel and JSW, along with selected secondary manufacturers. While the department has piloted low carbon materials such as rebars with higher recycled content, large scale adoption of green steel will depend on policy guidance, verified availability, and cost feasibility.

Procurement follows EPC-based contracts with a combined technical and L1 financial evaluation, referencing Bureau of Indian Standards (BIS) and CPWD manuals. However, lifecycle assessments, EPDs and verified emissions data are not currently mandatory in tenders or bid documentation. Survey responses indicate that financial mechanisms such as cost enablers or compensation for green materials could support early adoption.

CPWD has already initiated sustainability measures through rooftop solar installations of around 12 MW across multiple sites, energy efficiency projects, and water conservation programmes. Its high procurement volumes, structured evaluation framework and centralised oversight position it as a strong potential driver of green steel demand once a national policy direction, MRV standards and economic incentives are clearly established.

4 Green steel supplier readiness and future availability outlook

India's transition toward green steel is underway, but the availability of certified low-carbon steel remains limited. Most producers continue to operate at an average emission intensity of ~2.5 tCO_2 per tonne of crude, well above the global average of ~1.85 tCO_2. While ambition is rising, readiness varies widely across segments and regions, and certification-linked supply is still at an early stage.

A major policy shift is underway with the transition from the Perform, Achieve and Trade (PAT) scheme to the Carbon Credit Trading Scheme (CCTS). While PAT primarily drove energy-efficiency improvements, CCTS introduces direct emissions management through compliance obligations and credit trading, aligning more closely with India's climate commitments and laying the foundation for market-linked signals.

Under CCTS, baseline assessments were completed in December 2024, with draft targets issued in June 2025. The first phase covers nine energy-intensive sectors, including iron and steel, assessing 253 units representing 107.06 MMT of crude steel, or approximately 74% of national output in FY 2024. Intermediary facilities were excluded, making this baseline the most robust reference for estimating taxonomy-aligned green steel availability.

Early readiness is emerging, particularly among integrated producers aligning investment plans with evolving policy signals. Parts of the secondary sector show faster compliance potential in specific product categories but remain constrained by scrap availability. Across the sector, energy management practices and renewable electricity uptake are improving, yet limited third-party verification, uncertainty around thresholds and cost-recovery risks continue to slow investment decisions.

Certification activity has begun, with NISST designated as the central certification agency by the Ministry of Steel. Around 85 steel companies have applied for certification, and approximately 60 have received certification to date. However, most certified facilities are steel processing units (SPUs).

4.1 Estimating current availability of green steel

Since green steel certification in India is still nascent and no consolidated dataset currently exists for certified green steel volumes, an indicative estimation methodology was developed to assess availability up to FY 2030. Instead of projecting market behaviour, the approach focuses on what is realistically achievable based on current industry conditions, policy signals and readiness levels. The methodology followed three logical steps:

1 **Establishing a baseline:** Emission levels and production capacities were taken from the CCTS assessment, which covers roughly 91% of India's steel production, targeting the most emission

intensive facilities across 253 Integrated Steel Plants (ISPs), Secondary Steel Producers (SSPs), and Steel Processing Units (SPUs).

Description	Total production Qty, Million tonnes	Emission intensity, tCO_2/Mt
ISP	84.3	2.804
SSP	23.8	2.682
SPU	22.9	0.352
Hot re-rolling Mills	13.4	0.450
Overall	144.4	

This study estimates green steel availability by combining draft CCTS emission intensity benchmarks with the Green Steel Taxonomy star-rating thresholds. The CCTS benchmarks provide indicative emissions trajectories through FY2027. For each year, projected emission intensity levels were assessed against the taxonomy thresholds to determine the proportion of production that would qualify as green under the national classification framework.

Across the full steel production system, including SPUs and scrap-based downstream units, approximately 36.3 MT of output currently meets the taxonomy criteria for green steel. However, the majority of sectoral emissions arise from primary steelmaking activities, particularly within ISPs and SSPs. These segments therefore represent the central focus of India's decarbonisation efforts.

In addition, large-scale public procurement primarily sources steel from primary producers. For this reason, this report adopts a narrower boundary limited to ISPs and SSPs in order to provide a more policy-relevant estimate of green steel supply.

Within this defined scope, green steel availability in FY2024–25 is estimated at approximately 4.68 MT.

This boundary selection explains the difference between the Ministry of Steel's reported issuance of more than 10 MT of green steel certificates through NISST and the lower volumes presented in this analysis. The Ministry's reported figures include SPUs and scrap-based downstream units, whereas this study focuses specifically on primary steelmaking segments that are most material for emissions reduction and public procurement demand.

2 **Applying taxonomy thresholds:** The thresholds and scoring framework under the Green Steel Taxonomy were used to assess the possible alignment of existing production. Since certification is not yet widespread, readiness was evaluated by examining present emission levels against achievable reductions through energy mix improvements, process optimisation and available technology pathways. Different routes were assessed separately, given the structural differences between BF-BOF and IF/EAF producers.

3 **Validated with industry insights:** Survey responses and direct consultations with steel plants were used to test assumptions regarding timelines, likely technology adoption, capacity

expansion and certification preparedness. Readiness was judged using indicators such as energy management practices, ISO certifications, GHG inventory verification, planned capex, interest in pilot tenders and current engagement with public procurement channels. These inputs helped differentiate near-term feasibility from aspirational intent.

This methodology does not model prices or forecast demand. It aims to provide a pragmatic assessment of the supply landscape, grounded in present operational realities and the direction of policy transition. The projections developed through this approach are therefore not definitive forecasts but readiness-based availability scenarios, aligned with how the procurement system may begin recognising low-carbon steel in the coming years.

The CCTS draft notification dataset was analysed to estimate the volume of steel that may qualify under the Green Steel Taxonomy. Under CCTS, industries have been assigned emission reduction targets ranging from 3-8% by FY 2027, depending on their process configuration and reduction potential. For the iron and steel sector, this corresponds to an absolute reduction of 39 million tonnes of CO_2, equivalent to 10.6% of the baseline emissions level. These targets serve as the basis for assessing which units could meet taxonomy thresholds over the next three years.

The categorisation of units under the taxonomy, based on current performance and projected improvements, is summarised below:

Table 6: Green steel categorisation as per Draft CCTS data

	FY 2023-24		FY 2025-26		FY 2026-27	
Star Category	No. of Units	Annual Production, MMT	No. of Units	Annual Production, MMT	No. of Units	Annual Production, MMT
ISPs						
3 Star	0	0.00	0	0.00	1	7.68
4 Star	0	0.00	0	0.00	0	0.00
5 Star	0	0.00	0	0.00	0	0.00
Sub Total	0	0	0	0	1	7.68
SSPs						
3 Star	14	2.39	14	2.59	15	2.56
4 Star	12	2.33	15	2.64	19	3.46
5 Star	3	0.45	3	0.45	3	0.45
Sub Total	29	5.18	32	5.68	36	6.47
Grand Total in tcs*		5.18		5.68		14.16
Grand total in tfs*		4.66		5.12		12.74
% Growth				9.8%		149%

- The taxonomy-based analysis indicates that early compliance is driven overwhelmingly by secondary steel producers, reflecting the structural constraints of the BF-BOF route and the greater adaptability of IF and EAF-based units. As of FY 2024, 29 secondary producers already meet Green Steel Taxonomy thresholds, with compliance expected to expand gradually to 32 units by FY 2026 and 36 units by FY 2027, signalling steady but incremental progress within the secondary sector.
- In contrast, ISPs remain largely outside taxonomy thresholds in the near term, underscoring the limitations of legacy production routes. No ISPs qualify prior to FY 2026. However, the expected entry of AM/NS in FY 2027 marks a clear inflection point. The inclusion of even a single large ISP materially alters the supply outlook, driving a sharp increase in green-rated production from 5.68 MMT in FY 2026 to 14.16 MMT in FY2027, largely through the 3-Star category.

Taken together, the results suggest that while near-term green steel availability will be led by secondary producers, meaningful scale-up begins only once large integrated capacity starts to enter the taxonomy, a transition that is likely to accelerate from FY 2027 onward, particularly if procurement-linked demand becomes visible and credible.

4.2 Estimating future availability of green steel – Methodology

The following approach was adopted to estimate the future availability of green steel over the 2027-2030 period. The methodology combines regulatory baselines, taxonomy thresholds and stakeholder inputs to move from current emissions performance to plausible future supply outcomes. It anchors projections in officially notified CCTS data, applies the Green Steel Taxonomy to classify potential supply by star rating, and incorporates producer-level transition plans and procurement-side signals.

Together, these elements allow for a structured assessment of how green steel availability could evolve under different decarbonisation pathways, rather than relying on top-down assumptions alone.

Figure 4: Approach to estimating future Green Steel availability

Since certified volumes are currently low and do not reflect broader market readiness, a broader assessment was also undertaken to estimate potential green steel availability by FY 2030. This assessment included:

- Review of public sustainability commitments from major producers including AM/NS, Tata Steel, JSW, JSPL and SAIL.
- One-on-one interactions and surveys conducted across 28 steel industries, covering ISPs, SSPs and SPUs.
- Consideration of international certifications such as ResponsibleSteel, which provide verified decarbonisation pathways aligned with global standards

4.3 Forecasting green steel availability till FY 2030 - Scenarios

The average emission intensity of India's steel sector stood at 2.54 tCO_2 per tonne of crude steel in FY 2024, reflecting a mix of ISPs, SSPs and SPUs. Finished steel produced in SPUs and scrap based downstream re-rolling mills together account for 36.3 million tonnes which already falls under green steel category as per the taxonomy criteria, considering the nature of production practices. For the purposes of this whitepaper, the analysis focuses on ISPs and SSPs, as these segments account for the bulk of production volumes and emissions.

Accordingly, the emission intensity projections to FY 2030 presented below reflect combined ISP and SSP performance only. The figure below illustrates projected emission intensity trajectories under three decarbonisation pathways:

- **Low scenario (2% annual reduction):** Reflects cautious adoption of decarbonisation measures, driven primarily by incremental energy-efficiency improvements, limited renewable electricity integration and weak demand-side policy signals.
- **Medium scenario (4% annual reduction):** Assumes moderate policy support, steady investments in renewable energy and more systematic deployment of energy-efficiency measures across plants.
- **High scenario (6% annual reduction):** Represents an accelerated decarbonisation pathway enabled by strong regulatory mandates, rapid scaling of energy efficiency and renewable electricity, early deployment of green hydrogen and closer alignment with global net-zero trajectories.

Overall, the analysis draws on CCTS baseline emission trajectories, survey-based readiness signals from 28 steel plants, and announced modernisation and renewable energy integration plans. It also incorporates the expected impact of procurement-led pilots in accelerating adoption beyond business-as-usual trajectories.

Figure 5: Emission Intensity projections for all ISPs

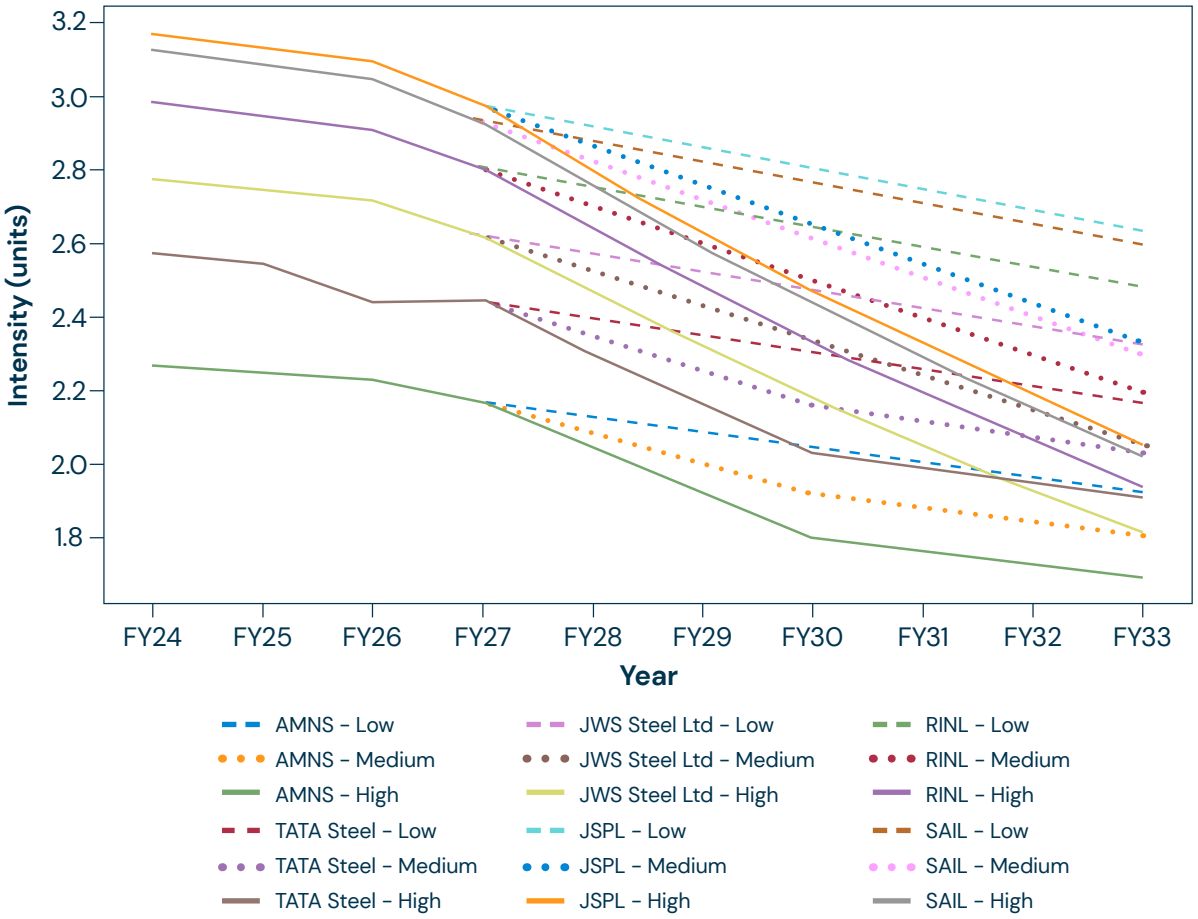


Table 7: Green steel availability projection upto FY 30

Total green steel availability		FY 24	FY 25	FY 26	FY 27	FY 28	FY 29	FY 30
Low scenario: 2% Y-O-Y Emission intensity reduction	**Total**	**4.68**	**4.68**	**4.95**	**12.58**	**12.75**	**23.77**	**28.22**
	3 Star	2.36	2.16	2.35	9.24	9.24	19.29	23.57
	4 Star	1.91	2.11	2.19	2.93	3.05	3.50	3.67
	5 Star	0.41	0.41	0.41	0.41	0.46	0.98	0.98
Medium scenario: - 4% Y-O-Y Emission intensity reduction	**Total**	**4.68**	**4.68**	**4.95**	**12.58**	**23.77**	**29.01**	**30.50**
	3 Star	2.93	2.93	2.93	9.24	19.29	17.16	17.37
	4 Star	0.41	0.41	0.41	2.93	3.50	10.65	11.41
	5 Star	2.93	2.93	2.93	0.41	0.98	1.20	1.71
High scenario: - 6% Y-O-Y Emission intensity reduction	**Total**	**4.68**	**4.68**	**4.95**	**12.58**	**28.22**	**30.50**	**55.17**
	3 Star	2.93	2.93	2.93	9.24	23.57	17.37	27.16
	4 Star	0.41	0.41	0.41	2.93	3.67	11.41	25.69
	5 Star	2.93	2.93	2.93	0.41	0.98	1.71	2.32

Note: *Projected Green Steel availability includes only ISPs and SSPs. Doesn't include SPUs and downstream scrap units.*

Phases of transition

Green steel availability remains limited during FY 2024 to FY 2026 due to slow technology adoption, cost competitiveness challenges and gaps in enabling infrastructure, particularly renewable power access, scrap processing and certification systems, but increases materially from FY 2027 to FY 2030 as policy signals strengthen, certification frameworks mature and the first integrated producer (AM/NS) enters taxonomy-aligned production.

Against this transition profile, the pace and scale of green steel availability diverge significantly under alternative decarbonisation pathways, as illustrated by the low, medium and high scenarios below.

- **Low scenario (2% year-on-year emission intensity reduction):** In this scenario, green steel availability grows gradually, reaching 28.22 MT by FY 2030. This pathway reflects incremental efficiency improvements with limited policy push, with adoption largely confined to secondary producers and efficiency-led measures.
- **Medium scenario (4% year-on-year emission intensity reduction):** In this scenario, availability ramps up more visibly after FY 2028, reaching 30.50 MT by FY 2030. This outcome indicates moderate policy support, increased renewable energy integration and broader uptake of efficiency measures across secondary producers and select primary producers.
- **High scenario (6% year-on-year emission intensity reduction):** In this scenario, green steel availability increases sharply, reaching 55.17 MT by FY 2030. This represents an accelerated decarbonisation pathway enabled by strong regulatory signals, rapid deployment of low-carbon technologies including renewable electricity and green hydrogen, and closer alignment with global net-zero trajectories.

Under current policy settings and investment conditions, the low and medium scenarios represent the most plausible near-term outcomes, while the high scenario illustrates the upper bound of achievable supply, contingent on coordinated policy action, substantial capital mobilisation and strong regulatory enforcement.

Achieving scale under any pathway, however, will depend on which producer segments are able to respond. While certification uptake among SPUs is encouraging, these facilities contribute limited volumes, and meaningful scale-up of green steel supply will hinge on participation from ISPs and SSPs.

Decarbonisation readiness of major producers and post-FY30 outlook

Several large producers have announced plans to deploy EAF-based capacity, which offers substantially lower emissions than conventional BF-BOF routes and is expected to contribute materially to certified green steel volumes beyond FY 2030.

Based on current investment signals, technology trends, company disclosures and stakeholder interviews, a growing share of India's steel output could meet taxonomy-compliant thresholds

post-FY 2030, provided demand-side mechanisms such as public procurement are sustained. The assessment below summarises expected readiness across producer segments.

- JSW Steel, Tata Steel and AM/NS India are currently best positioned to achieve taxonomy-aligned emission intensities below 2.2 tCO_2 per tonne of finished steel by FY 2030, driven by a combination of modern asset bases, higher renewable electricity uptake and active decarbonisation roadmaps.
- Tata Steel Jamshedpur and AM/NS have the potential to go below 2.0 tCO_2 per tonne of finished steel by FY 2030, placing them closer to higher star-rating thresholds under the Green Steel Taxonomy.
- Interviews with Steel Authority of India Limited revealed major modernisation and renewable energy integration initiatives are planned over the next three to four years. However, as the Green Steel Taxonomy is expected to be revised and tightened on a three-year cycle, the central challenge for SAIL will be not only achieving initial alignment, but sustaining compliance as thresholds become more stringent. Under current plans, alignment with taxonomy requirements is therefore likely post FY 2035, subject to the pace and ambition of future revisions.

Overall, the analysis suggests a widening differentiation among major producers, with early movers already positioned to benefit from procurement preferences, financing advantages and export competitiveness, while others face rising transition risk unless decarbonisation efforts accelerate.

5 Green steel demand: Scale and drivers

Public procurement currently accounts for about 22% of India's total steel demand and is projected to rise to nearly 28% by 2030 as per industry estimates. Based on these estimates, steel demand from government projects is expected to more than double from 28.4 MMT in FY 2024 to 58.8 MMT in FY 2030, growing at an average annual rate of 12.6%, far outpacing the overall growth of India's steel industry.

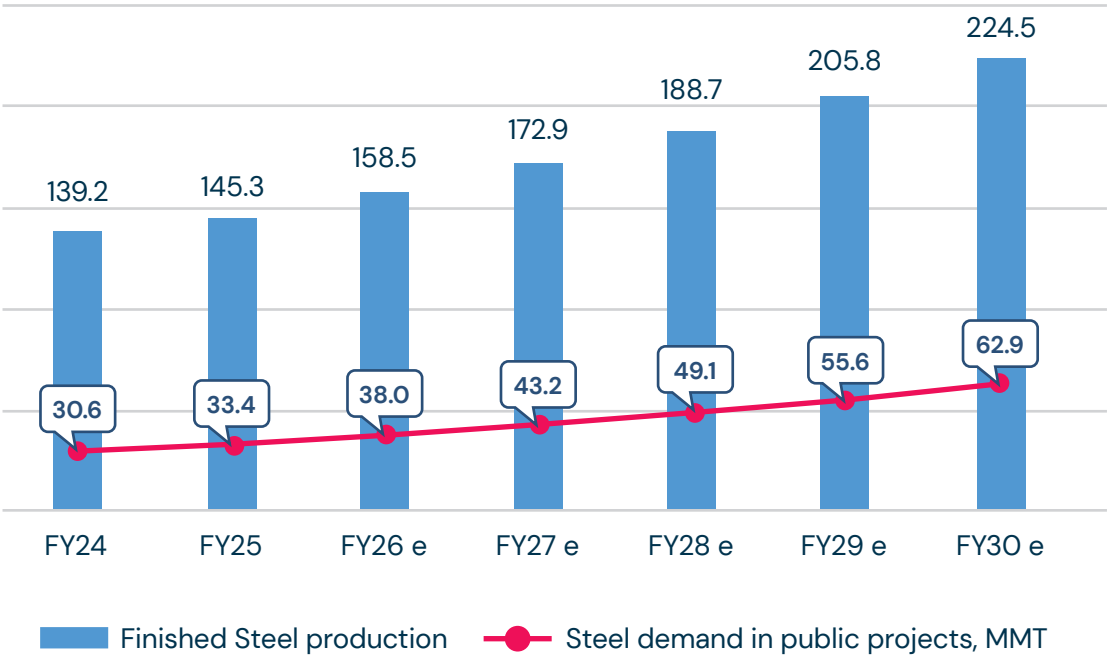
The September 2025 monthly flash report on infrastructure projects published by the Ministry of Statistics and Programme Implementation (MoSPI), Government of India, covers 721 ongoing infrastructure projects, the majority of which are scheduled over the next 5-10 years. The total estimated project cost is approximately INR 28.6 lakh crore (USD 324.8 billion). This scale of public infrastructure investment is expected to drive substantial demand for finished steel products. According to the Joint Plant Committee (JPC), a statutory body under the Ministry of Steel, construction and infrastructure account for around 68% of India's total finished steel consumption, of which an estimated 25-30% is consumed through government-funded projects.[9] Large programmes such as PMAY, metro rail expansions, national highways and railway corridors, which rely heavily on long and structural steel, offer a natural entry point for scaling low-carbon steel at scale.

Against this backdrop, policy discussions are considering a phased green steel mandate to manage procurement complexity and cost impacts. The proposal under review would require 26% green steel in public projects above ₹1 crore, with a defined star-rating mix aligned to the Green Steel Taxonomy.

At present, certified green steel availability remains limited, and demand estimates are therefore indicative and scenario-based, assuming expanded certification and procurement readiness post-FY 2028. As steel demand from public projects grows faster than overall production, procurement-led signals will play a decisive role in shaping both supply chains and the pace of green steel adoption.

9 'Infrastructure-Construction-Sector-Leads-Steel-Demand-in-India-Government-Projects-Key-Contributor-Industry-Experts', n.d., accessed 31 October 2025, https://ibef.org/news/infrastructure-construction-sector-leads-steel-demand-in-india-government-projects-key-contributor-industry-experts.

Figure 6: Finished steel production Vs estimated steel demand in public projects (All value in MMT)



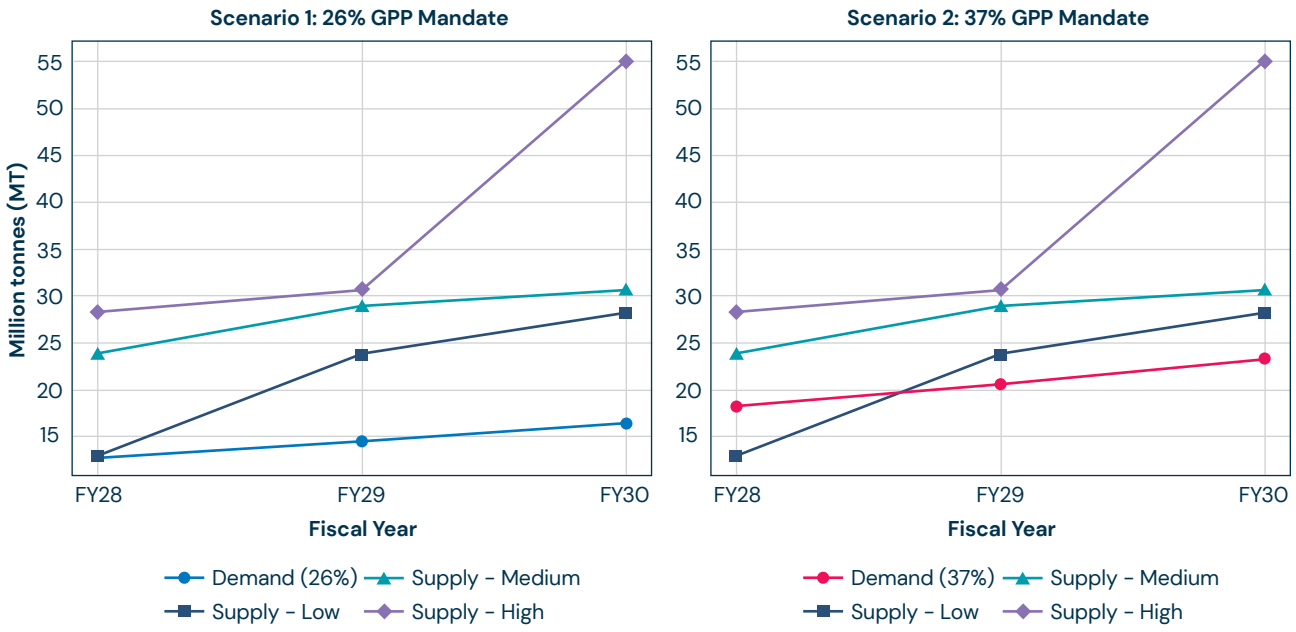
Steel demand from government projects is set to surge dramatically, rising from 28.4 MMT in FY 2024 to 58.8 MMT by FY 2030; a growth of more than 107% within just six years. This translates to an exceptionally high average annual growth rate of 12.6%, far outpacing the overall growth of India's steel industry.

Such rapid expansion underscores the accelerating scale of India's public infrastructure pipeline, with government led programmes in housing, transport, railways and urban development becoming the single largest driver of incremental steel demand. This doubling of demand not only signals strong public-sector investment momentum but also highlights the transformational role that government procurement will play in shaping future market dynamics, supply chain preparedness and the transition toward low carbon steel.

To assess how green steel supply could align with this growing demand, a comparative analysis was undertaken for two proposed GPP mandate levels: Scenario 1 (26%) and Scenario 2 (37%), evaluated across low, medium and high green steel availability pathways. The analysis examines supply adequacy, potential surpluses or deficits, and feasibility over FY 2028-FY 2030, based on projected demand by star-rating categories (3-Star, 4-Star and 5-Star).

The below charts present projected green steel availability under the three supply scenarios relative to demand under both mandate levels, illustrating the trade-offs between ambition, timing and market readiness.

Figure 7: Supply Vs Demand analysis – Comparative Assessment of GPP Scenarios



Demand growth projections

Demand for green steel is expected to rise steadily under both mandates.

1 **26% Mandate (Scenario-1)**: This scenario mandates 20% 3 Star, 5% 4 Star, and 1% 5 Star steel in government projects for an 8-year period starting from FY 2028. The estimated green steel demand from government projects is as follows:

Table 8: Supply Vs Demand analysis - Scenario-1

Scenario 1: Govt. plan of mandating 26% GPP (20% 3 Star, 5% 4 Star and 1% 5 Star steel in govt. projects for a period of 8 years from FY 28							
	Estimated green steel demand from govt. projects				Green steel availability scenario		
	Total Demand	3 Star	4 Star	5 Star	Low	Medium	High
FY28 e	12.75	9.81	2.45	0.49	12.75	23.77	28.22
FY29 e	14.45	11.11	2.78	0.56	23.77	29.01	30.50
FY30 e	16.35	12.57	3.14	0.63	28.22	30.50	55.17

Under this mandate, total demand increases from 12.75 MMT in FY28 to 16.35 MMT in FY 2030, representing a moderate yet achievable ramp-up that allows for gradual industry adaptation.

2 **37% Mandate (Scenario-2)**: This more ambitious scenario mandates 25% 3 Star, 10% 4 Star, and 2% 5 Star steel in government projects starting from FY 2028. The estimated green steel demand is as follows:

Table 9: Supply Vs Demand analysis - Scenario-2

Scenario 2: Govt. plan of mandating 37% GPP (25% 3 Star, 10% 4 Star and 2% 5 Star steel in govt. projects from FY 28							
Estimated green steel demand from govt. projects					Green steel availability scenarios		
	Total Demand	3 Star	4 Star	5 Star	Low	Medium	High
FY28 e	18.15	12.26	4.91	0.98	12.75	23.77	28.22
FY29 e	20.56	13.89	5.56	1.11	23.77	29.01	30.50
FY30 e	23.26	15.72	6.29	1.26	28.22	30.50	55.17

Here, demand escalates from 18.15 MMT in FY28 to 23.26 MMT in FY30, approximately 40% higher than Scenario 1, pushing the boundaries of current production capabilities and necessitating accelerated supply-side interventions.

Supply Vs. demand gap

The supply-demand dynamics reveal varying levels of alignment across scenarios, with breakdowns by star rating highlighting specific areas of surplus or shortfall.

Table 10: Supply Vs Demand gap analysis - Scenario-1 & 2

Scenario 1: Govt. plan of mandating 26% GPP (20% 3 Star, 5% 4 Star and 1% 5 Star steel in govt. projects												
	Supply Vs demand scenario			Low scenario			Medium scenario			High scenario		
	Low	Medium	High	3 Star	4 Star	5 Star	3 Star	4 Star	5 Star	3 Star	4 Star	5 Star
FY28	0%	46%	55%	-6%	20%	-7%	49%	30%	50%	58%	33%	50%
FY29	39%	50%	53%	42%	21%	43%	35%	74%	54%	36%	76%	68%
FY30	42%	46%	70%	47%	14%	36%	28%	72%	63%	54%	88%	73%
Scenario -2: Govt. plan of mandating 37% GPP (25% 3 Star, 10% 4 Star and 2% 5 Star steel in govt. projects from FY 28												
	Supply Vs Demand scenario			Low Scenario break-up			Medium Scenario break-up			High Scenario break-up		
	Low	Medium	High	3 Star	4 Star	5 Star	3 Star	4 Star	5 Star	3 Star	4 Star	5 Star
FY28	-42%	24%	36%	-33%	-61%	-113%	36%	-40%	0%	48%	-34%	0%
FY29	13%	29%	33%	28%	-59%	-13%	19%	48%	7%	20%	51%	35%
FY30	18%	24%	58%	33%	-71%	-28%	10%	45%	26%	42%	76%	46%

Scenario analysis: Demand-supply dynamics and investment signals under GPP mandates

Scenario 1 (26% mandate): Market activation and absorption of existing supply

- Under Scenario 1, green steel demand is projected at approximately 13 MMT in FY 2028, rising to ~16 MMT by FY 2030. Across all supply pathways, this level of demand can be met without disruption. Medium and high supply scenarios generate substantial surpluses as early as FY 2028, exceeding demand by 46% and 55% respectively, while even the low-supply pathway achieves full coverage from FY 2028 onwards and builds surplus capacity over time.
- This outcome reflects the fact that a large share of near-term green steel availability is driven by incremental efficiency improvements and high scrap utilisation, particularly in the secondary sector. As these improvements continue, 3-star compliant steel is expected to remain widely available, allowing Scenario 1 demand to be met largely through optimisation of existing assets rather than through transformative investments.
- From a system-design perspective, this makes the 26% mandate a credible and low-risk entry point. It enables procurement agencies to operationalise green steel purchasing, suppliers to obtain certification, and MRV systems to be tested and standardised at scale. However, precisely because supply comfortably exceeds demand, Scenario 1 does not materially alter producer investment decisions. Without further escalation or tightening of eligibility criteria, the mandate risks functioning primarily as an absorption mechanism for existing 3-star supply rather than a driver of deeper decarbonisation.

Scenario 2 (37% mandate): Demand pressure and the transition from optimisation to transformation

- Scenario 2 raises green steel demand to ~18 MMT in FY 2028 and ~23 MMT by FY 2030, representing an increase of roughly 40% over Scenario-1. This shift materially changes the demand–supply balance, particularly in the early years. Under the low-supply pathway, FY 2028 shows a significant shortfall, while medium and high supply scenarios generate only modest surpluses initially before closing gaps by FY 2029 and strengthening further by FY 2030.
- This near-term tightness is not simply a volume issue. Rather, it reflects the limits of incremental efficiency gains. Meeting Scenario 2 demand at higher star-rating mixes requires production routes with substantially lower emissions intensity, which in turn depend on new buildouts, major retrofits, higher-quality scrap access, and deeper power-sector decarbonisation. As a result, Scenario 2 begins to reshape producer incentives, pushing firms beyond optimisation of legacy assets toward investment in structural decarbonisation pathways capable of delivering 4- and 5-star steel.
- In this sense, Scenario 2 functions less as a feasibility test and more as an investment-shaping signal. While it introduces near-term constraints, these constraints are precisely what creates long-term supply response. Medium and high supply scenarios demonstrate that once investments begin to materialise, supply can scale rapidly, closing early gaps and generating meaningful surpluses by FY 2029 to FY 2030.

Interpreting the scenarios: What the modelling reveals

Taken together, the two scenarios illustrate a core trade-off in GPP design. Scenario 1 shows that early demand can be met comfortably, but largely through existing 3-star supply and incremental efficiency gains. Scenario 2 introduces near-term friction, but is necessary to unlock investment, technology adoption and the scale-up of higher-star steel over time.

The modelling makes clear that this is not a choice between scenarios, but a question of design. Demand alone is insufficient unless it evolves in both scale and quality. A static mandate risks entrenching the current supply mix, while a sequenced and escalating mandate can progressively shift the market toward deeper decarbonisation.

Policy design implications

The results support anchoring 26% as a market-entry floor, paired with a time-bound commitment to scale toward 37% post-FY 2030 and progressively tighten eligibility toward 4- and 5-star steel. In the initial phase, procurement can absorb available 3-star supply and build institutional capacity; over time, tightening thresholds is essential to avoid locking in incremental pathways.

This quality shift is what allows GPP to function as a capital-allocation signal, shaping investment decisions for the 100-150 MT of new steel capacity expected over the next five years and aligning future buildouts with India's long-term decarbonisation trajectory. Early signalling is critical: even if higher mandates apply later, credible commitments today can shape investment pipelines and accelerate readiness across the value chain.

5.1 Impact of GPP mandates on emission reduction

Emission intensity in India's steel sector is shaped by technology choices, energy inputs, raw material quality and policy signals on both the supply and demand side. While existing supply-side measures such as energy efficiency improvements, renewable electricity obligations and the CCTS are already contributing to gradual emissions reduction, they are insufficient on their own to deliver a rapid transition to low-emission production routes. Against this backdrop, the following analysis estimates the emissions reductions that can be achieved under different GPP mandate levels and decarbonisation pathways.

Decarbonisation pathways and scenario design

To assess the emissions impact of GPP, three decarbonisation pathways have been modelled: Low, Medium and High. These pathways represent different speeds of adoption across key decarbonisation levers, rather than probability-based forecasts.

- The Low scenario reflects incremental progress driven by efficiency improvements, limited increases in scrap utilisation, partial renewable electricity integration and slow uptake of advanced technologies.

- The Medium scenario represents accelerated but realistic transition supported by stronger policy pull, improved market signals and moderate investment flows.
- The High scenario illustrates outcomes achievable when strong demand-side signals, including higher GPP mandates, are combined with coordinated policy support, faster infrastructure development and access to finance.

Table 11: Decarbonisation levers across Low/Medium/High emission reduction scenarios

Decarbonisation lever	Low scenario	Medium scenario	High scenario
Energy efficiency & process optimisation	Incremental Best Available Technology (BAT) retrofits; basic process controls; Carbon capture targets pursued slowly	Plant-wide optimisation (sinter/pellet, coke, rolling); near-universal BAT adoption	Efficiency gains largely saturated; digital twins/AI for marginal improvements
Renewable electricity for captive power	Limited RE Power Purchase Agreements (PPAs); partial grid greening; small on-site solar	Meeting RE consumption obligations; significant non-process loads shifted to RE	Near-100% non-process loads on RE; firmed RE supports EAF baseload
Scrap use & circularity	Slow scrap growth; marginal EAF share increase; informal recycling persists	Organised recycling scales up; EAF clusters emerge; product design reduces virgin demand	High scrap availability; EAF dominates secondary sector; quality monitoring, reporting, and verification (MRV) supports scale
Route shifts: coal-DRI/IF to gas-DRI/EAF	Pilot gas-DRI projects; natural gas access remains constrained	Regional shift from coal-DRI to gas-DRI with significant per-tonne emission reductions	Gas-DRI becomes mainstream bridge until H□-DRI scales nationwide
Hydrogen in ironmaking	BF hydrogen injection pilots with low substitution rates	First commercial H_2-ready DRI modules; blended H_2 in select DRI plants	Multi-plant H_2-DRI deployment; H_2-DRI dominates new capacity additions
CCUS on BF/BOF & process units	Front-End Engineering Design (FEED) studies and small pilots on sinter/ coke/off-gases	Commercial capture at select large BF stacks where logistics/geology permit; cluster pilots initiated	Widespread CCUS on legacy BF/BOF routes; integrated hubs for capture, transport, and utilisation/storage
Raw-material upgrades	Basic beneficiation and modest pellet quality improvements	Widespread high-grade pellets; partial biomass reductants validated via Life Cycle Assessment (LCA)	Advanced agglomeration; optimised reductant blends; industry-wide standardized feed specifications
Market & policy instruments	Green steel certification established; limited private market demand; GPP mandate as primary growth driver	Certification and benchmarking influence investment decisions; increased market demand via stronger GPP mandates	Mature market incentives: international buyer requirements consolidate deep decarbonisation

The analysis reveals:

- Across all three scenarios, emission intensity declines between FY 2024 and FY 2030, but at materially different rates. By FY 2030, emission intensity ranges from approximately 2.27 tCO_2 per tonne of finished steel in the Low scenario to around 1.85 tCO_2 per tonne in the High scenario. This variation highlights the importance of accelerating supply-side decarbonisation through complementary demand-side interventions.
- The progression of key decarbonisation levers across the Low, Medium and High scenarios, including efficiency improvements, renewable electricity adoption, scrap circularity, route shifts, hydrogen deployment, CCUS and raw material upgrades, is summarised in the above table.
- Taken together, the Low and Medium scenarios reflect near-term outcomes under current policy settings, investment flows and technological constraints, while the High scenario illustrates the emissions reductions achievable under an accelerated transition enabled by stronger policy coordination, faster infrastructure development and improved access to finance.

Quantifying avoided emissions

Projected emissions and avoided emissions under a 26% GPP mandate across the three decarbonisation scenarios are presented below. Under this mandate level, cumulative avoided emissions over FY 2028-FY 2030 range from 4.5 $MtCO_2$ in the Low scenario to 20.9 $MtCO_2$ in the High scenario, with the Medium scenario delivering a more realistic reduction of approximately 13.0 $MtCO_2$.

Under a more ambitious 37% GPP mandate, cumulative avoided emissions over FY 2028–FY 2030 increase further, ranging from 6.4 $MtCO_2$ in the Low scenario to 29.7 $MtCO_2$ in the High scenario, with the Medium scenario yielding approximately 18.4 $MtCO_2$.

A comparison of cumulative avoided emissions across both mandate levels and all scenarios is summarised in the table below.

Table 12: Analysis on avoided emissions across GPP mandate Scenario-1 & 2

Year	Steel use in govt. projects, MMT	Steel Demand, MMT	Emissions from steel use in govt. projects, MtCO2				Emissions avoided, MtCO2		
			BAU	Low Scenario	Medium Scenario	High Scenario	Low Scenario	Medium Scenario	High Scenario
Emission Reduction Scenario for 26% Green steel Mandate									
FY28	51.9	13.49	126.6	125.6	123.7	121.8	1.0	2.9	4.7
FY29	58.5	15.22	141.4	139.9	137.1	134.5	1.5	4.3	6.9
FY30	65.4	17.00	156.3	154.3	150.6	147.1	2.0	5.8	9.3
Emission Reduction Scenario for 37% Green steel Mandate									
FY28	51.9	19.19	126.6	125.2	122.4	119.8	1.4	4.1	6.7
FY29	58.5	21.66	141.4	139.3	135.3	131.6	2.1	6.1	9.8
FY30	65.4	24.19	156.3	153.5	148.1	143.1	2.9	8.2	13.2

Interpretation of results

The avoided emissions estimated under both mandate levels are achieved through the progressive displacement of high-emission primary steel, predominantly from BF-BOF and coal-based DRI routes, with greener alternatives that incorporate higher scrap shares, renewable electricity, efficiency gains and emerging low-carbon processes.

The results demonstrate that demand-side ambition plays a critical role. Lower mandate levels can largely be met through incremental efficiency improvements and existing supply. Higher mandate levels begin to influence technology choice, retrofit decisions and new capacity planning, thereby shaping the trajectory of supply-side decarbonisation. In this sense, GPP does not merely reduce emissions at the margin, but helps determine which production pathways scale over time.

At the upper end of the range, avoided emissions by FY 2030 are equivalent to approximately 8 to 10% of India's current annual steel-sector emissions, or the removal of 6 to 9 million passenger vehicles from the road for one year. Even under conservative assumptions, the avoided emissions remain material and policy relevant.

6 Case studies

To demonstrate the real-world implications of adopting green steel in public infrastructure projects, a structured case study approach has been developed using illustrative, tiered price premiums aligned with the proposed star-rating system under India's Green Steel Taxonomy.

While the study received confidential pricing inputs from a limited number of producers, permission was not granted to use these data, even in anonymised or aggregated form. In addition, many producers declined to share premium information, resulting in a dataset that was neither representative nor suitable for robust analysis. For these reasons, the study does not present a primary green steel premium assessment, and instead applies assumed premium ranges drawn from existing literature and stakeholder discussions to illustrate potential cost and procurement impacts.

The table below summarises the available literature on green steel price premium estimates in India that informed the case study assumptions.

Table 13: Summary of current literature on estimation of Green Steel premium price

Report Title	Org.	Published date	Estimated green steel premium
Unlocking Green Steel Demand in India	EY / WWF-India / CII / IGSC	July 28, 2025	• Green steel via green-hydrogen DRI currently carries a premium of ~US$210/tonne (≈₹17,500/tonne). • This results in only a 3.7-5.2% cost increase for end-users in construction, infrastructure, and automotive sectors. • The premium is projected to drop sharply to ~US$7/tonne (≈₹580/tonne) by 2030 as green hydrogen prices fall and carbon pricing raises the effective cost of conventional steel.
Green Steel Economics	Transition Asia	July 25, 2024	• US$231 per ton (Japan) based on H_2 at $5/kg.
Unlocking the Potential of Green Public Procurement	RMI	April 2024	• Moderate 25% emissions-reduction targets lead to a 2-8% green premium (₹1,350-₹5,400 per tonne). • More ambitious 45% reduction targets raise the premium to 3-15% (₹2,025-₹10,125 per tonne). • These premiums show that near-term decarbonisation is feasible through steps like higher scrap use and renewable electricity integration.
Evaluating Net-zero for the Indian Steel Industry	CEEW	October 2023	• 20-25% premium if CCUS costs decline to around US$50 per tonne of CO_2. • Without such optimisation, premiums could range from 40-70%, depending on the production route. • Energy efficiency and renewable power can reduce costs, but deep decarbonisation requires hydrogen blending or higher scrap use.
Cleaning up the Act	ICRA	2023	• US$60-165 per MT (Impact of CBAM certificates on export profits).
Achieving Green Steel: Technical Annex	TERI	2022	• 30% impact (today); 15% impact (by 2030)

Considering the above estimates, for analytical and illustrative purposes, the following conservative yet realistic price premiums are assumed:

- **3-Star Rated Steel**: 20% price premium over conventional steel
- **4-Star Rated Steel**: 25% price premium over conventional steel
- **5-Star Rated Steel**: 30% price premium over conventional steel

These premiums reflect the additional production costs associated with progressively deeper decarbonisation pathways, ranging from enhanced energy efficiency, higher renewable energy integration and increased scrap usage (3-Star) to hydrogen blending or partial CCUS (4-Star), and deep decarbonisation through near-zero routes such as 100% green hydrogen (5-Star).

To understand what these cost differentials mean in practice for public procurement, the financial and sustainability implications of applying such premiums to large government building and infrastructure projects are examined through three illustrative case studies.

Table 14: Overview of Selected Case Studies

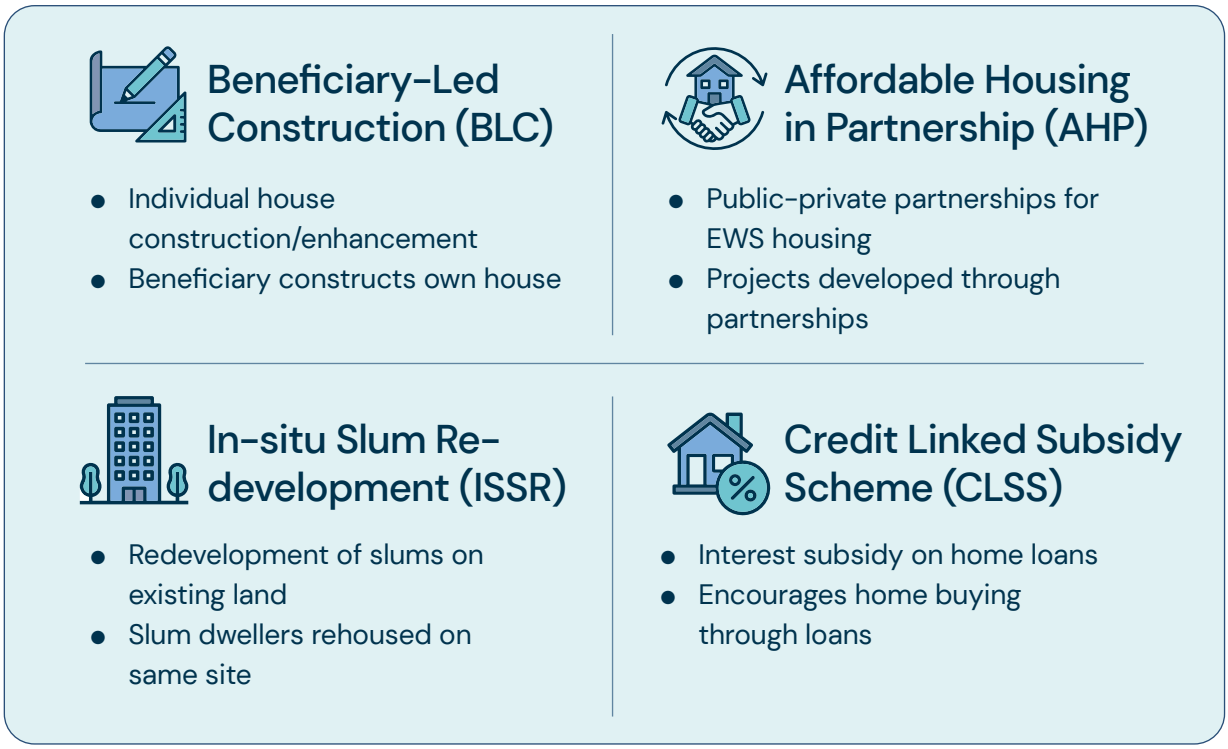
S.No	Case study	Sector	Purpose
1.	PMAY Urban 2.0	Housing	The projected steel requirement for PMAY-U 2.0 over the next five years is estimated at 9-12 million tonnes. Spread over multiple years, this translates to roughly 6 to 7% of India's current annual domestic steel consumption, indicating that the programme constitutes a moderate but meaningful demand driver.
2.	Bengaluru Metro	Mass rapid transport	India currently has around 640 km of metro projects under construction, with an additional 660 km planned in the coming years. Metro systems typically require about 13,000 tonnes of steel/route km, making metros one of the most steel-intensive public infrastructure segments.
3.	Indian Railways	Transport	Indian Railways consumes approximately 10 to 13 lakh tonnes of steel per year for track renewal and the construction of new lines. Steel procurement constitutes a significant share of its overall infrastructure expenditure.

Case study 1: Assessment of green steel price premium on Pradhan Mantri Awas Yojana – Urban 2.0 scheme

Introduction:

The Pradhan Mantri Awas Yojana - Urban 2.0 (PMAY-U 2.0), launched in August 2024, aims to deliver 10 million urban homes over five years, supported by ₹2.3 lakh crore in government assistance and ~₹10 lakh crore in total investment. The programme is expected to require ~9-12 MT of steel, making it a significant and visible demand anchor for low-carbon construction materials.

Figure 8: PMAY Scheme details



Steel procurement under PMAY housing projects

Steel procurement for PMAY-U projects is decentralised and undertaken by Urban Development Authorities, State Housing Boards and empanelled private developers, in line with GFR 2017, state procurement rules and BIS. Requirements are defined at the Detailed Project Report (DPR) stage, procured through competitive e-tendering, and monitored via third-party quality checks and MIS systems.

Given its scale and standardised procurement processes, PMAY-U 2.0 is well suited for early adoption of GPP through the inclusion of low-carbon criteria and EPD's in tenders, supported by platforms such as the GeM portal and the central public procurement portal (e-procure.gov.in).

Steel demand profile

PMAY-U housing primarily uses:

- TMT bars and structural steel for reinforcement and load-bearing elements
- Light Gauge Steel (LGS) for prefabricated and modular housing
- Galvanised sheets, wire rods, and HRC/CRC for roofing, fittings and fixtures

Total steel demand of 9-12 MT over five years represents ~6-7% of annual domestic steel consumption, indicating that PMAY-U can absorb green steel volumes without disrupting the broader market.

GPP mandate assumptions (from FY28)

Base steel price: ₹60,000 per tonne **Assumed green premium:** 3-star: +20% 4-star: +25% 5-star: +30%	**Scenario 1:** **26% GPP mandate** Minimum mix for projects with steel value >₹1 crore: 20% three-star 5% four-star 1% five-star	**Scenario 2:** **37% GPP mandate** Minimum mix for projects with steel value >₹1 crore: 25% three-star 10% four-star 2% five-star

Table 15: Analysis on Green Steel adoption – PMAY-U 2.0 project

Description	Current scenario	Scenario 1	Scenario 2
Estimated Steel consumption, Million Tonnes		10.0	10.0
Project cost, INR Crore	1,000,000	1,003,330	1,004,860
Steel cost. INR Crore	60,000	44,400	37,800
3-star Green Steel demand, INR Crore		14,400	18,000
4-star Green Steel demand, INR Crore		3,750	7,500
5-star Green Steel demand, INR Crore		780	1,560
Total steel cost, INR Crore	**60,000**	**63,330**	**64,860**
Steel cost as % of total cost	**6.0%**	**6.3%**	**6.5%**
Overall project cost increment		**0.3%**	**0.5%**
Overall project cost increment, INR Crores		**3,330.0**	**4,860.0**
Potential green steel demand created by the project, Million Tonnes		**2.6**	**3.7**
Estimated CO_2 emissions reduction, Million tCO_2		**0.94**	**1.43**

Key takeaways

- **Limited cost impact, high climate value:** Green steel adoption under PMAY-U 2.0 leads to only a modest increase in overall project costs, while delivering meaningful emissions reductions.
- **Strong demand signal:** The programme creates a credible and visible market signal for low-carbon steel, helping catalyse investment in cleaner production pathways.
- **Material demand at scale:** PMAY-U 2.0 is expected to generate 2.6-3.7 MT of green steel demand under the two GPP mandate scenarios.
- **Emissions impact:** The mandates could deliver 0.94-1.43 MT of CO_2 emissions reduction, demonstrating the role of public housing as an effective decarbonisation lever.

Case Study 2: Impact assessment of green steel price premium on Metro Rail systems in India

India's metro rail network has emerged as a key pillar of urban mobility and sustainable transportation. Since the commissioning of the first metro in Kolkata in 1984, the sector has grown exponentially. As of 2025, India operates over 970 route-kilometres of metro systems across 20 cities, with an additional 640 km under construction and a planned expansion of around 660 km in the coming years. Major metro networks include those in Delhi, Mumbai, Bengaluru, Chennai, Hyderabad, Kolkata, Pune, Ahmedabad, Nagpur, and Lucknow, which collectively serve millions of daily passengers.

The expansion of metro rail systems contributes directly to national goals of reducing urban congestion, air pollution, and fossil fuel dependency. However, large-scale infrastructure development also drives high material demand; particularly steel, which forms the backbone of metro viaducts, tunnels, rolling stock, and station structures. Each kilometre of metro construction typically consumes about 13,000 tonnes of steel encompassing reinforcement bars, structural sections, rails, and fabrication-grade materials.[10]

In the context of the National Mission for Sustainable Steel and the proposed forthcoming mandate on low-carbon steel procurement from FY 2028, metro projects financed by central and state governments are expected to progressively source a share of their steel from certified green steel producers. This case study examines the financial and sustainability implications of integrating green steel into upcoming metro rail projects across major Indian cities.

Metro rail – Steel requirement

Steel requirements can vary based on the design and construction methods employed:

1. **Elevated metro:** Requires comparatively less steel than underground systems because of prefabricated structures and minimal tunnelling. Approximately 10,000 tonnes of steel per kilometre is needed for construction.
2. **Underground metro:** Involves significantly higher steel usage due to reinforced concrete and complex tunnel engineering. Around 15,000 tonnes of steel per route kilometre is required.
3. **Mixed systems:** Combines elevated and underground sections, resulting in moderate steel demand. This approach typically uses 13,000 tonnes of steel per kilometre, which serves as the basis for subsequent calculations

10 Press Information Bureau. (2020, September 23). Metro rail steel requirements. Press Information Bureau, Government of India. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1646643

GPP mandate assumptions (from FY28)

Base steel price: ₹60,000 per tonne **Assumed green premium:** 3-star: +20% 4-star: +25% 5-star: +30%	**Scenario 1:** **26% GPP mandate** Minimum mix for projects with steel value >₹1 crore: 20% three-star 5% four-star 1% five-star	**Scenario 2: 37%** **GPP mandate** Minimum mix for projects with steel value >₹1 crore: 25% three-star 10% four-star 2% five-star

Analysis – Impact of a GPP mandate

Metro	Units	Total
Planned Expansion upto 2030	Km	660
Weighted avg project Cost for 10 metros (INR Cr)	INR/Km Cr	580.4
Steel Requirement (@avg of 13000 t/km)	Tonne	85,80,000
Steel requirement (26% mandate)	Tonne	22,30,800
Increase in Steel price increase (26% mandate)	%	5.6
Steel requirement (37% mandate)	Tonne	31,74,600
Increase in Steel price increase (37% mandate)	%	8.1
Emissions @ Current EF (2.50 tCO_2/ tfs)	tCO_2	2,14,50,000
Emissions @ 3 Star (2.20 tCO_2/ tfs)	tCO_2	1,88,76,000
Emissions @ Revised EF 26% mandate (2.406 tCO_2/tfs)	tCO_2	2,06,43,480
Emissions @ Revised 37% mandate EF (2.357 tCO_2/tfs)	tCO_2	2,02,23,060
Average increase in Overall Project Cost (26% mandate)	%	1.08%
Average increase in Overall Project Cost (37% mandate)	%	1.57%

Key takeaways

- **Modest cost impact, high climate payoff:** Under the proposed mandates, integrating green steel into metro projects increases overall project costs by an average of 1.08% (26% mandate) and 1.57% (37% mandate), while delivering substantial environmental and long-term societal benefits.
- **Significant emissions reduction potential:** For the planned 660 km metro expansion requiring approximately 8.58 million tonnes of steel, switching to low-carbon steel could reduce 8–12 million tonnes of embodied CO_2, compared to conventional steel production.
- **Alignment with national climate goals:** Emission intensity reductions from ~2.50 tCO_2/tfs to 2.35–2.406 tCO_2/tfs directly support India's commitment to lowering GHG emissions intensity

and achieving net-zero by 2070, while strengthening the sustainability profile of urban transport systems.

- **Access to green finance and certifications:** Adoption of green steel enhances eligibility for green building certifications (e.g. IGBC) and facilitates access to sustainable finance instruments such as green bonds, improving the financial attractiveness of metro projects.
- **Competitiveness and co-benefits beyond carbon:** Green steel procurement positions India's metro infrastructure favourably against emerging global mechanisms such as CBAM, supports innovation and job creation in low-carbon steelmaking, and delivers broader public health and air-quality benefits in rapidly urbanising cities.

Case Study 3: Assessment of green steel use in Indian Railways projects

Indian Railways is India's largest institutional consumer of steel and a cornerstone of the country's infrastructure ecosystem. With a network spanning over 119,000 km and serving nearly 25 million passengers daily, rail operations are inherently steel-intensive, relying on steel for safety, durability and system modernisation.

In FY 2024-25, India produced 146.6 Mt of finished steel and consumed 152 Mt, with Indian Railways accounting for an estimated 5-7% of national finished steel consumption. This demand is reinforced by sustained capital investment, including ₹1.046 trillion in FY 2024-25 for new lines, track renewal, doubling, electrification and gauge conversion. Collectively, these activities position Indian Railways as a strategic demand anchor for low-carbon steel in India.
Major steel applications in Indian Railways

- **Rails:** Predominantly carbon steel for track infrastructure
- **Bridges and elevated sections:** Structural steel for bridges and corridors
- **Rolling stock:** Stainless steel for coaches and wagons (including Vande Bharat and metro trains)
- **Electrification infrastructure:** Steel masts, gantries and poles
- **Station redevelopment:** Structural steel for station buildings, footbridges and architectural elements

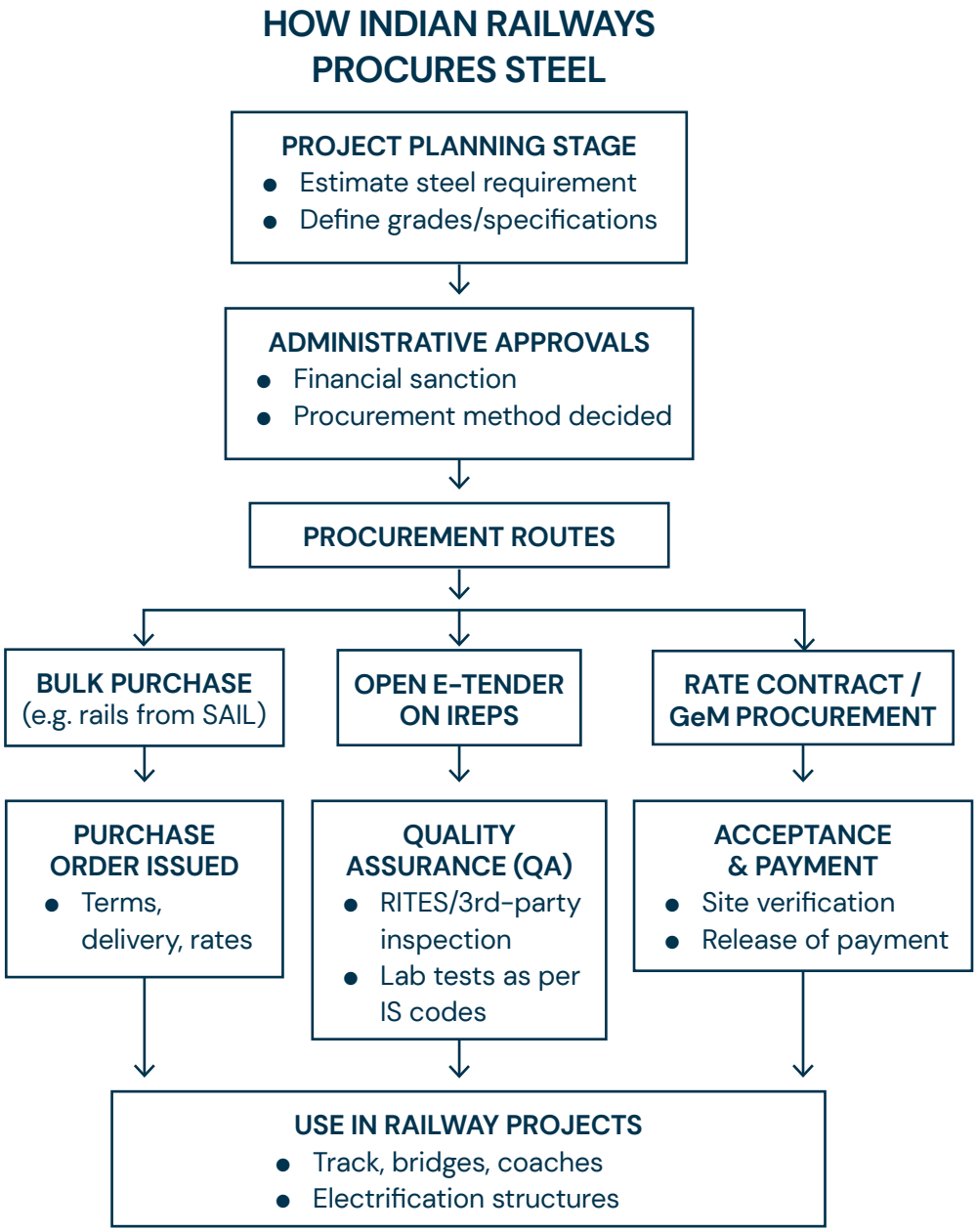
Steel procurement in Indian Railways

Indian Railways operates a highly systematised and transparent procurement framework. Strategic oversight, policy setting and funding approvals rest with the Railway Board, while procurement execution is largely decentralised and managed by Zonal Railways, Divisions and Production Units.

Routine procurement of structural steel, TMT bars and construction materials is conducted through decentralised tenders on the Indian Railways E-Procurement System (IREPS). The Railway Board intervenes directly only for strategic and high-value procurements, most notably the centralised purchase of rail steel, long-term bulk supply contracts, and the issuance of procurement policies and vendor guidelines.

Procurement decisions are guided by demand estimates from engineering and production units, with specifications aligned to IS and RDSO standards, and governed by the General Financial Rules, Railway Stores Code, vigilance norms and domestic preference policies such as *Make in India*. This hybrid model of decentralised execution and centralised contracting for critical inputs ensures material quality, supply security and cost efficiency.

Figure 9: Steps involved in Steel procurement by Indian Railways



Major steel suppliers to Indian Railways and recent procurement trends

Indian Railways works with a broad supplier base, including SAIL, Tata Steel, JSPL, Jindal Stainless, and AM/NS India, enabling it to support large-scale expansion while maintaining standardisation and reliability.

In line with its ongoing modernisation and capacity expansion programme, including higher locomotive production targets for FY 2025-27, Indian Railways has finalised major steel procurement contracts worth ₹1,586.39 crore. These contracts have been awarded to five leading domestic producers: SAIL, Tata Steel, Jindal Stainless, AM/NS India, and JSPL.

The procurement covers critical steel inputs required for rolling stock, track infrastructure and allied railway assets. The supplier-wise and product-wise breakup of steel quantities procured is presented in the table below.

Table 16: Latest Steel Procurement by Indian Railways from various ISPs

ISP	Total quantity, MT	Type of steel	Total value, INR (crores)
SAIL	1,21,826	105,000 MT of mild/corten steel worth 16,356 MT of stainless steel for fabrication of wagons, coaches, foot-over bridges, and more across eight production units	891.17
Tata Steel	52,753	Mild/corten steel for tracks, bridges, and rolling stock	333.48
Jindal Steel & Power Limited (JSPL)	16,172	Structural steel for bridges and station frameworks	105.06
Jindal Stainless	13,049	Stainless steel for passenger coaches and sanitation infrastructure	173.73
ArcelorMittal Nippon Steel (AM/NS)	13,015	Specialty steel for metro systems and high-speed rail projects	82.95
Total	**2,16,815**		**1586.39**

Impact of a GPP mandate

While Indian Railways has several ongoing projects, this case study focuses on evaluating the impact of green steel adoption in Indian Railways' upcoming East Coast Dedicated Freight Corridor (East Coast DFC).

Base steel price: ₹60,000 per tonne **Assumed green premium:** 3-star: +20% 4-star: +25% 5-star: +30%	**Scenario 1:** **26% GPP mandate** Minimum mix for projects with steel value >₹1 crore: 20% three-star 5% four-star 1% five-star	**Scenario 2:** **37% GPP mandate** Minimum mix for projects with steel value >₹1 crore: 25% three-star 10% four-star 2% five-star

Table 17: Analysis on Green Steel adoption – Indian Railways (East Coast DFC)

Description	Current scenario	Scenario-1	Scenario-2
Estimated Steel consumption, Million Tonnes	0.33	0.33	0.33
Project cost, INR Crore	44,000	44,110	44,160
Steel cost. INR Crore	1,980	44,400	37,800
3-star Green Steel demand, INR Crore		14,400	18,000
4-star Green Steel demand, INR Crore		3,750	7,500
5-star Green Steel demand, INR Crore		780	1,560
Total steel cost, INR Crore	1,980	2,090	2,140
Steel cost as %of total cost	4.5%	4.7%	4.8%
Overall project cost increment		0.2%	0.4%
Overall project cost increment, INR Crores		110	160
Potential Quantity of Green steel demand created by the project, Million Tonnes		0.09	0.122
Estimated CO_2 emissions reduction, Million tCO_2		0.031	0.047

Key takeaways

- **Low-cost impact, high climate return:** Green steel adoption in the Indian Railways project results in only a modest increase in overall project costs, while delivering clear sustainability benefits.
- **Strong market signal:** Early adoption by Indian Railways sends a credible demand signal to steel producers, accelerating investment in low-carbon production pathways.
- **Meaningful demand creation:** The East Coast DFC could generate 0.09-0.12 MT of green steel demand under the two GPP mandate scenarios.
- **Emissions impact:** Green steel procurement could deliver 0.031-0.047 MT of CO_2 emissions reduction, demonstrating the decarbonisation potential of large public infrastructure projects.

7 Recommendations:

The analysis demonstrates that Green Public Procurement can move from a compliance tool to a market-shaping instrument for decarbonising India's steel sector. Designed with clarity, sequencing and institutional coordination, a GPP mandate can create durable demand, redirect capital and technology choices, and accelerate the shift to low-carbon steel while managing near-term supply and cost constraints. The recommendations below set out the actions needed to turn this potential into a scalable, system-level transformation.

1 Formally notify a time-bound GPP framework

Notify a formal notification of a green steel procurement framework by March 2026, with implementation commencing in FY 2028. The notification should clearly define scope, coverage and applicability across central projects and centrally sponsored schemes, providing early certainty to influence investment decisions for the 100-150 MT of new steel capacity expected over the next five years.

2 Anchor initial ambition at 26% with a defined star mix

Adopt an initial requirement of 26% certified green steel for projects exceeding ₹1 crore in steel value, with minimum thresholds of 20% 3-star, 5% 4-star and 1% 5-star steel. This level should be treated explicitly as a market-entry floor: it is sufficient to generate 13.5–17.0 MT of predictable annual demand from FY 2028 onward, activate certification and procurement systems, and send a clear signal to producers. Anchoring ambition at 26% enables early market functioning, while creating the conditions to rapidly scale toward higher shares and deeper decarbonisation in subsequent phases.

3 Pre-commit to post-FY 2030 escalation through volumes and quality

Include a binding commitment, communicated well in advance, to phased escalation after FY 2030, either through higher overall mandate levels (toward 37%) or through progressively tighter star-rating weightages within the mandate. Early and credible signalling is essential to prevent GPP from being absorbed primarily by readily available 3-star supply, and to ensure demand shifts over time toward 4- and 5-star steel. By providing visibility ahead of implementation, GPP can function as a technology-forcing and investment-shaping instrument, incentivising new capacity buildouts, deeper process changes and alignment with long-term decarbonisation pathways rather than incremental efficiency gains alone.

4 Initiate inter-ministerial dialogue to enable sustainability-based procurement

Initiate a structured inter-ministerial dialogue with the Ministry of Finance, alongside key infrastructure ministries with independent procurement systems, including Railways, Road Transport and Highways, and Housing and Urban Affairs, to clarify, supplement or develop clear operating guidance under GFR 2017 and aligned sector-specific manuals. The objective is to explicitly enable sustainability criteria, lifecycle costing and verified emissions performance in procurement, providing procuring agencies with confidence from an audit and compliance perspective.

5 Integrate green steel into procurement platforms and Schedules of Rates

Integrate certified green steel categories into the Government e-Marketplace (GeM), Central Public Procurement Portal (CPPP) and agency-specific Schedules of Rates (SoRs) to normalise low-carbon steel procurement across public agencies. Standard bidding documents and Bills of Quantities (BoQs) should include pre-approved green steel categories, with 10-20% weighted technical scoring for verified low-carbon attributes under QCBS frameworks. Fast-track vendor empanelment for certified suppliers and use pilot tenders to test pricing, documentation and evaluation before full-scale rollout, ensuring consistency, auditability and ease of adoption across ministries and PSUs.

6 Provide transitional fiscal support to bridge early price premiums

Deploy time-bound, targeted transitional instruments to address early green steel price premiums during the market-formation phase. These may include predefined preferential margins of 8-15%, limited-duration GST relief, and viability gap funding linked to CCTS credit generation or verified emissions performance. Support should be carefully calibrated to project type and star-rating, taper over time as costs converge, and be explicitly sunset-linked to capacity scale-up to ensure fiscal efficiency and avoid locking in subsidies.

7 Accelerate producer readiness through targeted supply-side enablers

Accelerate supply-side alignment by streamlining renewable energy open-access approvals, facilitating captive and group-captive RE projects, and strengthening enforcement of scrap recycling policies to expand high-quality feedstock availability. Address state-level bottlenecks that currently constrain uptake, including delays in open-access approvals, variability in wheeling and banking charges, and inconsistent treatment of cross-subsidy surcharges.

Complement these measures by extending the PLI framework to cover EAF expansions, hydrogen-ready DRI facilities and CCUS retrofits, with incentives linked to verified emissions reductions rather than capacity addition alone. These efforts should be supported by a dedicated ₹10,000-

crore blended-finance facility, anchored by SIDBI and IREDA with participation from multilateral institutions to de-risk early investments and crowd in private capital.

8 Strengthen upstream transparency and technical capacity

Strengthen the credibility of green steel claims by mandating upstream emissions disclosure across iron ore, pellets, scrap and energy inputs, using standardised templates and system boundaries aligned with the Green Steel Taxonomy. To address current data quality and verification gaps, establish a national capacity-building programme targeting 500 personnel per year across producers, auditors and procuring agencies, focused on GHG accounting, EPD preparation, digital MRV systems and third-party verification protocols. Over time, this will enable consistent product-level accounting, reduce compliance friction and support scalable procurement.

9 Prepare procuring agencies through pilots and operational guidance

Issue an omnibus operational guideline mandating green steel procurement from FY 2028, preceded by a voluntary pilot phase in FY 2026-27 across flagship programmes such as PMAY-Urban 2.0, metro rail expansions and Indian Railways projects. The pilot phase should be used to test tender language, pricing treatment, documentation and verification processes, and to build confidence among procuring agencies and suppliers.

Revised Bills of Quantities (BoQs) should embed pre-approved green steel categories with verified premium uplifts, supported by fast-track empanelment of NISST-certified suppliers and standardised EPD templates, to reduce transaction costs and enable consistent, auditable implementation at scale.

10 Establish governance, monitoring and interoperability mechanisms

Constitute an inter-ministerial GPP Steel Task Force under Ministry of Steel leadership to oversee rollout, resolve inter-agency bottlenecks and coordinate across procurement, finance and industrial policy. The Task Force should oversee publication of an annual public dashboard tracking certified supply, procurement uptake, premium trends and avoided emissions, alongside clearly defined contingency protocols for temporary supply constraints.

In parallel, promote interoperability between NISST and global standards such as ResponsibleSteel through mutual recognition or alignment of core metrics, to reduce compliance costs, support export-oriented producers and preserve access to ESG-linked capital and international markets.

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