



Institute for Energy Economics
and Financial Analysis

Sustainable finance for a just transition in Odisha

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Key findings

Odisha earned INR14,148 crore from coal and petroleum in financial year (FY) 2025, 13.1% of its own revenue. Fossil-fuel-dependent sectors contributed about a third of Gross Value Added (GVA), highlighting their major role in the state's economy.

Renewables account for just 11.3% against the 33.01% Renewable Purchase Obligation (RPO) target for FY2026, leaving a 21.8 percentage-point gap. The target rises to 43.33% by FY2030.

Around INR1.1 lakh crore is needed by FY2036 for 10.7 gigawatts (GW) of new renewable energy, 2.7GW of pumped storage, 0.13GW of battery storage, and transmission upgrades. Blended and concessional finance will be important to raise funds.

A three-part approach is suggested: assess transition costs, develop a sustainable finance framework, and establish a dedicated fund for public, private, and climate finance across power and other transition sectors.



Executive summary

Odisha is one of India's fastest-industrialising states and a major producer of steel, aluminium, and minerals. However, its economic and fiscal structure remains closely linked to fossil fuels and extractive industries, creating growing exposure to transition, market, and environmental risks. A structured sustainable finance framework at this time would help Odisha assess transition needs, mobilise capital, and direct investment towards renewable energy, industrial decarbonisation, and emerging green sectors while supporting a just transition.

Fiscal vulnerability from fossil-fuel dependence

Fossil-fuel revenues form an important part of Odisha's fiscal position. In financial year (FY) 2024–2025, the state received an estimated INR14,148 crore from coal and petroleum resources, equivalent to 13.1% of its own tax and non-tax revenues and 7.7% of total revenue receipts. Although this share has declined from 16.2% in FY2022–2023, it reflects stagnation in coal-related revenues rather than meaningful diversification of the revenue base. The state's economic structure is similarly vulnerable, with mining and quarrying accounting for 12.9% of Gross Value Added (GVA) and energy-intensive manufacturing contributing 20.85%. Given the importance of mineral royalties and coal-related revenues to the state's non-tax income, a sustained slowdown in fossil-fuel activity could affect fiscal stability, employment, and long-term economic growth.

Underutilisation of renewable energy potential

Odisha has substantial renewable energy potential but limited deployment. The state has an estimated solar potential of 139.5 gigawatts (GW), compared with only about 0.82GW of installed capacity. Wind potential is estimated at 12.13GW, but the state currently has no grid-connected wind capacity. Hydropower, the most mature renewable resource, has utilised only around 2.2GW of its estimated 7.6GW potential. As a result, Odisha's power system remains heavily coal-dependent. Coal-fired generation has an emission intensity of 0.969 tonnes of carbon dioxide/megawatt hour (tCO₂/MWh), compared to the Indian grid average of 0.710tCO₂/MWh. Renewables currently account for only 11.3% of the state's electricity demand, with non-hydro renewables contributing just 2.1%.

Growing Renewable Purchase Obligation (RPO) gap

With its limited renewable energy deployment, Odisha also faces a substantial RPO gap. For FY2025–2026, the national RPO target is 33.01%, while Odisha's current share is approximately 11.3%, including large hydro, resulting in a gap of nearly 21.8 percentage points. With the target rising to 43.33% by FY2029–2030, the state will require substantial additional investment to close the gap. Delayed compliance could increase power procurement costs and financial pressures on distribution utilities, with potential implications for consumers and industry.

Scale of investment required in the power sector

The Resource Adequacy Report of the Central Electricity Authority (CEA) indicates that Odisha will need to add approximately 10.7GW of renewable capacity between FY2025–2026 and FY2035–2036. This would comprise 6.25GW of solar, 1.90GW of wind, 1.93GW of distributed renewable energy (DRE), and 0.58GW of hydro. The state will also require 2.7GW of pumped storage and 0.13GW of battery energy storage, alongside significant investment in intra-state transmission infrastructure.

The combined investment requirement for renewable generation, storage, and grid infrastructure is estimated at approximately INR1.1 lakh crore over the decade. Mobilising this scale of capital will require a combination of public and private investment, concessional and blended finance, and instruments such as viability gap funding (VGF), particularly for capital-intensive technologies such as floating solar and pumped storage.

Broader financing needs beyond the power sector

The transition will extend well beyond renewable energy and power infrastructure. Odisha will require significant investment in industrial decarbonisation, green hydrogen, electric mobility and public transport, energy-efficient buildings, sustainable cooling, and other emerging low-carbon technologies. At the same time, targeted financing will be needed for just transition measures, including worker reskilling, livelihood diversification, social protection, mine closure and land restoration, and economic diversification in coal-dependent districts. These investments highlight the need to view Odisha's transition as a broader economic transformation rather than solely an energy sector shift.

A three-pronged financing strategy

Meeting these investment needs will require an integrated financing approach built around three priorities listed in the figure below.

Figure 1: Integrated financing approach under the three-pronged strategy



Source: IEEFA analysis

A comprehensive cost assessment can help identify investment requirements and priorities across sectors, while a sustainable finance framework can match different projects and risk profiles with appropriate sources and instruments of capital. A dedicated transition fund could then de-risk investments, support emerging technologies, and ensure that just transition priorities receive adequate and predictable funding.

Odisha's transition presents a fiscal challenge and an opportunity to build a more diversified and resilient growth model. A structured sustainable finance framework can help the state assess transition-related investment needs, develop a pipeline of bankable projects, mobilise public and private capital, and strengthen the capacity of state-level institutions to access emerging sources of green and transition finance. Early action can help reduce exposure to fossil-fuel-related risks while enabling Odisha to capture new investment and economic opportunities in the clean energy economy and support an equitable, orderly transition.

Introduction and context

Odisha's continued reliance on coal-based thermal power to support its industrial growth has enabled strong industrial output, employment generation, and revenue mobilisation. However, this development trajectory is deeply anchored in fossil fuels and extractive industries, creating structural dependencies that may pose significant long-term risks.

As global and national economies transition towards low-carbon and climate-resilient pathways, Odisha's current growth model faces increasing challenges. The state's fiscal reliance on fossil-fuel-linked revenues, relatively low penetration of non-hydro renewable energy, and rising decarbonisation pressures on energy-intensive industries such as steel and aluminium expose it to transition risks. Environmental degradation and climate-related risks such as extreme weather events further underscore the need to shift towards a more sustainable and diversified economic model.

In this context, adopting a structured sustainable finance framework becomes critical for Odisha. Such a framework can help the state systematically assess its transition costs, identify and mobilise diverse sources of capital, identify capacity gaps among state-level stakeholders, and channel investments into renewable energy, industrial decarbonisation, and emerging green sectors. Importantly, it can also support fiscal stability by reducing long-term exposure to fossil-fuel risks while ensuring that the transition is equitable and inclusive for communities dependent on carbon-intensive sectors.

This report examines the case for sustainable finance in Odisha across multiple dimensions. It analyses the state's fiscal dependence on fossil fuels, current gaps in renewable energy deployment, and challenges in meeting Renewable Purchase Obligations (RPOs). It further explores the scale of investment required for the renewable energy expansion and highlights the need for institutional mechanisms to enable a just and well-planned transition.

Odisha's dependence on fossil-fuel revenues

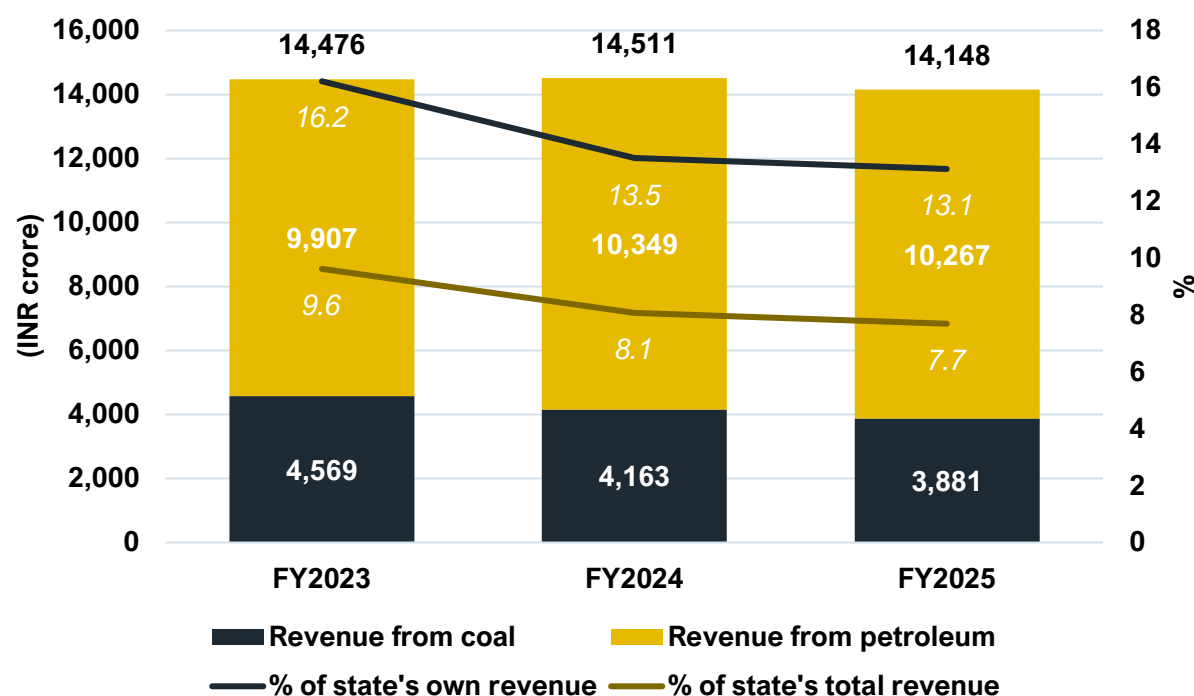
Odisha's fiscal and economic structure remains closely linked to its rich coal and mineral resources. Coal mining, mineral-based industries, and related activities contribute significantly to state revenues and economic output. While revenue dependence on fossil fuels has declined in recent years, the state remains exposed to risks from changing coal demand, market volatility, and the broader energy transition. This concentration highlights the need for a phased strategy to diversify Odisha's revenue base and economic activity.

High fossil-fuel exposure across the state economy

As per an analysis by the Institute for Energy Economics and Financial Analysis (IEEFA), in financial year (FY) 2024–2025, the state was estimated to receive approximately INR14,148 crore in direct

revenues from coal and petroleum resources. This constitutes about 13.1% of Odisha's own tax and non-tax revenues and around 7.7% of its total revenue receipts. Such a high concentration of revenues from a narrow set of fossil-fuel-linked sources exposes the state's finances to transition, market, and regulatory risks.

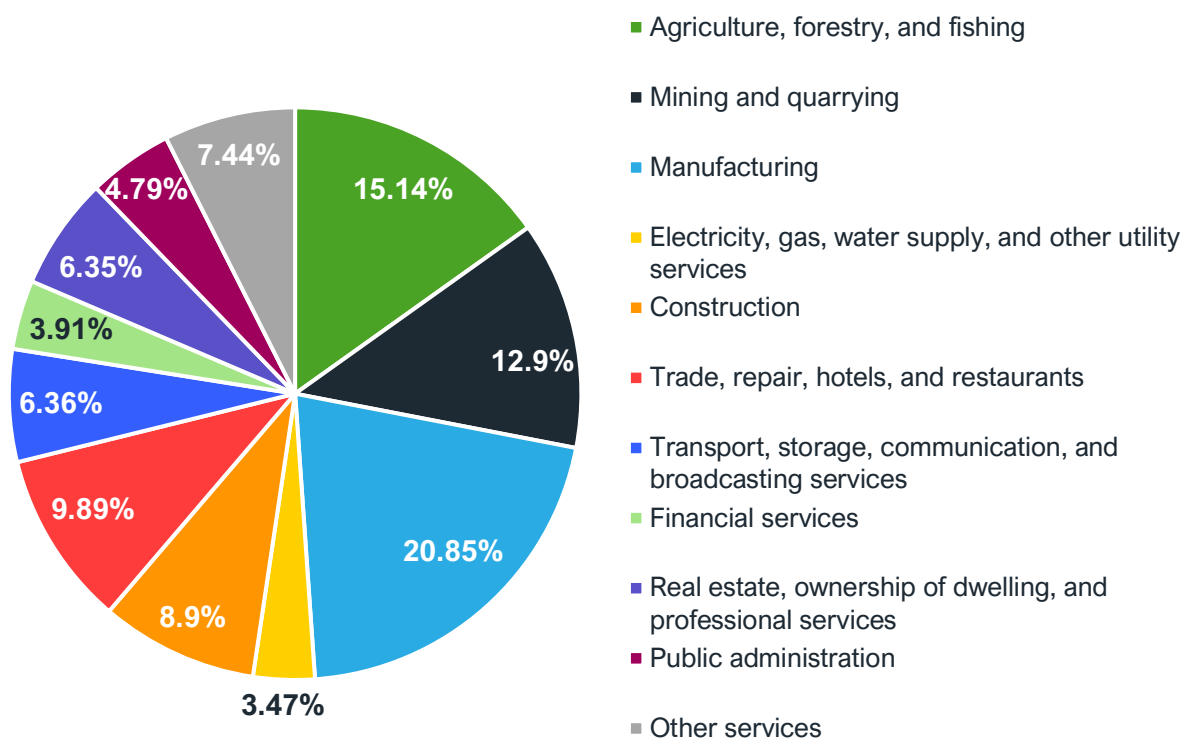
Figure 2: Odisha's fossil-fuel dependency (FY2022–2023 to FY2024–2025)



Source: IEEFA analysis, Coal India Limited annual reports, Finance accounts (Odisha), and India climate and energy dashboard (NITI Aayog)

Recent trends, however, suggest a gradual decline in this dependence. The share of own revenue directly derived from fossil-fuel sources has fallen from about 16.2% in FY2022–2023 to 13.1% in FY2024–2025. However, this apparent diversification does not reflect only growth in alternative revenue streams. It also reflects stagnation in overall fossil-fuel-linked revenues and a sharp decline in coal-related receipts in particular. This decline could be attributed to a combination of factors including moderation in coal production growth, price volatility, changing royalty regimes, and the early impacts of energy transition policies at the national and global level.

This trend signals an emerging structural risk for Odisha's public finances. Coal has historically been a stable and high-yield revenue source for the state, supporting expenditure on social welfare, infrastructure, and development programmes. A sustained slowdown or decline in coal revenues, without compensatory growth in other sectors, could constrain fiscal space and increase reliance on transfers from the central government.

Figure 3: Sectoral Gross Value Added (GVA) (at current prices) (FY2024–2025)

Source: IEEFA analysis, *India climate and energy dashboard* (NITI Aayog)

The vulnerability extends beyond state revenues to the broader economic structure. GVA data for Odisha indicates that mining and quarrying account for around 12.9% of the state's total GVA, with coal being one of the most significant contributors. In addition, manufacturing contributes approximately 20.85% of GVA, with iron and steel, aluminium, and other mineral-based industries forming the backbone of the sector.¹ These industries are highly energy-intensive and closely linked to coal pricing.

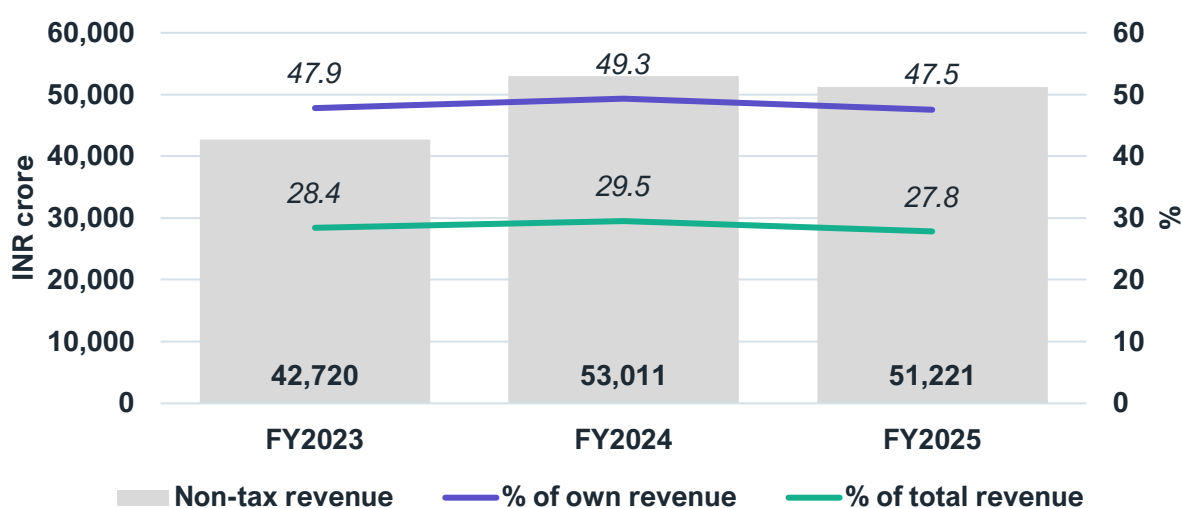
Taken together, nearly one-third of Odisha's GVA is directly or indirectly dependent on fossil-fuel extraction and consumption, exposing the state to energy transition risks. Without a planned and phased diversification strategy, the slowdown in fossil-fuel-based revenues and value addition could have significant implications for Odisha's fiscal stability, employment, and long-term growth trajectory.

¹ NITI Aayog, [India climate and energy dashboard](#)

Fiscal risks

The state's fiscal vulnerability is further reinforced by its high dependence on non-tax revenues, which account for around 47.5% of the state's own revenue. A significant portion of these revenues is derived from mineral royalties, coal-related cess, and dividends from resource-linked public-sector enterprises.² Recent trends show that non-tax revenues have also witnessed a decline in FY2024–2025, closely mirroring the slowdown in coal-related receipts.

Figure 4: Non-tax revenue in Odisha (FY2022–2023 to FY2024–2025)



Source: IEEFA analysis, Finance accounts (Odisha)

Given the inherently volatile and policy-sensitive nature of non-tax revenues, continued reliance on coal as a major source of such income exposes Odisha's fiscal position to heightened transition, regulatory, and market risks.

Low renewable energy penetration

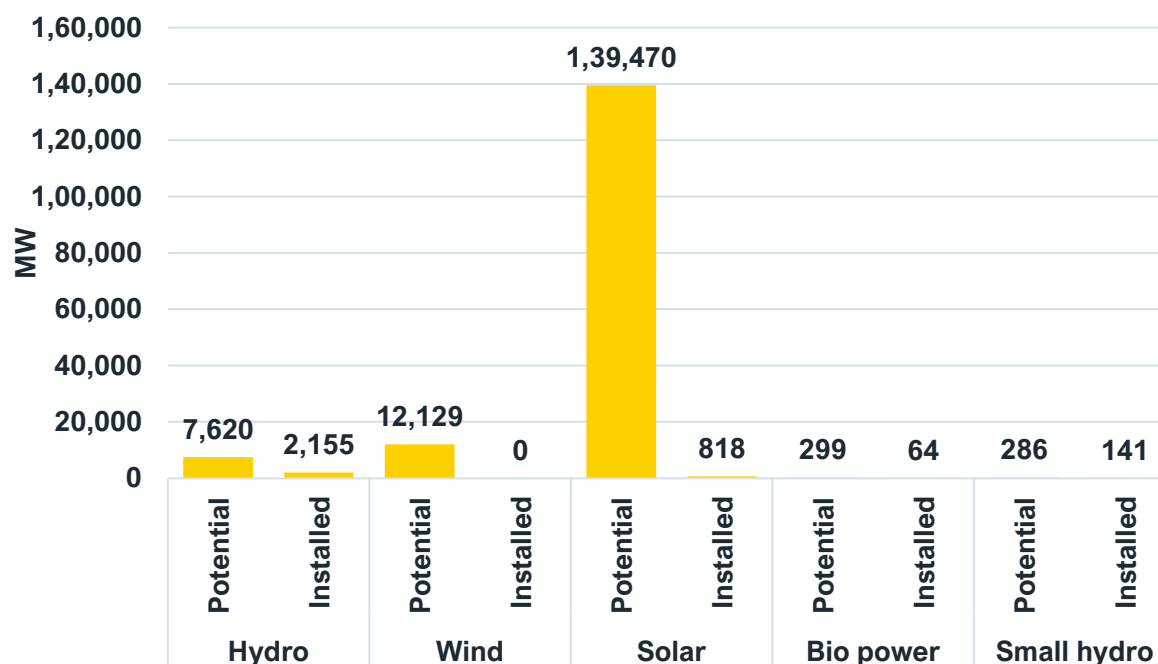
Odisha has significant renewable energy potential across solar, wind, and hydropower, but actual deployment remains substantially low. The limited uptake has kept the state's power system heavily coal-dependent while constraining opportunities to diversify its energy mix, attract new investment, and create alternative economic opportunities. Closing this gap will not only strengthen decarbonisation and energy security, but also reduce transition risks, and support long-term economic resilience.

² Principal Accountant General (A&E), [Odisha, Finance accounts \(Odisha\)](#)

Installed renewables capacity vs potential

Despite possessing substantial renewable energy resources across multiple technologies, Odisha's actual deployment of renewable energy remains significantly below its assessed potential.

Figure 5: Renewable energy potential vs installed capacity in Odisha (as of March 2026)



Source: IEEFA analysis, NITI Aayog

Hydropower represents one of Odisha's relatively mature renewable energy segments, with an estimated potential of about 7.6GW. However, around 2.2GW has been installed to date, harnessing around one-third of the available potential.³ Similarly, small hydropower projects show a moderate level of development, with installed capacity of 0.14GW against a potential of 0.29GW. While hydropower deployment faces constraints related to land acquisition, environmental clearances, and social impacts, the existing gap suggests scope for carefully planned, environmentally sensitive expansion, particularly through rehabilitation, uprating of existing projects, and run-of-the-river schemes.

The underutilisation is even more pronounced in solar and wind energy. Odisha has an estimated solar potential of approximately 139.5GW, but installed capacity stands at only about 0.82GW, representing less than 1% of the assessed potential. Wind energy has a potential of around 12.13GW but no grid-connected installed capacity at present. These figures indicate that Odisha has not been able to translate its high technical potential into actual projects. Constraints related to land

³ NITI Aayog, [India climate and energy dashboard](#)

availability, grid connectivity, and limited private investment appetite may have played a role in slowing deployment.

Consequences of low renewables penetration

Continued reliance on coal-based power generation reinforces the state's existing structural dependence on fossil fuels. This contributes to a higher carbon intensity of the power sector, with coal-fired thermal plants exhibiting an emission intensity of around 0.97 tonnes of carbon dioxide/megawatt hour (tCO₂/MWh), significantly higher than the Indian grid average of approximately 0.71tCO₂/MWh⁴. Given the dominance of such plants in meeting baseload demand, Odisha's overall power sector emissions remain elevated. As national power sector planning increasingly prioritises cleaner generation sources, Odisha's coal-heavy energy mix risks becoming misaligned with India's evolving electricity system. Apart from its environmental impact, this also increases the state's exposure to transition risks, including potential underutilisation of thermal assets and reduced competitiveness of its energy-intensive industries.

Low renewable adoption also exposes Odisha to growing regulatory and compliance risks as India advances towards its Nationally Determined Contribution targets and its net-zero commitments. Stricter emissions norms, RPOs, and carbon-related regulations could raise compliance costs for utilities and industries, translating into higher long-term power costs for consumers and the state. Without a timely scale-up of renewable energy, Odisha risks locking itself into costlier and more rigid power supply arrangements, while missing opportunities to benefit from declining renewable energy tariffs, enhanced energy security, and new investment flows.

Odisha's RPO challenge

At present, Odisha meets only about 11.3% of its electricity demand from renewable energy sources, with the majority of this contribution coming from large hydropower. Excluding large hydro, the share of other renewable sources such as solar, wind, and bioenergy remains at around 2.1% of total electricity generation.

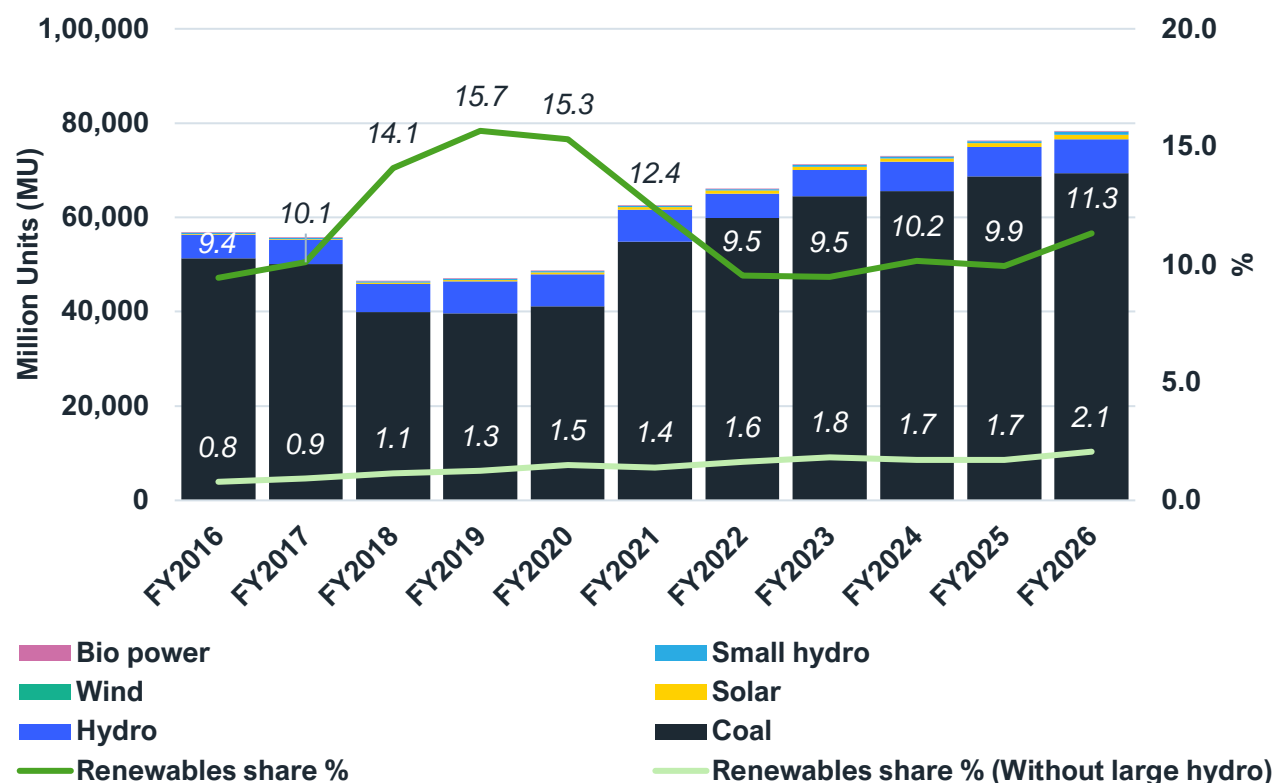
As the figure indicates, coal drives most of the growth in power generation and the existing renewable share is largely driven by legacy hydro capacity, while new renewable deployment remains limited. The share of renewable energy, including large hydro, stabilised at around 9–11% in FY2025–2026. When large hydro is excluded, the share of modern renewables such as solar, wind, and bio power remains low, increasing from 0.9% to about 2.1%.

As per the notification issued by the Ministry of Power, each state is required to meet specified RPO targets, which outline the minimum share of electricity that must be sourced from renewable energy.

⁴ CEA, [CO₂ baseline database for the Indian power sector](#), November 2025

For FY2025–2026, these targets collectively imply that states should meet 33.01% of their electricity consumption from renewable sources, with distinct sub-targets for solar, wind, hydro, and other technologies.⁵

Figure 6: Electricity generation by source in Odisha (FY2016–2017 to FY2025–2026)



Source: IEEFA analysis, India climate and energy dashboard (NITI Aayog)

In the case of Odisha, the current share of renewable energy generation remains significantly lower, at 11.3% even after including large hydro. This indicates a substantial gap of nearly 21.8 percentage points compared to the mandated targets. Without timely and large-scale investments in renewable energy capacity, this gap is likely to widen further, increasing the compliance burden on power utilities as they strive to meet regulatory requirements. This, in turn, could lead to higher procurement costs and greater financial stress on utilities. Addressing this gap proactively would therefore be critical not only to mitigate regulatory non-compliance risks but also to avoid escalating costs and to capture opportunities in the clean energy transition.

⁵ Ministry of Power, Government of India, [Renewable Purchase Obligation \(RPO\) and Energy Storage Obligation Trajectory till 2029–30](#), July 2022

Table 1: Renewable Purchase Obligation (RPO) (FY2024–2025 to FY2029–2030)

Year (FY)	Wind	Hydro	Distributed renewable energy	Other renewable energy	Total
2024–25	0.67%	0.38%	1.50%	27.35%	29.91%
2025–26	1.45%	1.22%	2.10%	28.24%	33.01%
2026–27	1.97%	1.34%	2.70%	29.94%	35.95%
2027–28	2.45%	1.42%	3.30%	31.64%	38.81%
2028–29	2.95%	1.42%	3.90%	33.10%	41.36%
2029–30	3.48%	1.33%	4.50%	34.02%	43.33%

Source: Ministry of Power, Government of India.

Investment priorities: Renewable energy, storage, and grid integration

To support the expansion of its power system over the next decade, Odisha will need substantial investment in renewable energy generation, energy storage, and grid infrastructure. The Resource Adequacy Report of the Central Electricity Authority (CEA) projects significant additions to renewable energy capacity between FY2025–2026 and FY2035–2036, alongside investments in storage and intra-state transmission infrastructure. Taken together, these requirements point to an estimated INR1.1 lakh crore of investment over the period.

Scaling up renewable energy capacity

The CEA's resource adequacy analysis indicates that Odisha would need to add approximately 10.7GW of renewable energy capacity between FY2025–2026 and FY2035–2036.⁶ Solar accounts for the largest share of the projected additions at 6.25GW, followed by distributed renewable energy (DRE) at 1.93GW, wind at 1.90GW and hydro at 0.58GW. The projected capacity mix indicates that

⁶CEA, [Resource Adequacy Study Report](#), November 2025

solar and decentralised renewable energy will be the principal drivers of Odisha's renewable energy expansion.

Based on the technology-specific cost assumptions used in this analysis, these capacity additions would require approximately INR73,566 crore of investment. The annual investment requirements vary depending on the timing of capacity additions, with the highest investment needs expected during FY2029–FY2031.

Table 2: Renewable energy capacity and investment requirements in Odisha

Year (FY)	Hydro (MW)	Wind (MW)	Solar (MW)	DRE (MW)	Total (MW)	Investment requirement (INR crore)
2025–26	161	102	773	572	1,608	9,822
2026–27	36	793	0	338	1,167	8,382
2027–28	19	0	70	0	89	593
2028–29	104	148	167	273	692	5,455
2029–30	94	853	600	322	1,869	13,978
2030–31	0	0	1,540	77	1,617	9,260
2031–32	107	0	300	68	475	4,006
2032–33	0	0	700	65	765	4,862
2033–34	0	0	700	68	768	5,108
2034–35	63	0	700	70	833	6,481
2035–36	0	0	700	72	772	5,619
Total	584	1,896	6,250	1,925	10,655	73,566

Source: IEEFA Analysis, Resource Adequacy Report (Odisha) (CEA)

The projected renewable capacity is heavily concentrated in solar, while wind additions are relatively limited after the initial years, and hydro additions remain modest. This could increase the system's dependence on solar generation and, in turn, the need for complementary storage, flexible generation, and grid infrastructure.

Land availability could also become an important constraint for large-scale ground-mounted solar projects. Odisha could partly address this by expanding floating solar, particularly given its extensive network of reservoirs and dams. However, floating solar generally involves higher capital costs than conventional ground-mounted projects and could therefore increase the overall financing requirement and may need instruments such as Viability Gap Funding (VGF), concessional finance, or blended finance to maintain project viability and affordability.

Storage critical for renewable energy integration

The expansion of variable renewable energy will also require additional energy storage to manage fluctuations in generation and improve system flexibility. The CEA estimates that Odisha will need around 2.7GW of pumped storage project (PSP) capacity and 0.13GW of battery energy storage system (BESS)⁷ capacity by FY2033–2034. While Odisha's rivers and reservoirs could provide a strong basis for developing pumped storage capacity, project development will depend on site suitability, environmental considerations, transmission connectivity, and financing.

Table 3: Storage capacity and investment requirements in Odisha

Year (FY)	PSP (MW)	BESS (MW)	Investment required (in INR crore)
2025–26	0	0	0
2026–27	0	0	0
2027–28	0	125	683
2028–29	0	0	0
2029–30	500	0	3,876
2030–31	500	0	4,050
2031–32	600	0	5,079
2032–33	600	0	5,307

⁷ CEA, [Resource Adequacy Study Report](#), November 2025

2033–34	500	0	4,622
2034–35	0	0	0
2035–36	0	0	0
Total	2,700	125	23,616

Source: IEEFA analysis, Resource Adequacy Report (Odisha) (CEA)

Based on the cost assumptions used in this analysis, the proposed storage capacity would require approximately INR23,616 crore of investment. The bulk of this investment is concentrated between FY2029–2030 and FY2033–2034 when the proposed PSP capacity is scheduled to be developed.

The timing of these investments is important. Storage cannot be treated as a standalone addition to renewable capacity; it needs to be developed in parallel with generation and transmission infrastructure. Early planning and project development will therefore be important to ensure that storage capacity is available when the share of variable renewable generation increases.

Grid investment essential for integration

The expansion of generation and storage capacity will need to be supported by corresponding investments in Odisha's transmission network. The CEA estimates that, by FY2034–2035, the state will require 22,680 megavolt-ampere (MVA) of transformer capacity additions or augmentation, 4,837 circuit kilometres (ckm) of new transmission lines, 295ckm of reconductoring, and 146ckm of underground cabling. The estimated cost of these intra-state transmission investments is approximately INR12,798 crore.⁸

Table 4: Intra-state transmission investment requirements

Year (FY)	Capacity addition (MVA)	Transmission line addition (ckm)	Reconductoring (ckm)	Underground cable (ckm)	Investment required (in INR crore)
2026–27	2,560	985	221	98	2,397
2027–28	4,360	322	74	48	1,884
2028–29	4,240	1,322	0	0	1,947

⁸ CEA, [Transmission Resource Adequacy Study Report](#)

2029–30	3,660	960	0	0	2,973
2030–31	2,000	114	0	0	590
2031–32	3,000	106	0	0	741
2032–33	1,000	766	0	0	1,373
2033–34	0	0	0	0	0
2034–35	1,860	262	0	0	893
Total	22,680	4,837	295	146	12,798

Source: Resource Adequacy Report (Odisha) (CEA)

In addition to transmission expansion, Odisha will need investments in distribution-level infrastructure and reactive power compensation to address potential voltage and power-quality issues. Strengthening the grid will be particularly important as renewable capacity becomes more geographically dispersed and as electricity flows become more dynamic across the state.

Overall investment requirement

The CEA's projections should be viewed as a planning baseline rather than a ceiling on future investment requirements. The analysis assumes an annual electricity demand growth rate of 4.01%, based on Grid Corporation of Odisha's (GRIDCO) projections.⁹ However, electricity demand could grow faster if industrial investments associated with the state's various memorandums of understanding materialise and if Odisha succeeds in attracting energy-intensive sectors such as data centres¹⁰. Higher-than-projected demand would create additional requirements for generation, transmission, distribution, and storage infrastructure.

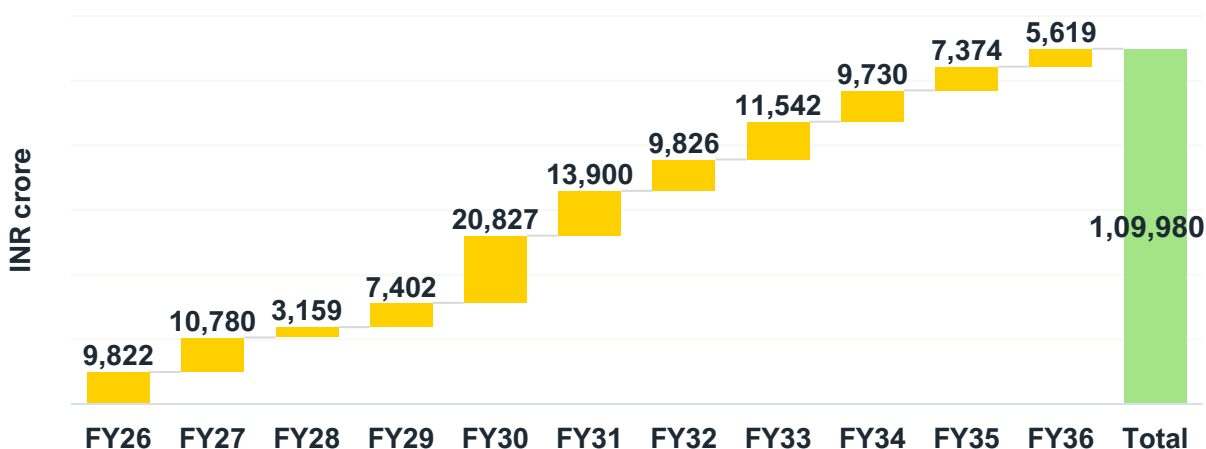
Based on the capacity and infrastructure requirements assessed above, Odisha would require approximately INR1,09,980 crore of investment between FY2025–2026 and FY2035–2036. Renewable energy accounts for INR73,566 crore (67%), storage for approximately INR23,616 crore (21%), and grid infrastructure for INR12,798 crore (12%). The concentration of investment in renewable generation reflects the scale of capacity additions required, while the significant storage requirement highlights the growing importance of flexibility as the renewable share increases.

⁹ CEA, [Resource Adequacy Study Report](#), November 2025

¹⁰ HCL tech, [HCLTech announces AI Data Center in Bhubaneswar in partnership with Sarvam and Government of Odisha](#), July 2026

Investment requirements are projected to peak at approximately INR20,827 crore in FY2029–2030, followed by INR13,900 crore in FY2030–2031 and INR11,542 crore in FY2032–2033. This suggests that Odisha will need to mobilise capital well ahead of the years in which investment requirements peak, particularly for projects with long development and construction timelines such as PSPs, hydro, and transmission infrastructure.

Figure 7: Investment required in renewable energy and grid integration in Odisha



Source: IEEFA analysis, Resource Adequacy Report (Odisha) (CEA)

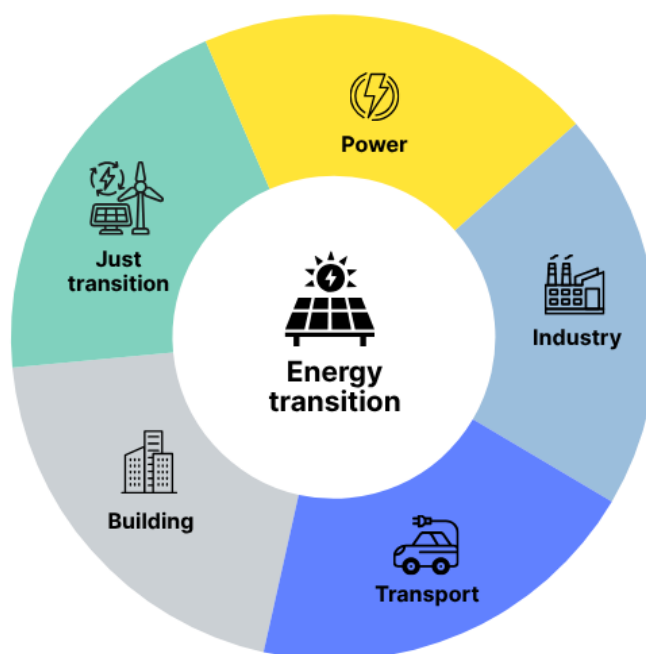
The investment requirement also points to the need for a coordinated financing and implementation strategy. Mobilising capital for renewable generation alone will not be sufficient. Odisha will need to align renewable energy development with investments in storage, transmission, and distribution while creating conditions for greater private-sector participation.

Odisha's significant renewable energy potential also provides an opportunity to go beyond meeting its own electricity requirements. With appropriate investment in generation, storage, and grid infrastructure, the state could potentially develop a larger role in supplying renewable electricity to other states. The key challenge will be to ensure that generation capacity, grid infrastructure, and financing are developed in a coordinated manner, so that renewable capacity additions translate into reliable and economically useful electricity rather than creating integration bottlenecks.

Financing needs beyond the power sector

Beyond the power sector, Odisha's clean energy transition will require substantial investments across a broader set of interconnected sectors. These include decarbonisation of industrial sectors such as steel, cement, and chemicals, apart from development of a green hydrogen ecosystem, including production, storage, transport, and end-use applications. The transport sector will require accelerated investments in electric mobility, charging infrastructure, and modal shifts towards more energy-efficient systems such as rail and public transport. In parallel, the buildings and urban systems sector will need investments in energy efficiency and sustainable cooling solutions to manage growing electricity demand. Emerging clean technologies and other low-carbon innovations will also play a critical role in supporting long-term decarbonisation pathways.

Figure 8: Key investment sectors for energy transition



Source: IEEFA analysis

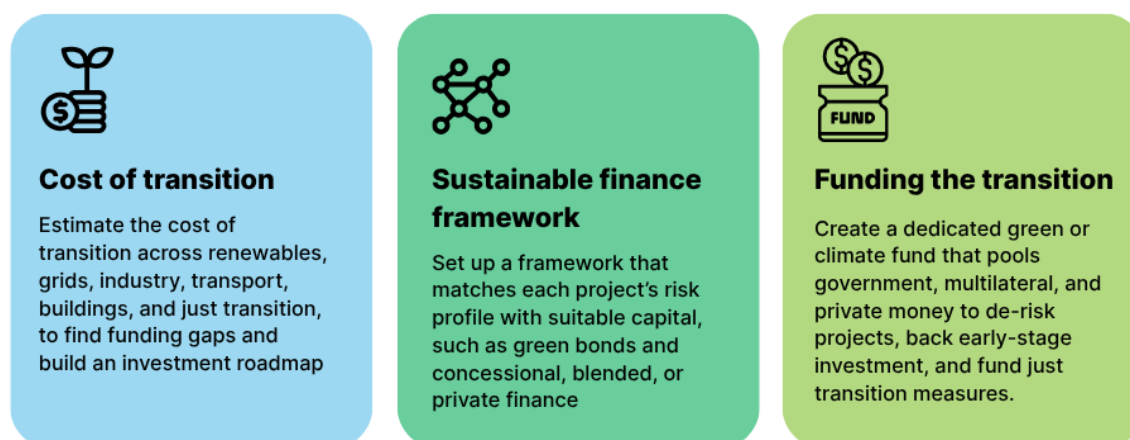
Odisha will also require significant investments to support just transition efforts, given its structural dependence on coal and allied industries for revenue, employment, and regional economic stability. The transition away from fossil fuels could have substantial socio-economic implications, particularly for workers, communities, and districts reliant on coal mining and thermal power generation. Addressing this challenge will necessitate targeted investments in reskilling and livelihood diversification, social protection measures, economic diversification of coal-dependent regions, and strengthening of local infrastructure and institutions.

A well-planned just transition strategy will therefore be critical to ensure that the shift to a low-carbon economy is both inclusive and equitable, while minimising adverse impacts on vulnerable stakeholders. Evidence from similar analyses, including the IEEFA Jharkhand Just Transition Financing Report,¹¹ highlights that these components can constitute a significant share of overall transition financing needs and require early and coordinated policy attention.

Financing Odisha's just energy transition: A three-pronged strategy

Odisha's current dependence on coal, energy-intensive industries, and mineral-based revenues makes a clean energy transition complex. It requires careful planning and significant financial resources. However, Odisha has the potential to make significant progress in clean energy, green industrial development, and just transition pathways. To achieve this, the state needs a structured and integrated approach to financing the transition. This chapter proposes a three-pronged strategy: (i) understanding the full cost of transition, (ii) developing a sustainable finance framework to align capital with investment needs, and (iii) creating a dedicated financing mechanism to mobilise and pool resources.

Figure 9: Proposed financing strategy for Odisha's energy transition



Source: IEEFA analysis

Understanding the cost of transition

The first and most critical step for Odisha is to develop a comprehensive and granular understanding of the cost of transition across various sectors. The transition extends well beyond renewable energy

¹¹ IEEFA, [Jharkhand's Just Transition: A roadmap for economic growth and diversification](#), November 2025

deployment alone. While preliminary estimates suggest that renewable energy sector (including storage and transmission) alone could require investments of around INR1.1 lakh crore over the next decade, the inclusion of these additional components will substantially increase the overall financing requirement.

Experience from similar analyses, particularly IEEFA's Jharkhand Just Transition Report, highlights the importance of adopting a whole-of-economy perspective. The Jharkhand analysis shows that while power sector investments form a significant share of total costs, a substantial portion arises from non-power sectors such as industry decarbonisation, transport electrification, and investments linked to just transition measures. It further underscores that costs related to mine closure, land restoration, worker reskilling, and economic diversification in coal-dependent areas can be material and must be explicitly accounted for in transition planning.

A similar robust cost assessment in Odisha should adopt a sectoral approach that would capture both capital and lifecycle costs, including investments in charging infrastructure, public transport systems, building retrofits, distributed energy solutions, and digital and grid integration technologies. Expenditures related to the just transition listed above must be systematically accounted for. The assessment should also incorporate multiple scenarios based on policy ambition, technology pathways, and market conditions, enabling the state to evaluate trade-offs between delayed and accelerated transition pathways.

Developing such a comprehensive cost framework will support more effective fiscal planning and prioritisation of public resources, while helping align state-level strategies with national and global climate commitments. It can also provide greater visibility to investors and development partners on the scale, timing, and distribution of investment opportunities across sectors. This, in turn, can improve investor confidence, facilitate capital mobilisation, and support a more coordinated and efficient transition process in Odisha.

Developing a sustainable finance framework

Once the investment requirements are clearly understood, Odisha needs to establish a sustainable finance framework to map them to appropriate sources of capital. Different transition assets carry different risk-return profiles and, therefore, require tailored financing solutions. For example, utility-scale renewable energy projects may attract private sector investment due to their relatively stable cash flows, whereas emerging technologies such as green hydrogen or industrial decarbonisation may require concessional finance, VGF, or blended finance structures to become viable.

Figure 10: Sustainable finance framework

Source: IEEFA analysis

A robust sustainable finance approach begins with a clear understanding of asset and market characteristics, including capital intensity, technology maturity, gestation period, and revenue certainty, all of which shape project viability. These factors feed into the risk-return profile, where construction, offtake, policy, and technology risks determine expected returns and investor appetite. Based on this, an appropriate financing structure can be designed, combining debt, equity, and public or concessional capital from domestic and international sources, including climate finance institutions.

To enable investment at scale, risk mitigation measures and enabling conditions play a critical role. Instruments such as guarantees, payment security mechanisms, and blended finance help de-risk projects, while strong policies and institutional capacity improve investor confidence. At the same time, financing strategies must go beyond individual projects to incorporate system-level and just transition considerations, including socio-economic support such as reskilling and regional diversification. Together, these elements ensure that the transition is not only financially viable but also inclusive and sustainable.

Creation of a dedicated transition fund

Given the scale and complexity of financing required, Odisha would benefit from establishing a dedicated transition fund to pool resources and channel investments strategically. Such a fund could act as a central vehicle to mobilise capital from multiple sources, including state and central government allocations, multilateral and bilateral finance, climate funds, and private sector

contributions. By aggregating resources, the fund can achieve scale, reduce transaction costs, and enhance the effectiveness of financing interventions.

The transition fund could be structured to provide a mix of financial instruments, including grants, concessional loans, guarantees, and equity support. It can play a catalytic role by de-risking investments in emerging technologies, supporting early-stage projects, and crowding in private capital. For instance, it could provide VGF for distributed renewable energy projects, support pilot projects for industrial decarbonisation, and finance just transition initiatives in coal-dependent regions.

Importantly, the fund can also ensure that social dimensions of the transition are adequately addressed. Dedicated windows can be created for worker reskilling, community development, and economic diversification. Strong governance, transparency, and accountability mechanisms will be essential to ensure effective utilisation of resources and to build trust among stakeholders and investors.

Way forward

Odisha stands at a critical juncture in its development journey. It must balance its continued industry-led economic growth with the transition to a cleaner and more resilient economy. A forward-looking roadmap should begin with a clear assessment of the full cost of transition, covering investments in renewable energy, industrial decarbonisation, grid strengthening, and social support systems for affected communities. Alongside costs, the state should also account for long-term benefits such as reduced fuel dependency, improved efficiency, and job creation in emerging sectors. Establishing this evidence base will help Odisha build a compelling investment case and guide policy decisions.

Odisha further needs a structured approach to mobilise finance and implement the transition effectively. Developing a practical sustainable finance framework will be key to identifying appropriate sources of capital for different types of investments, aligning risk profiles with financing instruments, and attracting both public and private capital. As part of this roadmap, the state could establish a dedicated transition fund to pool resources from government budgets, development partners, and private investors, while prioritising high-impact and socially inclusive projects. Strengthening institutional coordination, building capacity across departments, and creating a robust pipeline of bankable projects will be essential to translate plans into action. With a well-defined roadmap and strong stakeholder engagement, Odisha can manage its transition in a way that is fiscally sound, socially inclusive, and economically transformative.

Annexure 1: Methodology for estimating renewable energy investment requirements in Odisha

This analysis uses a benchmark-based approach for estimating capacity additions and capital costs. The installation requirements are based on the CEA's Resource Adequacy Report for Odisha. Capital cost assumptions are drawn from CEA benchmarks and supplemented with industry evidence, with minor adjustments to reflect Odisha-specific conditions¹².

Technology	Reference cost range (INR crore/MW)	Value used (INR crore/MW)	Key reason
Solar (utility-scale)	4.1–4.5	4.5	Mature technology, Odisha conditions broadly aligned with national average
Wind (onshore)	6.0–7.0	6.8	Moderate wind resource, slightly higher logistics costs
Hydropower	6–20	12.0	Terrain, Rehabilitation and Resettlement (R&R), and site-specific risks increase costs
DRE (solar)	5–8*	6.5	Smaller systems, higher Balance of System (BOS) and decentralised deployment costs
PSP, 8-hour	5–7.5	6.5	Broad CEA reference range; INR6.5 crore/MW also supported by ICRA's base-case PSP assumption ¹³
BESS, 4-hour	4.72–8.22	5.0	Lower-end planning assumption reflecting declining BESS costs and economies of scale

*Derived from rooftop solar, mini-grid, and decentralised system benchmarks.

All cost assumptions are expressed in current prices and escalated over the modelling horizon using a uniform inflation factor. The analysis assumes an annual inflation rate of approximately 4.5%, consistent with the medium-term inflation target of the Reserve Bank of India (4% ±2%). A uniform inflation rate is applied across technologies for simplicity and transparency.¹⁴ However, it is acknowledged that different cost components may evolve differently over time. For instance,

¹² Central Electricity Authority (CEA), [Resource Adequacy Report for Odisha](#), November 2025

¹³ Investment Information and Credit Rating Agency, [Strong policy focus on pumped storage hydro schemes to encourage rapid development](#), March 2023

¹⁴ Reserve Bank of India, [Minutes of the Monetary Policy Committee Meeting April 4–5, 2018](#), April 2018

renewable technologies such as solar and wind may experience cost moderation due to technological advancements and economies of scale, while construction-intensive technologies such as hydropower may face higher cost escalation due to input price volatility and implementation risks.

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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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