Briefing Note

POWERING PROGRESS

Unlocking Jharkhand's Renewable Energy and Storage Potential

Introduction

Jharkhand has long been recognised as one of India's richest states in terms of mineral wealth. It holds the second-largest coal reserves in India, amounting to 87 billion tonnes[1], ranks second in iron ore, third in copper, and seventh in bauxite, while also being the country's sole producer of prime coking coal[2]. Nearly 40 percent of India's mineral reserves are found in Jharkhand[3], which for decades powered the country's steel, cement, and industrial growth.

Mining, heavy industries, and thermal power generation have given Jharkhand national significance, jobs, and revenue, but this has led to a deep dependence on fossil fuels. The significant reliance on revenues tied to coal needs to be addressed, along with impounding environmental and social issues such as widespread land degradation, air pollution, and migration. As the global and national energy landscape shifts, Jharkhand now faces a decisive moment. It can remain tied to a fossil-heavy economy or embrace its equally abundant renewable resources to build a resilient, inclusive, and sustainable future.

Why Renewables Matter for Jharkhand's Future

India has pledged to achieve 500 GW of renewable energy capacity by 2030, and has already reached the milestone of 50% installed capacity from non-fossil sources, five years ahead of schedule[4]. For Jharkhand, this national momentum offers a timely opportunity to harness its abundant solar irradiation, forest biomass, and small hydro resources for sustainable growth while maintaining industrial competitiveness.

The state's peak electricity demand is experiencing a significant increase, as highlighted in Figure 1, which shows a rising trend over the years. This growing demand makes a strong case for the development of renewable energy sources in the state. Industrial expansion, urbanisation, and new energy uses like cooling and digital infrastructure will accelerate this trajectory.

Meeting this demand primarily through coal would confine Jharkhand to a carbon-intensive future, compromise India's climate goals, and expose the state to health and economic risks.

However, renewable energy offers an alternative that can reduce coal dependence, diversify revenues, and attract clean investment.

[1] Ministry of Coal
[2] Department of Mines and Geology, Government of Jharkhand
[3] Jharkhand State Mineral Development Corporation Ltd.
[4] PIB

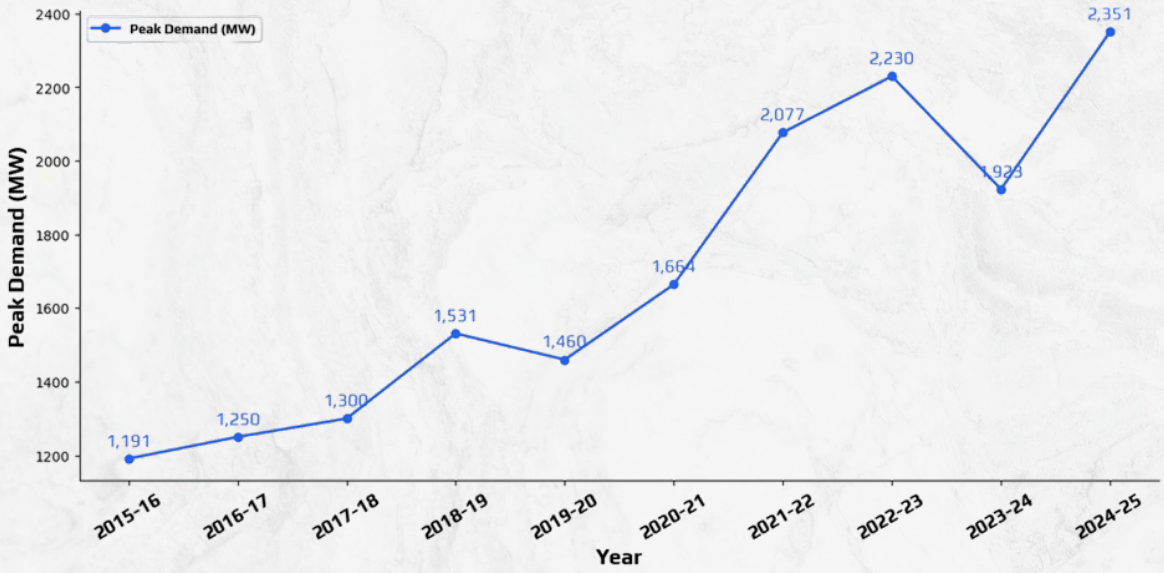

Figure 1: Peak Electricity demand of Jharkhand over the years

Source: ICED, Niti Aayog

Current Energy Landscape of Jharkhand

As of FY 2024-25, the state has an installed renewable energy capacity of just 434 MW[5], which represents only around 7% of its total energy mix, including hydro, as shown in Figure 2. In contrast, India as a whole had installed nearly 220 GW of renewable capacity by the same period, contributing 46% of its power mix.

This is notably low when compared to the national context, where India had installed approximately 220 GW of renewable energy capacity[5] by the same period, contributing around 46% to the country's overall installed power capacity. Bridging this gap is essential not only for Jharkhand's energy security and climate goals, but also for economic diversification and job creation in a state historically dependent on coal.

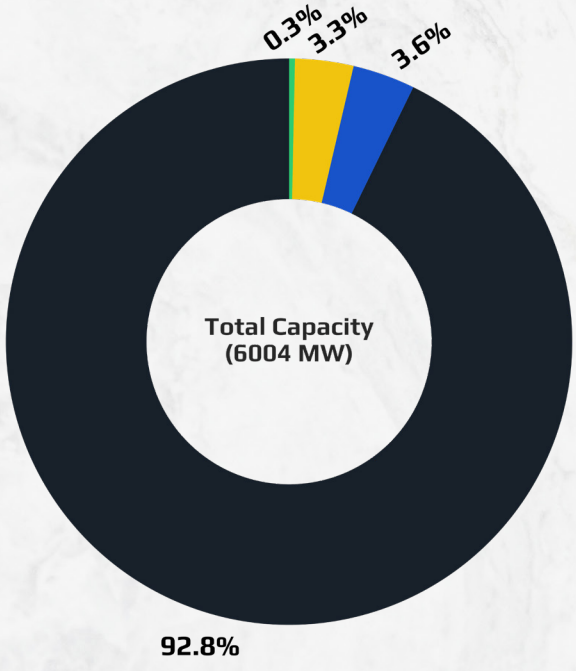

Figure 2: Installed capacity of Jharkhand as of March 2025

Source: ICED, Niti Aayog

[5] ICED, Niti Aayog

Addressing the Research Gap

One of the biggest barriers to renewable energy planning in Jharkhand has been the lack of detailed and actionable research. Earlier national assessments, such as MNRE's 18.8 GW estimate, were broad and lacked granularity.

The report presents the first of its kind comprehensive, high-resolution assessment of renewable energy potential across all 24 districts of Jharkhand, which can provide a transformative opportunity that could redefine the state's economic and environmental future. This assessment tries to fill the gap and demonstrates that the transition from coal-dependent energy systems to renewable sources is not just environmentally imperative but economically compelling, offering pathways to create green jobs while attracting investments in the state.

Key Findings: Unveiling Jharkhand's Sustainable Energy Treasure

This assessment reveals that Jharkhand has a renewable and storage potential of around 66 GW across its various blocks and districts.

Renewable Energy: Opportunities to diversify the energy portfolio

- Solar dominates with 41 GW potential: utility-scale (17.2 GW), agrivoltaics (9.4 GW), rooftop solar (6.2 GW), floating solar (6.2 GW), and concentrated solar power (1.9 GW).
- Hydropower contributes 4.1 GW, especially in hilly districts like Simdega and Singhbhum.
- Biomass and waste-to-energy can add nearly 1 GW, with Ranchi and Jamshedpur showing major potential.
- Wind adds 715 MW, useful for hybrid projects

The Storage Revolution: PHES as a Game-Changer

Pumped Hydro Energy Storage (PHES) is the game-changer, with 20 GW identified across 113 sites. This positions Jharkhand not only as a renewable generator but as a regional energy storage hub for balancing grids in eastern India. PHES technology transforms Jharkhand from a passive energy consumer to an active grid balancer, capable of storing excess renewable energy during low-demand periods and releasing it during peak hours. This capability opens entirely new revenue streams through energy arbitrage and grid services.

This diverse renewable energy portfolio positions the state to reduce reliance on any single technology, enhancing overall energy resilience and flexibility. The inclusion of Pumped Hydro Energy Storage (PHES) further expands opportunities by providing critical services such as energy security, grid stability, and additional revenue streams through storage solutions. Figure 3 highlights the districts with the highest potential across various technologies, based on detailed assessments conducted at the district and block levels, offering valuable guidance for targeted development and strategic planning.

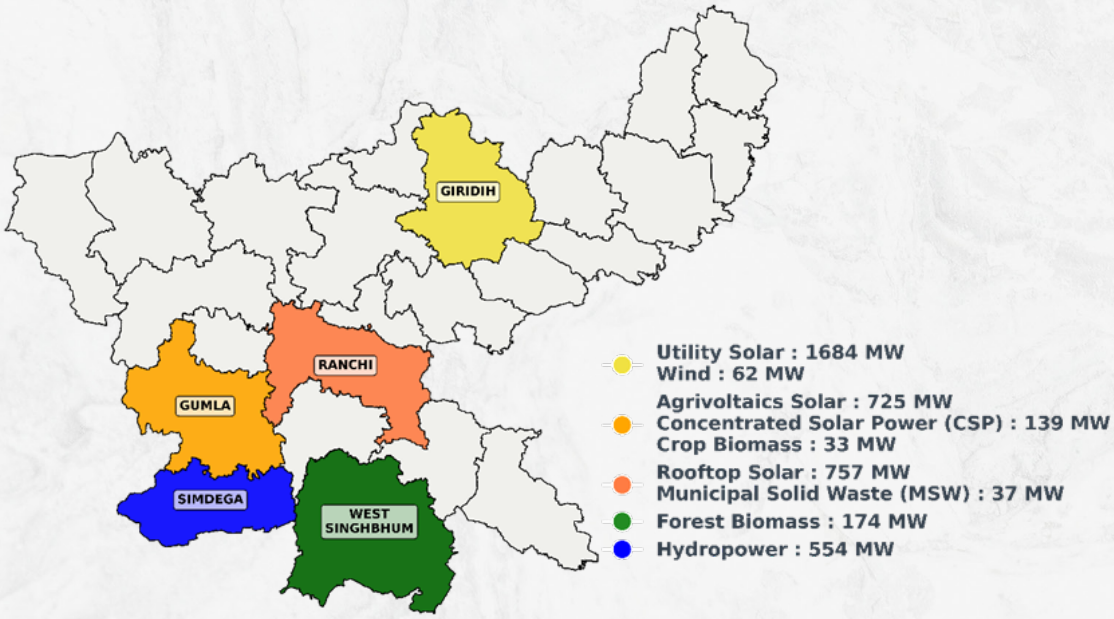

Figure 1: District having the highest potential in different renewable technologies

The Way Forward

Jharkhand has long beenpivotal to powering India's industrial growth and energy security. Its mineral wealth has powered steel, cement, and electricity generation, shaping India's economic trajectory. This assessment highlights that Jharkhand possesses 66 GW of renewable and storage potential, a scale that can not only meet its rising energy demand but also diversify its economy, generate new livelihoods, and attract clean investments. The shift from a fossil-dependent economy to one anchored in renewables will not happen overnight, but it must begin now. With decisive action, Jharkhand can transform its legacy of powering India's past into a new role: leading Eastern India's clean energy future.

For further details, please contact:

Task Force-Sustainable Just Transition (GoJ)
E-mail: sjtjharkhand.office@gmail.com

Center for Environment and Energy Development (CEED)
Email: info@ceedindia.org