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Briefing Note

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Financing the MSME Transition in Jharkhand's Steel Sector

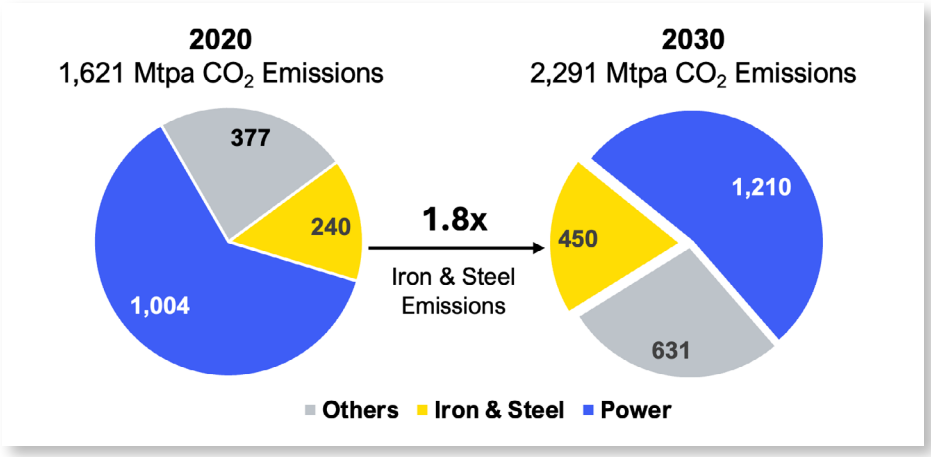
- *Micro, small and medium enterprises (MSMEs) in India's steel sector are constrained with out-dated technologies, lack access to finance, and structural barriers to decarbonisation.*
- *Although concessional finance, credit guarantees and central/state schemes exist, most MSMEs and Energy Service Companies (ESCOs) serving these MSMEs, lack awareness and project preparation capacity to access them.*
- *Without support, India's energy transition risks job losses and regional disparity, particularly for MSME-heavy sectors such as steel.*
- *A dedicated Project Preparation Facility can enable MSMEs and ESCOs to unlock existing capital and scale low-carbon technologies through project preparation, transaction advisory, and matchmaking.*

1. Introduction

India has committed to achieving net-zero carbon emissions by 2070, with interim targets including a 45% reduction in the carbon intensity of its economy by 2030 from 2005 levels, and the installation of 500 gigawatts (GW) of non-fossil fuel electricity capacity. Given the industrial sector accounts for 24% of the country's energy-related greenhouse gas (GHG) emissions, its decarbonisation is essential to meeting these national climate goals.

Among industrial subsectors, steel is one of the most energy and emissions intensive, making it a critical focus area for mitigation efforts. India is the world's second-largest steel producer, generating approximately 150 million tonnes (Mt) of crude steel in 2024. The sector contributes about 12% of the country's total carbon dioxide (CO_2) emissions, with steel output projected to rise to 255Mt by 2030 in response to growing domestic infrastructure and manufacturing demand. This expansion, while economically vital, poses a significant risk of locking in high-emission technologies if decarbonisation measures are not urgently adopted.

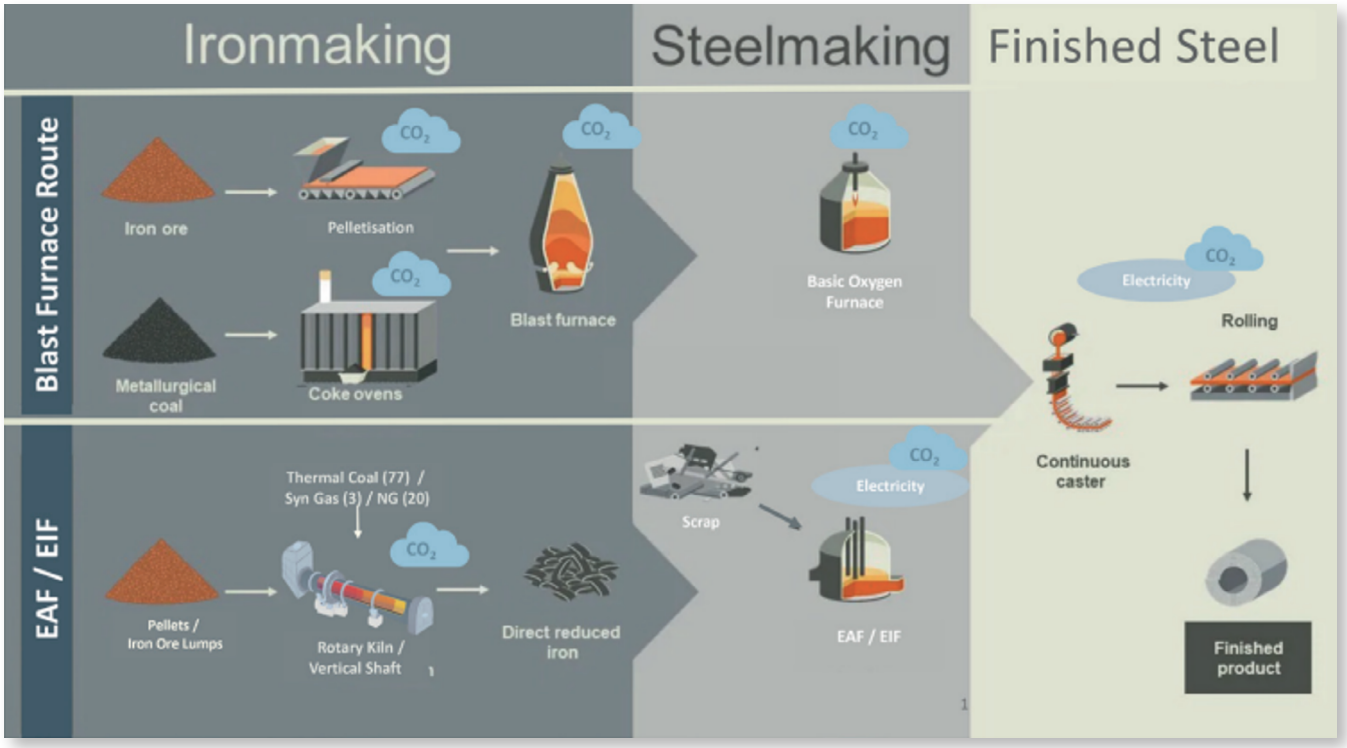
Figure 1: Dependence of India's Emission Reduction on Steel Sector Decarbonisation



Source: Niti Aayog; IEEFA Analysis

Steel production in India is divided between two distinct technological routes. The integrated route, used chiefly by large corporates, relies primarily on the blast furnace-basic oxygen furnace (BF-BOF) process, which depends on coking coal and iron ore as key inputs in the production process. The secondary route, which accounts for about 55% of total steel output in the country, is dominated by micro, small and medium enterprises (MSMEs) that use coal or gas-based direct-reduced iron (DRI) and electric arc furnaces (EAFs) or induction furnaces (IFs). These MSMEs are concentrated in states such as Jharkhand, Chhattisgarh and West Bengal, and are often characterised by small-scale operations, limited financial resilience, and outdated high-emission technologies.

Figure 2: Steel Production Pathways in India



Source: Ministry of Steel

India's Ministry of Steel published a detailed decarbonisation roadmap in 2024, outlining short-, medium- and long-term measures to reduce emissions across the sector. The roadmap categorises decarbonisation solutions based on the production technologies used in the sector. This segmentation offers a clear pathway for both large integrated steel producers (ISPs) and MSMEs.

However, while this segmentation provides clarity, implementing these solutions will be both capital and technology intensive. While larger ISPs usually have the balance sheet strength and institutional capacity to adopt these technologies, MSMEs, already operating under financially precarious conditions, will face significant challenges.

1.1 The Need for Targeted Support to Decarbonise Steel MSMEs

Although the Government of India and several global development partners have launched financing schemes and energy efficiency programs targeting the broader MSME sector, their impact on MSME decarbonisation has been limited. As a result, there remains a critical gap in accessible and effective financial support for this high-emitting but underserved segment.

Additionally, the decarbonisation of steel sector MSMEs is also critical from a socio-economic perspective. These entities are significant employers in economically vulnerable regions, supporting local livelihoods and contributing to regional development. Without targeted support, they risk being excluded from India's low-carbon transition, threatening jobs, deepening regional disparities and undermining the broader goals of a just energy transition.

Why a Just Transition Matters for Steel MSME Sector

India's steel sector reflects a stark divide between large ISPs and MSMEs in terms of technology adoption and access to finance for decarbonisation. For example, ISPs such as Tata Steel and JSW Steel are investing in developing decarbonisation solutions for their operations with advanced, low-carbon technologies and leveraging green finance at scale. Tata Steel is piloting breakthrough processes such as HIsarna, capable of halving CO_2 emissions without carbon capture, and is working to mainstream decarbonisation across its operations. JSW Steel has pledged more than US$1 billion (Rs86 billion) to lower its emission intensity from 2.36 tonnes of CO_2 to 1.95tCO_2 per tonne of crude steel by 2030, investing in green hydrogen, renewables and carbon capture.

These large companies benefit from economies of scale, robust balance sheets and better access to domestic and international finance, including sustainable finance instruments (JSW Steel being the first in the global steel sector to issue sustainability-linked bonds).

In contrast, steel MSMEs remain reliant on outdated high-emission technologies such as coal-based rotary kilns for DRI, and induction furnaces for steelmaking. MSMEs operate with limited financial flexibility, and often lack the technical capacity to innovate or invest in cleaner alternatives. Most are excluded from the formal green finance ecosystem.

This challenge is compounded by the fact India's steel MSMEs are a critical part of the sector's economy. These MSMEs are predominantly located in industrial clusters across several states, and are not only vital from a production standpoint but also serve as engines of employment in economically vulnerable regions. They are also embedded in the supply chains of larger companies, which are increasingly under pressure to meet environmental, social and governance (ESG) targets. As these large companies transition, they may pass compliance costs downstream by requiring their suppliers, including MSMEs, to adopt cleaner production processes, invest in environmental certifications, upgrade technologies, or meet disclosure obligations, leaving MSMEs

exposed without adequate support. This could lead to exclusion from value chains, closures, and job losses, particularly in economically vulnerable regions. Ensuring a Just Transition for steel MSMEs is therefore not just an environmental imperative but a socio-economic one, critical for balancing emissions reduction goals with employment protection and regional stability.

To address this, this paper proposes a targeted Project Preparation Facility (PPF) to facilitate a Just Transition for steel sector MSMEs. This would build on the various interventions already introduced for MSME decarbonisation in India. Two key insights drive the facilities' design. First, while there are concessional loans, grants, and credit guarantees available for MSMEs to decarbonise, the real challenge lies in MSMEs' limited accessibility and capacity to tap into these financing solutions. Second, there is a lack of awareness, high perceived risk and lack of technical capacity among several steel MSMEs, hindering the integration of decarbonisation levers into their operations. Energy Service Companies (ESCOs) offer a viable solution in this context, given their ability to assess the techno-economic feasibility of such measures. However, many ESCOs themselves fall under the MSME category, limiting their ability to scale.

Hence, this paper focuses on enabling MSMEs and ESCOs to better access existing financial mechanisms through a PPF.

Piloting the intervention in Jharkhand's MSME steel clusters presents a strong case for targeted action, such as a **PPF-Green Financing Facility for Just Transition (GFF-JT)**. With a critical mass of MSMEs engaged in coal-based DRI steel production, strong interlinkages with local economies, and an emerging policy focus on a Just Transition, the state offers a viable ecosystem to demonstrate the feasibility and impact of targeted financial enablement for low-carbon technologies.

By addressing financing and capacity barriers in Jharkhand, the approach can generate replicable models and build investor confidence, paving the way for similar interventions across other states such as Chhattisgarh, Odisha, and West Bengal. This state-based strategy can thus serve as a scalable blueprint for MSME decarbonisation and a Just Transition nationwide.

2. Decarbonisation Pathways for MSMEs

To enable a just and equitable transition for India's steel sector MSMEs, it is critical to identify realistic and scalable decarbonisation pathways. These should prioritise near-term levers that can reduce emissions while minimising operational disruption and financial strain. Based on the Ministry of Steel's decarbonisation roadmap, three near-term levers stand out: energy efficiency, renewable energy adoption and material efficiency.

Energy Efficiency: Offers one of the most immediate and cost-effective pathways for emissions reduction. For example, trials of coal-based DRI technology in the Odisha MSME steel cluster have shown that implementing energy-efficiency measures, such as raw material preheating using flue gas, can lower coal consumption by 20-25% and enhance productivity by up to 20%. Additionally, the use of variable frequency drives (VFDs) on process motors can reduce electrical energy consumption by 15-20%, contributing to significant overall efficiency gains.

Renewable Energy: Can support MSMEs, reducing their emissions by sourcing electricity from solar and other renewable options, either through rooftop solar installations or third-party open-access agreements.

Material Efficiency: In the steel sector, increasing the share of scrap-based steelmaking presents a powerful lever to reduce both energy intensity and carbon emissions. Compared with virgin iron production, scrap use drastically lowers process emissions. The central government's Steel Scrap Recycling Policy (2019) was introduced to formalise and expand scrap availability. However, informal and fragmented scrap markets dominate MSME-dense regions, limiting the policy's effectiveness and underscoring the need for stronger implementation and support mechanisms.

Of the three options, our analysis focuses on renewable energy and energy efficiency, as these represent the most relevant decarbonisation levers for MSMEs operating coal-based DRI processes.

While these levers offer promising emissions reduction potential, their uptake depends on the local industrial context. In this regard, Jharkhand's steel MSME clusters are an ideal test case for the feasibility of these interventions, given their scale and emissions profile.

3. Jharkhand's Steel Sector and MSME Landscape

Jharkhand is one of India's major steel-producing states, contributing significantly to the country's iron and steel output due to its proximity to raw materials such as iron ore and coal. The state hosts a dual industrial ecosystem, large ISPs such as Tata Steel and the Steel Authority of India Ltd (SAIL), and a fleet of MSMEs. Within Jharkhand, the steel sector alone emits about 3.9Mt, accounting for roughly 4% of the state's total GHG emissions. Jharkhand has about 3.6Mt a year (Mtpa) of coal-based DRI capacity and 19Mtpa of hot metal production via the blast furnace route, dominated by large ISPs. The majority of MSMEs in Jharkhand use coal-based DRI production, which is both energy- and carbon-intensive.

MSMEs in Jharkhand's steel sector face several systemic challenges encountered across India's MSME landscape, limiting the adoption of low-carbon technologies. These include:

- Policy-related bottlenecks such generic policies and schemes that often overlook the diversity in MSME clusters.
- Lack of awareness about decarbonisation options and their impact on operational costs and emissions.
- Financial constraints due to limited access to affordable finance.

This paper focuses on challenges to financing and investment. Without access to adequate and appropriately structured finance, even proven decarbonisation levers remain out of reach for most MSMEs. Understanding these constraints is critical to designing a credible solution.

3.1 Bottlenecks to Financing MSME Decarbonisation in Jharkhand

A fundamental bottleneck in MSME decarbonisation (including steel) in Jharkhand is the perception that energy efficiency and renewable energy are non-core investments that do not directly enhance top-line revenue. Unlike capacity expansions or machinery upgrades, energy efficiency and renewable energy are often perceived as secondary priorities, especially when they do not yield immediate financial gains. In the context of volatile input costs, thin margins and uncertain demand for commodity steel products, MSMEs in Jharkhand prioritise short-term survival over long-term efficiency gains. These conditions reduce competitiveness and further deter investment in low-carbon-intensive assets. This reluctance also extends to project preparation activities such as Detailed Energy Assessments (DEAs) or Detailed Project Reports

(DPRs). These steps are critical for structuring bankable energy efficiency and renewable energy interventions, but are often viewed as overheads without immediate operational value.

3.2 ESCO is a Viable Business Model for MSME Decarbonisation, but Lacks Access to Capital

Given the structural limitations of MSMEs, financing models that channel capital through ESCOs are a viable option. ESCOs absorb technical and financial risks, allowing MSMEs to benefit from energy efficiency and renewable energy interventions under shared savings or pay-as-you-save models. However, the ESCO ecosystem is weak in the region. Many smaller, local ESCOs, which also qualify as MSMEs, struggle with limited financial capacity and liquidity. Most commercial lenders demand collateral or verified financials, which are often unavailable for small ESCOs. As a result, even though ESCO-led models are better suited for fragmented industrial clusters, ESCOs are unable to scale up due to a lack of access to capital.

Another challenge for ESCOs is the cash-flow mismatch between upfront investment and deferred revenue. Energy efficiency and renewable energy interventions, such as solar rooftop installations or induction furnace upgrades, require significant upfront capital expenditure. However, payback periods often stretch to three to five years, especially in clusters with irregular demand or billing cycles. During this period, ESCOs must manage debt servicing and cash-flow generation. This staggered cash-flow structure makes it extremely difficult for smaller ESCOs to scale operations. The lack of equity capital or flexible debt capital exacerbates the issue.

3.3 Financing Options for MSME Decarbonisation

Despite these structural barriers, an ecosystem of financing interventions is emerging to address these gaps and enable MSME decarbonisation. A number of financial institutions and service providers are offering tailored financing models to support MSMEs in adopting clean energy technologies, including rooftop solar and energy efficiency solutions. Institutions such as the Small Industries Development Bank of India (SIDBI) have introduced targeted schemes for this purpose. These include the MSE Green Investment and Financing for Transformation (MSE-GIFT) scheme for low-carbon assets such as solar, and the End to End Energy Efficiency (4E) scheme. These schemes reduce upfront costs through concessional lending, and help MSMEs view clean energy investments as financially viable.

For MSMEs and ESCOs unable to access traditional credit due to lack of collateral, leasing and operating expenditure-based arrangements, provide a compelling alternative. Leasing allows MSMEs to adopt renewable energy systems without collateral or no objection certificates (NOCs); the equipment itself acts as the asset with repayments structured as rentals, offering tax efficiency and independence from existing credit limits.

Lease and power purchase agreement (PPA) models such as "test-and-buy" options are also gaining popularity, allowing firms to lease solar assets initially and decide on ownership later based on performance.

In parallel, central and state governments schemes also play a role in reducing investment risk. Central schemes such as the Rooftop Solar Subsidy (offering up to 40% for smaller systems), the Credit Linked Capital Subsidy Scheme (CLCSS) and concessional loans under Priority Sector Lending (PSL) provide critical support for clean energy adoption. Udyam-registered MSMEs also benefit from lower interest rates and simplified loan procedures.

At state level, Jharkhand's Solar Policy offers further opportunities, particularly through open-access procurement for medium-sized steel companies. These include exemptions on transmission and wheeling charges for solar projects with storage, waivers on cross-subsidy surcharges, and a fast-tracked Deemed Open Access approval process.

In addition, several private equity and venture capital funds are scouting opportunities to invest in entities facilitating energy transition at the small scale. These are particularly relevant for ESCOs and solution providers that serve MSME-heavy sectors such as steel. Funds such as Eversource's Green Growth Equity Fund and Avaana Capital's Climate and Sustainability Fund, can play a catalytic role in scaling MSME decarbonisation by providing equity capital to ESCOs and clean-tech service providers. Equity support strengthens ESCOs' ability to raise debt.

Together, these interventions directly respond to the structural, financial and behavioural barriers that have historically limited MSME participation in clean energy transitions. While not tailored specifically to Jharkhand, they represent viable options for the state's steel sector MSMEs. However, MSMEs and ESCOs servicing these MSMEs continue to face significant barriers in accessing these funds because the enabling ecosystem required to utilise them is missing.

4. PPF: A Pathway to Steel MSME Decarbonisation in Jharkhand

This is where a Project Preparation Facility (PPF) becomes a critical intervention. MSMEs often lack awareness of available financing options, the technical capacity to undertake project preparation, and the internal bandwidth to manage complex application and compliance processes. Similarly, ESCOs struggle to structure viable projects due to weak balance sheets, limited access to working capital, and an inability to absorb the upfront cost of conducting DEAs or preparing investment-grade project reports. Financiers, in turn, lack clear, credible pipelines and are reluctant to underwrite projects without adequate technical documentation and risk mitigation. As a result, existing schemes, while well-designed, remain underutilised, and the market for low-carbon solutions for MSMEs continues to be fragmented and underserved.

While there are multiple challenges to financing low-carbon technologies in steel MSMEs, it is unrealistic to expect all barriers to be tackled simultaneously and quickly. Designing an end-to-end financing solution for MSMEs is a lengthy and complex process, and even a fund-based solution would still compete with existing financing sources. It will be more challenging if the financial solution is a fund that will continue to chase the same source of capital, particularly concessional capital.

Instead of attempting to address all financial and institutional challenges at once, a PPF focuses on the most immediate and addressable barriers, such as information gaps, project development costs, lack of coordination among stakeholders, and limited capacity to meet lender and investor requirements.

PPFs expedite technical, financial, legal and regulatory processes for projects that would otherwise have difficulty achieving commercial viability, and provide viable solutions to establish project bankability and achieve financial closure. By providing early-stage funding for essential services such as technical and commercial feasibility studies, financial structuring (e.g. credit enhancement support if available), PPFs can help advance economically viable projects to a stage that allows public and private investment.

Once the market is created through improved coordination, information flow and reduced transaction costs, it can generate a credible track record of MSMEs adopting low-carbon technologies. This will play a critical role in building confidence among banks and investors, demonstrating the viability and bankability of such projects. Over time, it will incentivise more

MSMEs to transition to these solutions, knowing that financing is accessible. This market momentum can catalyse greater capital inflows into the segment.

The PPF would initially be funded by public financiers, including the Government of Jharkhand and foundations. **Since the facility is solving the problems of MSMEs while addressing Just Transition issues, public funding is justified.** PPFs are considered efficient use of public money, leveraging public capital to attract private investment. From a public policy perspective, it is critical to support the steel industry in the MSME segment to transition (as discussed earlier). PPFs have been successful in scaling up clean energy investments globally. Successful examples include FELICITY (Financing Energy for Low-carbon Investment – Cities Advisory Facility), the Private Financing Advisory Network (PFAN) and US-Indian Clean Energy Finance (USICEF).

5. Green Financing Facility for a Just Transition

To implement the PPF approach, this paper proposes the **Green Financing Facility for Just Transition (GFF-JT)**, a dedicated institutional mechanism to accelerate low-carbon investments in Jharkhand's MSME sector. Anchored in the state's steel clusters, the GFF-JT will serve as a catalytic platform to unlock finance for clean energy interventions, starting with energy efficiency and renewable energy solutions.

The facility's initial focus will be on supporting MSMEs engaged in coal-based DRI steel production, given their high emissions intensity and readiness challenges. Over time, its scope can expand to include other industrial sectors and technology segments within the state.

The PPF (GFF-JT) will actively scout opportunities in the MSME sector, either directly or through intermediaries such as ESCOs, particularly in areas such as energy efficiency and solar rooftop and open access installations. MSMEs in the steel sector will also directly approach the GFF-JT for technical assistance that can support them in funding any low-carbon projects.

5.1 GFF-JT Financing Facility Design

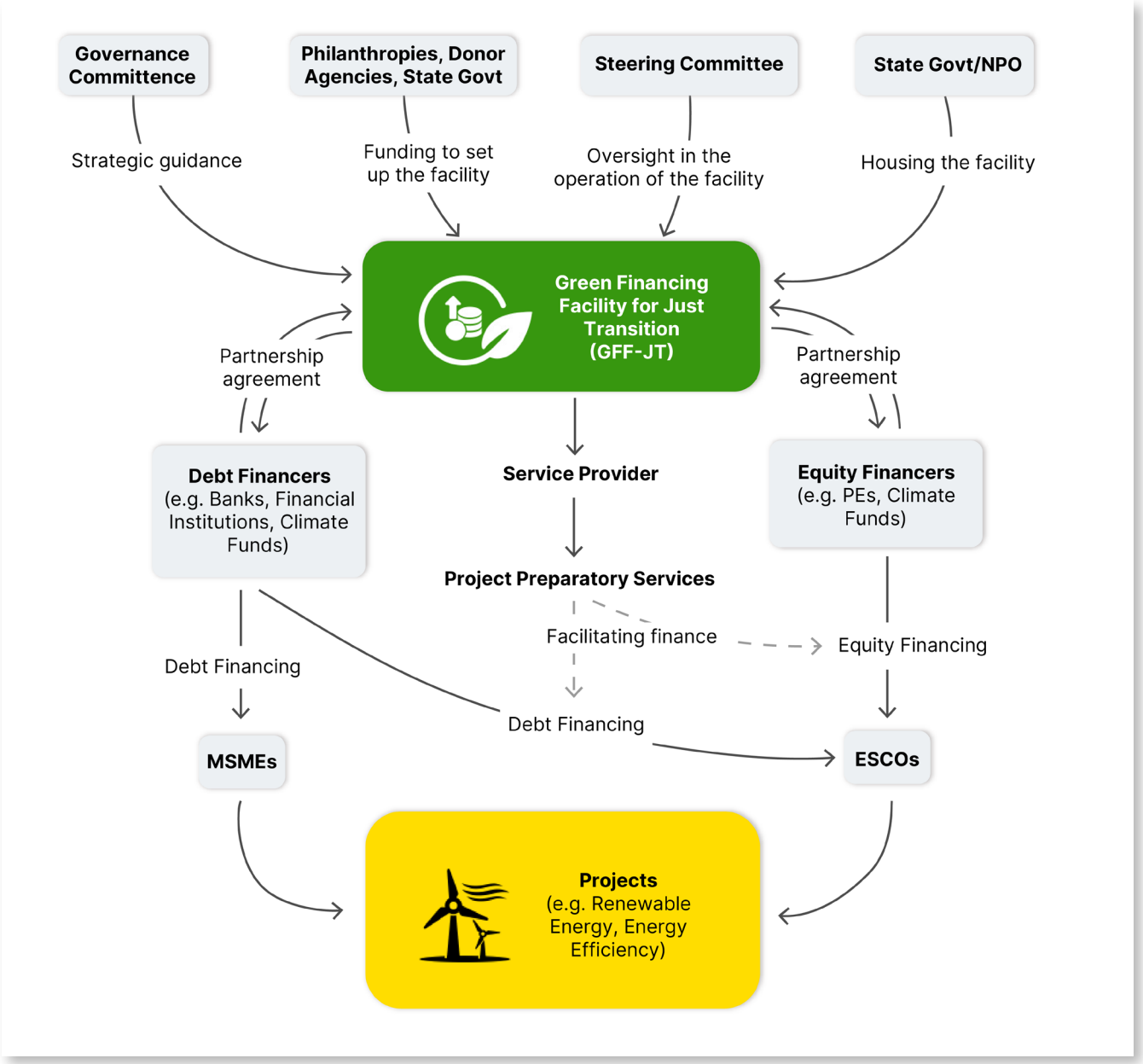
The state government, with the support of philanthropies and donor agencies, would set up this facility. It could be overseen by a not-for-profit or state-run entity, such as Jharkhand's Department of Energy or the Department of Forest, Environment & Climate Change. It would hire professionals with experience in financing, MSMEs, steel and climate technology sectors to run the programme.

GFF-JT will develop a strong partnership with banks, financial institutions and dedicated climate funds, which can assess financing proposals. The state government can support facilities to access funding from central government programmes such as SIDBI's Green Finance Scheme. The facility will support MSMEs to raise debt capital while supporting ESCOs to get both debt and equity capital.

Grant funding would be used to support a range of activities, including: project preparation oriented towards raising debt and/or equity financing; technical feasibility; investment banking; legal support; market assessment; commercial transaction structuring for fundraising, and; ESG impact assessment studies through professional service providers.

The PPF will have a steering committee comprising experts in this field, government officials and funders to provide strategic guidance, and an advisory committee comprising key lenders, investors and independent technical experts to review funding recommendations.

Figure 3: Structure of the GFF-JT



Source: IEEFA Analysis

5.2 Role of Various Partners in the GFF-JT

The financing facility involves multiple stakeholders, each playing a distinct and complementary role. The role of each player is discussed below.

Entity	Role
Philanthropies/donor organisations	• Funding to cover the cost of set-up and operations • Strategic Guidance
State Government	• Funding to cover the cost of set-up and operations • Strategic Guidance • Facilitating access to the benefits offered under various government programs and schemes • House the facility within a designated government institution for better coordination and oversight

GFF-JT (Secretariat)	• Socialising the facility among beneficiaries, financers/investors, public finance institutions and government departments • Selection of beneficiaries (MSMEs/ESCOs) and service providers • Develop partnerships with debt and equity financiers, and government departments with schemes for MSMEs in this segment • Coordination between financiers and investee companies

5.3 Key Functions of the Green Finance Facility for Just Transition (GFF-JT)

The GFF-JT will have the following key functions:

- **Matchmaking investment opportunities:** Connect debt and equity investors in the MSME segment with a pipeline of projects in MSMEs and ESCOs segment in the steel industry in Jharkhand.
- **Selection of service providers:** Selection of third-party service providers to offer project preparatory services.
- **Enhance project bankability:** Support project identification in MSMEs and ESCOs operating in the steel industry, preparation of project proposals, financial structuring and ESG assessment to meet funders' financial and non-financial conditions.
- **Facilitate access to government schemes:** Assist MSMEs and ESCOs in accessing various government schemes and programmes, based on specific project and borrower needs.
- **Develop risk-sharing models:** Create model agreements and viability gap funding structures with optimal risk allocation to attract private capital.
- **Knowledge resources:** Create a repository of interventions based on learnings from pilot programmes conducted by the Bureau of Energy Efficiency (BEE), Global Environment Facility (GEF), the United Nations Industrial Development Organization (UNIDO) and state-level clean energy programmes. This can be used to create metrics such as expected energy savings, payback periods and return on investment (ROI) for each technology.

5.4 Envisaged Impacts of the Facility

The GFF-JT aims to deliver system-level impact by:

- **Improving access to finance at a reasonable rate:** Connect MSMEs and ESCOs with debt and equity capital providers for low-carbon technologies.
- **Developing standard models:** Generate templates for technologies, financing structures and assessment tools.
- **Improving Project Design:** Offer derisking solutions through structured financial products and contractual arrangements.
- **Promoting Implementation and Awareness:** Disseminate learnings to enhance sectoral participation and scalability.
- **Strengthening the Ecosystem:** Foster collaboration among MSMEs, ESCOs, tech providers, investors and policymakers through shared platforms.

6. Next Steps

To implement the GFF-JT, anchor support from the Government of Jharkhand will be pivotal. Its leadership will lend credibility to the initiative, ensure alignment with state priorities, and facilitate coordination across departments, public agencies and funding sources. Development of the facility can be overseen by the Jharkhand Just Transition Task Force in collaboration with its partner agencies. To achieve this, the following steps are recommended:

- **Develop a detailed proposal:** Prepare a comprehensive proposal outlining the facility's objectives, governance model, operational structure and funding requirements. The proposal should also quantify the expected impacts of this facility, such as GHG mitigation, MSME resilience, finance mobilisation and job creation, and clearly define the role of each partner.
- **Mobilise stakeholder endorsements and secure seed commitments:** Share the proposal with relevant stakeholders, including the Government of Jharkhand, central ministries, philanthropic foundations and climate-focused donor agencies to mobilise grant-based support for the facility's set-up and initial operations.
- **Engage ecosystem stakeholders**: Engage MSMEs, ESCOs, commercial banks, NBFCs, multilateral development banks, development finance institutions, and climate funds to refine the facility's design. These consultations will help align GFF-JT's support with the needs of the ecosystem, and ensure complementarity with existing financing instruments.
- **Lay groundwork for implementation:** Initiate partnerships with financial institutions and service providers, define eligibility and selection criteria for beneficiaries and projects, and develop a repository of preparatory tools and templates. This will enable a faster and more effective launch of GFF-JT operations in Jharkhand's steel MSME clusters.

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The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

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