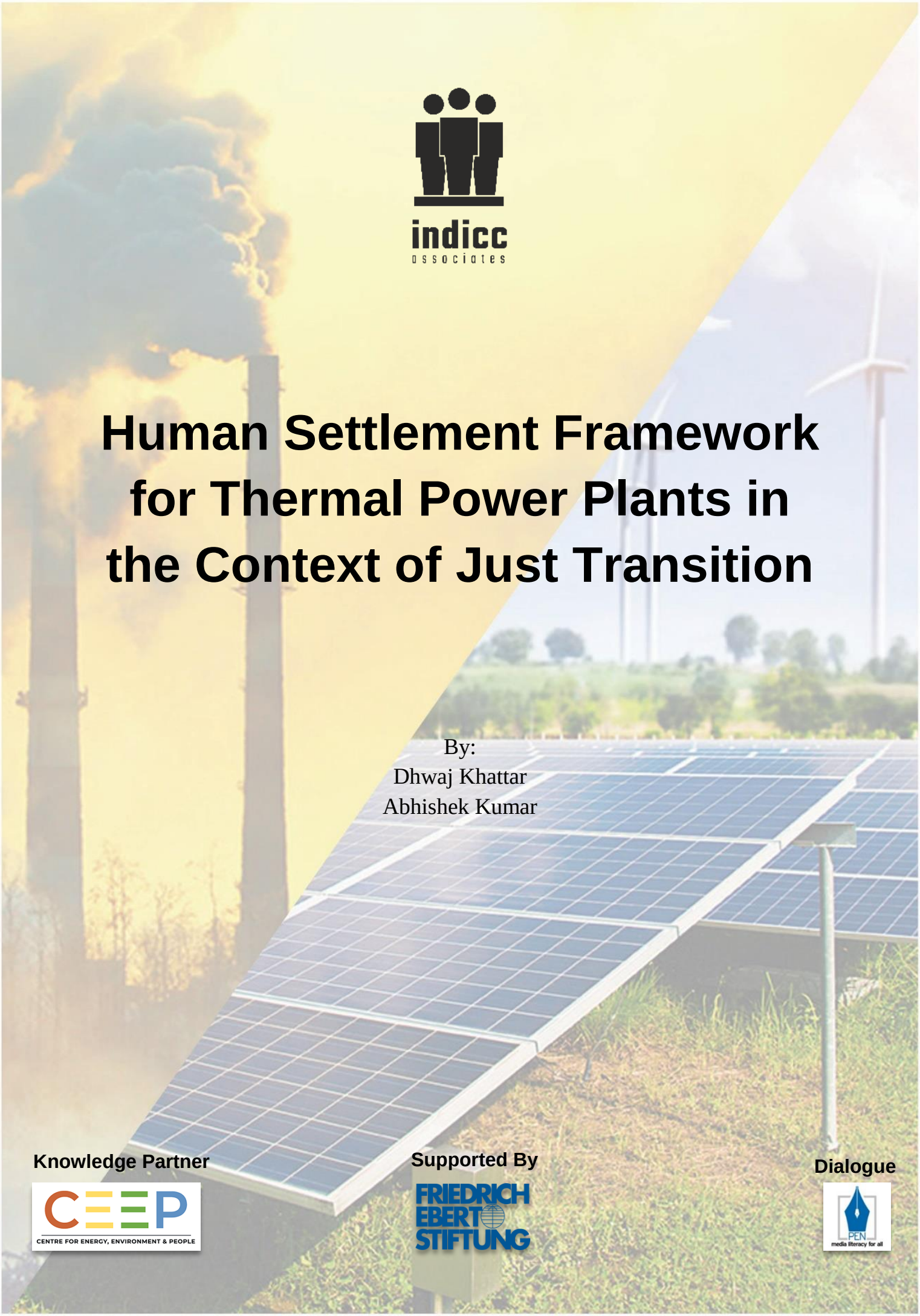

Human Settlement Framework for Thermal Power Plants in the Context of Just Transition

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Executive Summary

India is geared up to constitute the largest share of energy demand growth at 25% of the overall increase by 2040 with its electricity demand set to increase much more rapidly than its overall energy demand, as per the analysis of the India Energy Outlook, 2021 released by the International Energy Agency (IEA)[1]. In the context of rising global temperatures and its consequent indiscriminate ramifications, it becomes imperative to strike a fine balance among the trinity of economic development, environmental sustainability and social justice. The zealous objectives envisioned in the form of updated Nationally Determined Contributions (NDC) and a detailed Long Term - Low Emission Development Strategy (LT-LEDS) demonstrate India's commitments to sustain high economic growth while transitioning towards cleaner sources of energy.

In addition, the State of World Population Report, 2023[2] released by the United Nations Population Fund(UNFPA) highlights that 68% of India's population, the largest in the world, is in the 15-64 years age group, forming a substantial segment of the global workforce and hence, the powerhouse of future global economic growth. This entails the availability of adequate energy supply and investment capital, in the absence of which there is a risk of demographic dividend turning into a demographic disaster. However, in the present global landscape, it is imperative to transition from carbon-intensive and polluting energy sources to renewable and sustainable sources of energy. This requires a comprehensive intervention at the policy, institutional, technological, socio-economic and behavioural level by suitable stakeholders including Union, State and Local Governments, industrial centres and their associated workers amongst others.

Given the intricate dynamics of India's fossil fuel economy, encompassing factors such as direct and indirect income reliance, skewed workforce distribution with informality of labour, the stagnant socio-economic structure of regions dependent on fossil fuels, concerns related to pollution and ecological degradation as well as the imperative to uphold social and environmental justice, there is a compelling necessity to design a comprehensive framework of a 'just' transition. The proposed framework aims to address all these multifaceted dimensions by identifying relevant stakeholders and leveraging disguised opportunities.

Contextualising the best-practices from across the globe to the Indian scenario, it is proposed to develop and implement strategic pathways guided by the envisaged frameworks. This is especially conceived at the state level as interventions at this level are critical for ensuring energy security

[1] India Energy Outlook, 2021, https://www.iea.org/reports/india-energy-outlook-2021

[2] https://www.unfpa.org/swp2023

while undertaking a transition which is just and fair as per local requirements. This can be visualised as an attempt to challenge systems of exclusion and discrimination while improving prosperity and well-being for all. Just Transition, hence, is an overarching concept which delves into resolving the 'economic development - environmental sustainability dichotomy' by creating a socially conducive atmosphere for engendering a sustainable, inclusive and equitable transformation.

The deep entrenchment of the fossil fuel dependent economy is evident from the scale of Thermal Power Plant(TPP) operations across India. With 210 GW of generation capacity amounting to 56.8%[3] of the overall generation capacity in India, thermal power plants with less than 20 years of operations constitute a staggering 78% of this existing thermal capacity. These plants are here to stay and India is uniquely positioned to embark on a comprehensive and contextualised pursuit of just transition in the energy landscape. This is further reinforced while observing the high quantum of investments which need to be mobilised as climate finance from the mitigation and adaptation view point, under the present circumstances for the global south.

The study endeavours to establish an overarching framework for realising fair and equitable outcomes in the event of transition in the industrial and economic landscape. It deploys an exhaustive framework to recognize the challenges associated with transition activities, especially in the light of decommissioning or repurposing of TPPs as well as the components of desirable Just Transition in such events. The framework is characterised by five pillars - Transitions and Governance, Planning, Development and Infrastructure, Natural Resources and Environmental Planning, and Capacity and Institutions. This detailed framework for Human Settlements is an outcome of the insights from the detailed engagements and interactions with human settlement, energy, finance and governance experts, worker unions, workers and local community, management of coal-based TPPs as well as government machinery ranging from the union-level to the local administration. This is further enriched by the case study of the Kota Super Thermal Power Station (KSTPS) conducted by Centre for Energy, Environment & People (CEEP) in collaboration with Indicc Associates as well as the contributions of Indian Institute of Human Settlements (IIHS) through its Urbanisation framework.

This analysis is deepened by enumerating fundamental challenges and concomitant opportunities encountered in the process of transition for the Human Settlements associated with TPPs which are identified by examining disparate layers of assessment - Natural Resources Layer, Industrial Layer, Habitation Layer, Connectivity Layer, Labour/Skilling Layer and Climate Vulnerability Layer.

[3] https://powermin.gov.in/en/content/power-sector-glance-all-india

Moreover, to augment the initiative of the Ministry of Power, Government of India, setting up State-level Steering Committees for Energy Transition, it has been attempted to ensure representation of key stakeholder departments on the steering committee to expedite the process and ensure desirable outcomes by improved coordination. Further, the intersection of the roles and responsibilities of relevant departments at the state-level have been recognised. These departments shall have an eminent bearing on the implementation of the transition activities while managing the negative externalities which may emerge while implementation. It is proposed that these departments at the state level have independent structures and institutional capacity to contribute to the formulation and execution of the transition plans. This initiative by the Ministry of Power underlines the eminent and critical role of state-level interventions in transition activities, suitable to the peculiarity of each state as well as scope for opportunities of cross-pollination among the states.

A 'just' and 'equitable' outcome of transition activities is a direct consequence of fair and inclusive institutions, established procedures including statutes and rules, and processes which mandate as well as incentivise a just transition. In order to fortify the 'justness' of the transition process, the study underscores the importance of engendering the cause and intent of just transition among the local population associated with the facility undergoing transition by recommending the institutionalisation of a social audit mechanism. This shall uphold the accountability of diverse stakeholders in the process and at the same time ensure that the voices of the vulnerable sections do not remain unheard among the institutions formulating and executing the transition activities.

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1. Introduction

The United Nations Intergovernmental Panel on Climate Change released a comprehensive synthesis report[4] in March 2023 highlighting human induced global warming of 1.1℃ which has spurred unprecedented changes including rising sea-levels, melting of polar and sea ice as well as higher frequency of extreme weather events. As per computations by the working groups, there are more than 50% chances that global temperature rise would breach the 1.5℃ threshold between 2021-2040 across different scenarios, with chances of hitting the threshold sooner (by 2037), in case of a high emissions pathway. This should urge the global community to initiate immediate and urgent actions to combat global warming and to jointly create a sustainable future for the planet. Even as nations move towards a more sustainable low carbon economy, around 75 percent of greenhouse emissions worldwide are attributed to the burning of fossil fuels such as coal, natural gas, and oil. India updated its Nationally Determined Contribution (NDC), committing to reduce its GDP's emissions intensity by 45 percent by 2030 from the 2005 level. Also, India aims to achieve around 50 percent of cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, as per the government's announcement in 2022. Additionally, India has proposed a Long Term Low Emission Development Strategy (LT-LEDS) which intends to achieve net-zero for the country by 2070. These targets signal India's commitment to combat climate change and transition towards cleaner and more sustainable energy sources.

With such ambitious targets set by India in its updated NDCs, subnational action becomes crucial in achieving these goals. However, this requires a transition approach that is just and fair. State level strategy on Just Energy Transition could be seen in a broader context of distribution of resources. For instance, eastern part of India has plenty of coal reserves while west and south have abundant solar. Similarly, Himalayan region has enormous potential for Hydro while coastal region is blessed with Wind. The difference in resource availability therefore will increase costs and need for interstate and centre-state coordination.

The question of energy transition is also not just limited to the power sector transition strategies alone. Associated industries like cement, steel, brick et al. consume coal for manufacturing while sectors like Railways are significantly dependent upon coal freight for its commercial viability. Therefore, both direct and indirect impact on jobs, livelihood, investments and demand would need to be assessed. Similarly, other policy considerations such as exigencies of the fossil fuel sector, socio-economic realities of these regions, generation of employment opportunities based on the nature of workforce, and the need to uphold equity during and post-

[4] *AR6 Synthesis Report Climate Change* - https://www.ipcc.ch/report/ar6/syr/

Table 1: India's Policy and Implementation Roadmap for Climate Action

India's NDCs (*Panchamrit*)	Long-Term - Low Carbon Development Strategy (LT-LEDS) – Pathways to achieve NDCs
• Reach 500 GW of Non-fossil energy capacity by 2030. • 50 per cent of its energy requirements from renewable energy by 2030. • Reduction of total projected carbon emissions by one billion tonnes from now to 2030. • Reduction of the carbon intensity of the economy by 45 per cent by 2030, over 2005 levels. • Achieving the target of net zero emissions by 2070	• Low Carbon Development of Electricity Systems Consistent with Enhanced Development Benefits • Develop an Integrated, Efficient, Inclusive Low-Carbon Transport System • Promoting Adaptation in Urban Design, Energy and Material-Efficiency in Buildings, and Sustainable Urbanisation • Promote Economy-Wide Decoupling of Growth from Emissions and Development of an Efficient, Innovative Low-Emission Industrial System • CO_2 Removal and Related Engineering Solutions • Enhancement of Forest and Vegetative Cover Consistent with Socio-Economic and Ecological Considerations • Economic and Financial Aspects of Low-Carbon Development

Table 2: A Macro Overview of Climate Finance Landscape

Organisation	Global Green Investment Requirements	India's Green Investment Requirements	
	NDCs by 2030	NDCs by 2030	NZ by 2050 or 2070
Estimates highlighted in RBI Report on Currency and Finance, 2023		Upwards of 2.5% of GDP by 2030 for Climate aligned Infrastructure.	5 – 6% of GDP by 2070 (may increase if NZ horizon is shortened)
Climate Policy Initiative, 2022[5]	US$4.5 - US$5 tn annually	US$170 bn annually (2015-2030) Cumulative US$2.5 tn by 2030	
McKinsey, 2022[6]		Cumulative US$1 tn by 2030 (2.6% of GDP)	Cumulative US$7.2 tn by NZ 2050 (3.5% of GDP) US$2 tn by 2030-40 (3.1% of GDP) US$4.2 tn by 2040-50 (4.1% of GDP)
International Energy Agency, 2022[7]		US$160 bn annually under Stated Policies Scenario (STEPS)	
CEEW, 2021		Cumulative US$542 bn by 2030 (taking 2040 as peak emission year and 2070 as NZ year) Cumulative Decadal breakdown: 2030-40: US$0.89 tn 2040-50: US$2.5 tn 2050-60: US$2.8 tn 2060-70: US$3.8 tn	Total US$10.1 tn by NZ 2070 InvIT support of US$1.4 tn needs to be mobilised (US$28 bn per year from 2020 to NZ 2070)

[5] https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/

[6] https://www.mckinsey.com/~/media/mckinsey/business%20functions/sustainability/our%20insights/decarbonizing%20india%20charting%20a%20pathway%20for%20sustainable%20growth/Decarbonising-India-Charting-a-pathway-for-sustainable-growth-ES-Oct-2022.pdf

[7] https://iea.blob.core.windows.net/assets/1de6d91e-e23f-4e02-b1fb-51fdd6283b22/India_Energy_Outlook_2021.pdf

transition, should be integrated in the Just Transition framework.

So far India's approach has been that of coal phase down rather than coal phase out. While this allows India to position its need for industrialization emphatically - nascent market maturity in renewables, limited fiscal space, criticality of energy security and attracting capital markets for financing infrastructure which prefer funding for a green economy, are compelling forces that emphasize the need to take timely steps towards Just Transition.

In May 2022, the Union Ministry of Power asked all State Governments and Union Territory Administrations to set up State Level/UT-level Steering Committees for Energy Transition[8]. The Steering Committees would work under the chairmanship of the Chief Secretaries of the respective States/Union Territories, along with relevant departments. It was emphasized that States/UTs have a vital role in meeting state-specific goals on sustainable development in the most energy-efficient way.

Further, LT-LEDS which spells out a pathway to India's updated NDCs also stress upon the need for state action towards low emission strategies. With states assuming prominence in meeting climate action, it is but natural that just transition initiatives are led by them in collaboration with the Union government and non-state agencies as well. In this regard, there are some forward-looking initiatives on Just Transition by the Coal Ministry and Ministry of Power[9].

Additionally, a report of the Inter-ministerial Committee on Just Transition from Coal, published by NITI Aayog[10], highlights the need for a just transition policy addressing 5 key issues - livelihoods, community health, physical and social infrastructure, repurposing of resources and public finance. The Committee advocates for a three-tier task force (described below) to enable a just transition.

- **Tier-1:**
  - ✓ **Members:** Chaired by Minister of Coal, representatives from relevant Central ministries, non-govt experts from relevant sectors
  - ✓ **Role:** Task force to ensure establishment of standards and best practices by ensuring convergence and alignment with current national policies and programmes.
- **Tier-2:**
  - ✓ **Members:** Representatives from state govt, coal companies, and civil society. (Constituted for each coal bearing state)

[8] State Level Steering Committees for Energy Transition https://www.pib.gov.in/PressReleasePage.aspx?PRID=1828191

[9] Sustainable and Just Transition Division (Ministry of Coal) - https://coal.nic.in/en/sustainable-development-cell/about-sdc

[10] *Report Of The Inter-Ministerial Committee On Just Transition From Coal (NITI Aayog)* - https://www.niti.gov.in/sites/default/files/2023-02/Report_Just-Transition-Committee_compressed.pdf

- ✓ **Role:** Task force is to oversee the plans for each asset closure in the state and building the regional development framework to facilitate the closure of coal mines using just transition principles

- **Tier-3:**
  - ✓ **Members:** Representatives from the impacted local communities, project workers, and the appropriate district administration and agencies.
  - ✓ **Role:** Based on public input, it shall prepare and implement a redevelopment and re-purposing plan for each asset that is being closed

While the above stated structure has been developed predominantly for coal mines, general attributes of a response mechanism to ensure just transition are likely to be more or less the same for all industries, be it at the central or state level. Here, it may be pertinent to expand on the concept of just transition in detail.

2. Deconstructing 'Just Transition'

Broadly, 'Just Transition' is a transition that challenges systems of exclusion and discrimination and seeks to improve prosperity and well-being for all. It can apply to any field but has mainly evolved in the environmental domain. Essentially, it challenges the idea that valuing job security and caring for the environment are two mutually exclusive goals. In other words, at its very core, it challenges the 'Jobs Vs Environment' binary which has typically inhibited any debate towards a more profound transition.

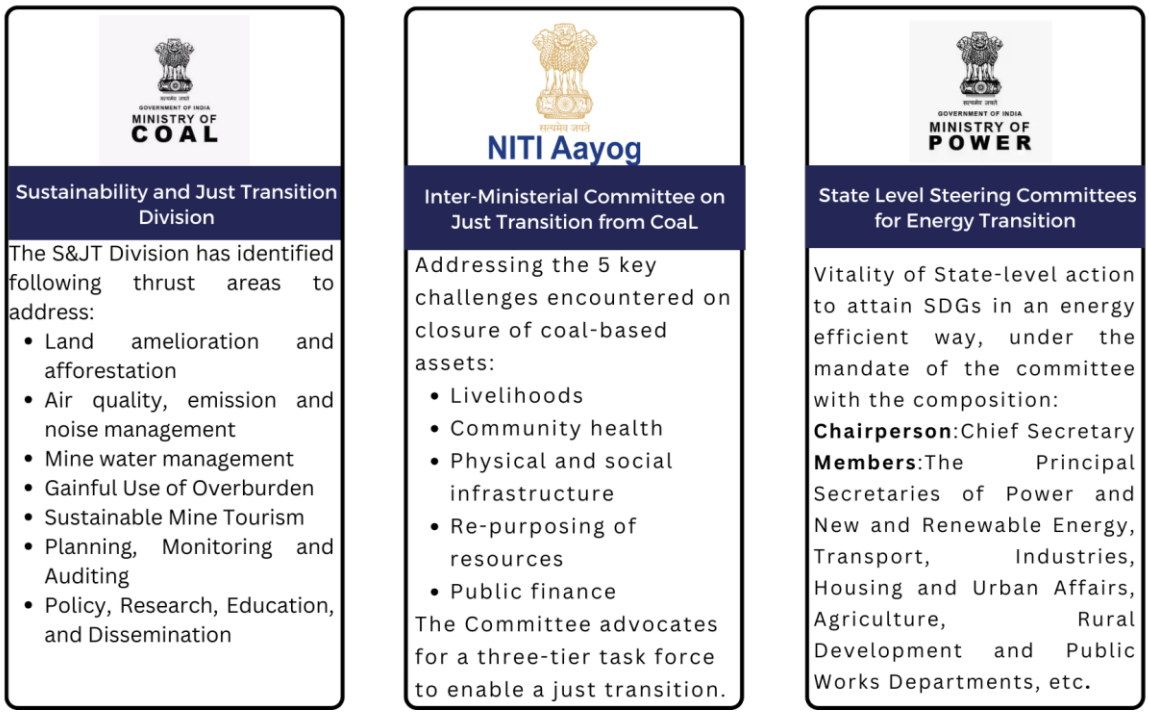


Figure 1: *Department-level Interventions for Sustainable & Just Transition by the Government of India*

Up until recently 'Just Transition' was considered mainly a Western construct

despite it having gathered much mass and diversity in its evolution from a local campaign in the US in 1970s to a much wider construct that has come to influence policies in several countries and institutions. For instance, 'Just Transition' has been explicitly referred to in the Green Jobs Initiative[11] ; International Confederation of Free Trade Unions[12] (ICFTU) ; Trade Union Advisory Council (TUAC) to the Organization for Economic Co-operation and Development (OECD); Green European think tanks and from there on to the United Nations Environment Programme (UNEP), International Labour Organization (ILO), United Nations Commission on Sustainable Development and United Nations Framework Convention on Climate Change (UNFCCC).

Needless to say, this diffusion of the concept of 'Just Transition' at a global scale has been accompanied by a diversification of the meanings associated with it. In fact, it may be appropriate to say that diversification of meanings and multiple interpretations perhaps enabled greater diffusion.

Perhaps this compelling expansion necessitated 'Just Transition Research Collaborative'[13] to publish comprehensive research titled *Mapping Just Transition(s) to a Low-Carbon World*[14]. Authored in 2018, the report looks at regional approaches and case studies from three developing countries and as many developed countries[15]. Insights gleaned from the report and case studies reveal interesting aspects that can be considered by policy makers in India[16].

While 'Just Transition' remains largely a recent and esoteric concept for most grassroots CSOs/NGOs in India, the Government of India and State Governments have made policy announcements incorporating the popular phraseology of the concept. For instance, as earlier discussed, the Union Ministry of Coal has recently announced that it will have a 'Just Transition' division, which will draft sustainable coal mine closure plans for areas economically dependent on coal. To facilitate this process, the World Bank is set to provide monetary support and prepare a 'detailed project report' in consultation with various stakeholders, especially mine workers' unions.

What has perhaps enabled the Indian state to champion the 'Just Transition' approach

[11] A joint initiative of UNEP, the ILO, the ITUC and the International Organization of Employers

[12] In 2006 merger of the ICFTU and the World Confederation of Labour gave birth to the International Trade Union Confederation (ITUC) which from the outset placed environmental concerns at the heart of its agenda

[13] A joint effort by the United Nations Research Institute for Social Development (UNRISD) and Edouard Morena of the University of London Institute in Paris (ULIP)

[14] https://www.uncclearn.org/wp-content/uploads/library/report-jtrc-2018.pdf

[15] Brazil, South Africa, Kenya, US, Canada and Germany.

[16] In drafting this section, the author has borrowed key concepts and critically analyzed them to juxtaposed with Indian context

without much ground swell and prolonged struggle may be the combination of four high level factors. First, fossil fuel divestment is picking up globally with trillions of dollars moving away from fossil to non-fossil industry. Second, as a result there is an increasing fear of stranded assets in the fossil fuel industry. Third, a principle-based approach articulated at international forums towards a greener future is also complemented by favourable economics of producing cheap energy from alternative sources. Fourth, there is increasing evidence of strong correlation between the performance of Environmental, Social and Governance (ESG) funds and positive investment returns.

No surprise therefore that even Ministry of Power too seems to have evinced keen interest towards preparing different approaches for repurposing of power plants as well as the development of alternative economic and employment options[17]. At the state level, Jharkhand has emerged as the first state to have formulated a formal approach to Just Transition in coal bearing areas.

However, since electricity is a concurrent subject[18], states will have an equally important role in managing the transition. In fact, centre and state will have to evolve a comprehensive framework across key elements of transition and demarcate their common and differentiated responsibilities.

In this context, it will be in order to list out some of those key elements. Drawn from various interpretations of 'Just Transition' articulated by prominent institutions spread across different geographies[19], these key elements include:

- Need for inclusive approach in greening the Economy
- Need to create decent work opportunities
- Need for effective social dialogue to manage transition
- Need to honour fundamental labour principles and rights
- Need to ensure greater job security and social protection
- Need to equitably distribute costs and benefits of Climate Action
- Need to provide adequate training opportunities to improve quality of employment opportunities
- Need to ensure that substantial benefits of a green economy transition are shared widely, while also supporting those who stand to lose economically
- Need to have a vision-led, unifying and place-based set of principles, processes, and practices that build economic and political power to

[17] https://www.cif.org/sites/cif_enc/files/knowledge-documents/supporting_just_transitions_in_india.pdf

[18] The Concurrent List consists of subjects of common interest to both the Union along with the States. Both, the Union as well as the state governments are eligible to make laws on the Concurrent subjects.

[19] ILO, WRI, Just Transtion Centre, EBRD, Just Transition Alliance, UNFCCC, UNEP

shift from an extractive economy to a regenerative economy.

- Need to have transparent planning
- Need to have coexistence of healthy economy and clean environment
- Need to have losses fairly compensated and need to have affected people have their due voice and leadership in crafting policy solutions
- Need to have redressal of harms and creating new relationships of power through fair processes of transition
- Need to have policies and programmes incorporate strong gender dimension
- Need to have policies and programmes in line with the specific local conditions, including stage of development, economic sectors, and types and sizes of enterprises

Based on the above, a synthesized framework of 'Just Transition' may read as follows:

Just Transition entails a process of robust social dialogue amongst different stakeholders, (keeping affected people at the centre) to effectively plan equitable distribution/redistribution of costs and benefits of greening the economy through an approach which is premised upon respect for labour rights, relevant state policies and local context, with an aim to achieve tangible outcomes like decent Jobs, job security and social protection (including skill training for job security) so that inclusive growth can be shaped with minimum conflict between livelihood and environment.

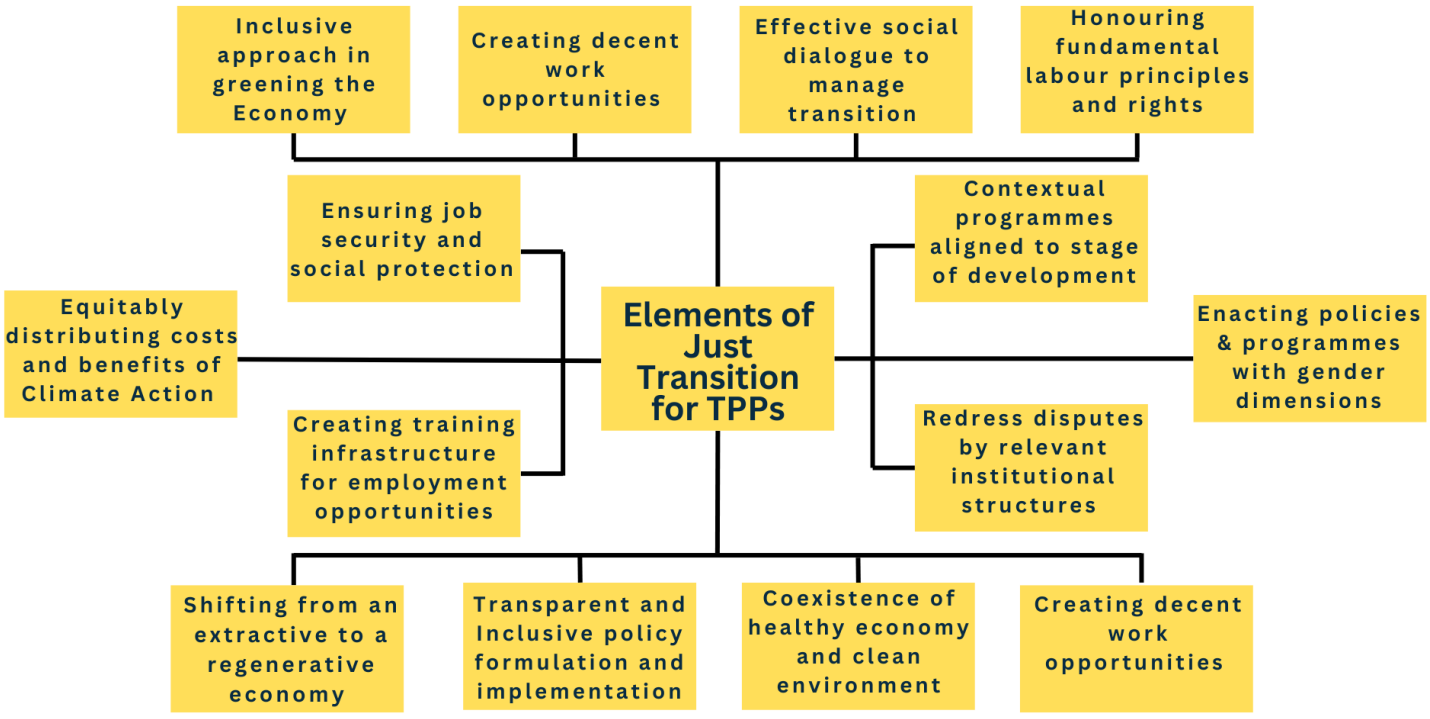


Figure 2: *Key Elements of Just Transition for TPPs Undergoing Repurposing/Decommissioning*

It is essential to highlight here that definitional framework alone cannot guarantee the desired outcome because 'Just Transition' may vary in terms of how governance structures, institutions and policies are shaped, for whom justice is intended (humans or/and nature, particular groups or all people), the kind of justice (environmental, climate, energy, social, gender etc.), and how it should be sought (through distributional, procedural, restorative and/or recognition justice).
Reflecting on these questions would be essential for policy making to gauge if transition management entails merely a shift from a dirty to a clean economy or can a shift to a low carbon economy serve as a catalyst for much deeper transformation? For instance, questions related to energy may entail how its usage may be controlled and it is distributed to alleviate poverty and ensure universal access to affordable and sustainable sources?

To understand it differently, it may help to consider that there may be multiple approaches to 'Just Transition'[20] each with a different outcome. For instance, the puritan laissez faire approach is built on the belief that the free market will drive the transition and bring about positive change. It seeks to assert the cost of inaction and argues that the state should provide an enabling environment through incentives to businesses and consumers. Under this approach, compensation, skill training and replacement of old jobs with new ones are considered as a proxy to justice. This approach is often referred to as 'status-quoist'.

A step ahead to 'status quo' is another approach that is built on an argument that the fossil fuel regime generates inherent inequalities in terms of access, affordability, impact on health et al. However, existing legal and regulatory framework is not well equipped to address overall wellbeing and hence a more responsive legal and regulatory structure that is geared towards greater equity is needed. Under this approach the existing paradigm is not challenged and a limited policy improvement is considered as a proxy for justice. It is often referred to as a 'managerial approach'. Then there is the 'structural reform' approach which implies institutional change and structural evolution of the system. Essentially it entails modified governance structures with greater representation of people to ensure democratic participation and decision making. In short, the approach focuses not just on compensation elements and regulatory improvements but also on institutional reform per se. In other words, it entails both distributive justice (compensation) and procedural justice (collective institutional ownership).

The next step in the continuum is 'transformative approach' for which no society yet seems ready. Basically, this approach argues for promoting alternative

[20] *Just Transitions: A Comparative Perspective*- https://www.gov.scot/publications/transitions-comparative-perspective/

development pathways. For instance, it calls for ending systematic dependence on the hydro-carbon industry and relentless obsession with the idea of economic growth alone. This is however fast emerging as an aspirational approach.

Turning back to the question of 'Just Transition', while the Union Ministry of Coal and Union Ministry of Power may well be on their way to incorporate the concept within their evolving mandate, the fact remains that in the absence of a prolonged struggle to mainstream this idea in policy discourse, the states may only have a distant understanding of impact on various stakeholders particularly those who are most adversely affected.

Further, it may be noted that so far policy research on Just Transition in India focuses on the impact of transition on key coal regions. However, even coal region transition planning cannot be comprehensively done without assessing the planned changes in forward and backward linkages of the coal sector. Therefore, state action on energy transition is inextricably linked with transition management strategies articulated by the Union.

Similarly, each state also needs to take a comprehensive assessment of activities that are being delinked from the carbon economy to develop a conscious 'Just Transition' pathway. For instance, in Rajasthan, it gets bulk of its Coal from Parsa Kanta Coal block in Chhattisgarh and Mahanadi Coal Fields in Odisha. Therefore, how Rajasthan will plan its energy transition will determine the impact it will have on coal blocks outside the state or associated economy with the thermal plants in the state. Industrial sectors like cement, steel and brick amongst others are also highly dependent on coal. Therefore, transition strategies will have to account for impact on industry, employment and investments in totality.

3. The Process of Decommissioning Thermal Power Plants in India:

Power generation companies in India routinely retire old thermal power plant (TPP) units from operations based on techno-economic considerations of performance, efficiency and costs. According to the Central Electricity Authority (CEA), as of July 2023, 260 units aggregating 18,362 MW of thermal capacity have been retired. This includes 181 coal-based units of 16,245 MW capacity, 44 gas-based units of 891 MW, 24 diesel- based units of 486 MW, and 11 lignite-based units of 740 MW capacity. If the Ministry of Power's recommendation to retire coal-based generation units of more than 25 years old is implemented, then as much as 50-60 GW capacity would need to be retired in the coming ten years[21].

[21] https://cea.nic.in/wp-content/uploads/2020/04/repl_thermal_units.pdf

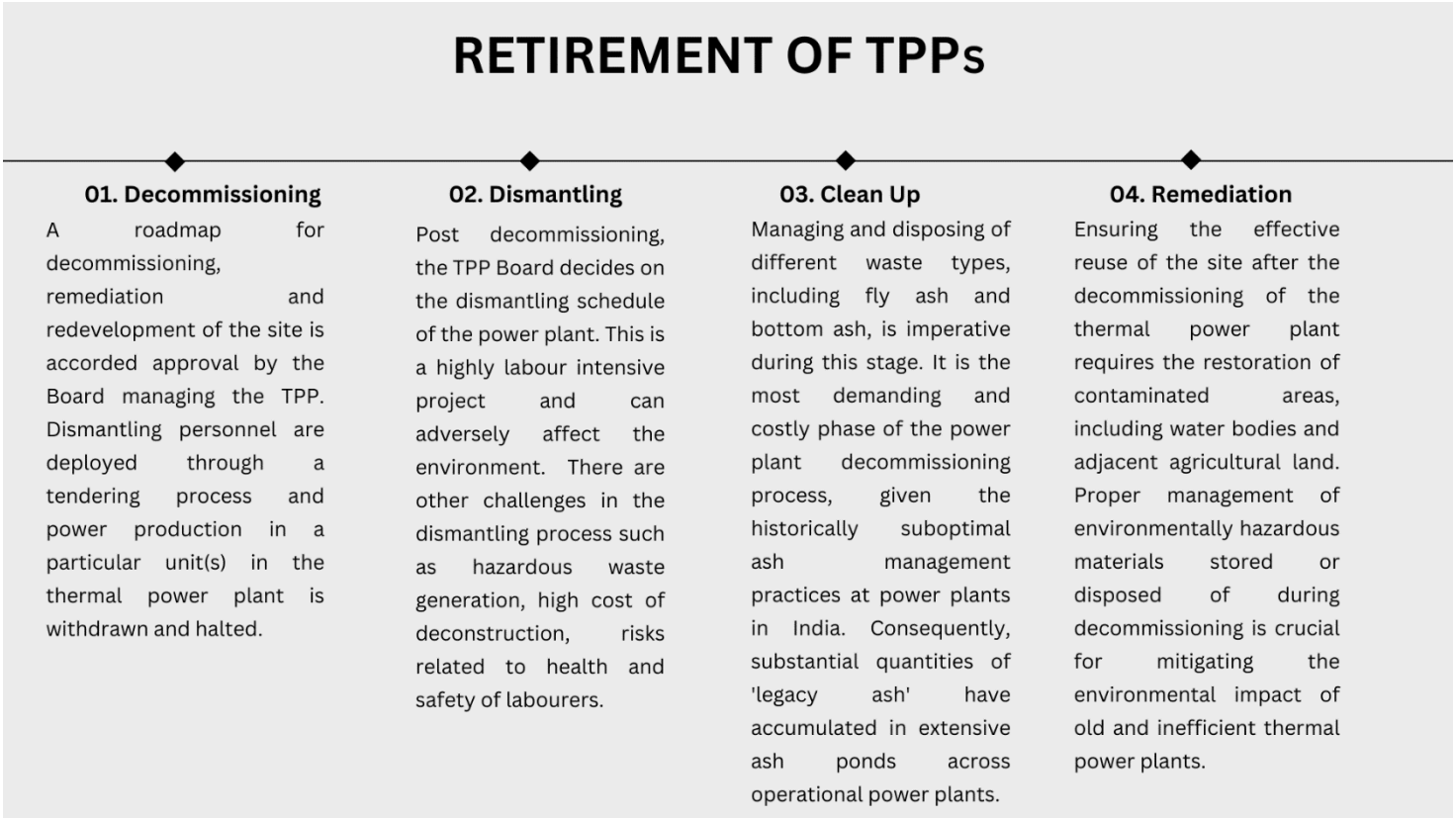


Figure 3: *A Stepwise Process of Retirement of TPPs*

Absence of proper guidelines for decommissioning of TPPs ensuring safe management, handling and disposal of hazardous substances, dismantling, reclamation or disposal of scrapped thermal power plant sites and structures including machinery, buildings, ash ponds as well as the rehabilitation of the associated workforce at such installations have complicated the process of decommissioning and impeded the cause of 'just transition'. Further, unregulated decommissioning results in water, air and soil pollution in and around the TPPs as hazardous substances such as asbestos, arsenic and lead from power plants seep through, causing severe ailments such as brain damage, kidney failure or fatal diseases such as Asbestosis.

The existing legal and regulatory requirements in India arising at the time of decommissioning in the context of environment, land, labour and finance are ambiguous and fall short of attaining the objective of just transition. To plug the regulatory deficit in the absence of a dedicated law mandating clean-up and remediation for TPP/industrial decommissioning, the Central Pollution Control Board (CPCB) published Environmental Guidelines for Decommissioning of Coal/Lignite-Fired Power Plant (Draft)[22] in July 2021 in response to an order of Hon'ble National Green Tribunal (NGT)[23] elaborating on the legal obligations in line with existing state and central environmental laws and regulations. However, these guidelines are

[22]https://greentribunal.gov.in/sites/default/files/news_updates/302021.pdf

[23] Dharmesh Shah versus Union of India and Ors.

devoid of numerous considerations such as examining the extent of contamination during the lifecycle of the TPP, determining timelines for EIA studies and processes to ensure timely decommissioning of polluting TPPs and most importantly, enabling repurposing of the power plant for new economic activities to prevent plant-site abandonment.

Decommissioning a coal-based thermal power plant (TPP) in this context entails a complex set of technical, social, economic and environmental interventions. To get a glimpse of the specifics for the retirement process of a TPP, a case study of the Kota Super Thermal Power Station (KSTPS) has been presented[24]. Using this case study and other insights, one of the objectives of this paper is also to identify the challenges towards designing important interventions in the following aspects of TPP decommissioning:

- Full remediation of the plant site.
- Compensation for the economic loss of the dependent workforce and communities.
- Creating new economic opportunities for the affected communities and delineating environmental outcomes of the just energy transition.

3.1. Case Study: Kota Super Thermal Power Station (KSTPS)[25]

3.1.1. Overview:

Situated on the northern bank of Chambal River in Kota, Rajasthan, KSTPS is one of the most labour-intensive industries of the city spread over an area of 204 hectares. The geographic location and broad gauge railway line connectivity of KSTPS provides proximity to coal fields in central India. Established in 1983 with two units of 220 MW capacity each, KSTPS continued to expand over the decades. By 2009, the capacity increased to 1240 MW with seven units.

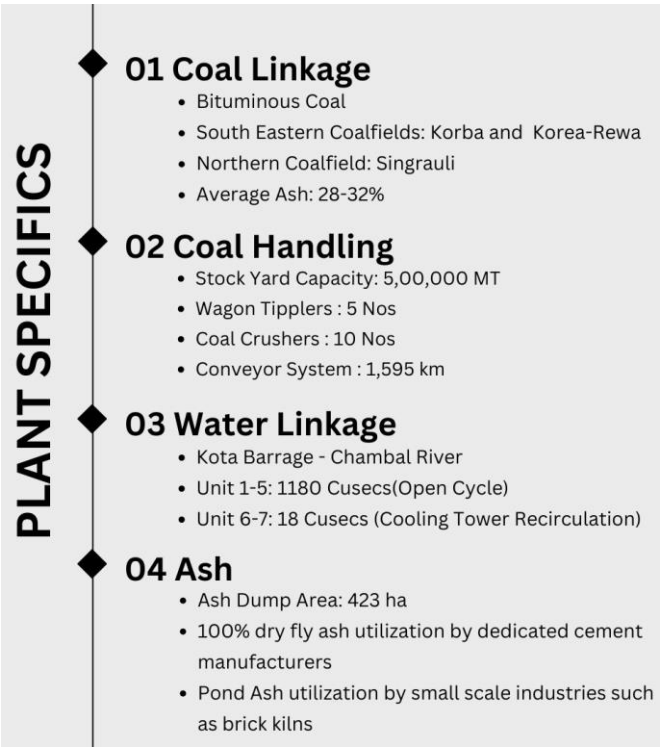


Figure 4: *Supply -Side Infrastructure Associated with KSTPS*

[24] S.Grover, N. Swami. 2023. *'Navigating Energy Transition : Understanding Socio-Economic Complexities and Intersectionality in Thermal Power Plants (A Case of Kota Super Thermal Power Station)'*

[25] This section only pertains to plant-level decommissioning and a broader framework for decommissioning in the context of Just Transition is subsequently reported.

Since its inception in 1984, the plant has consistently received meritorious productivity awards. Notably, it was honored with the 'Golden Shield' award by the Union Ministry of Power in 2004 for maintaining exceptional performance from 2000-01 to 2003-04. In the fiscal year 2010-11, KSTPS achieved a unique distinction by achieving 100% fly ash utilization. The plant also boasts an impressive record with a plant load factor of 91.06% and a station availability of 94.23%.

3.1.2. The growth of the Local Economy - Backward and Forward Linkages:

Since the inception of KSTPS, significant direct and indirect employment opportunities have been created in and around KSTPS. As of March 2022, KSTPS had 656 on-roll employees along with 2012 contractual workers performing different kinds of technical and non-technical work at the plant. The long-drawn operationalization of the KSTPS has provided a thrust to cement and fly ash brick industry in the surrounding RIICO Paryavaran Industrial area.[26] A cluster of 40-50 small-scale fly ash brick plants has emerged in the region, providing livelihood to nearly 3500 people for about seven months a year.

The fly ash industry associated with KSTPS utilises the legacy fly ash accumulated in the ash pond corresponding to KSTPS and dry fly ash generated daily from the plant. The cement industry is the principal consumer of dry fly ash, consuming nearly 80% of the fly ash generated by the plant. Birla Cement Works Ltd, Shree Cement Ltd, Grasim Industries Ltd, Mangalam Cement Ltd, and Associated Cement Company Ltd are some of the chief industrial units procuring fly ash from the plant. These industries provide a substantial scope to employ workers due to high and direct utilization of the fly ash obtained from the plant.

The Corporate Social Responsibility(CSR) initiatives of KSTPS have contributed to the socio-economic development of the local community as well as financed public infrastructure in and around the plant, supporting the urban development in the district of Kota. Various works undertaken by the plant's CSR implementation committee include constructing community centres, yoga sheds, and parks for the local colonies. Moreover, the plant also owns the infrastructure of a government primary school and a health dispensary - both habited within the Thermal Colony, thus contributing to local human development. As a result, KSTPS has made a significant impact on the local economy by generating direct employment, fostering associated jobs and economic opportunities, and enabling an ecosystem in which social infrastructure and other industries like transportation, real estate, and consumer goods have flourished.

[26] The industrial area was set up by Rajasthan State Industrial Development & Investment Corporation Limited (RIICO) during 1997-98 after the Ministry of Environment and Forests' notification on the utilisation of fly-ash from coal-based thermal power plants under the Environment (Protection) Act, 1986

3.1.3. Evolution of Neighbourhoods:

Since the inception of KSTPS, the land utilization in the surrounding areas have been determined by the plant operations and the expansion of associated[27] and allied activities[28]. Residential and mixed neighbourhoods have emerged and expanded adjacent to the plant, extending the limits of the urban centre.

The Thermal Colony, inhabiting direct and on-roll technical workforce, has been laid down to the north of the plant. The neighbourhoods of Kali Basti and Chambal Colony, situated to the northwest, accommodate a significant portion of contractual workers. Both the areas are informal settlements[29] resulting from the gradual encroachment of the government's land over the decades.

Fly-Ash brick industries emerged around KSTPS with the establishment of the RIICO Paryavaran Industrial area in Kota. in the period between 2000 and 2010. About 45 hectares of forest area was diverted to establish the industrial area occupied by small-scale industries. It can be observed that with the emergence of fly-ash brick industries, villages like Nanta, located to the north of the plant's ash pond, witnessed a tremendous expansion. Nanta hosts a significant number of the marginal workforce employed in the brick industry and a large section of KSTPS' contractual workforce.

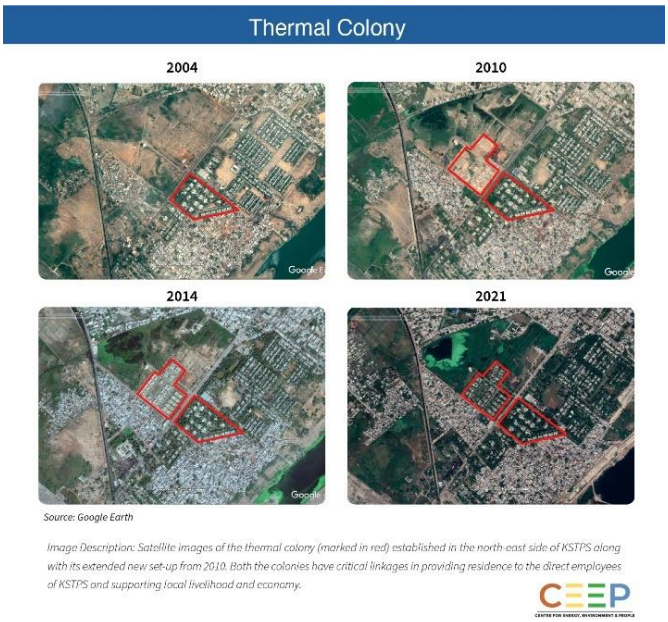
In addition to the above neighbourhoods, the plant has played a vital role in expanding the agricultural areas of Balita and Seenta. Located further north of KSTPS, both the neighbourhoods house many of the plant's direct and contractual workforce.

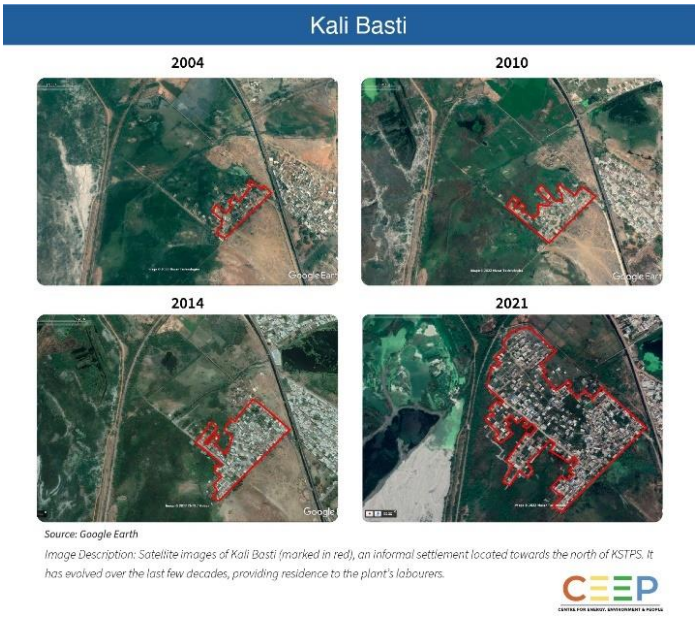
Figure 5: *Locations of KSTPS, Ash Brick Industry, and Associated Neighborhoods*

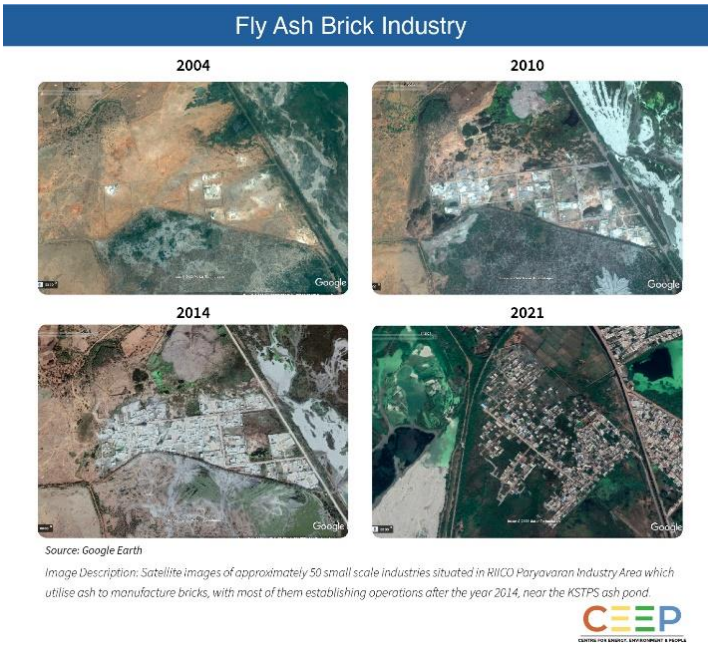
[27] Associated activities refer to the industries that act as material and operational inputs for the plants like equipment manufacturers, vendors, consultants and contractors.

[28] Allied activities refer to the local economy around a thermal power plant. This includes ration shops, drivers, house helps, security guards among others with a high degree of informality and absence of any statutory/contractual obligation with the plant.

[29] OECD defines informal settlements as areas where groups of housing units have been constructed on land that the occupants have no legal claim.







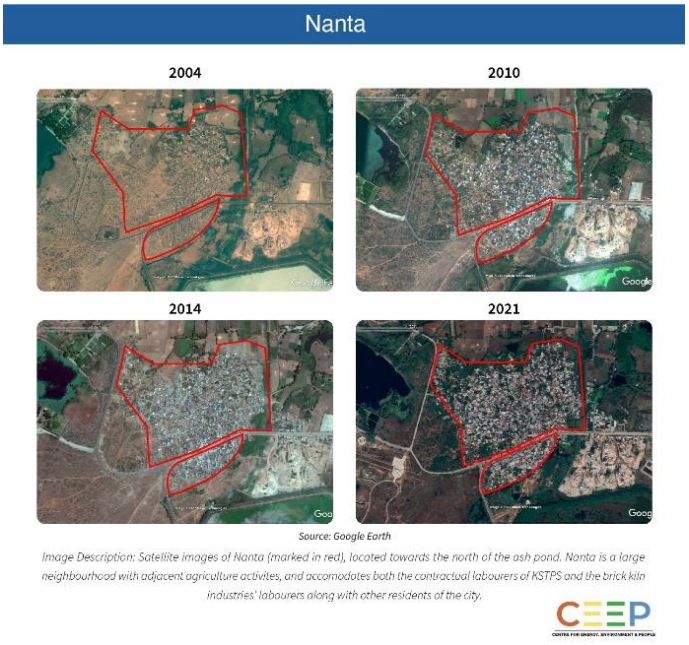


Figure 6: *Spatial-temporal evolution of KSTPS neighbourhood and associated economic centres*

3.1.4. Environmental Impact:

Positioned adjacent to the Chambal River and situated in the core of a city with a populace of approximately 1.4 million, KSTPS has a significant bearing on the air and water quality in the region. The monthly stack emissions reports issued by RVUNL paint a concerning picture of the plant's impact on air quality. The emissions data of the plant for the year 2021, for instance, reveals its non-compliance with essential environmental rules and regulations such as, emission norms for particulate matter (PM10, PM2.5), sulphur dioxide (SO_2) or installation of Flue-Gas Desulphurisation (FGD) System in the mandated time period.

Thermal power plants in Rajasthan have the second-highest freshwater withdrawal intensity from water bodies in India[30] for steam production and cooling. The facility at Kota employs water for various purposes such as coal and ash handling, demineralization, firefighting and meeting the domestic requirements of workers and staff. Although, the plant does not compete for Kota's water resources for other operational needs, as the majority of the water utilized is subsequently discharged back into the river Chambal, it however, discharges water at a higher temperature, leading to thermal pollution and hence, affecting the aquatic life and the users downstream.

3.1.5. Classification of Livelihoods - Capabilities and Vulnerabilities:

In the case of a potential closure of KSTPS, the diverse sections of the workforce shall be subjected to differentiated conditions and subsequent outcomes. The impacted livelihoods include KSTPS's workforce, the industry whose businesses are linked to KSTPS, and the local economy that has organically emerged due to the economic impetus KSTPS provides. Based on the legal and statutory relationship between the workers and the plant, the range of economic activities and livelihoods are classified into three broad categories: direct, associated, and allied livelihoods.

- **Direct Livelihoods:**
  The substantial operations of KSTPS are performed by the facility's permanent employees and contracted workforce. The permanent employees comprise officials, including management and other officers, and technical workmen including skilled technical workers holding the designations of supervisors and plant operators.
  A significant portion of the workforce present at the plant comprises contractual labour, consisting of skilled, semi-skilled, and unskilled workers. Deployed through various labour contractors, the contractual workforce is designated and remunerated according to the prescribed wage rates as per their expertise.

[30] Luo, Krishnan and Sen 2018

The permanent and the contractual workforce operate within the boundaries of KSTPS. The institution's laws, rules, and policies apply to these categories.

- **Associated Livelihoods**

  KSTPS engages equipment manufacturers, vendors, consultants, and contractors to meet operational and material requirements. Also, fly ash and cement industries also depend on KSTPS for dry fly ash and pond ash, a key input material for the industry.

  The goods and services contractors engaged with KSTPS in direct commercial transactions are independent agencies to whom KSTPS does not owe statutory responsibility, beyond contractual liabilities. The vulnerability of these agencies differs based on the nature of their linkages to KSTPS, and the form of their enterprises.

- **Allied Livelihoods**

  In addition to the livelihoods discussed above, the existence of KSTPS has propelled several local economic activities including private enterprises, local transport, informal work, and activities related to the public infrastructure sprung up as a consequence of the expansion of plant operations. The small and marginal enterprises predominantly reliant on the facility's presence are likely to face a significant loss of revenue due to its closure.

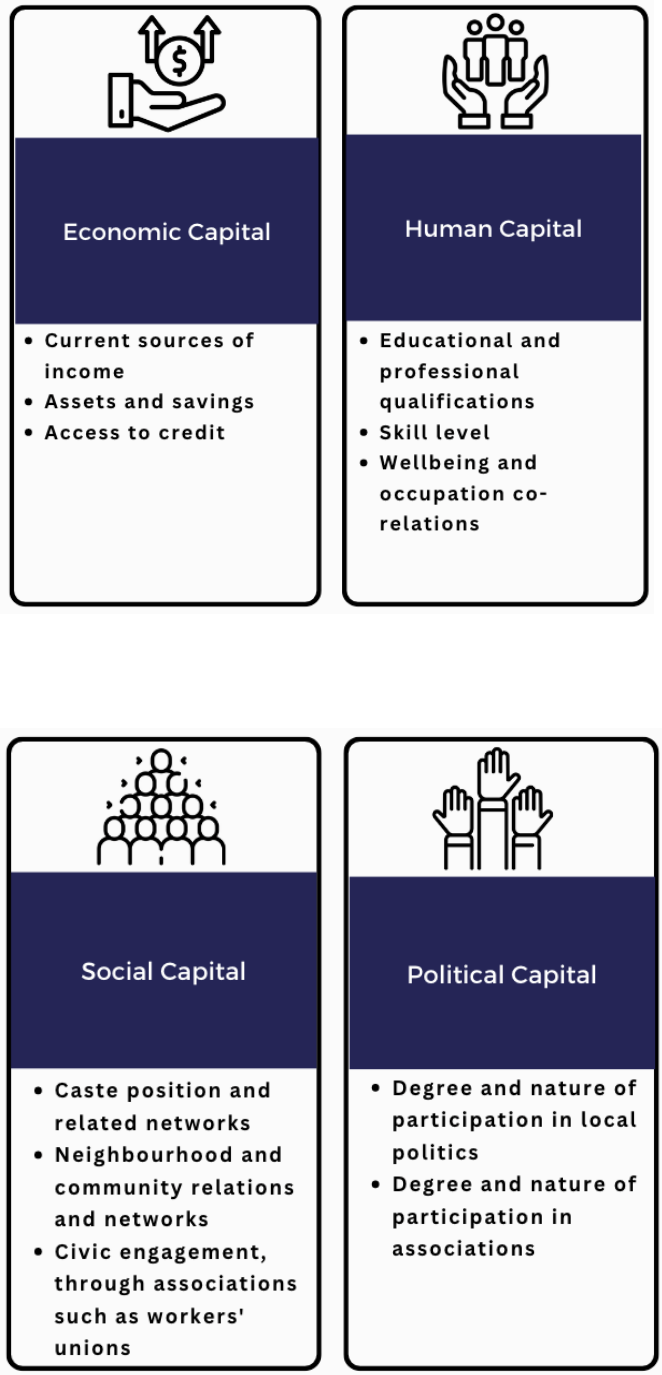


Figure 7: *Parameters for Evaluating Vulnerabilities of Workers*

The residential colonies of the plant's permanent employees support an ecosystem of informal workers including household help, gardeners, drivers, ration shopkeepers and security guards. An array of small businesses exists outside the residential complexes of plant employees to cater to the day-to-day requirements of the neighbourhood. These include provision shops, vegetable vendors, dairies, stationeries, mobile and electrical repair shops, vehicle mechanics, barbers, and tailors. A community of local shops can be found in most neighbourhoods with a high concentration of the institution's permanent and contractual workforce. While there is no shared contractual or statutory relationship between these local enterprises and KSTPS, the plant’s closure will cause them a considerable economic shock.

The specific determinants of the vulnerability of the above mentioned categories shall differ based on their respective capabilities and expertise. Literature on climate change and energy transition shows that the capability approach as propounded by Amartya Sen, offers a constructive way to assess the vulnerabilities of individuals and communities (Schlosberg 2014).

In order to evaluate their vulnerabilities in case of a TPP shutdown, the capabilities and resilience of the workers - classified on the basis of their expertise, are assessed in view of their economic, human, social and political capital. The description of the parameters considered are as follows **:**

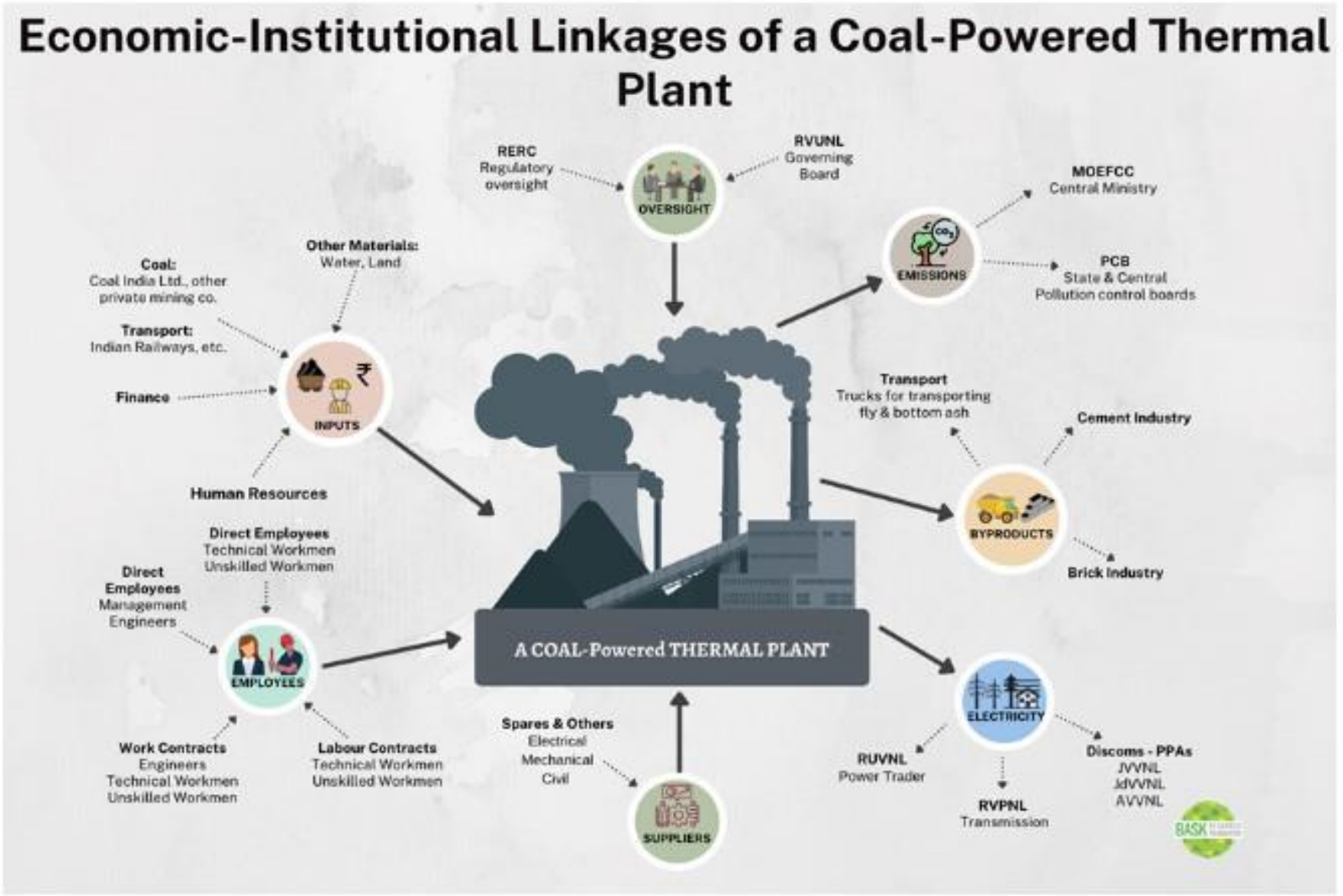


Figure 8: *Backward & Forward Institutional Linkages of a Coal-Powered TPP*

Table 3: Mapping Capabilities and Vulnerabilities of different categories of workers:[31]

Category of Workers	Economic Capital	Human Capital	Social Capital	Political Capital
Skilled (mechanic fitter, electrician, light and heavy vehicle drivers, operators, supervisors)	Minimum daily wage of INR 283 as specified by GoR. Better positioned to access opportunities for additional income through other means of livelihood such as small shops, working in other industries. Indicate a higher degree of asset ownership, including houses and lightweight vehicles. Insured under the ESI scheme. EPF deposit serves as the primary saving. Both formal sources, such as banks and microfinance institutions, and informal sources, such as relatives or colleagues are utilized to access credit.	Typically hold at least matriculation, with most recent recruits holding ITI diplomas. Conditions of work are harsh with high occupational hazard risk. Relatively less prolonged and direct exposure to hazardous materials. Better positioned to receive alternative employment at current wages as skills and experience are ratified through experience certificates. Provided with required safety gear such as helmets, gloves, and shoes.	Includes a mix of persons from different caste backgrounds, including Brahmins, Rajputs, Scheduled Castes, and Other Backward Castes. Most are locals or migrants from nearby areas such as Kota, Tonk, and Newai. Hence likely to have mature social networks.	Members of labour unions, visible and vocal participation in union activities. As local residents or residents of nearby areas, have some political voice in local decision-making.
Semi-skilled (Helper, junior fitter, welders, gardeners)	Minimum daily wage of INR 271 as specified by GoR. Access to opportunities for additional income is curtailed due to strenuous work shifts. **Many possess local housing with a high degree of informality in tenure. Some workers possess marginal agricultural land in places of origin.** Insured under the ESI scheme. EPF deposit serves as the primary saving. **Credit is secured through informal sources such as relatives, neighbours, employers, or colleagues. Express aversion to formal sources of credit.**	Typically middle school graduates. **Under-recognition of skill level gained through on-hands work experience.** **Degree of direct and prolonged exposure to hazardous materials is high, impacting physical and mental well-being.** **Access to alternative employment at existing wages is curtailed due to a lack of formal recognition of skills and experience**. Provision of safety gear such as helmets, gloves, and shoes is not adequate and timely.	Primarily includes workers belonging to Other Backward Castes and Scheduled Castes. The majority are locals or migrants from nearby areas such as Tonk, Newai, and Jhalawar and hence, likely have mature social networks.	Members of labour unions. **However, active and vocal participation is not uniform across the category.** As local residents, may exercise some say in local decision-making. However, **capacity for active participation is curtailed due to the informal nature of their settlements.**

[31] Source: (Grover and Saini,2022) Livelihoods, Vulnerabilities, And Clean Energy Transition - A case of Kota Super Thermal Power Station

Unskilled (labour, cleaning, and sanitation workers)	Minimum daily wage of INR 259 as specified by GoR. Access to opportunities for additional income is significantly reduced due to the physically strenuous work. **Many possess local housing with a high degree of informality in tenure. Few indicate none to marginal agricultural land holding in places of origin.** Insured under the ESI scheme. EPF deposit serves as the primary saving. Credit is secured through informal sources such as relatives, neighbours, employers, or colleagues. Express high aversion to formal sources of credit.	Generally comprise primary school graduates. Perform physically arduous manual labour, including civil construction and maintenance work, as well as cleaning and sanitation work. **Opportunities for professional growth are usually stagnant.** **Poorly positioned to gain alternative employment due to highly informal nature of work and limited opportunity to gain skills**. Provision of safety gear such as helmets, gloves, and shoes is not adequate and timely.	**The majority belong to Scheduled Castes and Scheduled Tribes, with sanitation and cleaning workers being predominantly Dalits.** Accounts for significant participation of female workforce across the overall livelihood spectrum. Mainly locals or migrants from nearby areas such as Tonk, Newai, and Jhalawar. Hence likely to have mature social networks.	**Members of labour unions. Leadership in union activities is minimal.** **The participation of women is virtually absent.** As local residents, may exercise some say in local decision-making. However, **capacity for active participation is curtailed due to the informal nature of their settlements.**
Fly Ash Brick Industry Workers	**Determination of wages for workers is based on productivity** (units of bricks produced or loaded/unloaded). (INR 180/190) **The majority of workers are migrants and do not possess any local assets.** Some indicated small to marginal agricultural land holding in their places of origin. **Not insured under the ESI scheme**, limiting access to healthcare. **Not covered under the EPF Act**. Formal savings are absent. C**redit is secured through informal sources** such as relatives, neighbours, employers, or colleagues. Express high aversion to formal sources of credit.	Majority were primary school graduates. High and prolonged exposure to hazards at the workplace. **Poorly positioned to gain alternative employment due to the highly informal nature of work and limited opportunity to gain skills.** **Not provided with required safety gear such as helmets, gloves, shoes or masks.**	The majority belong to Scheduled Castes and Dalit communities. **Most are migrant workers from MP, UP, Bihar, and other parts of Rajasthan. As a result, mature local social networks are likely to be absent.**	**Participation in local politics is virtually absent.** **Organised workers' associations are absent.**

4. Policy and Regulatory Gaps:

With reference to the above case study of the KSTPS, a holistic analysis of the governance, policy and institutional deficit becomes imperative for enabling a just transition for the affected population and geographical landscape. The following section describes the broad challenges associated with the decommissioning of a thermal power plant(TPP) and suggests a framework of contextual strategies and interventions to address them. To identify the characteristic gaps in transition for Human Settlements associated with TPPs facing potential decommissioning, we have built on the urbanization framework[32] devised by the Indian Institute of Human Settlements (IIHS)[33] which attempts to design short term and long term interventions within contextual boundaries.

4.1. Transitions and Governance:

- **Need for monitoring while establishment of a TPP and its associated economy:** Even though a TPP is a pivot around which local associated economy comes to rely and expand, systematic monitoring of habitation and its expansion is rarely done. However, in the event of decommissioning the onus is squarely on the local body which may not have the capacity to manage this transition systematically.

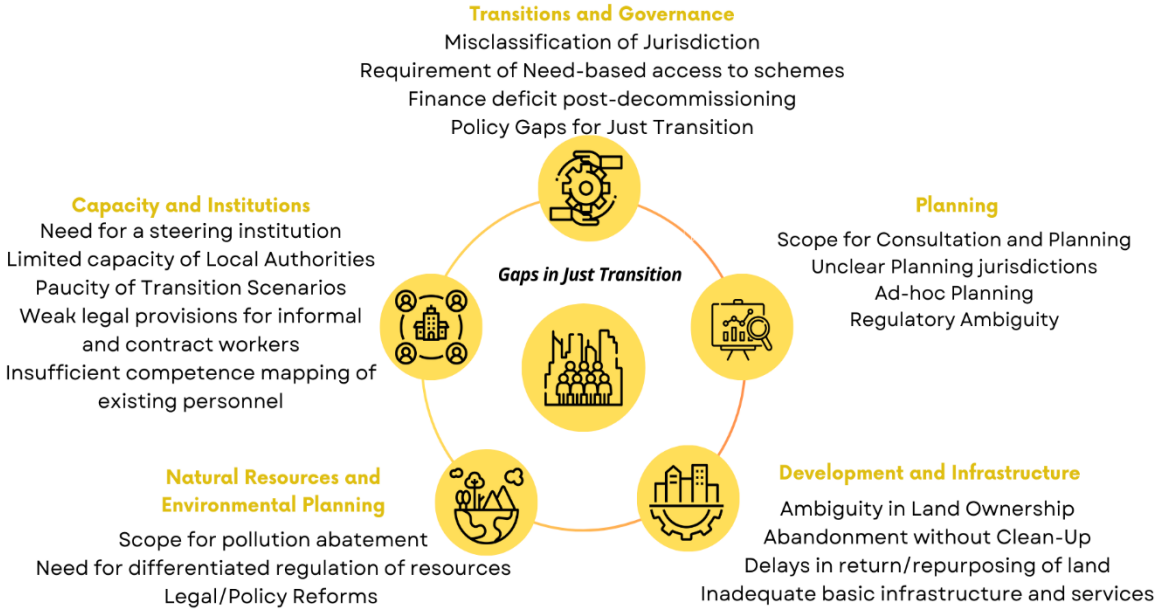


Figure 9: *Challenges Encountered by Human Settlements Associated with TPPs*

- **Misclassification of jurisdiction:** It is also possible that areas with urban characteristics are still governed as rural, especially after long-term operations of a TPP. This may curtail access to relevant schemes and policies and impacts local

[32] *Urbanization of Rural Areas* - https://plan.rajasthan.gov.in/pages/sm/department-page/67805/456

[33] https://iihs.co.in/knowledge-gateway/

governance and social protection of the existing and migrant population.

- **Classification-based rather than need based access to schemes:**
  There is also a likelihood of unavailability of interim finance to support urban areas which may be newly notified due to establishment of a TPP before urban schemes and funds are applied for or allotted. As a result, there is a mismatch between the development of urban infrastructure and the rate of settlement of direct, associated and allied workforce of the TPP in its neighbourhood.

- **Challenges that may be overlooked following decommissioning:**
  Incorporating the cost of transition and reduction in sources of finance post decommissioning could have a detrimental impact on the existing requirements of the workforce pertaining to their income, housing and social infrastructure.

- **Policy/Legal gap for a just transition:**
  Decommissioning a TPP could lead to retrenchment of a large labour force, including both formal and informal workers. Since, informal workers could be several times the formal workers, the scale of impact on them could be much higher - a fact that gets further exacerbated due to lacunae in the Indian Labour laws to address the shutdown of industrial facilities comprehensively. Mechanisms of conflict resolution between workers and owners also need codification and institutionalization.'

4.2. Planning:

- **Scope for consultation and participation in planning:**
  ULBs are also not likely to participate in the process of transition post-decommissioning of a TPP. However, they are required to implement the master plans created by state-level bodies and provide urban services in areas under transition. The planning process is often top-down and the lack of consultative planning in collaboration with the local bodies, labour unions, TPP owners, allied workers and other stakeholders. This results in a mismatch between the plan's stipulations and the needs of the settlement.

- **Multiple plans for a single area:**
  The planning of settlements in the neighbourhood of a TPP may also be subjected to multiple plans made by different agencies, with potentially varying economic, social, and spatial visions, including city-level master plans, regional industrial and corridor plans, infrastructure plans, and so on. This siloed approach to planning and a lack of coordination between agencies may lead to unsustainable development and inadequate repurposing.

- **Missing comprehensive development framework that considers the environment, economy and social security at present and in the future:**
  Master plans often overproject growth for settlements to meet regional development visions, disregarding local growth dynamics and local carrying capacities in terms of infrastructure and

natural resources. The growth of settlements in urban clusters varies based on the determinants of development. These settlements have been classified as - peripheral[34], intentional[35] and incremental[36]. These settlements would entail different priorities and demands for their further development. Regional industrial and economic visions may also prioritize a certain type of growth without assessing carrying capacity or integrating local needs of the settlement into the plan.

- **Potential for Regulatory Oversight:** There are no comprehensive legal requirements mandating the decommissioning and repurposing of a coal Thermal Power Plant (TPP). In contrast to the coal mining sector, there is no obligation to formulate decommissioning plans for TPPs either before plant construction or during operations. The prevailing laws and regulations pertaining to the environment, labor, land, and finance are either unclear or do not address decommissioning, allowing room for unconventional approaches.

- **Creating room for factoring in Decommissioning costs:** Presently, decommissioning costs are not considered in the financial calculations during the establishment of a Thermal Power Plant (TPP) and is not considered a liability, preventing its reporting and leaving no funds allocated for this purpose. A comprehensive overhaul of the existing legal, policy, and regulatory frameworks is necessary to facilitate the just decommissioning of TPPs by power plant owners for end-of-life activities. Currently, the assumption is that the salvage value would be sufficient for just decommissioning. In the absence of clearly designated funds and established liabilities, there is a significant risk of both public and private companies opting for inaction.

- **Multiplicity of clearances:** Dismantling, cleanup, remediation, and repurposing are considered new activities under various environmental statutes, necessitating the acquisition of multiple permits for the decommissioning process.

✓ New consent under the Water and Air Act would be required to initiate dismantling and clean-up. New permits are also required under Hazardous waste and C&D waste rules due to large scale waste generation during the process.

✓ For repurposing, a fresh consent may be required to establish and operate a new facility under the Air and Water Act.

✓ Depending on the sector of repurposing, a new Environmental Clearance (EC) will be required.

[34] Settlements experiencing urbanization due to their proximity to large urban settlements and their sprawl

[35] Settlements experiencing urbanization due to presence of large industrial estates or their proximity to transportation corridors such as the Delhi Mumbai Industrial Corridor (DMIC), Dedicated Freight Corridor (DFC), and National Highways

[36] Settlements experiencing urbanization which are not in proximity to either large urban settlements or industrial estates and transportation corridors.

✓ Change in land use/ activity will require a new forest clearance.

Hence, meeting the requirements of the existing statutes may be considered too cumbersome for decommissioning and repurposing, especially for new investors.

4.3. Development and Infrastructure:

- **Ambiguity in Land Ownership:** The land ownership structure in India's thermal power generation sector creates an additional layer of peculiar complexity. Power plants are usually installed on a mix of freehold and leasehold land, using land acquisition acts, creating a high possibility of delayed and ad-hoc decommissioning.

- **High probability of abandoning the plant without clean-up/repurposing:** If clean-up and repurposing are financially unviable, GENCOs are likely to leave the plant as it is, which has been the experience in the developed world. Hence, there is a need to create a financial security mechanism to enable decommissioning and repurposing.

- **Opportunity for clarity on timeline and condition of the return of leasehold land as well as repurposing freehold land:** A power generation company (GENCO) is obligated to return the land to the state/central government after the lease period expires. However, the specific requirements for the condition in which the land must be returned may not be detailed in the lease document's terms and conditions. Additionally, neither the states nor the central government has formulated a policy on the repurposing of brownfield projects.

- **Limited options for housing, especially for workers and migrant labourers:** Housing stock that is available and being developed in an unplanned manner to facilitate the inhabitation of informal workforce is unsustainable and incongruent with the needs of local and floating populations. Moreover, there is lack of policy insight into the sustenance of these households post-decommissioning.

- **Avenue for basic infrastructure and services:** Across sanitation, water-provisioning, waste management, public transport, housing, education, and healthcare, there are inadequacies in planning and provisioning that affect the quality of life of residents and migrants. These arise from multiple reasons including the lack of data, limited capacities, jurisdictional overlaps and ineffective political patronage.

4.4. Natural Resources and Environmental Planning:

- **Prospect for checking environmental pollution:** With high dependence on groundwater across the country, especially for industrial and agricultural purposes, the water table is highly susceptible to pollution. Insufficient monitoring and compliance with regulatory provisions for waste disposal during dismantling and clean-up and cyclical use of water from TPPs may lead to irreversible damage in the near future. Moreover, despite poor air quality,

particularly around TPPs, there are regulatory deficits to ensure timely and expedited decommissioning of TPPs. This is further leading to dire health issues for residents and migrants.

- **Possibility of improving governance framework and reforming institutions for water management:** There is a lack of differentiated governance and regulation of water based on type of use (agricultural, domestic, or industrial) and settlement (urban or rural). Lack of holistic governance of different uses and sources of water (surface, ground) has led to haphazard planning and excessive reliance on the resource with construction of settlements around the TPPs for the migrant workforce. There is little accountability across departments to conserve and rejuvenate a region's groundwater table. The absence of a state/regional level water authority makes water management challenging. There is thus, limited integration of natural resource management in planning and governance.

- **Horizon for a legal mandate:** There are no laws that mandate the clean-up and remediation works for TPP decommission or even an industrial decommission.
  - ✓ The 2006 Environmental Impact Assessment (EIA) notification, which provides for Environmental Clearance (EC) for establishing Thermal Power Plants (TPPs), does not address the decommissioning aspect.
  - ✓ The Forest Conservation Act of 1980, which allows for the diversion of forest land for the establishment of Thermal Power Plants (TPPs), does not provide details on decommissioning. Rather, it stipulates that the land must be returned to the forest department post cessation of operations.
  - ✓ Decommissioning is not mentioned in other statutes such as the Air Act or Water Act.

4.5. Capacity and Institutions:

- **Potentiality for planning and management during and after decommissioning of TPPs:** Settlements in transition encounter numerous challenges in the financial, administrative and socio-economic domains. The lack of a coordinating body to help plan and manage the transitions of settlements is a hurdle that causes delays, disjuncture, and exacerbates gaps in capacity.

- **Addressing coordination challenges among multitude of agencies:** The multiplicity of authorities, committees, and institutions in a TPP decommissioning may have overlapping functions or lack clarity on jurisdictions. This slows down decision making and implementation, hinders accountability, and makes grievance redressal convoluted and cumbersome for the concerned population.

- **Capacity building of local authorities:** ULBs are not involved in master planning and also have limited own-source finances. This may lead to an imbalance in development between the TPP and its surrounding areas. This subsequently

leads to undesirable living conditions and lack of accessibility to adequate municipal services and social infrastructure.

- **Critical necessity of financial planning:** While States are proactive in creating development and land use plans, they usually do not have concomitant financial plans. This hinders implementation of plans during the expansion phase of the TPP and post-decommissioning.

- **Mandate for strengthening provisions for informal and contract workers:** There are no provisions in the Contract Labour (Regulation and Abolition) Act, 1970, to provide social security or reskill unemployed labour. The Social security Code, 2020 is also not designed to deal with large-scale industrial closure.

- **Standardization of mechanisms for quick decision-making:** About two-thirds of the land of TPPs are with the state and the central government.[37] In addition, the leasehold land of the private sector would also revert to the government. So, the state and central government have the most significant role in deciding the fate of the TPP sites. However, there is no mechanism at the central or state level that can take quick and efficient decisions on repurposing and transferring land.

- **Augmenting competence and harmonizing procedures for personnel management:** Vacancies, frequent transfers, and information asymmetries slow down decision making and leave certain aspects of effective just transition unattended to. Coordination among the multiplicity of agencies requires awareness of systems, processes, contextual knowledge and jurisdictions which are dependent on institutional memory and the administrative capacity of the personnel responsible for seeing through the transition.

5. Components of a 'Just Transition' for a Thermal Power Plant:

On examining the current processes and legal mandates related to the decommissioning of coal Thermal Power Plants (TPPs), it is evident that policymakers may not have yet envisioned extensive dimensions for decommissioning. However, the decommissioning of some TPPs is inevitable given their ageing profile, increasing power demand and availability of competitive and non-polluting sources of energy.

The decommissioning process of a TPP in practice culminates with the completion of comprehensive exercises of retirement of the plant, dismantling of the plant infrastructure, clean-up of the facility and surrounding area and remediation for future applications. The attachment of the value 'just' to the process of decommissioning encompasses a wider gamut of activities and considerations[38],

[37] *'National Electricity Plan (Volume-1) Generation, 2023.'* https://cea.nic.in/wp-content/uploads/irp/2023/05/NEP_2022_32_FINAL_GAZETTE-1.pdf

[38] *What is a Just Transition? (Asian Development Bank)*-https://blogs.adb.org/blog/navigating-just-transition-leave-no-one-behind-battle-against-climate-change/

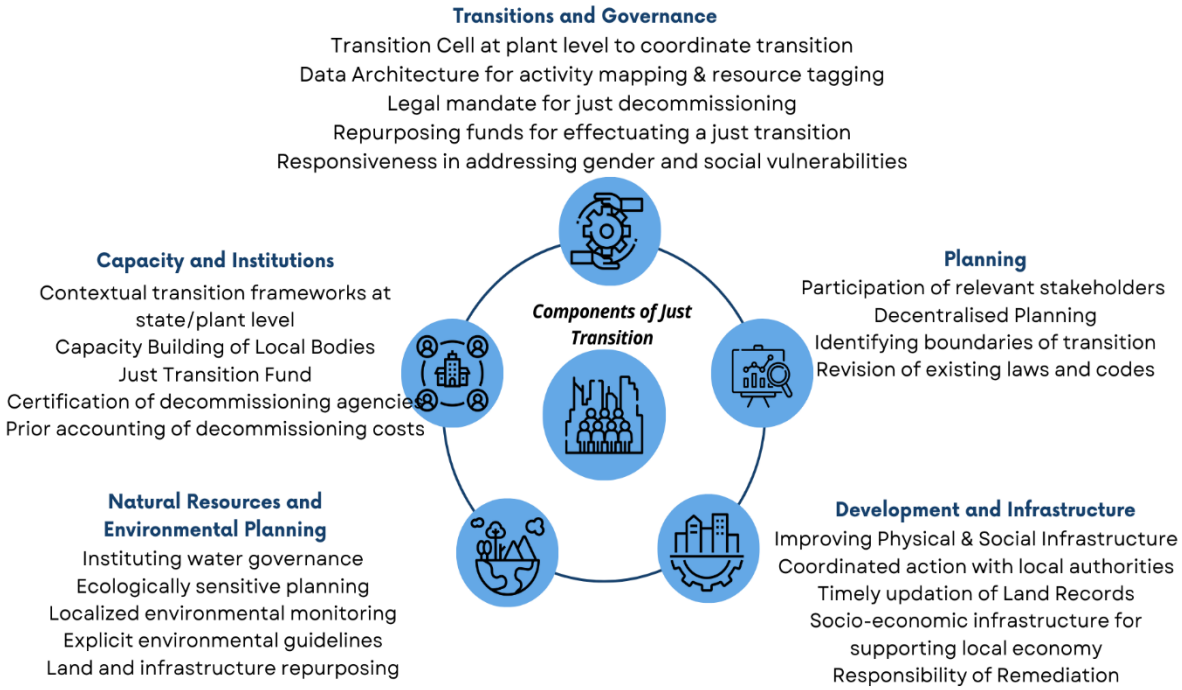


Figure 10: *Components of Just Transition for Human Settlements Associated with TPPs*

as explained in the earlier sections. In addition to comprehensive decontamination and remediation of the plant site on the basis of the peculiarities of the future land use, a 'just' decommissioning process would include a 'just' workforce transition with adequate compensation, skilling/reskilling and the creation of alternate job opportunities. This has to be bolstered with repurposing the plant site and its surroundings for supporting the socio-economic requirements of the dependent workforce and their families, especially in areas experiencing urbanization due to the presence of the TPP (intentional urbanization), as these lack pre-existing social infrastructure and economic opportunities.

To bring to fruition the 'just' decommissioning process, an exhaustive calibration/re-calibration of the existent policies, processes and legal mandates is vital. Advancing the urbanization framework designed by Indian Institute for Human Settlements(IIHS) for conceiving potential interventions in the realm of human settlements undergoing transition around decommissioned TPPs and integrating the ingenious recommendations of the experts in domains ranging from energy transition and finance to human settlements and environment, a comprehensive compilation of measures and a far-reaching framework has been proposed to give effect to the notion of 'Just' Transition.

5.1. Transition and Governance:

- **Transition Cell to enable and coordinate energy transition:** The Transition Cell could be a part of the existing local body (either a Gram Panchayat or a Urban Local Body) to ensure smooth transitions. This institution may take clues from the task-force

framework proposed by the Report of the Inter-ministerial Committee on Just Transition from Coal, published by NITI Aayog[39] and extend it to the power sector. The transition body shall be responsible for identifying key gaps in capacity as well as infrastructure, including affordable housing, sustainable social infrastructure and futuristic economic opportunities. The body may ensure that existing and future plans accommodate these requirements. This system will enable a feedback loop allowing the local body to seek timely funding and technical assistance to fill the identified gaps in resources and personnel.

- **Creating comprehensive data architecture for activity mapping and resource tagging:** Administrative and planning functions of areas undergoing transition in the vicinity of a decommissioned TPP bodies differ substantially. To ensure smooth transition there must be clear guidelines and training programmes offered to build capacity for the workforce in tackling the transition period. Horizontal data sharing between departments is equally important in order to appropriately plan decommissioning and repurposing the site. The data architecture would enable an embedded system that collects existing administrative data and periodically assesses parameters such as composition of population, economic and skill profile, use of resources like water and energy, and development of infrastructure. A State Technical Support Unit must be set up to facilitate this exercise among others, by building a framework for data collection, monitoring and building capacity for data collection at a local body level.

- **Addressing misclassification of rural and urban areas:** The settlements associated with TPPs are usually setup in neighbouring rural areas, which over time accumulate urban characteristics. Streamlining village plans with larger development plans would ensure that these are accompanied by relevant policy and direction for action. With the implementation of the decommissioning and staggered withdrawal of rural schemes, the rural plan would automatically be incorporated into the upcoming urban plan. This would in turn create greater integration between the administrative and planning institutions in the urban area with capacity to enable transition for the affected population.

- **A mandatory provision for effectuating decommissioning:** Decommissioning of TPPs should be either mandated by a new law or an existing law can be amended to institutionalize decommissioning. The can be done by amending the Environmental Impact Assessment notification, 2006, which requires all TPPs to obtain Environmental Clearance (EC).

  For new plants, the decommissioning plan could be part of the Environment Impact Assessment (EIA) study and the

[39] https://www.niti.gov.in/sites/default/files/2022-11/Report_Just-Transition-Committee_compressed.pdf

Environment Management Plan (EMP), whereas, for existing plants, submission of a decommissioning plan shall be mandated to be submitted well before the date of retirement.

- **A new Act for decommissioning:** The Draft Environmental Guidelines for Decommissioning a Coal/Lignite-Fired Power Plant lists multiple permit and compliance requirements for decommissioning. It also proposes an Environmental Impact Assessment (EIA) and an Environment Management Plan (EMP) for guiding the decommissioning process. However, under the EIA notification, 2006 another EIA study and EC would be required for repurposing. If the draft guidelines are implemented, then from closure to repurposing, multiple studies and clearances and consent would be required under Water and Air Acts and hazardous waste, C&D and fly ash rules etc. This would make decommissioning a highly time-consuming and cumbersome process.

  To avoid the multiplicity, a new act could be enacted to consolidate all the environmental-related provisions and remove multiplicity in clearances and permit procedures. It shall specify a simple process to obtain a permit for decommissioning and provide regulatory oversight with a clear timeline from closure to repurposing.

- **A just transition policy harmonizing economic development and environmental sustainability within a social justice framework:** Existing labour laws and codes fail to adequately and comprehensively address the transition needs of both informal and formal contractual workers engaged in power plants. On the other hand, consequences of historical pollution and land degradation necessitate the transition to renewables and remediating the surroundings of a TPP. The imperative for a just transition policy becomes evident, particularly in the context of the widespread closure of coal mines and Thermal Power Plants (TPPs). Such a policy could encompass provisions for worker support, training and skilling, repurposing existing coal infrastructure, and fostering economic revitalization in coal-dependent districts by leveraging the opportunities in the renewable energy supply chain.

- **Creating fiscal space to fund just transition**: A pertinent impediment in carrying out a just transition is the cost associated with it and the capacity to increase the fiscal space to bear that cost. It is crucial to identify the heads in the state government budget where funds are allocated for activities aligned with the just transition framework. The benefits accruing from the Union and State Government schemes can be channeled to the intended beneficiaries in the settlements undergoing transition. Alignment with just transition activities shall also enable outcome-linked borrowing at a lesser cost of capital. Moreover, it shall crowd-in private investors who may be incentivised to mobilize sector-specific and outcome-specific distribution of proceeds.

- **Awareness creation on Just Transition**

and Gender Justice during and post decommissioning: With a historical trend of long-term migration and settlements in association with concerned industrial units in India, there is limited expectation and experience among the affected workers, especially semi-skilled and unskilled workers, of decommissioning of an operational industrial unit/TPP. In order to address the incapacity of the vulnerable workforce and their families to respond to the decision of the management and state governments to carry out decommissioning, sensitization of the workforce in vernacular languages through local media and press and labour unions with a specific focus on abstract notions of just transition and gender justice becomes imperative. This shall be accompanied with explicit clauses in their contracts mentioning the timelines for decommissioning and the post-decommissioning obligations of the TPP management.

5.2. Planning:

- **Comprehensive planning for development:** There is a need to shift from a jurisdictional approach to a problem-based approach for engaging institutions to undertake planning exercise for a TPP undergoing decommissioning. A collaboration among impacted stakeholders and relevant agencies ranging from government institutions such as Development Authorities, Urban Local Bodies to Industrial Bodies, Labour Unions, and specialists such as environmentalists may transform it into an integrated process with a possibility to steer a long term transition plan. In order to effectively carry out this process, there is a need to invest in capacity building of the participants.

- **Encourage decentralised planning processes:** Currently, state-level bodies exclusively formulate master plans without involving local planning agencies and stakeholders. Consequently, these plans often fall short in addressing the critical challenges encountered by settlements. Given that Thermal Power Plants (TPPs) are concentrated in coal-mining regions or coastal areas, encompassing twenty-five districts across 13 states, accounting for roughly half of the nation's total installed coal-based power, there arises a necessity for an integrated just transition plan at the district level. This plan should effectively manage the closure of mines, power plants, and coal-dependent industries over the coming decades, allowing for the consideration of settlement and community-level needs. The states should reassess their current approach and commit to fostering sustainable planning practices that encourage participation from local agencies and the public and capture the local growth dynamics and carrying capacities.

- **Identifying boundaries of transition for prioritizing planning objectives:** Many transitioning settlements face challenges at the time of decommissioning of TPPs due to inability to identify the settlements and economic activities which are directly or indirectly impacted due to the closure. This further has a bearing on planning for post-decommissioning rehabilitation of the

settlements as the sources of finance (TPP owner, state governments, international institutions etc.) which may fund this transition have different scales of financing, scope of impacted communities and interests for outcomes. There is a need for targeted development strategies that address specific needs of the settlement. Transition plans should identify key projects that are critical for the sustainable development of the settlement and prepare a financial strategy for their execution. These projects should address gaps in physical infrastructure, social infrastructure, adequate, affordable and inclusive housing; enhance long-term ecological sustainability; and boost local employment. There is thus a need at a state level to create a dedicated fund that will enable transitioning settlements to execute post-decommissioning plans (as proposed under Just-Transition Fund).

- **Review and revision of the existing laws and codes:** A comprehensive review and revision of existing labor laws and codes are imperative from the standpoint of a just transition.

  - ✓ The Industrial Disputes Act, 1947 may be revisited to incorporate newer challenges in the context of decommissioning.

  - ✓ Contract Labour (Regulation and Abolition) Act, 1970 requires an amendment to incorporate provisions that address the safeguards available to workers in the event of Thermal Power Plant (TPP) closures.

5.3. Development and Infrastructure:

- **Improving physical and social infrastructure:** In order to meet the needs of local, floating and migrant populations, it is critical that state governments and the local bodies facilitate development of infrastructure such as housing, education, healthcare, and public transportation.

  For housing, the state could offer a wide range of housing options that factor location, affordability, models, and the type of population in the area. Areas close to TPPs attract migrants and local populations with specific housing needs and a high degree of location flexibility. It must be affordable, and be able to cater to the needs of the most vulnerable. It shall include different modalities of formal rental housing including dormitories, hostels etc.

  Housing infrastructure shall be accompanied by basic infrastructure services. Where networked solutions are difficult to implement, the state and the TPP board should consider implementing sustainable off-grid infrastructure arrangements such as septage management, and decentralized stormwater and greywater management.

  Public transportation systems also need to be enhanced to ensure mobility and transport and affordable prices, especially post decommissioning when the connectivity with the urban or industrial centres becomes crucial. Transportation systems must also focus on improving intercity connectivity as populations are dependent on larger urban centres for work, healthcare, education, amongst other needs

with retirement of the TPP.

Lastly, states may ensure that social infrastructure (educational, recreational, and healthcare facilities) are developed and the dependency on larger urban centres is reduced. Social infrastructure is paramount towards building an inclusive and independent settlement.

- **Coordination with local authorities to improve planning and service delivery:** Infrastructure provisioning and servicing witness shortcomings due to multiple agencies providing services across different jurisdictions. Basic physical and social infrastructure need to be planned along with housing projects at the time of establishment of TPPs, and services delivered in coordination with authorities such as the industrial bodies, local body, development authorities and state bodies such as the PHED, housing department, etc. Coordinated service delivery also enhances accountability.

- **Land management for natural resource protection:** Natural resource management is critical to conserve and protect groundwater resources. Development of land for economic and social development must be envisioned jointly with the conservation of local environment and biodiversity. In order to do so, local bodies should regularly pick up enumeration and updation of land records in the vicinity of large TPP establishments, including the common lands and public lands, and allocate land for physical and social infrastructure, affordable housing, resource rejuvenation, economic development, etc. Additionally, local bodies should identify No to Low Development Zones for ecologically sensitive areas. Industrial lands should be planned with the aim to conserve local natural resources to prevent further deterioration of the local environment.

- **Support localized economic activities:** It is imperative that the state creates local opportunities and skilling centres in line with occupational possibilities in areas undergoing transition, catering to local populations, especially women. New economic opportunities must be aligned with the local economy and associated supply chains so as to incrementally build necessary infrastructure. Additionally, existing systems and social protection schemes such as MGNREGA could be expanded to include the services and infrastructure sector.

- **Responsibility of remediation:** The return of leasehold land in the case of Thermal Power Plants (TPPs) to either the State or the Central Government is outlined in the lease contract. However, in many lease documents, the specific conditions for the land's return are vaguely defined. For instance, a commonly used standard land lease agreement for energy projects, formulated by the World Bank and widely adopted globally, includes a condition stating: "Lessee shall return the Site to Lessor upon the termination of the Agreement in good condition." This formulation is ambiguous and challenging to implement in practice. To mitigate potential conflicts, particularly when the leaseholder is a private sector entity, it is

crucial that the lease document clearly articulates the conditions for dismantling and remediation. Therefore, it is recommended that the Government amends the Land Acquisition Acts to explicitly specify standards for dismantling and remediation in lease agreements.

5.4. Natural Resources and Environmental Planning:

- **Instituting a water governance system:** A state-wide water governance system is crucial. Creating this should be an integrative process that enables collective planning and regulation of water systems in settlements near industries and TPPs by relevant authorities in that geographical region. This governance system would need to govern various water resources available in the state, including groundwater and surface water, as well as water delivery infrastructure. It should have an ecologically-led governance mandate, considering water conservation and abatement of water pollution as the priority.

- **Ecologically sensitive planning processes:** Planning of urban and industrial areas needs to be a more ecologically sensitive process. An inclusive planning process should also address the longevity of infrastructure being built and must consider future climate change impacts. The decommissioning and energy transition process should be compliant with environmental impact assessment and social risk assessment.

- **Localized environmental monitoring:** A critical gap in the governance framework is the lack of agency and autonomy at the local scale around impact of existing coal-based generation units on natural resources. There is a need for a localized environmental monitoring system that is embedded in the local governance framework. This would include monitoring local resource use, pollution levels, and waste disposal, particularly around small and remote industrial areas as well as TPPs. Regular monitoring and review processes create accountability and allow for smoother implementation of existing environmental standards and guidelines.

- **Explicit environmental guidelines for decommissioning of TPPs:** The Draft Environmental Guidelines submitted by the CPCB to the NGT is a generic document with inadequate focus on clear steps to carry out the decommissioning process and repurposing of the site. In addition, there are no standards for remediation. There is, therefore, a need to develop new guidelines that can guide the decommission of TPPs, focusing on[40]:
    - Determination of future land use depending on the site's prevailing environmental and socio-economic condition.
    - Procedure for site investigation and assessment
    - Dismantling and disposal of plant and machinery, including hazardous and C&D wastes
    - Standards for clean-up of

[40] Chandra Bhushan, Mandvi Singh, Yukti Chaudhary. (2022). *Just transition of coal-based power plants in India: A policy and regulatory review*. New Delhi.

contaminated areas such as coal storage and handling yards
- Setting remediation requirements based on repurposing
- Remediation and closure of ash ponds
- Health and safety guidelines
- Procedure for approval of the decommissioning plan
- Procedure for approving decommissioning completion
- Monitoring and reporting during and after the decommissioning
- Approval of repurposing plan

The decommissioning of a TPP must be seen in an integrated manner, and the guideline must describe it explicitly. Since, dismantling, remediation, and redevelopment are interrelated concepts, they must be clearly elaborated in the guidelines.

- **Policy for encouraging energy transition and repurposing of existing infrastructure**: Renewable energy generation and pollution management solutions are important aspects of sustainable and long-term planning in the light of large scale decommissioning of conventional energy sources. The vast amount of land available after the retirement of TPPs must be repurposed for a just transition of workers and communities. The state governments should develop a policy to incentivize the repurposing of power plant sites.

5.5. Capacity and Institutions:

- **Institutional changes and formulation of processes that support energy transitions:** Having established that transition in human settlements associated with decommissioned TPPs is a process that is not uniform or singular, it is important to lay out a transition framework that supports the different landscapes of decommissioning.

In the US[41], the Bipartisan Infrastructure Law and Inflation Reduction Act allocate substantial funds towards the advancement and implementation of clean energy technologies, workforce development initiatives, and safeguards for marginalized communities. In line with this objective, the Department of Labor has introduced the Good Jobs Initiative, aimed at enhancing job quality and promoting equity throughout the economy.

In India, this can be done through instituting a Transition Cell that plans for and supports the transition process. Ideally this Transition Cell should be housed within the relevant PRI or ULB, with the state government playing a supporting role. This body could anchor and coordinate decommissioning processes across departments and agencies in collaboration with the TPP Board, monitor and evaluate the impact of the proposed plan, identify government schemes that need to continue for transition support, processes that might need to be reformed, and facilitate skill upgradation of the associated workforce linked to alternate employment opportunities.

Furthermore, this could follow the template

[41] *The US Government's Role in Just Transition*, https://www.dol.gov/agencies/ilab/just-transition

provided by the Rajasthan Gig and Platform Workers (Registration and Welfare) Act, 2023, especially for vulnerable and informal workers requiring transition support.

Such an approach to facilitate decommissioning requires more granular data which should be maintained and shared through a clearly defined data architecture, sharing of information across silos, long-term planning, and increased access to resources. Importantly, this would reduce the resource gap in areas undergoing transition.

- **Capacity building of local governing institutions when planning for decommissioning:** It is crucial to consider the expansion and change in capacity required at the ULB-level when a settlement is in transition around a decommissioned TPP. It is also necessary to consider the natural resources of the region so that the transition process is sustainable and equitable. The state governments would have to play an important role in this, working with PRIs/ ULBs on identifying their interventions necessary for carrying out the process and the deficit in the capacity and resources to realize the same. This means providing appropriate training to ULB officials, making the planning process more bottom-up, building an information architecture such as correct worker numbers and their dependent families, extent of their dependence on the existing facility etc., that assists in planning transitions, and facilitating coordination.

  Moreover, skilling institutions at the state level shall be further empowered by making their boards more representative with participation from labour unions and skilling experts and creation of a framework for skilling/reskilling people for transition management for green economy.

- **Expanding ULB access to financial resources:** Institutional changes and strengthening local capacity can have significant impacts on areas undergoing transition when there is a proportional strengthening of finances and improved fiscal powers. Lack of capacity of the private sector to lead just transition, make public budgets important to fill the gaps. Also, high fiscal deficit is a constraint to access cheaper borrowing for the state governments or ULBs.

  To address this, the state governments should enforce the provisions of the 74th Constitutional Amendment Act and the XV Finance Commission and devolve fiscal powers to local governments. Further, the government should allow greater flexibility in financing PRIs and ULBs. For example, PRIs in close proximity to regions of Intentional urbanization associated with a sprawling TPP, which are poised to urbanize in the near future, should be financed as if they are already urban rather than receive rural financing. This could be done through a special status.

  When building capacity at the local level, it is important to focus on fiscal management. This would include training personnel on increasing local government's own tax and non-tax revenues. Improved fiscal

management is closely linked with ensuring that transition plans are backed by adequate financial resources.

- **Certification of decommissioning agencies:** The Union and State Governments should develop a system for accreditation of decommissioning agencies by specifying the minimum standards for technical capability, working conditions for the human resources, machinery and equipment and finance to undertake demolition, dismantling, remediation and repurposing.

- **A Just Transition Fund:** Coal-dominant countries are putting in a just energy transition fund to support income, health insurance, pension fund protection, job training, and job placement for workers affected due to the closure of power plants[42]. Countries in the global south such as South Africa have set up such a fund with contributions from developed countries[43].

  India can also set up a just transition fund on similar lines. This can be funded by repurposing the subsidies and support in the form of guarantees for the power sector, which would be reduced if a state government goes ahead with energy transition towards renewables. These along with the Corporate Social Responsibility (CSR), philanthropic and grant capital could become a major stream of the contributions to the just transition fund. This shall further catalyze private or commercial capital to fund the transition.

  A financial framework to fund decommissioning and repurposing can be developed, which may include an institutional setup to administer the fund, explicit provisions in the Power Purchase Agreements mentioning the obligations of GENCOs, TransCOs and Discoms for ensuring just decommissioning and repurposing, maintaining an escrow account with funds from the user charges to support gap funding in the transition process using the Just Transition fund amongst others.

- **Standard guidelines for public and private TPPs:** A comprehensive policy for transfers, re-employment, reskilling, and rehabilitation of displaced or unemployed workers needs to be formulated. The Ministry of Power along with relevant ministries such as the Ministry of Skill Development and Entrepreneurship should lay down such guidelines at the national level, to enable a just transition and reduce conflict.

- **Report on decommissioning cost:** Decommissioning is a liability, and hence it must be reflected in companies' balance sheets. The decommissioning costs shall be reported in a disclosure to the financial regulators for accessing public and private finance, as in the case of US where publicly listed companies are required to report decommissioning costs as an obligation

[42] *Just Transition Fund – European Commission*, https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/just-transition-fund_en

[43] Just Energy Transition Investment Plan (JET IP) - https://www.climatecommission.org.za/south-africas-jet-ip

associated with the retirement of a tangible long-lived asset to the US Securities and Exchange Commission[44].

6. A Prospective Roadmap for enabling Just Transition:

India's Just Transition strategy for TPPs shall be a culmination of the state and national level frameworks as well as plant specific mandates which can build on the interventions and opportunities mentioned in the previous section. It would have to delve into the forward and backward linkages of the fossil fuel based industries to design a holistic strategy which while upholding the global-level climate linked targets is rooted in the socio-economic welfare and long-term empowerment of the vulnerable sections of the society.

The national level strategy shall have the overarching objective of facilitating equitable development, mobilizing finance, creating institutional capacity and engendering reforms for enabling just transition by guiding national policies and statutes on energy transition, environmental sustainability, labour welfare, industrial development amongst others. The Parliament may also develop model laws for states to ensure incorporation of minimum provisions across all states for statutes on state subjects. Key subjects pertaining to energy transition are a part of the Union List under Schedule VII of the Constitution of India, which among other things includes coal, oil and gas, power sector majorly dominated by the union government, regulatory powers for land acquisition, forest diversion, and environment, oilfields, mines and mineral development and labour safety as well as inter-state migration.

On the other hand, the states shall have the mandate to implement the just transition policies and statutes formulated at the national and state level in an inclusive manner, engage in developing a comprehensive contextual planning framework, enable convergence of funds, schemes and functionaries to optimally utilize existing capacities, enable negotiations among industries, labour and regulators and oversee fulfilment of contractual obligations, hence catalyzing regional growth and development. Moreover, the states are empowered to legislate on important subjects aiding energy transition which are enumerated in the state list under the Indian Constitution including land, industrial development, public health and water. These subjects have substantial bearing on facilitating a just transition as these can ensure a conducive environment for the well-being of the vulnerable workforce and their families while at the same time safeguard energy security and prevent further environmental degradation.

Encompassing the union and state-level mandates are the subjects which require an integrated intervention and continuous policy calibration by both - Union and State governments. Economic and Social planning, Industrial and Labour disputes, Social security and social insurance, Trade

[44] Financial reporting developments – Asset retirement obligations -

Unions amongst others, are a part of the Concurrent List of the Indian Constitution which allows both the Parliament and the State Legislatures to legislate upon.

This provides a salient opportunity for contextualizing the transition strategy based on the peculiarity of the challenge at the industry level (TPPs and other coal-based industries) and priorities of the local as well as state level governance structures.

Steering Committees for Energy Transition (Figure 11), it is attempted to map the intersection of the roles and responsibilities of various departments at the state-level with the key dimensions identified from the framework discussed above with regards to gaps in effectuating 'Just Transition' and its components during decommissioning of a TPP and other coal-based industries (Section 4 and Section 5).

Taking an archetype of Rajasthan, a comprehensive exercise has been

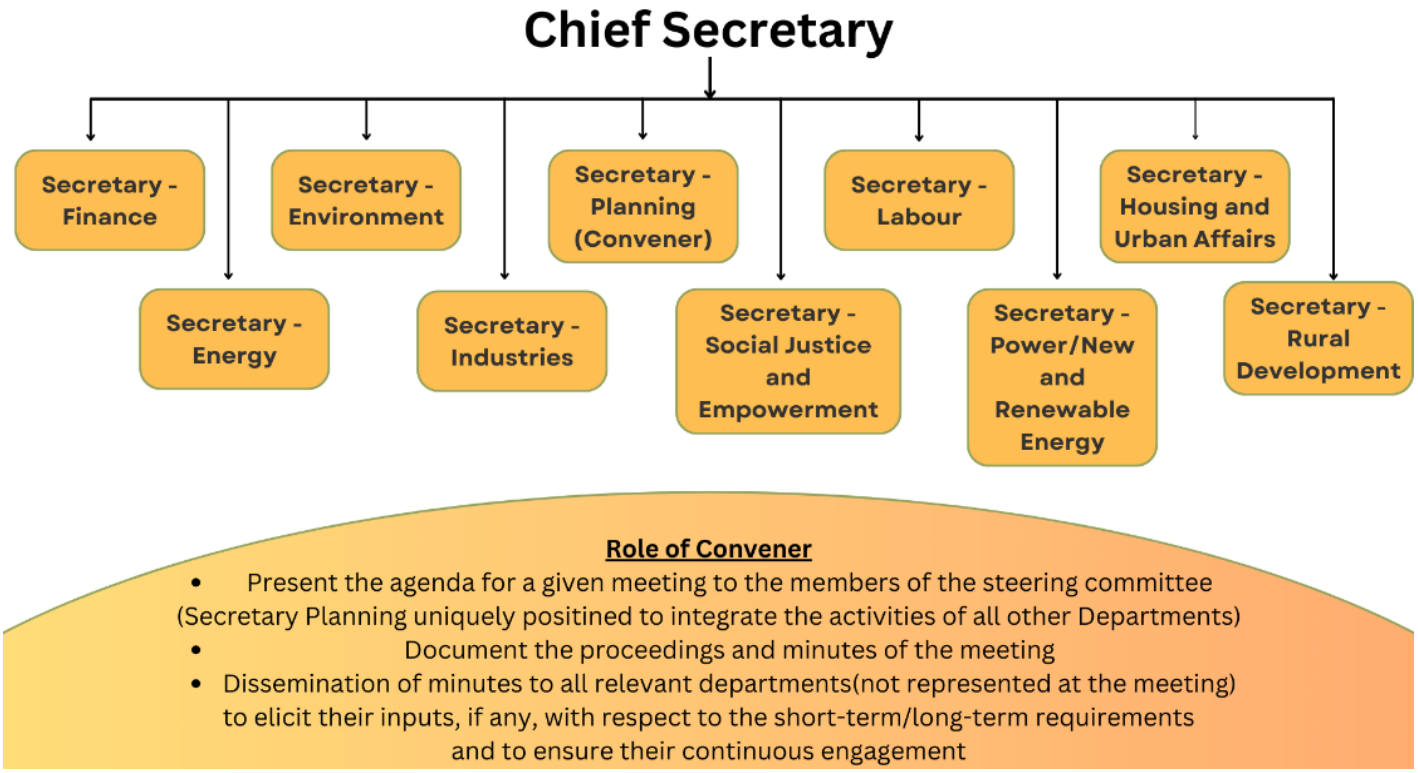


Figure 11: *An Illustrative Composition of the State-Level Steering Committee for Energy Transition, as Proposed by the Ministry of Power, Government of India*

To realize the operationalization of the recommendations mentioned in Section 5, the effective inclusion and participation of relevant departments for policy formulation and implementation at the state level become important with the facilitation and overarching directives provided by the Union-level. Building on the Ministry of Power directive to setup State-level

undertaken to critically determine an exhaustive list of potentially relevant departments at the state level. These have been classified in three broad categories - Technical, Developmental and Data Collation/Analysis Departments. To identify these departments, the vulnerability on various layers have been ascertained to gather intelligence for re-

drawing the transition strategy for the Human Settlements associated with TPPs and other coal-based industries. These vital layers include the following:

1. Natural Resources Layer
2. Industrial Layer
3. Habitation Layer
4. Connectivity Layer
5. Labour/Skilling Layer
6. Climate Vulnerability Layer

A critical evaluation of the above layers provides a thorough understanding of the unique challenges and opportunities at hand as well as the determination of the relevant stakeholders to address these challenges and leverage these opportunities. An evaluation of the departmental stakeholders has been undertaken.

These shall have an eminent bearing on the implementation of the transition activities while managing the negative externalities which may emerge as they are being executed. It is proposed that these departments at the state level have independent structures and institutional capacity to contribute to the formulation and execution of the transition plans. The key highlights of the intelligence gathered with respect to challenges and opportunities are illustrated in Figure 12 and Figure 13.

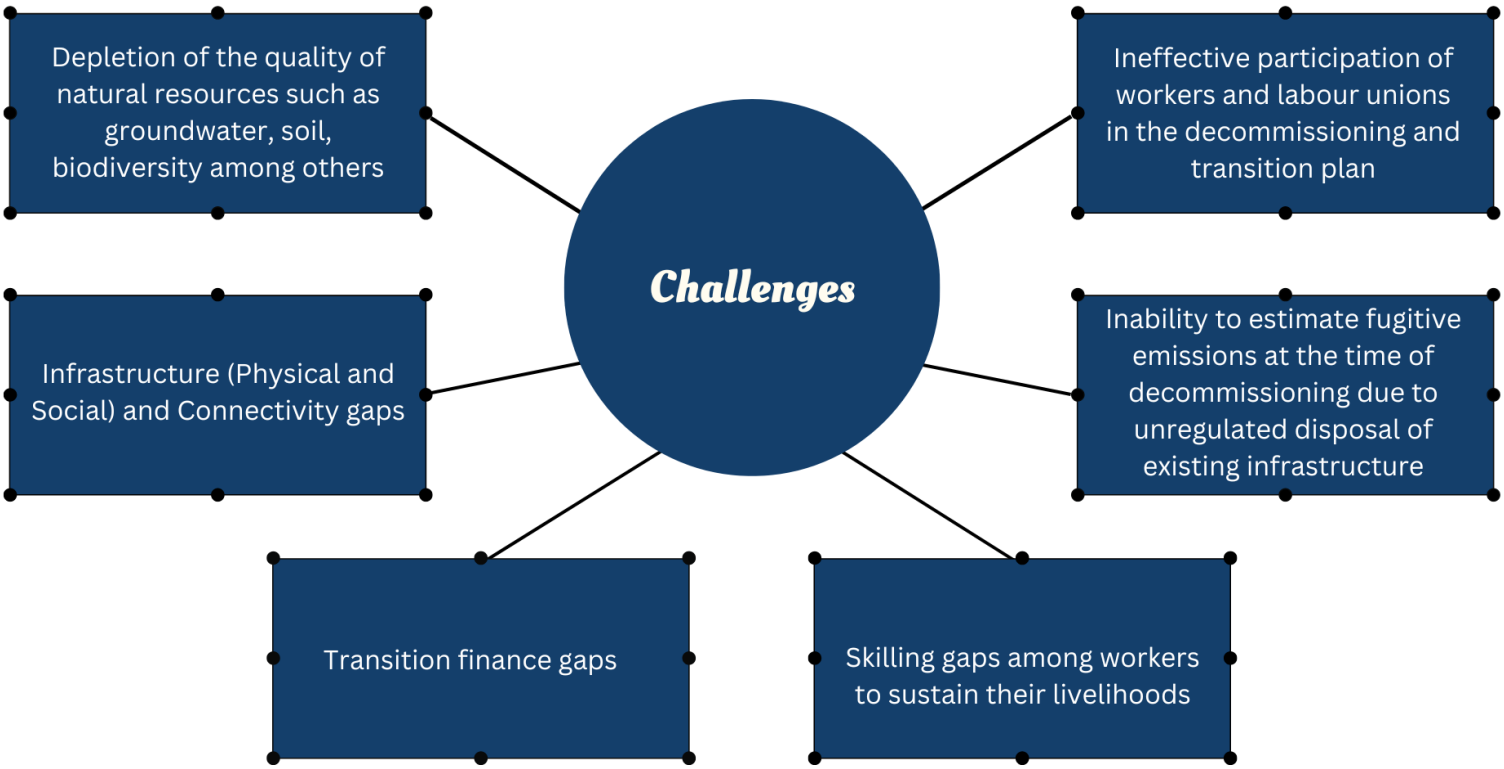


Figure 12: *Challenges in the process of transition across various layers examined*

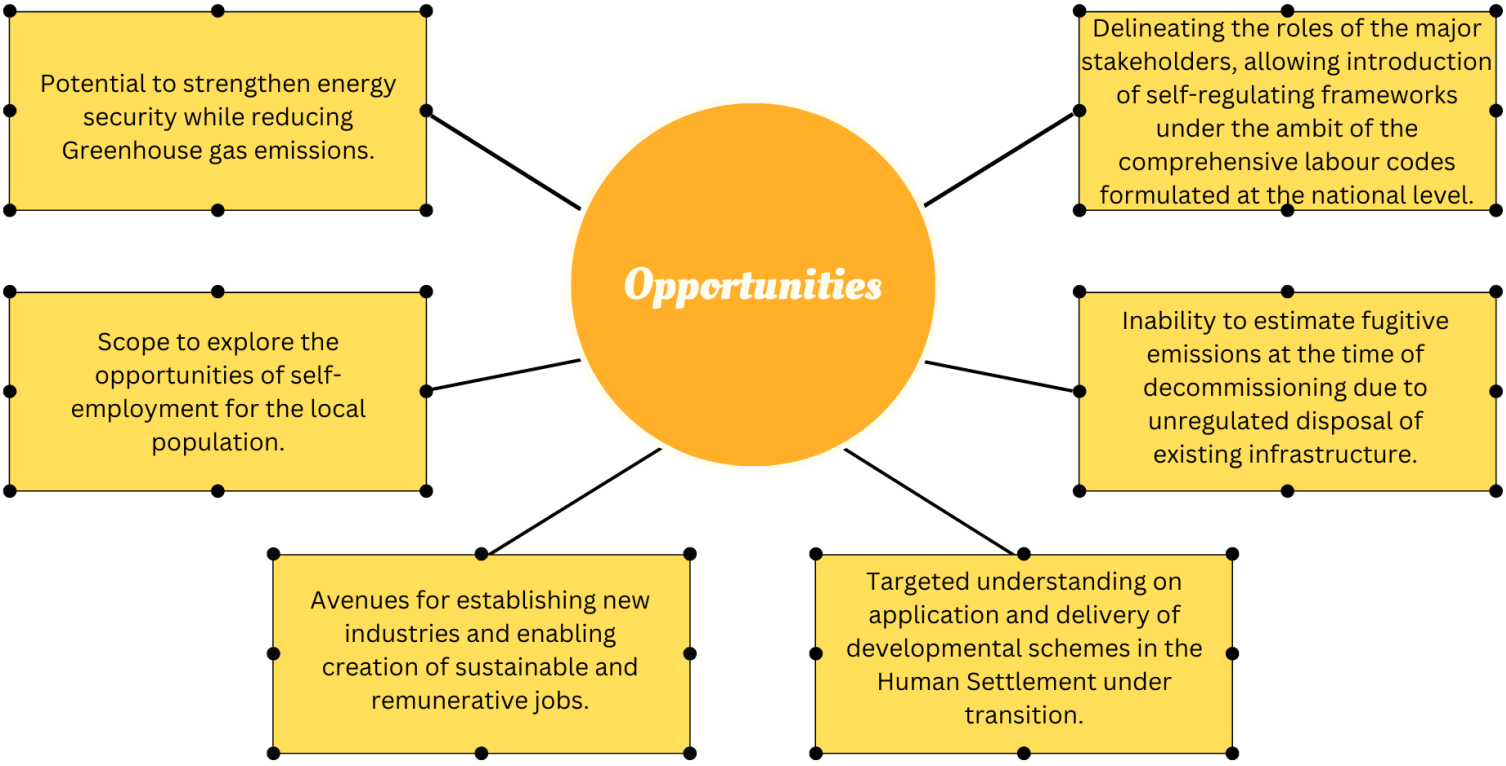


Figure 13: *Probable opportunities in the process of transition across various layers examined*

The exhaustive list of departmental stakeholders required to exhibit coordinated action are enumerated in Figure 14.

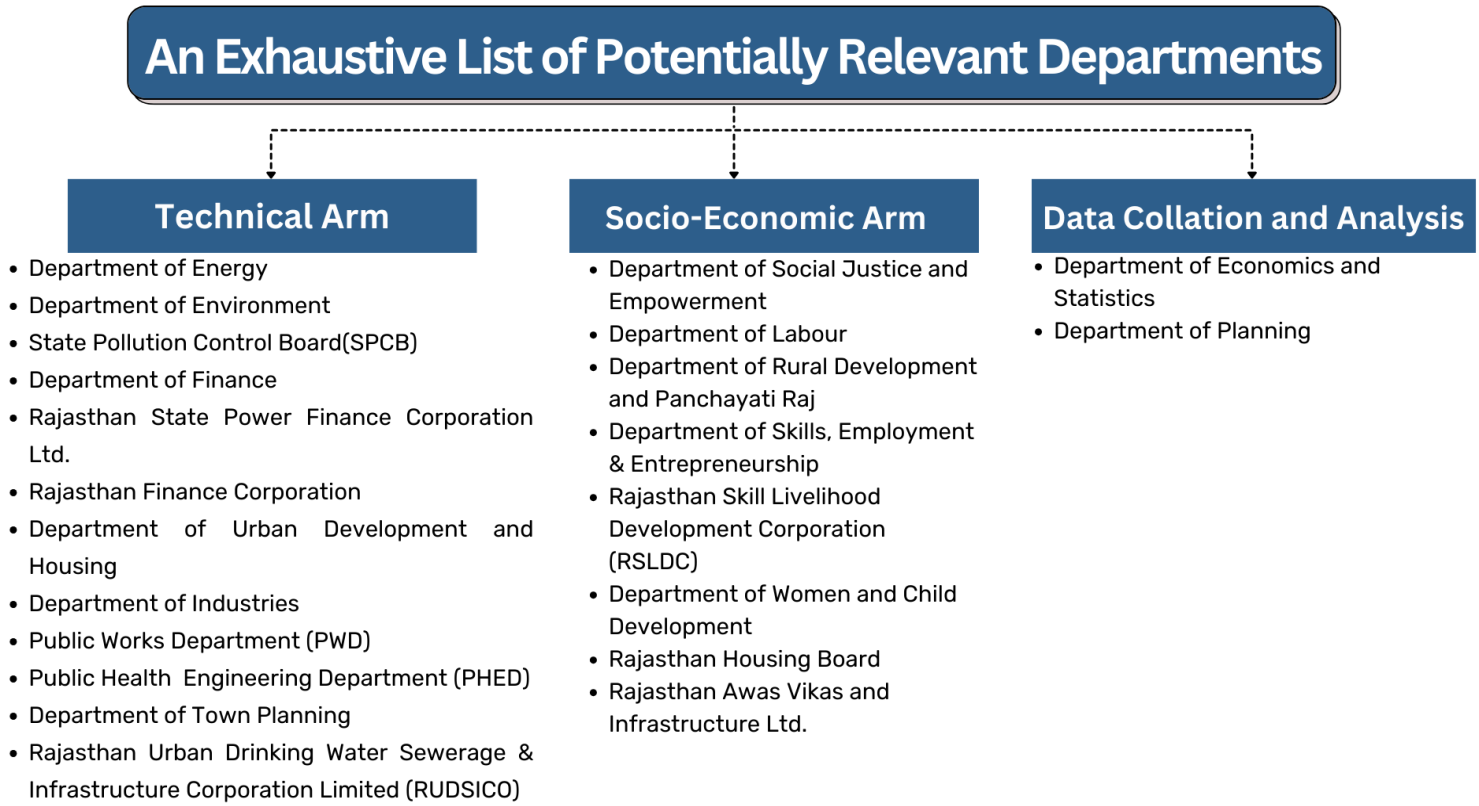


Figure 14: *An Exhaustive List of potentially relevant Departments whose coordinated action is essential for addressing the challenges and leveraging the opportunities*

In continuation of the above, institutionalizing a system of social audit is essential for ensuring accountability of the department functionaries while upholding the principles of inclusivity, participation and justice from the lens of the affected population and public at large. It shall allow the active participation of stakeholders varying from workers, worker unions, Thermal Power Plant management, civil society organizations, participants in the associated economy amongst others to safeguard their interests and ensure compliance with reformed laws and regulations. An effective system of social audit shall incorporate a robust set of service standards which shall be delineated in Citizen Charters as well as a periodic suo-moto disclosure from the relevant governments and their respective departments.

The exercise of social audit with demarcated roles and responsibilities of respective departments at the state and local government level under the wide ambit defined by the Union Government shall ensure effectiveness of the just transition objectives. The state governments shall evolve a contextual framework of social audit, clarifying its objectives, scope and procedures. This can be attained through comprehensive consultations with civil society organizations, worker and contractor unions and industry representatives. The NGOs and Community-based Organizations shall be encouraged to mobilize and facilitate local community to undertake social audit. They shall carry out capacity building workshops, grassroot level sensitization and organizing periodic as well as timely project-level social audit camps for the local population which can provide fundamental insights to the formal audit exercise carried out by independent audit agencies.

A comprehensive Just Transition framework shall be a culmination of institutional, process and behavioural reforms which can visualize the transformation of the economic landscape in the pursuance of environmental sustainability from the lens of the socio-economic necessities of the workers, their families and the associated community. There is hence an imminent case for pertinent action at various levels of the government and effective and sustained participation from the affected population and external stakeholders. This attempt to identify challenges to and components of Just Transition, as described in the report, is an endeavour to unearth diverse vulnerabilities and concomitant opportunities for the settlements associated with epicentres of energy generation which lay ahead in our pursuit of effectuating a just, equitable, inclusive, fair and economically progressive transition.

Annexure - A

List of participants in the roundtable convening on "Human Settlement Framework for Thermal Power Plants in the Context of Just Transition"

Sr. No.	Participants	Designation
1.	Abhishek Kumar	Founding Partner, Indicc Associates
2.	Akshat Mishra	Partner, Indicc Associates
3.	Anurag Shanker	Program Manager, Friedrich-Ebert-Stiftung (FES) Office, India
4.	Ashwini K Swain	Fellow, Centre for Policy Research
5.	Chaitanya Lodha	Fellow, Indian Institute of Human Settlements (IIHS)
6.	Dhwaj Khattar	Technical Consultant - Green Economy, Indicc Associates
7.	Harimohan Sharma	General Secretary (Rajasthan), Bharatiya Mazdoor Sangh (BMS)
8.	Ishtefaque Jafri	Rajasthan Skill and Livelihoods Development Corporation (RSLDC)
9.	Jagdish Kumar	Thermal Thekedar Workers Union, Kota
10.	Jagdish Raj Shrimali	State President(Rajasthan), Indian National Trade Union Congress (INTUC) and Minister of State
11.	Krishn Mathur	Programme Officer, Indicc Associates
12.	Mandvi Kulshreshtha	Program Advisor, Friedrich-Ebert-Stiftung (FES) Office, India
13.	Manoj Kumar	Thermal Thekedar Workers Union, Kota
14.	Narottam Joshi	Secretary General (Rajasthan), Indian National Trade Union Congress (INTUC)
15.	Neha Kumar	Head, South Asia Programme, Climate Bonds Initiative
16.	Neha Sami	Associate Dean, Indian Institute of Human Settlements (IIHS)
17.	Ramvatar Swami	General Secretary, Rajasthan State Electricity Workers Federation
18.	Richard Kaniwewski	Deputy Country Director, Friedrich-Ebert-Stiftung (FES) Office, India
19.	Shipra Mathur	Founder, Pen Literacy Foundation
20.	Simran Grover	Founder and CEO, CEEP
21.	Sowmya Kolla	Consultant, Indicc Associates
22.	Suranjali Tandon	Associate Professor, National Institute of Public Finance and Policy (NIPFP),
23.	Swati Dsouza	India Lead Analyst and Coordinator, International Energy Agency (IEA)
24.	Victor Jagota	Intern, Friedrich-Ebert-Stiftung (FES) Office, India