

Facilitating a Transition Away from Coal in India

Introduction

India's commitment at the recently concluded 26th Conference of Parties (COP26) meeting of the United Nations Framework Convention on Climate Change (UNFCCC) at Glasgow will be a game-changer for determining the future energy mix of India. At this platform, the Prime Minister of India, Narendra Modi, delivered the *Panchamrit – the five-point agenda* India adopted in combatting climate change. It includes:

- raising the non-fossil fuel-based energy capacity of the country to 500 GW by 2030;
- meeting 50 percent of India's energy requirements using renewable energy sources by 2030;
- reducing the total projected carbon emission by one billion tonnes between 2021 and 2030;
- reducing the carbon intensity of the economy to less than 45 percent by 2030; and
- becoming carbon neutral and achieving net-zero emissions by the year 2070.

The Indian government is currently trying to facilitate a shift from a conventional to an alternative energy base. However, while reducing our reliance on fossil fuels like coal, several challenging questions emerge: Who is bearing the brunt of this process that will inevitably induce structural shifts in the Indian economy? While the targets mentioned above sound promising on paper, in reality, would they prove to be just as promising for those on the lowest rungs of the socio-economic ladder? Will the entire process be inclusive enough to ensure their distributive justice in terms of its potential gains resulting from reduced electricity bills, improved environmental balance, and climatic conditions? A careful assessment of all these is imperative while deliberating on this transition.

The Indian power sector (conventional) has been responsible for a substantial percentage of (68.7 percent of India's total GHG emissions)¹ Green House Gas Emission further contributes to global GHG emission. This is why the carbon footprint² of the Indian energy sector has always been on the global

radar. Given this context, attaining the targets set by India at the COP26 and facilitating a transition away from coal-based power generation necessitates adopting greener pathways that are in conjunction with its growth and human development targets. This, in turn, mandates addressing two key challenges -

Firstly, the relevance of conventional coal-based energy systems like thermal power plants cannot be ignored since more than 70 percent of India's electricity comes from these thermal-based electricity generation plants dependent on coal.³ The power demand is even set to rise as the economy recovers from the blows of the pandemic. Predictions say that the overall coal demand for the power

sector may increase from 672 Mt in 2017 to 827-1,277 Mt by 2030.⁴

Secondly, the anticipated energy transition from conventional coal-based to renewable energy systems comes with severe social, economic, and environmental impacts.

It is imperative that attaining the COP26 targets be *JUST*, to minimise socio-economic adversities, especially on the economically vulnerable sections at the grassroots. Thus, the central idea behind Just Transition in the Indian context would be to switch from a heavily capitalised, coal-based, centralised energy system to an eco-friendly, decentralised energy system by placing the Communities and the Workforce at the core.



The underlying objective is to overcome distributive and welfare challenges and proceed towards a better sustainable, greener tomorrow across all stakeholders, including the affected communities, government, regulators, and civil society organizations.

First, let us see the challenges associated with a transition away from coal in the next section.

Challenges

1. **Spatial Mismatch:** The majority of the fossil fuels reserves in India, such as coal mines and natural gas, are concentrated in central and eastern India (in West Bengal, Chhattisgarh, Jharkhand, Odisha, and Madhya Pradesh), which are considered 'resource-rich.' Whereas, the solar and wind energy resources required for the flourishing green energy sector are concentrated in the western part of the country, in the states of Rajasthan and Gujarat.

Thus, a spatial mismatch (portrayed in detail in the tables) exists between the concentration of fossil fuels in the country and its renewable resources. A similar mismatch exists in new investments being made, which predominantly focuses on the renewable sector.

2. **Internal Migration:** While the majority of the job losses in the coal sector will be experienced mainly by the coal-rich eastern part of the country, green jobs will be concentrated in the western and southern part due to the high resource potential of the region in terms of renewables.

This will eventually result in job-induced migration of a large workforce across regions, although the socio-economic impact of the same will differ from state to state. Due to age and other demographic barriers, the possibility of re-skilling the affected or displaced workforce for the RE sector jobs might be challenging.

3. **Not Labour Intensive:** Challenges associated with this Energy Transition process will be manifold in regions where coal plays a central role in economic development. It is said that each formal coal job induces 3 to 10 additional jobs in the coal mining district.⁵

With the high dependence on coal mining for income, a sizeable proportion of informal workers exist in and around these mines. The transition will affect the coal workers directly employed in the mines and several other stakeholders associated with this sector and region. This highlights

that a sudden shift from coal to renewables is not optimal for India, considering the more extensive eco-system coal is associated with. Jobs in the renewable sector are not labour-intensive except for the construction phase.

As a result, they are not at the scale where they can offset or counterbalance the formal and informal unemployment that would stem from the closure of coal mines in India.

4. **Community Displacement and Compensation Packages:** The vulnerable sections of the society, like landless labourers and women, shoulder the most significant impacts of the coal value chain disruption but gain very little from it. Yet surprisingly, their perspectives are hardly considered in the mainstream policy deliberations.

The compensatory packages offered to the local communities by the coal mine authorities or government often fail to account for several factors such as deterioration of water quality, biodiversity loss, and long-term health impacts on local inhabitants.⁶

On the other hand, acquiring land for RE installations from people without formal land rights

implies that these people will not claim compensation.

5. **Other Concerns:** The numerous environmental and health hazards are associated with coal mines. Apart from sound and water pollution, restoration and maintenance of the mining sites are not regular, with coal companies constantly trying to cut corners. The coal washery further adds to environmental pollution.

The RE poses lesser threats to the environment and health. However, aspects like recycling solar panels and the impact of windmill transmission lines on wildlife should also be factored in a while facilitating the transition.

Table 1 and Table 2 underline this spatial contradiction of Conventional resources and RE capacities.^{7,8}

Table 1: Top Six Indian States having highest Installed Capacity of Renewable Power (as of October 31, 2021)

Name of the State	Total installed capacity (MW)
Karnataka	15,734.29
Tamil Nadu	15,747.88
Gujarat	15,228.18
Rajasthan	13,387.01
Maharashtra	10,566.19
Andhra Pradesh	9,175.51

Source: <https://mnre.gov.in/the-ministry/physical-progress>

Table 2: Top six Indian states having largest coal reserves (as of April 01, 2018)

Name of the State	Coal Reserve Capacity in Million Tonnes
Jharkhand	83,152
Odisha	79,295
Chattishgarh	57,206
West Bengal	31,667
Madhya Pradesh	27,987
Telangana	21,702

Source: <https://coal.gov.in/index.php/major-statistics/coal-reserves>

The Changing Scenario: Disincentives to Curtail Coal Primacy

Many are the key impediments faced by the coal sector in recent times apart from the supply shortage concern. This includes the high vulnerability index of the country in the face of climate change;⁹ the rising threats posed by stranded coal assets;¹⁰ higher coal transportation costs;¹¹ and land acquisition issues for coal mining and power generation.

On the other hand, there has been a steady decline in coal financing over the years.¹² Under its draft energy policy, international investors, such as the Asian Development Bank (ADB) have announced the discontinuation of any initiative financing a new coal-fired capacity for power and heat

generation or any facilities associated with new coal generation.

In another move, heavily industrialised states like Gujarat and Maharashtra have announced a '*no new coal policy*' to address the coal overcapacity problem and the plummeting cost of renewables. These significant reductions in coal project finance coupled with policy-level changes introduced by the government bodies imply that authorities have become more cautious about the multi-layered risks involved in coal investments.

As a result, despite the pandemic-induced market imbalances, 2020 & 21 have been a step forward in India's commitment towards a clean energy transition.

Let us now see how are the states of West Bengal and Rajasthan are placed in this transition matrix and how the employment loss can be countered.

West Bengal

In light of these coal shortages threatening the West Bengal state government's objective to achieve 100 percent electrification and provide 24x7 access to reliable and affordable energy to its consumers, the potential of the renewable energy sector is being explored increasingly. With the projected peak demand estimated to be approximately 14,730MW by 2031,¹³ several efforts are being made



towards increasing the capacity of this sector in the state to ensure an uninterrupted supply of energy and minimize the reliance on conventional energy sources.

However, one factor that gets completely overlooked in this respect is that the resource potential of West Bengal for renewable energy is limited. Consequently, the scope of green jobs in this state is also relatively low.

On the other hand, West Bengal has several coal mines, including the Raniganj coalfield, the oldest in the country. Each of these coal mines provides formal and informal employment to thousands of people and their families, with livelihoods

centered around these coal mines. A transition to renewables would render these mining communities jobless, making them casualties of a climate change-induced structural shift.

To mitigate some of the risks associated with this green energy transition and make it more inclusive, the state government of West Bengal has been investing heavily in training and capacity-building programmes. These programmes will focus on re-skilling the existing coal miners and other members of the workforce employed in allied sectors switch to jobs in the growing renewables sector.

Additionally, the state government has been promoting certain industries,

such as Tea Tourism, the IT and Electronics industry, and the MSME sector. The aim is to absorb a part of the labour force that shall be rendered unemployed by the structural shift from conventional to conventional non-conventional sources of energy.¹⁴

Recently Asia's second-largest coal mine was allocated by the Centre to West Bengal. If this block becomes functional for coal extraction, it will solve the coal shortage crisis and create around 1 lakh jobs.¹⁵ However, owing to the massive protests by the local communities and conservationists citing potential hazards that this coal mine will create in this existing stone quarry hub and possible damages to the ecology, the project will surely take time to be implemented.

Rajasthan

Due to the lack of sizeable coal mines, the state has suffered from power disruptions due to coal shortage and mainly relies on coal imported from other states to meet its energy demands. However, since the last few decades, the Rajasthan government has been increasingly looking at alternative and non-conventional sources of energy to meet the power deficiency during peak daytime hours.

Starting from the Rawatbhata nuclear plant in the 1960s to the recent

additions to the installed capacities of solar and wind power plants, Rajasthan has always looked towards reducing its reliance on fossil fuels as much as possible.

Additionally, Rajasthan holds immense resource potential for solar and wind energy generation. India's National Institute of Wind Energy estimates Rajasthan's wind power potential to be 18.7GW,¹⁶ but it has not been fully exploited to its maximum potential. Rajasthan also hosts a desert of approximately 102,000 square kilometers (three percent of India's total landmass). It has high solar irradiance, wind speeds, and abundant barren land to deploy many solar and wind power projects.

All these possibilities, if capitalised adequately, could make Rajasthan one of the most significant contributors to India's target of achieving 500 GW of renewable energy by 2030, thereby becoming a hub for green jobs.

Suggestive Measures for a 'Just Transition' in Indian Energy Sector

The much envisaged Energy Transition from Thermal to Non-conventional and Renewable Energy will ensure an environment-friendly development programme for a growing economy like India and place the country as a global hub for Cleantech Innovation

alongside creating the world's largest market for clean energy deployment.

While access to reliable, affordable, and sustainable energy is central to India's many productive economic activities, this must not be realised at the cost of local livelihoods. The Just Transition process should identify and mobilise state, national and global institutes to bring about the desirable transformational change.

While the disappearance of some jobs is inevitable, national governments and supranational agencies can intervene with programs to provide professional training that will ease the transition for existing workers to newer opportunities, primarily in other

sectors of the economy. Additionally, a social welfare system must be put in place to absorb the shocks from the preliminary phase of the transition, thus making it as seamless as possible.

Following are a few suggestive steps to be taken while pursuing a transition away from Coal -

Assessment of Losses associated with Coal Mine Closure

- The ecological, socio-cultural, and health impacts of the coal sector on the direct and indirect stakeholders should be included for assessing the transition losses. The process must take care of indigenous cultural identity, forest restoration,



and the vulnerability of the communities affected in the best possible participative and holistic manner, ensuring the active involvement of all stakeholders. This can be enabled via institutional mechanisms such as financing local, sustainable activities.

Allocation and Utilisation of Funds, Redirecting Subsidies

- Greater research is required to determine if the present funds allocated for the coal sector would be enough to steer the transition. For example, coal cess funds from District Mineral Foundation and Compensatory Afforestation Fund Management and Planning Authority (CAMPA) are referred to as possible funding sources. But additional investments must also be included. Coal-dependent states should prepare an action plan and mobilise funds accordingly.
- Subsidies to the fossil fuel industry are much higher than Renewable Energy.¹⁷ Repurposing these subsidies while supporting renewable energy capacity expansion will result in double employment growth (full-time job) in the Indian Energy sector.
- Finally, moving away from coal primacy can not happen overnight, and rather, it should be done

through phase-wise interventions. A long-term plan for crowding private investment for large-scale industrial and commercial development is imperative to fuel this transition.

Adoption of an Inclusive Approach

- The transition dialogue must include various Departments of Government, Coal Mines, DISCOMs, State-owned enterprises, Trade Unions, and the wider community whose livelihoods depend upon coal. National Institution for Transforming India (NITI Aayog) can also play a central role in planning the transition holistically. Most importantly, the communities and workforce should be placed at the core of this energy transition dialogue.

Addressing Employment and Migration Issues

- A deep analysis of skill transferability and worker mobility in RE job creation is required. Most coal mines are situated in eastern and central India, whereas the giant renewable power plants (mainly solar and wind) are found in the western and southern regions. So, the manpower that must be shifted from closed mines to renewable sectors must be mobilised

geographically; other local alternative jobs must be created. MSMEs can act as the main driver of this transition with the government's required support.

- The Government should develop a detailed agenda towards re-skilling the workforce for the emerging employment opportunities. This should involve schemes as well as dedicated programmes for skill development.
- A regional hub strategy may be beneficial for the states' economic integration where coal and RE sources are located. The possibilities of establishing the manufacturing units of solar panels and other equipment essential for the RE sector in the eastern region where the coal-based jobs are lost can be explored. However, this requires a thorough cost-benefit analysis of the prospect and viability.
- Along with the ecological restoration of abandoned coal

mines, exploring possibilities for new economic activities like fisheries, eco-tourism, agroforestry, and renewable energy projects suitable to local contexts that can employ local communities, especially the erstwhile coalmine workforce, should be emphasised upon.

- Most importantly, fast-growing labour-intensive sectors have to be identified to generate alternate employment opportunities for the affected sections of workers and communities. Additionally, the role of Public Sector Undertakings (PSU) in job creation should be explored in the coal-dependent states.

Additionally, national grid capabilities are still a constraint in this energy transition process - factors like grid synchronisation with variable renewable energy push, etc., should be adequately addressed to ensure a seamless transition from coal to renewables.

A Case Study from Europe to reduce coal dependency in a phase-wise manner is presented below.

The German Experience: A Case in Perspective¹⁸

The closure of hard coal mines in Germany's Ruhr valley is considered one of the most comprehensive and planned approaches to Mine Closure with minimum economic and social fallouts.

During 1968, when coal mining started to become unprofitable and was dependent on government subsidies for sustenance, an agreement was signed between the federal government, unions, and businesses. All the mines were brought together under a single mining operation as part of the agreement. Long-term plans were undertaken to close the industry in a phased manner. The last mine in Ruhr was closed down in 2018, after 50 years of adopting the plan.

A unique form of capitalism was introduced then, known as *Rhenish Capitalism*. Rhenish capitalism is following collaborative management to a certain extent. The unions worked closely with the management and no major decision was taken without considering the community's stake and opinion, implying adoption of a community-driven approach.

The most distinctive part of this mine closure is that it was pre-decided that none would be rendered jobless from this. The workers who wanted to stick with mining jobs were shifted from mine to mine as the pits were closed one by one, and others were offered provisions for re-skilling. Also, the older employees got voluntary payouts. Coking plant sites were turned into parks, exhibition areas and museums. The single-point mining company, the RAG, worked with its annual "Eternity Fund" until the last black coal mine closure.

Conclusion and the Way Forward

Due to many reasons, such as stranded assets leading to bad debts and the adoption of unviable business models, the coal sector has been under financial distress for years. Also, it has been associated with a range of issues

from environmental hazards to impacts on public health and economic indicators, which are looking worse due to excessive use of thermal and other conventional resources. The current emphasis should be on phasing down the coal reliance while gradually promoting alternative source-based energy generation.

It is also evident that the five or six states in the coal belt of India will have to bear the greatest brunt of this power transition. Therefore, undertaking vulnerability assessments and developing Just Transition action

plans for these priority areas will be crucial towards creating alternative livelihood options. It is needless to say that a strong association of People, Government and Businesses will be imperative for this.

- 1 <https://www.climatelinks.org/resources/greenhouse-gas-emissions-factsheet-india#:~:text=In%20India%2C%2068.7%25%20percent%20of,percent%20relatively%20to%20GHG%20emissions.>
- 2 <https://bit.ly/3HeCuJm>
- 3 <https://bit.ly/3krsyT2>
- 4 <https://brook.gs/30hqs1t>
- 5 <https://bit.ly/30cWwCW>
- 6 <https://www.cprindia.org/managing-fair-transition-away-coal-india>
- 7 <https://coal.gov.in/index.php/major-statistics/coal-reserves>
- 8 <https://mnre.gov.in/the-ministry/physical-progress>
- 9 <https://bit.ly/3Hiv5c9>
High Vulnerability Index in the face of climate change or Climate Vulnerability Index (CVI) is an output of a study carried out by CEEW. Critical vulnerabilities can be marked from the index, and accordingly, experts can plan further strategies to increase the resilience.
- 10 <https://bit.ly/3De44nO>
- 11 <https://bit.ly/30l8tHs>
- 12 <https://bit.ly/3CdoM5Y>
- 13 <https://wb.gov.in/business-solar-power-industry.aspx>
- 14 <https://www.ibef.org/states/west-bengal-presentation>
- 15 <https://www.hindustantimes.com/cities/kolkata-news/mamata-announces-job-package-to-secure-land-for-india-s-largest-coal-mining-project-101643660134817.html>
- 16 https://niwe.res.in/departments/wra_100m%20agl.php
- 17 <https://www.ceew.in/publications/mapping-india%E2%80%99s-energy-subsidies-2020>
- 18 <https://bit.ly/3okXHJa>

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