



Institute for Energy Economics
and Financial Analysis



Transforming Jharkhand's economy in line with India's net-zero ambitions

Summary report



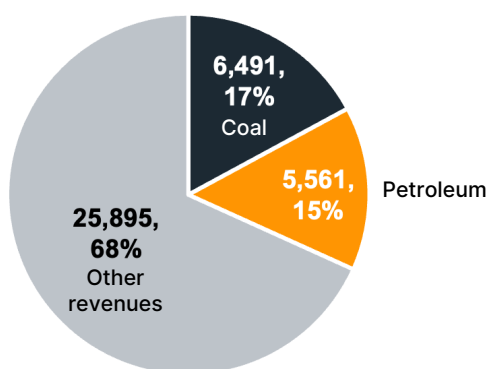
Introduction

India's net-zero target for 2070 involves phasing out carbon-intensive assets, developing new low-carbon capacity, and mobilising unprecedented levels of capital. For Jharkhand, this transition is both a high-risk challenge and a high-return opportunity, with the potential to enhance energy security, create large-scale employment, and drive long-term sustainable growth.

Fossil fuels currently account for 32% of Jharkhand's revenue, with coal alone accounting for 17%. Over half of the state's Goods and Services Tax (GST) collections come from fossil fuel-dependent industries.

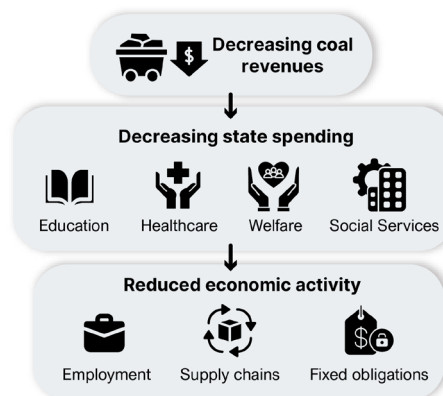
A decline in coal revenues will restrict the state's ability to fund essential social services and dampen economic activity. Since a substantial share of the budget has already been allocated for fixed obligations, such as administrative costs, any revenue shortfall would further reduce fiscal flexibility.

Figure 1: Jharkhand's direct fossil fuel revenue dependency (FY2022-23) (in Rs crore)



Source: IEEFA Analysis

Figure 2: Impact of decrease in coal-based revenues on Jharkhand's economy



Source: IEEFA Analysis

The state stands at a crossroads. Without proactive planning, the decline of the coal industry could trigger fiscal instability and job losses. However, with a thoughtfully crafted Just Transition strategy, Jharkhand can capture high-growth opportunities in low-carbon sectors, create sustainable livelihoods, and position itself to capitalise on emerging markets.

Planning for a just and sustainable transition in Jharkhand

Jharkhand possesses abundant renewable energy resources, significant potential for energy storage, an industrial base suitable for manufacturing low-carbon technologies, a concentration of critical mineral reserves essential for the energy transition, and a strong steel sector capable of anchoring green hydrogen demand. Alongside these, the state can also expand into agro-based industries, natural farming, circular economy applications, and IT/IT-enabled services. Together, these strengths provide a foundation for Jharkhand to diversify beyond coal and build a resilient, low-carbon and value-adding economy.

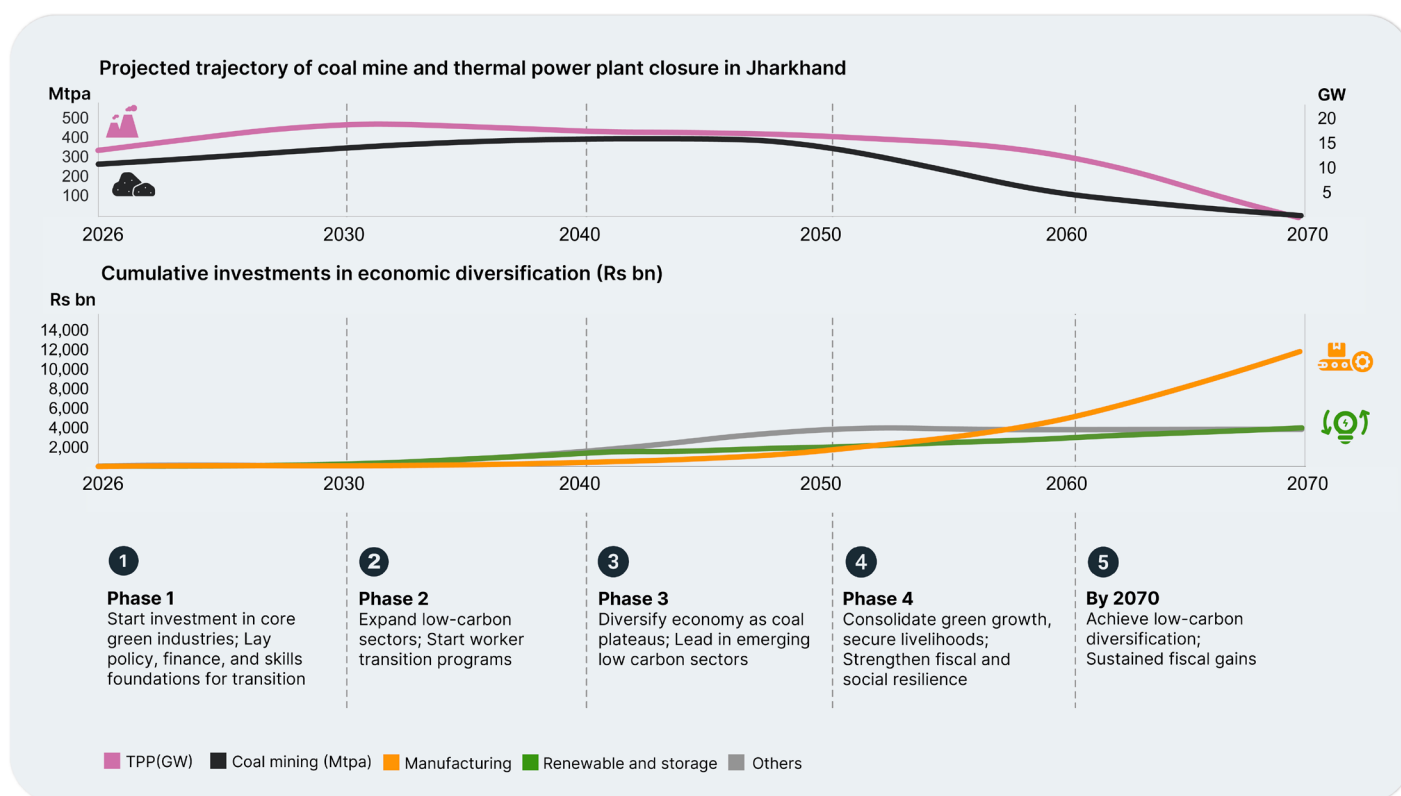
Our study models Jharkhand's transition from 2026 to 2070. While a few states in India have a net-zero target more aggressive than India's, for Jharkhand, aligning with the country's 2070 target is more viable for the following reasons:

- **Gradual phaseout:** A gradual phaseout of high-carbon assets allows coal mines and thermal power plants (TPPs) to close in stages, with time to repurpose land and redeploy workers.

- **Diversification window:** A phased approach creates space to scale up low-carbon sectors as new growth engines.
- **Financial feasibility:** Extending the transition to 2070 enables the mobilisation of concessional finance and blended structures, reducing transition costs and fiscal shocks.

We estimate that Jharkhand will require approximately **US\$256 billion (Rs22 trillion)** between 2026 and 2070 to transition from a fossil fuel-dependent economy to a low-carbon one while maintaining social and economic stability. This includes the costs of labour support, coal mine and thermal power plant closures, steel sector decarbonisation, and economic diversification.

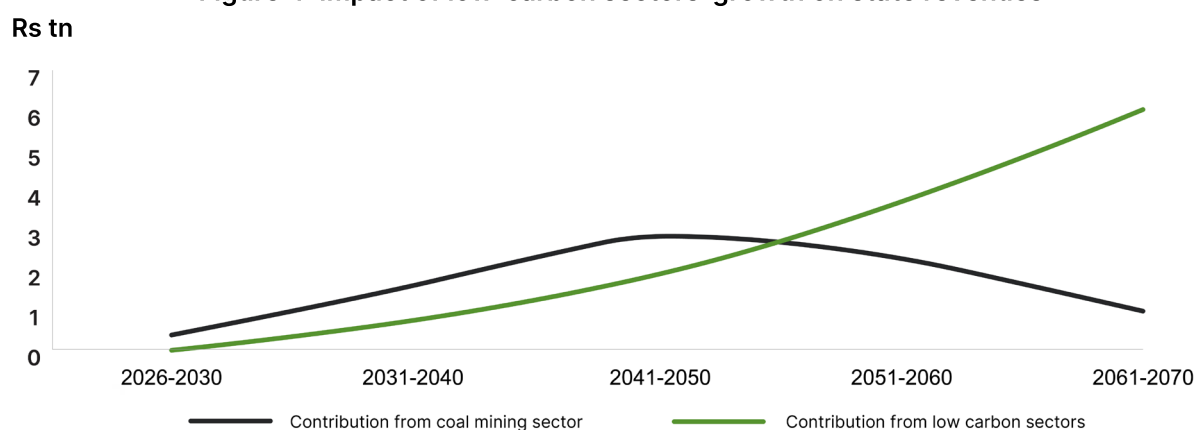
Figure 3: Phased approach for Jharkhand's Just Transition strategy



Source: IEEFA Analysis; Note: Others include investments in green hydrogen, agroforestry, and critical minerals; Investments in column X represents cumulative investments in renewables and storage, manufacturing and critical minerals.

Our projections show that a concerted effort to expand low-carbon sectors within the state can more than offset revenue losses from coal assets over the coming decades.

Figure 4: Impact of low-carbon sectors' growth on state revenues



Source: IEEFA Analysis

As illustrated in Figure 4, revenues from State Goods and Services Tax (SGST) driven by economic diversification into low-carbon industries are expected to surpass coal mining royalties after 2047, when coal revenues peak and subsequently decline through 2070. Over the full transition period (2026-70), this substitution delivers a net positive impact of about **Rs 6.7 trillion (US\$79.3 billion)** to the state budget. Importantly, this estimates only accounts for the state's own revenues (royalties and SGST) and does not include other budgetary revenue streams, including transfers from the central government.

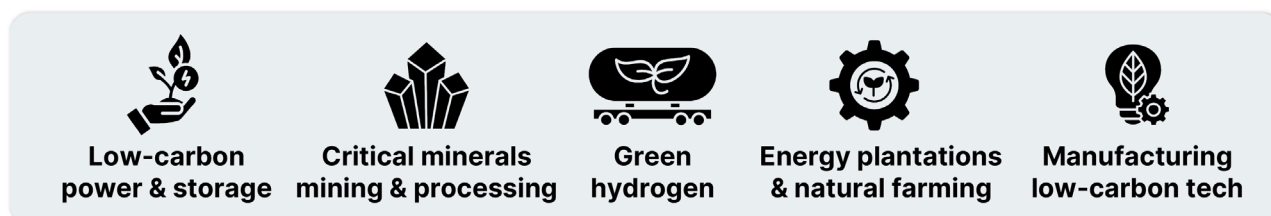
Realising this potential will require far more than sectoral investments. Transition planning must begin on priority. Building institutional frameworks, governance systems, regulatory clarity, and human capital needed for such a complex transformation will take years, if not decades. Acting early will allow Jharkhand to capture first-mover advantages, attract large-scale investment, and ensure the transition is just, inclusive, and sustainable.

The cost and the opportunity

Of the total **US\$256 billion** required over the next four decades, the bulk will go into economic diversification (**US\$206 billion**), with additional cost for coal mine reclamation (**US\$18.1 billion**), thermal power plant retirement (**US\$5.7 billion**), labour support (**US\$9.1 billion**), and community resilience (**US\$3.4 billion**).

Five priority sectors stand out for Jharkhand's economic diversification, offering high growth potential if acted upon now:

Figure 5: Priority areas for economic diversification in Jharkhand



- **Low-carbon power and storage:** With 50GW renewable energy potential, Jharkhand can become a clean power hub. Coupled with 20GWh pumped hydro storage capacity, the state can emerge as a national supplier of firm, round-the-clock clean power. This potential is supported by new renewable energy bids that mandate storage, the growing corporate power purchase agreement (PPA) market, and opportunities in power exchanges and the derivatives market.
- **Critical minerals mining:** With one of India's largest critical minerals reserves, Jharkhand is well-positioned to pioneer large-scale critical minerals mining. The state can also target mineral processing, capturing more value and skilled jobs.
- **Manufacturing low-carbon technologies:** Jharkhand's rich mineral reserves offer a natural advantage to expand into low-carbon manufacturing like solar modules, battery energy storage systems (BESS), and electric vehicles, with India's domestic supply chain push providing strong tailwinds.
- **Green hydrogen production:** Anchored by the demand from steel plants and future requirements of heavy goods vehicles, Jharkhand could emerge as a key green hydrogen

hub. A co-located hub model has been proposed in the report, for steel and a hub-and-spoke network for trucking, anchored by integrated producers.

- **Energy plantations and natural farming:** Energy plantations and natural farming can transform Jharkhand's agriculture by converting wastelands into bamboo-based energy plantations, and scaling natural farming on rainfed croplands to cut costs, improve soil health, and generate carbon credit revenues.

Table 1: Decadal cost of Just Transition for Jharkhand (in US\$ million)

Just Transition decadal cost	2026-30	2031-40	2041-50	2051-60	2061-70
Coalmine reclamation	1,270	1,297	1,218	7,099	7,257
Thermal power plant decommissioning	3	214	321	694	4,431
Labour support	140	196	270	1066	7,435
Community resilience	-	-	6	1,111	2,312
Economic diversification	5,200	24,113	26,062	53,611	97,912
Steel decarbonisation	958	1,079	5,343	5,222	-
Total Just Transition cost	7,571	26,899	33,220	68,803	1,19,347

Source: IEEFA Analysis

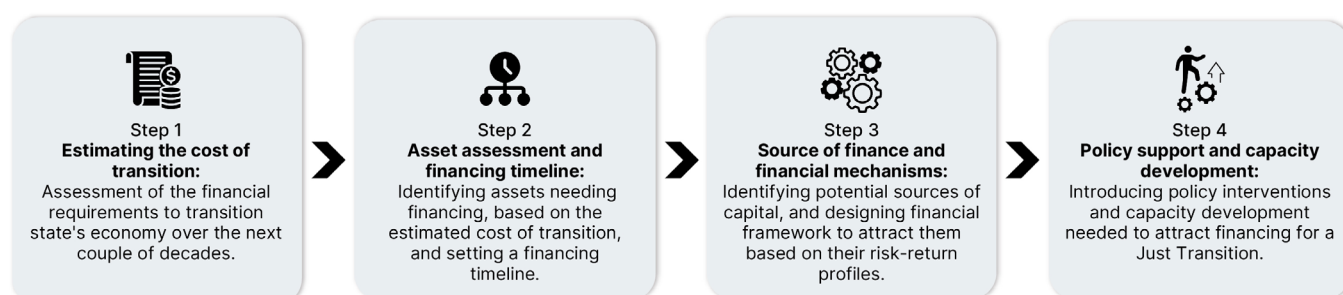
Additional opportunities exist in agriculture and allied activities, green buildings, and circular economy applications, alongside a growing potential for a services-based economy. In particular, IT and IT-enabled services, digital innovation hubs, business process outsourcing, and knowledge-based industries can create large-scale employment for Jharkhand's young workforce and diversify the state's growth model beyond traditional industries.

Together, these sectors can provide Jharkhand with a pathway to gradually replace coal dependence, create jobs, attract billions in investment, and secure a central role in India's energy transition. Acting on priority is critical to ensure that the state captures these opportunities.

Financing the Just Transition

Transitioning to a greener economy requires careful planning. The state's budgetary resources are limited, and not the most appropriate use of scarce capital to meet these requirements, making it essential to mobilise private capital and tap into public funds beyond the state's budget.

Figure 6: Creating an integrated financing strategy for Jharkhand

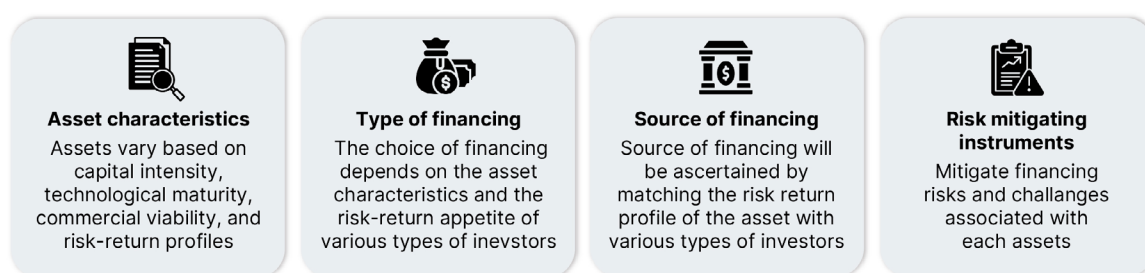


An integrated financing strategy is essential for Jharkhand to fund its Just Transition in the decades ahead. This begins with quantifying transition finance needs, followed by applying a sustainable finance framework to align assets and activities with suitable capital and instruments, while identifying the policy measures and capacity-building required to enable financing.

Sustainable finance framework

Different economic diversification assets require different types of capital from grants and concessional finance for early-stage or high-risk activities, to commercial debt and equity for more mature, revenue-generating projects. Mapping these sectors under a sustainable finance framework ensures that the right financing tools are deployed to the right activities.

Figure 7: Components of Sustainable Finance framework



Based on the analysis of different economic diversification assets, the table below maps them according to the sustainable finance framework.

Table 2: Mapping assets and activities based on sustainable finance framework

	Low-carbon power generation and storage assets					Manufacturing of low carbon assets			Green hydrogen	Sustainable land us	Critical minerals	Steel
	RE (utility scale)	DRE (solar)	BESS	Pumped storage	Bio-mass	Solar PV	BESS	Electric vehicle	GH ₂ production	Energy plantation and natural farming	Critical minerals	Steel decarb.
Asset characteristics												
Capital intensive												
Long gestation period												
Medium gestation period												
Low to moderate tech./general risk												
High Tech Risk												
Utility style												
Revenue uncertainty												
Low opex												
Low margin/loss making												
Moderate margin												

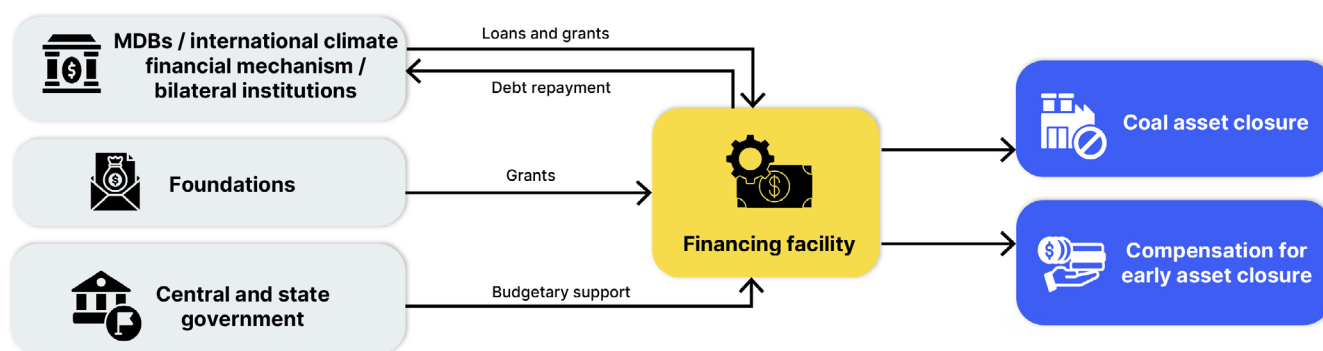
Type of financing												
Commercial loan												
Bonds												
Public equity												
Proprietary equity												
Risky equity												
Grant												
Concessional debt												
InVIT/ securitization/IDF												
Sources of financing												
Banks/NBFCs												
Institutional investors												
DFIs/MDBs												
Govt.												
Public sector financial institutions												
Corporations												
Farmers/ communities												
PEs/VCs												
Risk mitigation instruments												
Credit guarantee												
Payment security mechanism												
Insurance												

Source: IEEFA Analysis

Transitioning from fossil fuel assets

Decommissioning coal mines and TPPs will require significant capital, as existing mine-closure escrow balances are inadequate, and no equivalent regime exists for TPPs. Accelerated retirements will also need dedicated funding, including compensation for negotiated early shutdowns.

Figure 8: Structure of a coal asset closure financing facility



Source: IEEFA Analysis

A coal asset retirement financing facility/fund—jointly established by an international development agency and the Government of Jharkhand—can help bridge this gap by mobilising concessional debt and grants to cover decommissioning, compensation, independent oversight, and repurposing of sites for low-carbon uses.

India already has relevant precedents in setting up state-level financing vehicles, such as the Tamil Nadu Green Climate Fund managed through the Tamil Nadu Infrastructure Fund Management Company (TNIFMC), the Kerala Infrastructure Investment Fund Board (KIIFB) that raises capital through bonds, and Maharashtra’s innovation and technical development fund (MITDF) that channels investments via an alternate investment fund (AIF). These examples show that Jharkhand can design a tailored facility by adapting tested governance and capital-stack models to its own transition needs.

Levers required for a Just Transition

For Jharkhand to successfully navigate a Just Transition, policy and institutional reforms will be as critical as financing. The state must create an enabling environment that reassures investors, mobilises concessional finance, and builds the capacity of institutions and communities to adapt to change. Regular stakeholder engagement is also vital to ensure that policies remain responsive to emerging challenges and opportunities.

- **Developing a robust financial policy:** Jharkhand can attract low-carbon investments by creating a green sector cell to fast-track facility setup, address investor concerns, host investment events, and streamline land allocation through clear policies, designated green zones, and expedited approvals.
- **Adopting green budgeting:** Jharkhand should adopt green budgeting as a core practice, ensuring that state budgets track and prioritise climate-related spending, align fiscal planning with Just Transition goals, and increase transparency for investors and citizens on how public resources support the low-carbon shift.
- **Collaborating with MDBs:** Partnerships with multilateral development banks (MDBs) will be key to developing bankable green projects. MDB support can bring in concessional debt, credit guarantees, and risk-sharing structures, which in turn will crowd in private capital for large-scale investments.
- **Capacity building:** Capacity building for a low-carbon economy can be driven through partnerships with IITs, NITs, ITIs, and the Green Jobs Council to deliver specialised training. Grants can fund advanced curricula and hands-on training, while strengthening local banks’ capacity and product offerings for green projects can boost financing for small-scale and decentralised renewable energy (DRE) initiatives.
- **Developing an ecosystem for corporates and investors:** Encouraging local partnerships that link corporates to local supply chains can strengthen Jharkhand’s green tech ecosystem. Investor engagement can be enhanced through dedicated platforms, offering clear project pipelines, risk mitigation, and government-backed guarantees or subsidies, thereby driving private investment into green projects.

By combining policy clarity, fiscal innovation, institutional strengthening, and market facilitation, Jharkhand can create conditions for a just, inclusive, and sustainable transition.

About the Taskforce

The Government of Jharkhand has established a Task Force on Sustainable Just Transition to support national climate goals of achieving net-zero emissions by 2070, along with addressing associated socio-economic issues. The Task Force aims to provide key recommendations to the Government of Jharkhand on the sustainable transition for a future-ready Jharkhand by identifying innovative pathways for transitioning to a non-fossil fuel-based ecosystem, assessing the impact on the economy, workers and communities, identifying opportunities in green sectors, and recommending policy interventions.

About IEEFA

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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