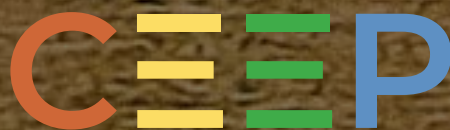


# Navigating Energy Transition

---

## Understanding Socio-Economic Complexities and Intersectionality in Thermal Power Plants

A Case of Kota Super Thermal Power Station



CENTRE FOR ENERGY, ENVIRONMENT & PEOPLE



indicc  
ASSOCIATES

## **Centre for Energy, Environment & People (CEEP)**

CEEP is a Jaipur-based human-centric research and policy advocacy initiative driving critical research and fostering democratic coalitions for accelerated low carbon transition and climate justice.

CEEP works at the intersection of energy, environment and people to enable institutional response, investments and political shift toward clean energy and sustainable practices. As an institution, it prioritises addressing socio-economic disparities and vulnerabilities faced by disadvantaged individuals and groups through inclusive and representative policy action.

## **Indicc Associates**

Indicc Associates is a non-partisan public interest firm focused on advancing public interest towards a better society, economy, and environment. The guiding principle of the organization is that public interest must be at the center of all policies and practice areas. Therefore, all endeavors must aim at mainstreaming their interests. Towards this goal, Indicc engages with governments, legislators, businesses, think tanks and communities through research, convening and solutions. In doing so, Indicc is guided by 'holistic' and 'systems' oriented approach.

**Authors:** Simran Grover and Naini Swami

**Photo credit:** Centre for Energy, Environment & People (CEEP)

March 2023

© 2023 Centre for Energy, Environment & People (CEEP). This work is licensed under a Creative Commons Attribution 4.0 International License.

Any part of this report can be reproduced for non-commercial use without prior permission, provided that CEEP is clearly acknowledged, and a copy of the published document is forwarded to CEEP.

## About the Authors

**Simran Grover** is the founder and CEO of Centre for Energy, Environment, and People (CEEP), an initiative for energy equity and climate justice. He has substantive experience in the domains of renewable energy, power sector, applied research, and entrepreneurship. He works to promote constitutional values and democratic practices in the domain of energy and climate governance.

Contact: [sgr@ceep.co.in](mailto:sgr@ceep.co.in)

**Naini Swami** is a post-graduate in law and development, working as a Research Associate at the Centre for Energy, Environment, and People (CEEP). In her work at CEEP, Naini has focused on land and labour governance concerns in Rajasthan's energy transition. The key issues she has worked on include decommissioning thermal power plants and the local impact of renewable energy expansion.

Contact: [naini@ceep.co.in](mailto:naini@ceep.co.in)

## Acknowledgement

The authors are grateful to Anshuman Gothwal (CEEP) for his guidance throughout the project. We thank Manideep Gudela (CEEP) for his steadfast technical support and contribution to field research, photography, and data visualisation. We acknowledge the contribution of former colleagues Sakshi Gupta (CEEP) for field research and Kolli Vamsi Krishna (Indicc Associates LLP) for primary and secondary research. We thank Abhishek Kumar (Indicc Associates LLP) and Gunjan Jhunjhunwala (Council on Energy, Environment and Water, CEEW) for reviewing the report and providing critical suggestions at the draft stages. We are thankful to Prof. Mritiunjoy Mohanty (IIM Calcutta), Prof. Runa Sarkar (IIM Calcutta), and Sudhir Katiyar (Prayas Centre for Labor Research and Action) for their astute, thorough, and timely reviews of the report.

We are grateful to the officials and staff of Rajasthan Rajya Vidyut Utpadan Nigam Ltd (RRVUNL) and Kota Super Thermal Power Station (KSTPS) for facilitating access and visits to KSTPS. We thank government officials from the labour department, Rajasthan State Pollution Control Board, and public healthcare providers in and around KSTPS for their forthright insights. We thank the fly ash brick industry owners and managers for their input. We are grateful to the labour union representatives of KSTPS for their cooperation and support in engagement with members of the plant's workforce.

Most importantly, we are thankful to KSTPS' contractual workers, workers of the fly ash brick industry, and members of their households for generously sharing their responses and concerns.

Any shortcomings or weaknesses in this report are our own.

# List of Contents

<b>1. Introduction</b>	<b>1</b>
1.1 Kota Super Thermal Power Station (KSTPS): An overview	3
1.2 Operational Performance of KSTPS	4
1.3 Local Linkages of KSTPS	4
1.3.1 Local Economy	4
1.3.2 Land Utilisation	6
1.3.3 Environment Impact	8
<b>2. Approach and Methodology: A qualitative framework for mapping workforce capabilities</b>	<b>13</b>
2.1 Objective	14
2.2 Approach	14
2.3 Data Collection	14
2.4 Classification of Livelihoods	14
2.4.1 Direct Livelihoods	15
2.4.2 Associated Livelihoods	15
2.4.3 Allied Livelihoods	15
2.5 Methodology for Assessment of Capabilities and Vulnerabilities	16
2.5.1 Economic Capital	17
2.5.2 Human Capital	17
2.5.3 Social Capital	18
2.5.4 Political Capital	18
<b>3. Qualitative Analysis of Capabilities of TPP Workers</b>	<b>19</b>
3.1 Economic Capital	23
3.2 Human Capital	24
3.3 Social Capital	24
3.4 Political Capital	25
<b>4. People’s Perspectives on Transition Away from Thermal Generation</b>	<b>29</b>
4.1 Labour Officials	30
4.2 Rajasthan State Pollution Control Board (RSPCB)	30
4.3 Fly Ash Brick Industry	30
4.4 KSTPS Workforce	31

4.4.1 Permanent Technical Workers . . . . .	.31
4.4.2 KSTPS Officials . . . . .	.31
<b>5. Conclusion . . . . .</b>	<b>.32</b>
<b>6. References . . . . .</b>	<b>.35</b>

## List of Annexures

Annexure 1: List of cement industries dependent on KSTPS' fly ash . . . . .	38
Annexure 2: The number of different categories of contractual workers at KSTPS as on 31.03.2022 . . . . .	38
Annexure 3: List of stakeholders consulted for the purpose of this report . . . . .	39
Annexure 3.1: List of identified residential localities of KSTPS contractual workers . . . . .	39
Annexure 3.2: List of respondents from government agencies and departments . . . . .	39
Annexure 3.3: List of respondents from the fly ash and cement industry. . . . .	39
Annexure 3.4: List of respondents from KSTPS' contractual workforce and women representatives from households of contractual workers in selected localities . . . . .	39
Annexure 3.5: List of respondents from contractual workers of the fly ash industry . . . . .	39
Annexure 3.6: List of informal workers interviewed . . . . .	40
Annexure 4: Cases recorded in the ESI dispensary no. 1, Kota, from 2016 to 2020 of insured persons and their families. . . . .	40

## List of Figures

Figure 1: Overview of KSTPS . . . . .	3
Figure 2: Operational performance of KSTPS. . . . .	5
Figure 3: KSTPS' emissions for the year 2021 . . . . .	12
Figure 4: KSTPS workforce composition . . . . .	16

## List of Images

Image 1: Locations of KSTPS, ash brick industry, and associated neighbourhoods . . . . .	7
Image 2: Expansion of Thermal Colony between 2004 and 2021 . . . . .	8
Image 3: Land utilisation of Kali Basti between 2004 and 2021 . . . . .	9
Image 4: Expansion and land utilisation of fly-ash brick industry between 2004 and 2021 . . . . .	10
Image 5: Evolution and expansion of Nanta between 2004 and 2021 . . . . .	11

## List of Tables

Table 1: Production capacity of all seven units of KSTPS. . . . .	4
Table 2: Assessment of substantive capitals of contractual workers of KSTPS and daily-wage in fly-ash brick manufacturing industry. . . . .	21

## List of Abbreviations

AC	Auxiliary Consumption
AHPM	Ash Handling Plant Maintenance
BM	Boiler Maintenance
C&I.M	Control & Instrumentation Management
CAM	Common Auxiliary Maintenance
CEA	Central Electricity Authority
CEEP	Centre for Energy, Environment & People
CHP	Coal Handling Plant
Comml.	Commercial
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
EPF	Employees' Provident Fund
ESI	Employees' State Insurance
GDP	Gross Domestic Product
Hg	Mercury
KSTPS	Kota Super Thermal Power Station
MoEFCC	Ministry of Environment, Forest and Climate Change
Mtc.	Maintenance
NDC	Nationally Determined Contribution
NEP	National Electricity Policy
NGT	National Green Tribunal
NOx	Nitrous Oxide
O&M	Operations and Maintenance
Opr.	Operations
P&A	Personnel and Accounts
PM	Particulate matter
RIICO	Rajasthan State Industrial Development and Investment Corporation
Rly.	Railway
RVUNL	Rajasthan Rajya Vidyut Utpadan Nigam Limited
SE	Superintending Engineer
SFOC	Secondary Fuel Oil Consumption
TM	Turbine Maintenance
TPP	Thermal Power Plant
Xen	Executive Engineer



# Executive Summary

Moving away from fossil fuels to renewable sources of energy generation is a key priority area for climate change mitigation (UNFCCC). However, transitioning away from coal entails significant challenges, particularly for livelihoods locked into fossil fuels-linked economic activities. To address these challenges, countries recognise the imperative of a just transition of the workforce and the creation of quality jobs in accordance with nationally defined development priorities (Paris Agreement 2015).

In India, the livelihood implications of transition are highly significant for the country's chief coal-bearing regions including Chhattisgarh, Odisha, Jharkhand, and Madhya Pradesh (Sharma and Banerjee 2021). Therefore, just transition in India is mainly discussed in the context of coal-bearing areas (Pai 2021), (Dsouza and Singhal 2021). However, an essential entity of coal-based electricity production, i.e., coal-based thermal power plants, is distributed across 22 states in the country (CEA 2021). A closer look into India's just transition needs calls for attention to the impact of the transition at the plants' level, in addition to and beyond the coal-bearing regions.

In the previous context, this report attempts to capture how the lives and livelihoods of people in the vicinity of a thermal plant are deeply intertwined with it. The report expounds a qualitative assessment of the capabilities of the disadvantaged workforce associated with Kota Super Thermal Power Station (KSTPS) to highlight their differentiated vulnerabilities in the event of the plant's repurposing. The report does not advocate for the early repurposing of thermal units nor comment on decision-making concerning the same. It aims to strive for a humane transition for all, especially the most disadvantaged voices of the fossil fuel industry, irrespective of timelines for transition. The following are the main findings of the report:

- Among the diverse livelihoods that may be affected by a thermal plant's repurposing, the directly deployed workforce is the immediate impacted group. However, a stark difference in the degree of impact is visible between permanent and contractual workers in the direct workforce. Permanent employees and workers enjoy secure employment, decent pay and accommodation, pension, and retirement benefits. In the event of repurposing, the permanent employees shall be transferred or offered voluntary retirement as per administrative planning and decision-making, shielding them from the possibility of abject loss of livelihood and unemployment.
- In contrast, contractual workers have substantially lower wage rates, and they're bereft of employment security, pension, and gratuity benefits, becoming vulnerable to socio-economic risks arising from livelihood loss due to repurposing. The intersectional vulnerabilities among the contractual workforce are further differentiated based on wage groups (skilled, unskilled, semi-skilled), location at the plant (e.g., boiler and turbine site or coal yard), and socio-economic conditions. Key nuances in the differences in the workers' capabilities and vulnerabilities as a function of their human, social, economic, and political capital are discussed.
- Most contractual workers in lower-wage groups, i.e., semi-skilled and unskilled workers, are involved in strenuous work that limits possibilities for pursuing supplementary income. Thus, existing economic differences among workers are accentuated by structural constraints of their employment. Moreover, the economic capital of the lower-wage groups is reduced due to the high occupational health risks and associated costs arising from prolonged exposure to toxic materials such as coal dust and fly ash. Safeguards available under the Employees State Insurance (ESI) and Employee's Compensation Act provide vital, albeit reportedly inadequate, assistance to KSTPS workers in such cases. It is important to note here that fly ash workers at the plant's associated fly ash

brick industry face particularly aggravated economic risk. As informal sector workers, minimum wages aren't statutorily enforced for them, and they remain outside the purview of safeguards of ESI and the Employee's Compensation Act.

- Formally recognised educational and skill levels are important determinants of the employability of workers. Semi-skilled and unskilled workers possess low academic and professional qualifications. A critical impediment highlighted by them in skill upgradation is the absence of formal mechanisms that recognise the skills they acquire during their employment at the plant. Furthermore, the employability of long-serving workers is curtailed due to the occupational health impacts of exposure to hazardous materials.
- The skilled workforce displays a heterogenous social composition and includes persons from the General category, Other Backward Castes, and Scheduled Castes. However, the social configuration becomes increasingly homogenous as one moves to semi-skilled and unskilled workers. Semi-skilled workers primarily belong to Other Backward Castes and Scheduled Castes, and unskilled workers are mainly from Scheduled Castes and Scheduled Tribes. The homogeneity of Other Backward Castes, Scheduled Castes, and Scheduled Tribe groups in lower-wage categories reflects their widespread exposure to livelihood loss at the community level and, thus, high collective vulnerability.
- The ability of workers to voice their concerns and seek safeguards for a just transition is affected by their political capital. The key determinant in this context is workers' participation in civic associations such as labour unions. The presence of skilled workers in union activities is active and vocal compared to the participation and engagement amongst semi-skilled workers. Unskilled workers' involvement in union activities appears largely tokenistic, and their representation in union leadership is virtually absent. However, while the participation of unskilled and semi-skilled workers in union activities is sub-optimal, the presence of unions was stated to provide workers with a

sense of employment security. Collective negotiations and lobbying from workers' unions were discussed as crucial in ensuring the re-employment of workers at the plant despite changes in contractual employers.

The thermal power generation industry employs many people. However, most workers are engaged in low-paying jobs with high associated risks. A large portion of the workforce in power plants is contractual, with negligible employment rights and safeguards. The workers' vulnerabilities are aggravated by the intersectionality of issues emerging from employment positions (work environment risks), social positions, economic status, gender, and age. The discourse for a just transition of workers associated with TPPs needs to begin from the fundamental understanding of the vulnerabilities of impacted workers and their households and be followed by inclusive and appropriate affirmative policy interventions.

Notwithstanding the critical needs of vulnerable groups during the transition, it serves well to note that the political economy of a thermal power plant is a complex landscape. The voices of the plant and other public officials, including the district administration, labour departments, and the state pollution control board, shape its political economy. Further, the industrial associations affected by a plant, including the fly ash brick and cement industries, form essential stakeholders. Any efforts toward just transition shall require the emergence of consensus among these multiple agents. Comprehensive socioeconomic risk impact assessments, participatory and inclusive pathways for leveraging transition, strengthening social safeguards, and responsible governance are recommended for sustained collective efforts for just transition (Section 5).

# 1. Introduction



The electricity sector is a crucial pivot of decarbonisation measures at global and national levels. As part of its global commitment to climate mitigation under the Paris Agreement, India has pledged to enhance its Nationally Determined Contributions (NDCs) and adopt a low carbon development strategy to achieve net zero emissions by 2070 (Ministry of Environment, Forest and Climate Change 2022). The updated NDCs entail reducing the emissions intensity of GDP by 45% by 2030, from the 2005 level and achieving 50% cumulative electric power installed capacity from non-fossil fuel sources by 2030 (Government of India 2022).

Prompted by the increasing importance of climate action, various public and private organisations in India are adopting net-zero targets (Chaliawala 2022). The Ministry of Coal has evolved its Sustainable Development Cell, set up in 2019, into a Sustainability and Just Transition Division (S & JT Division) to address climate change, sustainability and just transition concerns within the coal sector (Ministry of Coal n.d.). A comprehensive, cross-sectoral, and cross-ministerial nationwide policy on just transition is yet to emerge.

Presently, coal is a chief livelihood provider in India and its removal from economic activities will adversely impact the diverse workforce across its value chain (Bhushan and Banerjee 2023) (Dsouza and Singhal 2021) (Pai 2021). The acute implications of the coal phase-down in India bring forth the importance of a just energy transition for the workforce entrenched in coal-based activities. Just transition emphasises that energy transition outcomes shall regard due process, must recognise historical inequities, and take measures to remedy them through equitable distribution of costs and benefits (Williams and Doyon 2019) (Biswas 2022).

A bulk of existing literature on energy transition in India focuses on coal-intensive regions, with coal mining as the principal focus of analysis (Bhushan and Banerjee, Five R's A cross-sectoral landscape of Just Transition in India 2023) (Banerjee, Shalya and Joseph 2022). While a focus on key coal areas is

vital, it is worthwhile to understand the challenges faced by coal value chain entities situated outside such areas. As an essential segment of the coal value chain, a thermal power plant is a critical asset category for understanding transition implications and challenges beyond coal regions.

While the electricity sector stands at the fulcrum of India's climate commitments, the implications for coal-based electricity generation are complex and deeply intersectional. The Central Electricity Authority (CEA) in its National Electricity Plan (NEP) 2018 had envisaged the retirement of 22690.5 MW capacity by 2022 (CEA, National Electricity Plan 2018). In contrast, an advisory released in January 2023 stated that no thermal power plants will be retired before 2030 (Ministry of Power 2023). In line with the advisory, the NEP 2022 envisions only 2121.5 MW of coal-based capacity for retirement, a stark comparison with the 22690.5 MW scheduled to retire in the 2017-22 period (CEA 2023).

While acknowledging that the global emphasis on renewable energy will impact coal-based capacity in the future, the NEP asserts that coal-based power's share is likely to remain high to counterbalance the intermittency concerns of renewables.

Apart from the timeline of transition, a pressing and crucial concern is the gaps in the existing governance framework in regard to thermal power plant closures (Bhushan, Singh and Chaudhary 2022). These gaps include the absence of mechanisms to determine and address the impact of repurposing<sup>1</sup> coal-based power plants on the local population, economy, and environment. To better understand these critical concerns, which are central to the just transition objective, the present report undertakes a qualitative study of the Kota Super Thermal Power Station (KSTPS). The aim is to explore potential social and political challenges that may arise in the process of repurposing a thermal power plant's units.

The report seeks to understand the impact of a thermal power plant closure on some of the most vulnerable sections of the workforce directly and indirectly associated with

---

1. Repurposing may include partial remediation, complete dismantling and decommissioning, and repurposing of the site for brownfield or greenfield industrial, residential or mixed-use projects (The World Bank 2021).

the plant. Based on a qualitative assessment of livelihoods dependent on KSTPS, the report highlights socio-economic considerations that are of local relevance in the transition process. It explores the deep linkage of KSTPS with the local economy, land utilisation patterns, and the environment. Thereafter, it presents a qualitative mapping of the capabilities of selected workers' groups to deal with the loss of livelihood and highlights their intersectional vulnerabilities. Lastly, the report puts forth broad recommendations for policy and firm-level interventions for a more equitable transition.

### 1.1 Kota Super Thermal Power Station (KSTPS): An overview

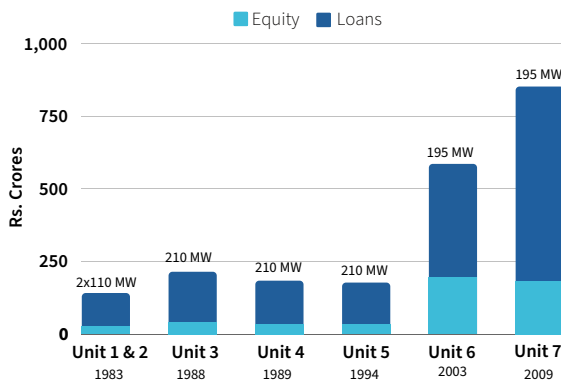
The Chambal River segments the city of Kota into two parts: Kota North and Kota South. KSTPS, located in the city's northern municipal corporation, is one of Kota's most labour-intensive industries. It is Rajasthan's first coal-based electricity-generating power plant (RRVUNL). The plant, spanning 204 hectares, is situated on the North bank of the Chambal River, ensuring year-round water availability. Further, KSTPS has an ash dump area of 423 hectares, located six kilometres from the plant. Its geographic location, combined

Figure 1: Overview of KSTPS

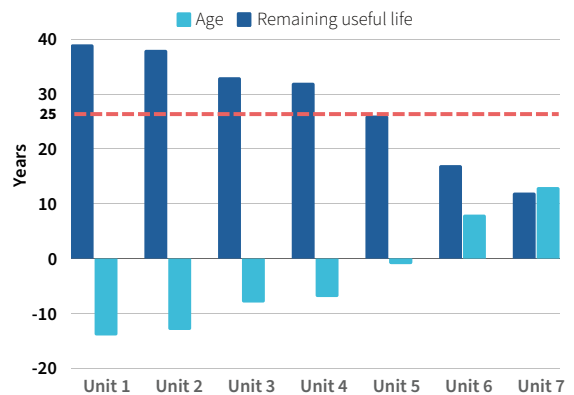
#### Details of the plant

Coal Linkage	Coal Handling	Water Linkage	Infrastructure	Ash Dump Area
<ul style="list-style-type: none"> <li>• Bituminous Coal</li> <li>• South Eastern Coalfields: Korba &amp; Korea-Rewa</li> <li>• Northern Coalfields: Singrauli</li> <li>• Avg Ash: 28-32%</li> </ul>	<ul style="list-style-type: none"> <li>• Stock Yard Capacity: 5,00,000 MT</li> <li>• Wagon Tippers: 5 Nos.</li> <li>• Coal Crushers: 10 Nos.</li> <li>• Conveyor System: 1.595 Kms</li> </ul>	<ul style="list-style-type: none"> <li>• Kota Barrage: Chambal River</li> <li>• Unit 1-5: 1180 Cusecs (Open Cycle)</li> <li>• Unit 6-7: 18 Cusecs (Cooling Tower Re-circulation)</li> </ul>	<ul style="list-style-type: none"> <li>• Steam Generators: M/s. BHEL</li> <li>• Turbo Generators: M/s. BHEL</li> <li>• Power Evacuation: 220 kV Outgoing Feeders (9 Nos.)</li> </ul>	<ul style="list-style-type: none"> <li>• Ash Dump Area: 423 Hectares</li> <li>• 100% Fly Ash Utilisation: Dedicated Cement Manufacturers</li> <li>• Pond Ash: Small Scale Industries, Brick Kilns</li> </ul>

\*Capital cost for various units of KSTPS, including additional capitalisation but not adjusted for inflation



\*Ageing analysis of various units of KSTPS as of March 31, 2022



with a broad gauge railway line, ensures connectivity to coal fields in central India. Coal for KSTPS is procured from the South Eastern Coalfields of Korba, Korea-Rewa, and Singrauli (Figure 1).

## 1.2 Operational Performance of KSTPS

Established in 1983 with two units of 220 MW capacity each, KSTPS continued to expand over the decades. By 2009, the plant’s capacity increased to 1240 MW with seven units (Table 1). Over the years, KSTPS has achieved several accolades and milestones. The plant has been a recipient of meritorious productivity awards since the beginning of its operations in 1984. It received the “Golden Shield” award from the Union Ministry of Power in 2004 for its consistent performance between 2000-01 to 2003-04. In 2010-11 it gained a unique distinction of 100% fly ash utilisation. KSTPS boasts a record plant load factor of 91.06% and station availability of 94.23%.

**Table 1: Production capacity of all seven units of KSTPS**

Unit Number	YoC <sup>2</sup>	Capacity
Unit 1	1983	110 MW
Unit 2	1983	110 MW
Unit 3	1988	210 MW
Unit 4	1989	210 MW
Unit 5	1994	210 MW
Unit 6	2003	195 MW
Unit 7	2009	195 MW

The plant achieved exceptional operational performance over the decades which is demonstrated through various accolades and awards it received. However, the plant’s current performance indicates a decline across certain key operational indicators. Despite high plant availability, station heat rate, energy charges rate and annual fixed charges, key performance benchmarks such as auxiliary consumption (AC),

secondary fuel oil consumption (SFOC), and operation and maintenance (O&M) expenses have increased beyond the normative threshold since 2015-16 due to old age of the plant and frequent repairs (Figure 2).

## 1.3 Local Linkages of KSTPS

Beyond powering Rajasthan’s economy over the last four decades, KSTPS has played a critical role in shaping Kota City. In this section, we attempt to understand the deep linkages KSTPS shares with the city.

### 1.3.1. Local Economy

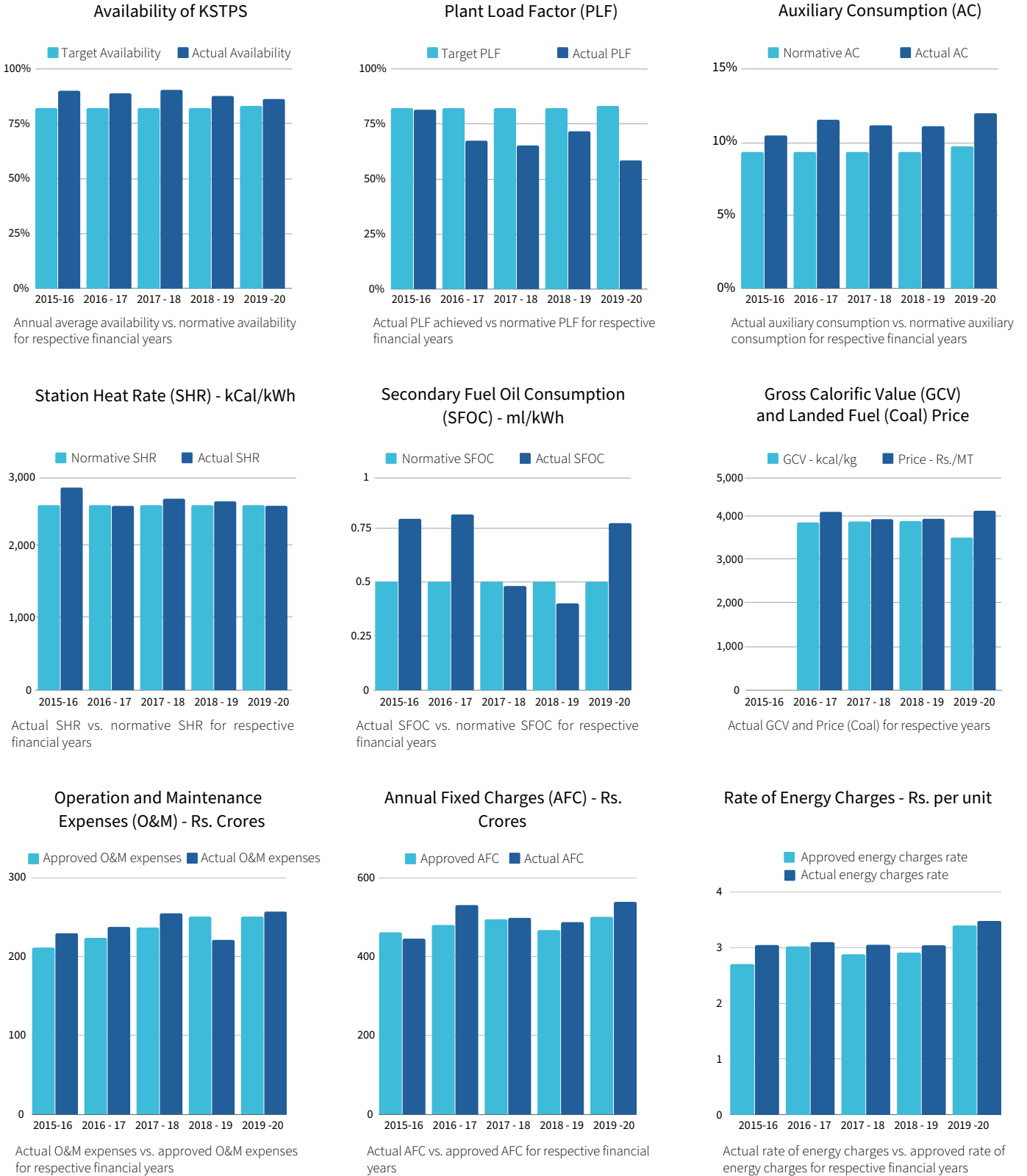
Since its establishment, KSTPS has generated significant direct and indirect employment. As of March 2022, it had 656 on-roll employees. In addition, there are a total of 2012 contractual workers performing different kinds of technical and non-technical work at the plant. The establishment of KSTPS led to the rise of associated industries in the region – primarily the cement and fly ash brick industry in the RIICO Paryavaran Industrial area, located seven kilometres from the plant. The associated industries utilise the produced fly ash as a by-product in thermal power generation as an essential input in their manufacturing processes at gratis or subsidised rates.

A cluster of 40-50 small-scale fly ash brick plants now operates in the RIICO Paryavaran Industrial area, providing livelihood to nearly 3500 people for about seven months a year. A majority of the units in the industry mushroomed post-2014 after the Ministry of Environment, Forests, and Climate Change’s directive to thermal power plants on 100% fly ash utilisation (MoEFCC 2016). Further, following a union government directive to thermal power plants to make fly ash available free of cost, KSTPS has achieved dry fly ash utilisation as per mandated environmental norms (NGT 2019).

Field observation and anecdotal information indicate that approximately 80% of the fly ash produced by KSTPS is dry ash which is stored in dedicated silos at the plant. The remaining 20% is bottom ash, which is transferred to an ash

Figure 2: Operational performance of KSTPS

## Operational and Financial Performance of KSTPS



pond situated in the RIICO Paryavaran area as slurry. The cement industry procures nearly 80% of the dry ash produced at KSTPS. Birla Cement Works Ltd, Shree Cement Ltd, Grasim Industries Ltd, Mangalam Cement Ltd, and Associated Cement Companies Ltd are some of the chief industrial units procuring fly ash from the plant. The cement industries employ many workers in operations concerning fly ash. Annexure 1 provides a detailed list of the cement industries and their association with the plant.

The fly ash brick industry is the next key procurer of fly ash from the plant. The industry primarily utilises dry ash, which it prefers over the coarse ash from the ash pond. Factories in the area can procure approximately 12 tons of fly ash per manufacturing unit from the plant. Close to 45 brick manufacturing units are installed in the RIICO Paryavaran industrial area, suggesting the industry uses around 540 tons of dry fly ash daily.

Thus, KSTPS contributes significantly to the local economy by creating direct employment, supporting associated<sup>3</sup> jobs and economic opportunities, and enabling the ecosystem where other industries, such as transport, real estate, consumer goods, etc., continued to grow. The plant has played a significant part in the local community's and society's socio-economic development through its Corporate Social Responsibility (CSR) initiatives. Its cumulative CSR spending until 2020-21 stood at INR 18.32 crores, making it one of the top CSR spenders under RRVUNL. During this period, it executed the construction of a community centre, yoga shed, and park at the KSTPS colony (RRVUNL 2020-21). Most of the projects undertaken through CSR are within Kota's city and district premises, contributing to the town's development. The plant also owns a government primary school infrastructure and a health dispensary within the Thermal Colony, the residential locale of its permanent employees.

### 1.3.2. Land Utilisation

Surrounded by the Abhera Biological Park and the firing range, the plant has shaped the land utilisation in the surrounding areas. This includes residential and mixed neighbourhoods, associated industries and fly ash ponds<sup>4</sup>. (Image 1)

The plant hosts the Thermal Colony residential area to its north, which houses most of its direct and on-roll technical workforce. The neighbourhoods of Kali Basti and Chambal Colony, situated to the northwest, accommodate a significant portion of contractual workers. Both areas are informal settlements<sup>5</sup> resulting from the gradual encroachment of the government's land over the decades. Satellite images, Image 2 and Image 3, demonstrate the evolution and expansion of Thermal Colony and Kali Basti from 2004 to 2021.

The period between 2000 and 2010 saw the emergence of fly ash brick industries around KSTPS with the establishment of the RIICO Paryavaran Industrial area in Kota. About 45 hectares of forest area was diverted to establish the industrial area located approximately seven kms from the plant. Rapid expansion and shifts in land utilisation patterns of the fly ash brick industry in the RIICO Industrial area are observed through satellite images for the period 2004–2021 (Image 4). It can be seen 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 (Image 5). A large section of KSTPS' and the fly ash brick industry's workforce resides in the settlements in Nanta as tenants or owners of informal housing.

In addition to these neighbourhoods, the plant played a vital role in expanding the Balita and Seenta, peri-urban residential and agricultural areas. Located further north of KSTPS, both neighbourhoods house many of the plant's direct and contractual workforce. The concentration of workers is also

3. Associated jobs in this report refer to jobs arising from the goods and services linkages of KSTPS, such as fly ash brick, transport, etc. Section 2.4 elaborates on the livelihoods qualifications.

4. Related activities include the development of associated sectors especially fly-ash brick industries in and around KSTPS (Section 2.4).

5. As per the UN HABITAT 2015 definition, "Informal settlements are residential areas where 1) inhabitants have no security of tenure vis-à-vis the land or dwellings they inhabit, with modalities ranging from squatting to informal rental housing, 2) the neighborhoods usually lack, or cut off from, basic services and city infrastructure and 3) the housing may not comply with current planning and building regulations, and is often found in geographically and environmentally hazardous areas" (UN HABITAT 2015).

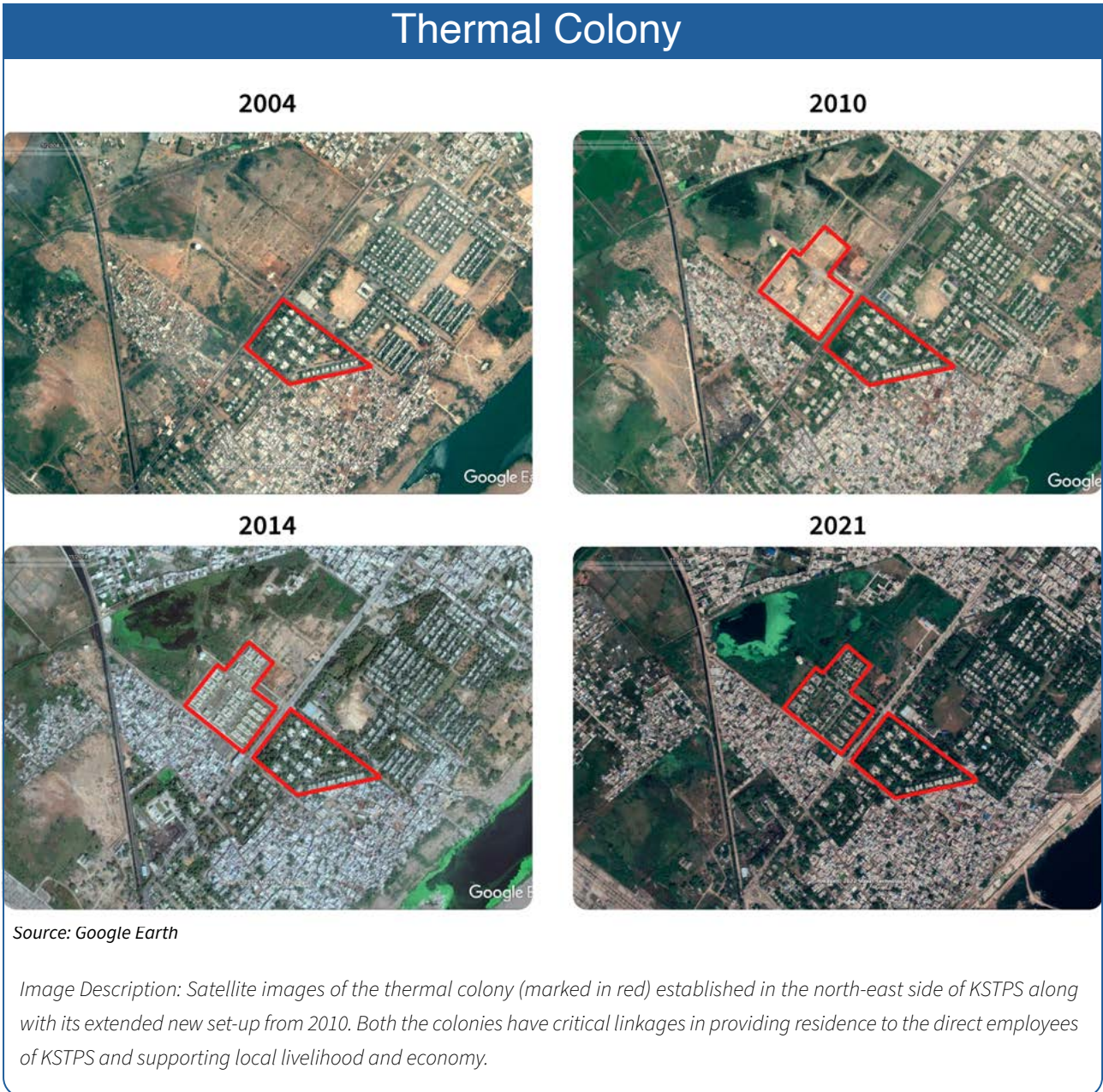


Image 1: Locations of KSTPS, ash brick industry, and associated neighbourhoods



Source: Google Earth

Image 2: Expansion of Thermal Colony between 2004 and 2021



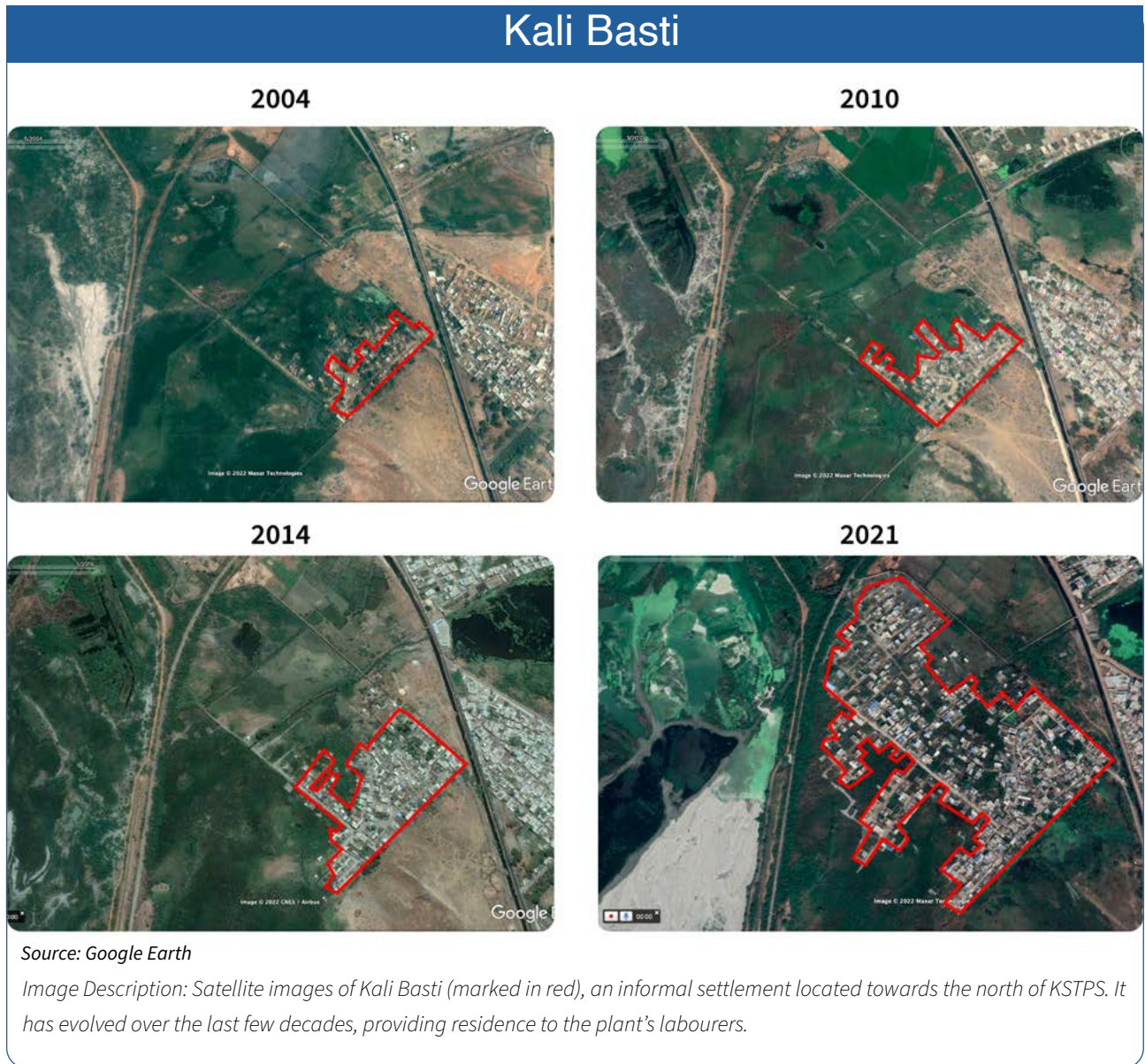
high in the neighbourhoods of Bhil Basti, Bharda Basti, Karni Nagar, and Sakatpura spread a few kilometres from the plant in different directions.

### 1.3.3. Environment Impact

Standing next to the Chambal River and located at the heart of a city home to around four million people, KSTPS is closely

linked to the region’s air and water quality. The monthly stack emissions of the plant issued by RRVUNL provide a troublesome picture of air quality. The plant’s emissions data for 2021 indicate non-compliance with crucial environmental rules and regulations (Figure 3). Six out of its seven units were in non-compliance with the relevant environmental norms for particulate matter (PM), and all seven units of the plant

Image 3: Land utilisation of Kali Basti between 2004 and 2021



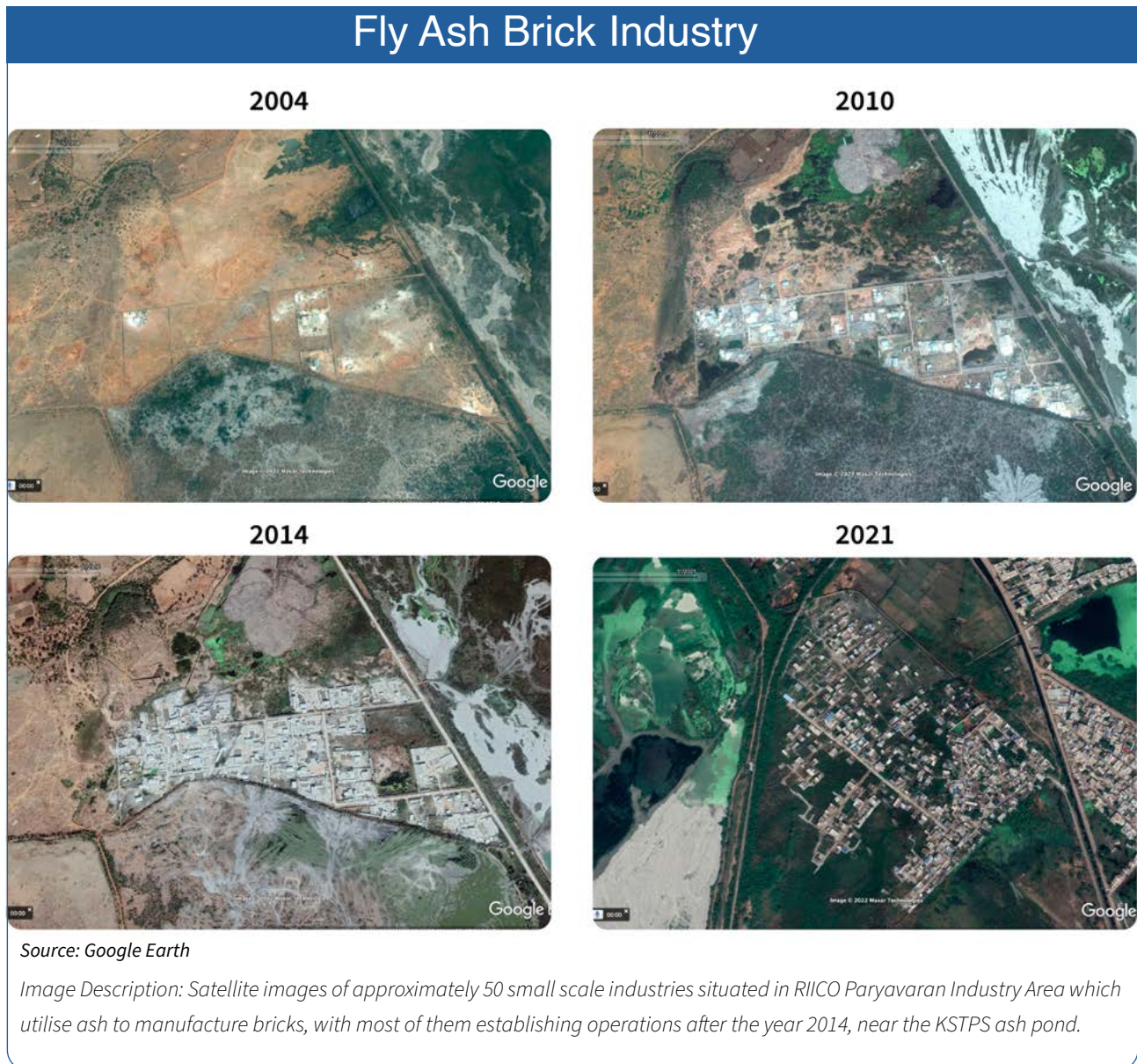
exceeded the sulphur dioxide emissions threshold (CPCB 2016). The plant, however, adhered to the norms for mercury (Hg) and nitrogen oxides (NOx).

Thermal power plants in Rajasthan have the second-highest freshwater withdrawal intensity from water bodies in India (Luo, Krishnan and Sen 2018). Official data from KSTPS states that units 1-5 of the plant utilise about 1180 cusecs of water from the Chambal River while units 6-7 consume only about 18

cusecs of water (RRVUNL n.d.). The consumption in units 1-5 is high due to the 'once-through cooling system' method, while the other two depend on the cooling tower method.

In addition to its cooling and steam production requirements, the plant utilises water for other activities such as coal and ash handling, demineralisation, firefighting, and domestic needs of the workers and staff. The plant doesn't compete with Kota's water needs for operational purposes, as most of the water

Image 4: Expansion and land utilisation of fly-ash brick industry between 2004 and 2021

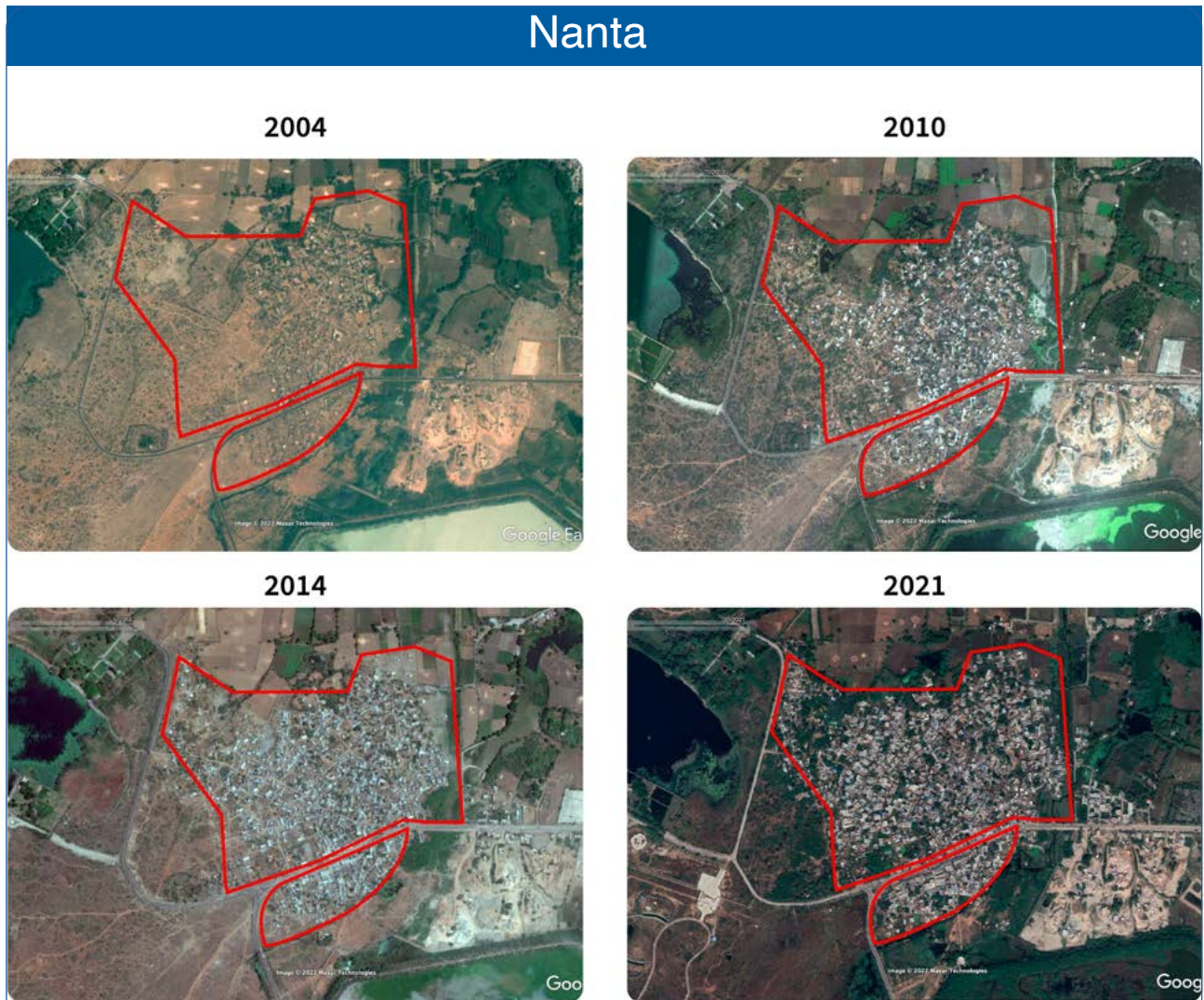


drawn by it is discharged back into the source. The overall withdrawal of water from the river is less when compared to the rate of flow of the Chambal River (Gopal, Rathore and Dalwani 2020). However, the discharge of water from the plant leads to a change in the temperature of the river body leading to thermal pollution, which eventually impacts the downstream marine ecosystem and users of the river.

With its substantial influence on local land use and the

environment, KSTPS has been among the key drivers for the growth of the local economy. The plant creates direct employment and transacts with many associated businesses and service providers. It facilitates a thriving ecosystem of allied livelihoods, such as local transport, real estate, and consumer goods and services primarily helmed by small local businesses. The power station is deeply integrated with the local economy. This includes full-time employees of RRVUNL, contractual employees and labour, service providers, big and

Image 5: Evolution and expansion of Nanta between 2004 and 2021



Source: Google Earth

Image Description: Satellite images of Nanta (marked in red), located towards the north of the ash pond. Nanta is a large neighbourhood with adjacent agriculture activities, and accommodates both the contractual labourers of KSTPS and the brick kiln industries' labourers along with other residents of the city.

small business owners, and various informal workers in the unorganised sector. KSTPS' deep integration with the local economy is likely to cause adverse spillover effects in the event of its closure, the subsequent sections of the report delve into them further.

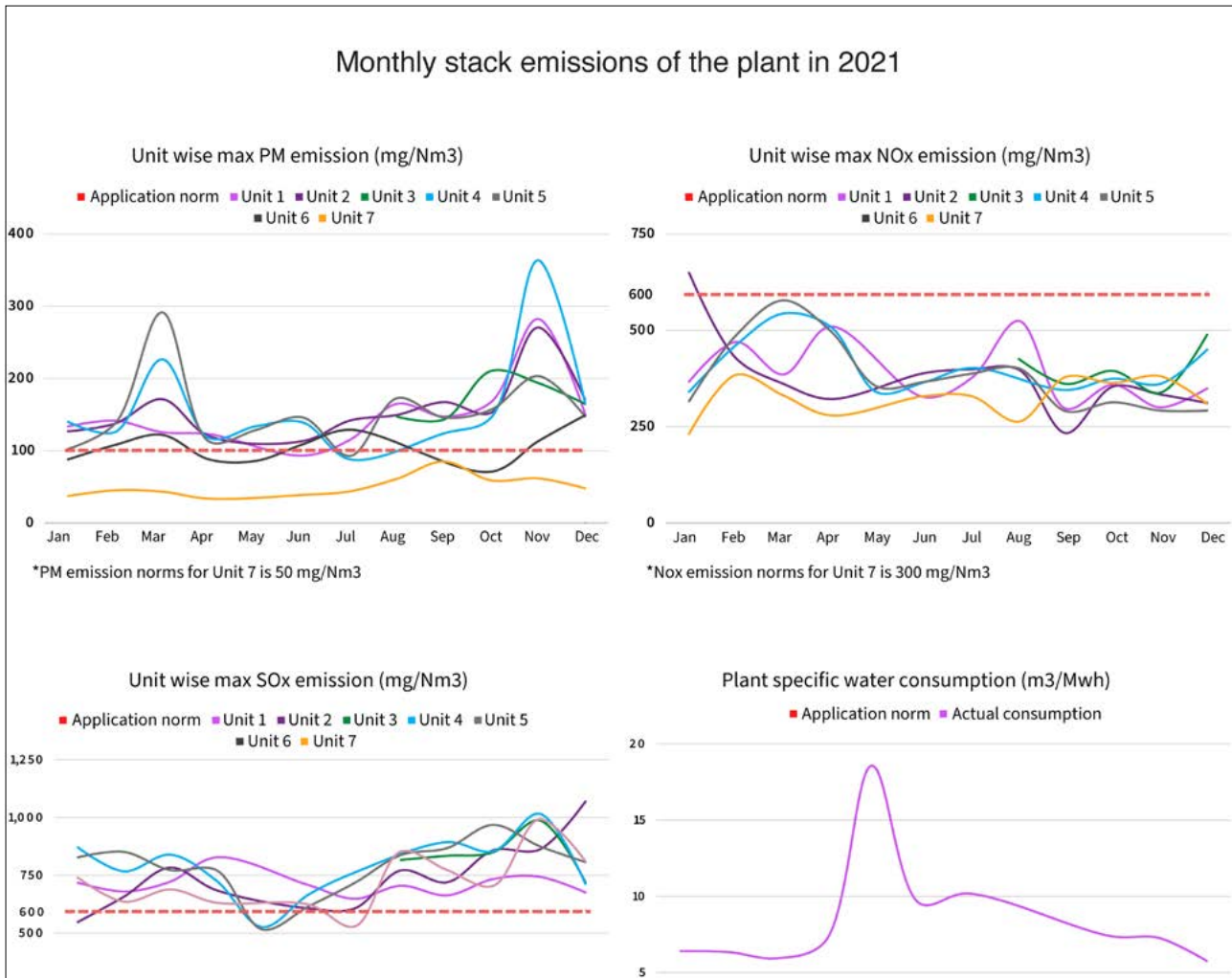
The principles of just transition enshrined in the Paris

Agreement (Paris Agreement 2015) and the Glasgow Climate Pact (Glasgow Climate Pact 2021) emphasise the need for creating adequate safeguards for the vulnerable and marginalised workforce of coal-dependent industries. Guided by the principles of just transition, the following sections of the report attempt to understand the differentiated capabilities of the workforce to traverse transition challenges and highlight

their vulnerabilities in the context of a possible event. Based on this, policy interventions to build resilience and create

safety nets for the vulnerable workforce and their families are recommended.

Figure 3: KSTPS' emissions for the year 2021



Source: KSTPS Environmental Status Report 2021

## **2. Approach and Methodology: A qualitative framework for mapping workforce capabilities**



This chapter presents the approach and methodology adopted for assessing the differentiated impact of the potential closure of KSTPS on vulnerable sections of the workforce. Based on primary qualitative research, a vulnerability assessment framework elucidating the differentiated impact of KSTPS' closure on vulnerable sections of the plant's workforce is presented. The methodology for the same, followed by the assessment framework, is discussed further in detail.

## 2.1 Objective

To understand the capabilities and vulnerabilities of some of the most disadvantaged worker groups directly or indirectly associated with KSTPS in the context of repurposing KSTPS.

## 2.2 Approach

At the onset, the broad gamut of economic activities and livelihoods connected with KSTPS was outlined. The impacted livelihoods include KSTPS' workforce, the industry whose businesses are linked to KSTPS<sup>6</sup>, and the local economy that has organically emerged due to the economic impetus KSTPS provides<sup>7</sup>. 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. Section 2.4 presents a detailed description of livelihoods included in respective categories.

Through personal interviews and focus group discussions, the perceptions and respective positions of impacted persons on the possible repurposing of KSTPS were gathered. Section 2.3 presents the details of data collection for the same. Further, the economic, human, social, and political capital of contractual workers in the direct and associated livelihoods interlinked with KSTPS are mapped. Based on the analysis of the different forms of capital of the respective groups, their differentiated capabilities and vulnerabilities in the event of repurposing

are assessed. A description of the assessment framework is discussed in Section 3.

## 2.3 Data Collection

A mix of personal interviews and focused group discussion methods were utilised for primary data collection. Personal interviews were conducted with public officials, including KSTPS officials, officials of the concerned administrative and revenue departments, the labour department, and the state pollution control board. Further, personal interviews with industry representatives of the fly ash brick industry, and the cement industries connected to KSTPS were also conducted. A detailed list of the stakeholders is enclosed in Annexure 3.

Interviews were conducted with labour union representatives and self-employed persons providing goods and services to the ecosystem that's sprung up near the plant. Based on their inputs, key residential localities of the plant's contractual workers were identified (Annexure 3). Among the identified localities, three were selected for further inquiry based on the concentration of plant workers in the areas. Personal interviews and focus group discussions with contractual workers of KSTPS, fly ash brick units, and representatives of households of the plant's contractual workers were undertaken in the selected areas. Interviews with contractual workers were also undertaken at different operational sites at the plant.

Personal interviews were conducted with public healthcare providers within the plant and in selected residential localities of plant workers. In addition, the disease and ailments data of the workers in the past five years was procured from the ESI dispensary at the plant (Annexure 4).

## 2.4 Classification of Livelihoods

This section discusses the classification of livelihoods directly and indirectly associated with KSTPS based on their degree of association and the legal and statutory relationship between the workers and the plant.

---

6. Including vendors, contractors, and consultants.

7. Local economy includes self-owned enterprises and informal workers, including vendors, mechanics household workers, and activities related to the public infrastructure, that have sprung up as a consequence of the plant.



### 2.4.1. Direct Livelihoods

The substantial operations of KSTPS are managed by the institution's permanent employees and contractual workforce. KSTPS is divided into 15 administrative circles or departments including general operations, control and instrumentation (C&I), turbine maintenance (TM), coal handling plant (CHP) operations, coal handling plant maintenance, boiler maintenance (BM), common auxiliary and ash handling plant maintenance (CAM-AHPM), electrical maintenance (EM), commercial, chemist, firefighting, and personnel and accounts.

The permanent employees comprise officials and technical workmen. The officials, including management and other officers, carry out relevant administrative functions and oversee the execution of tasks performed by the plant's permanent and contractual workforce<sup>8</sup>. The institution's permanent workmen, who are primarily skilled technical workers, hold the designations of supervisors and plant operators. The technical workers at the plant carry out the operational activities related to circles corresponding to specific functions at the plant.

A significant portion of the workforce present at the plant comprises contractual labour, consisting of highly-skilled, skilled, semi-skilled, and unskilled workers (Figure 4). Deployed through various labour contractors, the contractual workers are designated and remunerated according to the prescribed wage rates of highly-skilled, skilled, semi-skilled, and unskilled work. Annexure 2 provides details of the different categories of contractual workers engaged in the various departments of the plant.

In addition to the routinely engaged contract labour, which has a certain degree of income and social security, KSTPS also employs casual labour during its units' annual shut-down for maintenance. Seasonal casual labour, typically comprising workers from precarious socio-economic backgrounds, falls outside the purview of labour law protections. However, due to

logistical constraints, this report does not capture the impact of transition on the seasonal workforce.

The permanent and the contractual workforce operate within the boundaries of KSTPS. The institution's laws, rules, and policies apply to these categories. Hence, their livelihoods are considered to be directly manifesting from KSTPS.

### 2.4.2. Associated Livelihoods

KSTPS engages equipment manufacturers, vendors, consultants, and contractors to meet material and operational requirements. The institution employs its contractual workforce through labour contractors, many of whom are petty contractors either directly or indirectly supplying labour at the plant. Further, 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, to compensate for loss of business resulting from its closure. The vulnerability of these agencies differs based on the nature of their linkages to KSTPS, and the form of their enterprises.

The fly ash industry emerged due to the environmental regulations concerning the safe disposal of the fly ash generated by thermal power plants. The units, their contractual workers, and fly ash transport operators are likely to be highly vulnerable to the closure of KSTPS. Section 3 attempts to map their respective capabilities in detail.

### 2.4.3. Allied Livelihoods

In addition to the livelihoods discussed earlier, the existence of KSTPS has propelled several local economic activities. This includes private enterprises, local transport, informal

---

8. The officials are permanent employees of RRVUNL enjoying secure work tenure and decent salaries. In addition to their remuneration, they are entitled to gratuity, provident, and pension benefits upon retirement. As permanent plant employees, technical workmen enjoy employment security and hold pension entitlements, albeit their salary is lesser than officials. In contrast to permanent employees, the wages of the contractual workforce are statutory minimum wages, that are not timely revised nor appropriately adjusted for inflation. Further, as temporary employees, contractual workers do not hold pensions or other retirement entitlements.

work, and activities related to the public infrastructure that have sprung up as a consequence of the plant. The small and marginal enterprises predominantly reliant on the institution’s presence are likely to face a significant loss of revenue due to its closure.

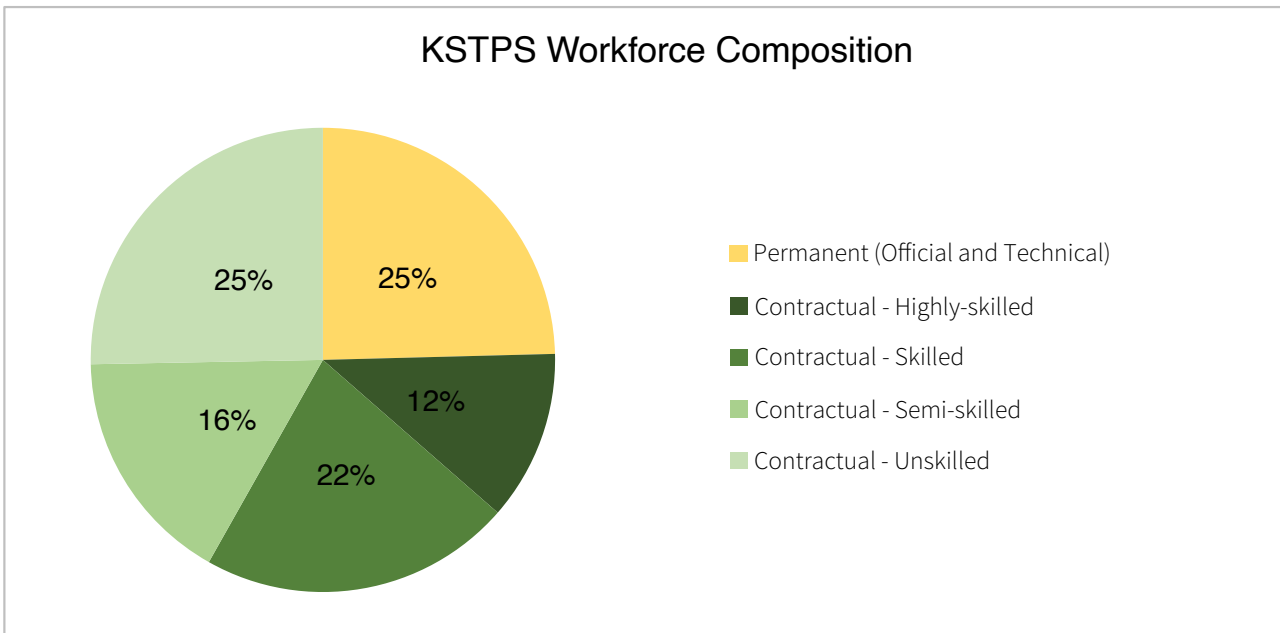
The residential colonies of the plant’s permanent employees support an ecosystem of informal workers such as household help, gardeners, drivers, ration shopkeepers, and security guards. An array of small businesses exists outside the residential complexes of plant employees to cater to the day-to-day 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 institution’s closure will cause them a considerable economic shock.

## 2.5 Methodology for Assessment of Capabilities and Vulnerabilities

Among the categories of livelihoods discussed earlier, the contractual workforce of KSTPS and the fly ash brick industry are likely to be highly vulnerable to transition. However, the specific determinants of their vulnerability shall differ based on their respective capabilities. Literature on climate change and energy transition demonstrates that the capability approach

Figure 4: KSTPS workforce composition



Source: Responses to RTI queries collated by CEEP

offers a constructive way to assess the vulnerabilities of individuals and communities (Schlosberg 2014).

The capability approach is an evaluative approach authored by Amartya Sen that proposes the assessment of human development based on individuals’ freedom or capability to pursue desired goals (Sen, Development as Capability Expansion 2005). The approach asserts that the assessment

of an individual’s development must look beyond income to how the resources at a person’s disposal allow them to fulfil goals she has reason to value. The capability approach is used for various kinds of evaluation including poverty or inequality assessment, quality of life measurement, and as an essential element in theorising justice (Robeyns 2005). As a tool to measure quality of life, the approach seeks to assess the

wellness of a person from the perspective of their welfare. It sees the state of a person's well-being as a determinant of the various combinations of freedom or capability they are able to achieve (Sen 1979).

Notably, the approach does not prescribe a list of capabilities to be assessed and leaves it to the evaluator to determine the same based on the objective of each evaluation. However, as a tool to measure deprivation and inequality, Sen recognises the necessity of evaluating the crucial category of basic capability or basic needs. Basic capability refers to an individual's ability to do certain basic things, including moving about, fulfilling one's nutritional, clothing, and shelter requirements, and participating in the community's social life (Sen). The notion of basic capability is also related to Sen's idea of substantive freedoms, which he states is essential for enhancing individual capability. Sen emphasises that development should mean the elimination of sources of unfreedoms, including poverty, tyranny, systematic social deprivation, neglect of public facilities, and intolerance from a highly regressive state (Sen 1999).

Capabilities denote a person's opportunity and ability to generate valuable outcomes, taking into account relevant personal characteristics and external factors. Consequently, the capability set outlined by this approach is not merely concerned with achievements; rather, freedom of choice, in and of itself, is of direct importance to a person's quality of life.

Human capability is a function of complex internal and external factors. Nussbaum defines internal capabilities that are personal abilities. She further defines combined capabilities "as internal capabilities together with the social/political/economic conditions in which functioning can actually be chosen." (Nussbaum 2011). Human capital may be used as a proxy of internal capabilities, covering substantive factors such as health and well-being, skills, and education. External conditions, stemming from social, economic, and political conditions can be comprehended by mapping the social, economic, and political capital of individuals. The potential effects of the plant's closure are likely to exert a negative influence on these external conditions. The interplay of economic, human, social and political capital, combined

with the adverse spillover effects complicate adjustments and the development of basic capabilities.

Consequently, the report attempts to map economic, human, social and political capital of workers across respective groups to understand their combined capabilities and vulnerabilities in the context of loss of livelihood. The broader definitions of these capitals and the parameters for their assessment are discussed in the following sections.

### 2.5.1. Economic Capital

An individual's economic capital represents the financial means available to them to meet their needs and pursue their goals. It includes their financial resources and assets such as incomes, savings, investments and property. Further, it also includes the ability to generate income and wealth over time. For some groups, economic capital will get hit first on the plant's closure, causing a cascading effect on human capital depending on their access to social and political capital. In this context, the following key parameters are adopted to map the economic capital of the target groups:

- i. Current sources of income
- ii. Assets and savings
- iii. Access to credit
- iv. Social security

### 2.5.2. Human Capital

The human capital of an individual is a signifier of their skills and ability to pursue possibilities of productive employment (Sen, Human Capital and Human Capability 1997). While skills are acquired through (academic and professional) training and experience, their ability to employ their skills depends, amongst other factors, on their physical and mental well-being. Consequently, the following key parameters are adopted to map the human capital of the target groups:

- i. Academic qualifications
- ii. Professional qualifications
- iii. Skill level
- iv. Health and well-being



*Image Description: Fly ash bricks at a factory located in the RIICO Paryavaran Industrial Area, Kota*

### 2.5.3. Social Capital

Theories of social capital recognise that individual autonomy loses its effectiveness if divorced from social relationships (Schuller 2001). A shared understanding of social capital has been long debated, with different disciplines, predominantly economics and sociology adopting varied approaches to define it. The report builds on James S. Coleman's functional conception of social capital as a resource available to actors through network ties, informational channels, and social norms that allow them to gain certain benefits based on their social position (Coleman 2000).

To infer the social capital of the concerned groups, the following networks are considered:

- i. Caste position and related networks
- ii. Neighbourhood, community relations and associated networks
- iii. Civic engagement, through associations such as workers' unions

### 2.5.4. Political Capital

The capability of an individual to influence political decisions defines their political capital. Political capital is determined by the dynamic combination of factors that may vary according to the context (Schugurensky 2000). Mapping the political capital of the different workers' groups sheds light on the capability of the group to negotiate favourable outcomes in transition.

The dimensions considered to assess the political capital of a concerned group for this report are:

- i. Degree and nature of participation in local politics
- ii. Degree and nature of participation in associations

### 3. Qualitative Analysis of Capabilities of TPP Workers



Contractual labour, across various skill levels, is identified as the most vulnerable among the workforce directly employed by KSTPS. This stems from the procedural aspects of labour governance in India and the legal protections offered by the thermal facility to the contractual workers. Similarly, daily wage labour employed in the fly ash brick industry is identified as highly vulnerable based on their socio-economic conditions which are exacerbated by the informal nature of work.

Based on the qualitative inputs collected from the concerned stakeholders (Annexure 3), the methodology for understanding capabilities discussed in Section 2 is applied to identified wage groups of contractual workers and workers of the fly ash brick manufacturing industry. The results of the exercise are presented in tabular format (Table 2), providing a succinct illustration of the differentiated capabilities of the identified workers' groups.

The subsequent sections discuss the divergence of respective capitals across the identified workers' groups and how their intrinsic intersectionality is likely to dictate the capability of a concerned worker to navigate the impact of loss of livelihood.

Table 2: Assessment of substantive capitals of contractual workers of KSTPS and daily-wage in fly-ash brick manufacturing industry

Category of Workers	Economic Capital	Human Capital	Social Capital	Political Capital
<p><b>Skilled</b> (mechanic fitter, electrician, light and heavy vehicle drivers, operators, supervisors)</p>	<ul style="list-style-type: none"> <li>• <b>Minimum daily wage of INR 283</b> as specified by GoR.</li> <li>• <b>Better positioned to access opportunities for additional income</b> through alternative livelihood opportunities such as running small shops or as skilled services gig-worker.</li> <li>• <b>Relatively high degree of asset ownership</b>, including houses and lightweight vehicles.</li> <li>• <b>Insured</b> under the ESI scheme.</li> <li>• <b>EPF deposit</b> serves as the <b>primary saving</b>.</li> <li>• Access <b>formal sources of credit</b> such as banks and MFIs, and <b>informal sources</b> such as relatives or colleagues.</li> </ul>	<ul style="list-style-type: none"> <li>• Typically hold at least <b>matriculation</b>, with most recent recruits holding <b>ITI diplomas</b>.</li> <li>• Relatively less prolonged and <b>direct exposure to hazardous materials</b>.</li> <li>• Better positioned to receive <b>alternative employment</b> at current wages as <b>skills and experience are ratified through experience certificates</b>.</li> <li>• <b>Provided safety gear</b> such as helmets, gloves, and shoes.</li> </ul>	<ul style="list-style-type: none"> <li>• Consists of people from <b>different castes</b>, including Brahmins, Rajputs, Scheduled Castes, and Other Backward Castes.</li> <li>• Most are <b>locals or migrants</b> from nearby areas such as Kota, Tonk, and Newai.</li> </ul>	<ul style="list-style-type: none"> <li>• Members of labour unions: <b>visible and vocal participation</b> in union activities.</li> <li>• <b>Assert political voice in local decision-making</b> to some degree as local residents or residents of nearby areas.</li> </ul>
<p><b>Semi-skilled</b> (Helper, junior fitter, welders, gardeners)</p>	<ul style="list-style-type: none"> <li>• <b>Minimum daily wage of INR 271</b> as specified by GoR.</li> <li>• Access to <b>opportunities for additional income</b> is curtailed due to strenuous work shifts.</li> <li>• Many possess <b>local housing with a high degree of informality</b> in tenure. Some possess <b>marginal agricultural land</b> at native place.</li> <li>• <b>Insured</b> under the ESI scheme.</li> <li>• <b>EPF deposit</b> serves as the <b>primary saving</b>.</li> <li>• <b>Credit</b> is secured <b>through informal sources</b> such as relatives, employers, or colleagues. Express aversion to formal sources of credit.</li> </ul>	<ul style="list-style-type: none"> <li>• Typically <b>middle school graduates</b>.</li> <li>• <b>Under-recognition of skills</b> gained through work experience.</li> <li>• High degree of <b>direct and prolonged exposure to hazardous materials</b>, impacting physical and mental well-being.</li> <li>• Opportunities for alternative employment at existing wages are curtailed due to a <b>lack of formal recognition of skills and experience</b>.</li> <li>• <b>Inadequate provision of safety gear</b> such as helmets, gloves, and shoes.</li> </ul>	<ul style="list-style-type: none"> <li>• Primarily includes <b>Other Backward Castes and Scheduled Castes</b>.</li> <li>• Most are <b>locals or migrants</b> from nearby areas, such as Tonk, Newai, and Jhalawar.</li> </ul>	<ul style="list-style-type: none"> <li>• Members of labour unions. However, <b>active and vocal participation is not uniform</b> across the skill-category.</li> <li>• <b>Assert political-voice in local decision-making</b> to some degree as local residents; <b>Capacity for active participation is curtailed</b> due to the informal nature of their settlements.</li> </ul>

<p><b>Unskilled</b> (labour, cleaning, and sanitation workers)</p>	<ul style="list-style-type: none"> <li>▪ <b>Minimum daily wage of INR 259</b> as specified by GoR.</li> <li>▪ Access to <b>opportunities for additional income is significantly reduced</b> due to the physically strenuous work.</li> <li>▪ Many <b>possess local housing with a high degree of informality in tenure</b>. Few indicate none to marginal agricultural land holding in places of origin.</li> <li>▪ <b>Insured</b> under the ESI scheme.</li> <li>▪ <b>EPF deposit</b> serves as the <b>primary saving</b>.</li> <li>▪ <b>Credit</b> is secured through <b>informal sources</b> such as relatives, employers, or colleagues. Express aversion to formal sources of credit.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Generally comprise <b>primary school graduates</b>.</li> <li>▪ Perform <b>physically arduous manual labour</b>, including civil construction and maintenance work, as well as cleaning and sanitation work.</li> <li>▪ Opportunities for <b>professional growth</b> are usually <b>stagnant</b>.</li> <li>▪ <b>Poorly positioned to gain alternative employment</b> due to highly informal nature of work and <b>limited opportunity to gain skills</b>.</li> <li>▪ <b>Inadequate provision of safety gear</b> such as helmets, gloves, and shoes.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Primarily includes <b>Scheduled Castes and Scheduled Tribes</b>, with sanitation and cleaning workers being predominantly <b>Dalits</b>.</li> <li>▪ <b>Significant participation of female workforce</b> across the overall livelihood spectrum.</li> <li>▪ Most are <b>locals or migrants</b> from nearby areas, such as Tonk, Newai, and Jhalawar.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Members of labour unions;</b> participation in union activities is <b>minimal</b>.</li> <li>▪ <b>The participation of women is virtually absent</b>.</li> <li>▪ <b>Assert political-voice in local decision-making</b> to some degree as local residents; <b>Capacity for active participation is curtailed</b> due to the informal nature of their settlements.</li> </ul>
<p><b>Fly Ash Brick Industry Workers</b></p>	<ul style="list-style-type: none"> <li>▪ Much lower daily wage, determined <b>based on productivity</b>, typically around INR 180/190.</li> <li>▪ Majority are migrants and <b>do not possess local assets</b>. Some indicated small to marginal agricultural land holding at their native place</li> <li>▪ <b>Not insured</b> under the ESI scheme, limiting access to healthcare.</li> <li>▪ <b>Not covered under the EPF Act</b>. Formal savings are absent.</li> <li>▪ <b>Credit</b> is secured <b>through informal sources</b>, such as relatives, neighbours, employers, or colleagues. Express <b>high aversion to formal sources of credit</b>.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Majority were <b>primary school graduates</b>.</li> <li>▪ <b>High and prolonged exposure to hazards</b> at the workplace.</li> <li>▪ <b>Poorly positioned to gain alternative employment</b> due to highly informal nature of work and <b>limited opportunity to gain skills</b>.</li> <li>▪ <b>Not provided with required safety gear</b> such as helmets, gloves, shoes or masks.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Primarily includes <b>Scheduled Castes and Dalit communities</b>.</li> <li>▪ Most are <b>migrants</b> from MP, UP, Bihar, and other parts of Rajasthan.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Absence of unionisation</b></li> <li>▪ <b>Participation in local politics is virtually absent</b>.</li> <li>▪ <b>Organised workers' associations are absent</b>.</li> </ul>



### 3.1 Economic Capital

In the event of repurposing of a thermal asset, workers' economic capital shall significantly shape their ability to cope with the shock of livelihood loss and consequent vulnerabilities. Beyond wages, the economic capital of workers can be understood in terms of their monetisable assets, ability to secure supplementary sources of income, and access to credit. Based on this, an understanding of the differentiated economic capabilities of workforce groups is outlined.

As inferable from Table 2, workforce wages and financial asset ownership vary across the mentioned worker categories. Being part of the organised sector, the workforce at KSTPS has an assurance of the minimum wage rate prescribed by the state government. However, the statutory right for minimum wage is not assured for fly ash brick industry workers because of the informal nature of most fly ash brick units.

It was observed that skilled category workers usually possess local land and housing with secure titles. Some skilled category workers reported ownership of other movable property resources, primarily lightweight vehicles. While semi-skilled and unskilled workers possess local land and housing assets, the ownership is typically informal, i.e., without secure ownership titles. Some workers in the semi-skilled and unskilled categories own ancestral agricultural land of up to three bighas, however, its dependents far exceed the land's productive capacity.

The fly ash brick workers' situation is observably most deprived in terms of asset ownership. A sizeable proportion of this workforce is migrant. As a result, they have no local land or assets. In cases where ancestral agricultural land is available, the land size is marginal in proportion to its number of dependents.

Beyond wages and financial assets, the economic capital of individuals or households is a function of their ability to complement their income through alternative livelihoods or additional earning opportunities. Several respondents from the skilled category reported pursuing economic activities to supplement their income. Often, these activities are micro-entrepreneurial opportunities such as shops and provision of

services for the local market or monetising their skills through part-time engagement in other industries.

For semi-skilled workers, the possibility of seeking additional income opportunities is curtailed because of the taxing nature of their shift work. For unskilled and fly ash brick workers, the options to seek alternative employment are significantly lesser due to the physically strenuous nature of their job. Many unskilled workers are deployed in harsh environments at sites such as coal yard, boiler, turbine, and generator that involve hazardous equipment and materials. For workers carrying out 12-hour shifts at these sites, undertaking another job is not only practically unfeasible but also dangerous.

The entitlements provided by public insurance and social security schemes such as the Employees Provident Fund (EPF) and Employees' State Insurance (ESI) serve as vital economic safeguards for workers and their households. EPF deposits are the primary and often the only monetary savings of the workers. Affordable healthcare access provided under the ESI scheme is a crucial safeguard for financially vulnerable households. Especially for women, the ESI services provide the principal medical support during childbirth and postnatal care.

EPF and ESI schemes cover all contractual workforce at KSTPS. However, as unorganised sector workers, the fly ash workers fall outside this ambit. In the absence of the EPF and ESI insurance mechanisms, the formal savings of fly ash workers are observed to be negligible compared to the workforce at KSTPS.

Access to credit plays a critical role in determining the ability of any household to deal with fiscal shocks. It is also a key enabler for building assets and capitalising on income generation opportunities (Omar and Inaba 2020). The cost of capital (credit) varies significantly based on the channel through which it is sourced, with informal channels being inherently more expensive than banking and non-banking financial institutions (Reserve Bank of India 2008).

It was observed that mainly skilled workers are able to access credit through formal sources such as banks and microfinance institutions. Workers across the remaining categories expressed an aversion to seeking credit from banks. Most

respondents cited the rigidity of repayment timelines and undignified treatment by bank officials as key reasons for the same. Neighbours, relatives, and colleagues constitute the principal sources of credit for them. As informal transactions are trust-based, the social position of workers plays a decisive role in the kind of access to credit they have access to. Fly ash workers appear to be particularly disadvantaged concerning the same because of their migratory character and the absence of long-term and reliable networks.

### 3.2 Human Capital

The economic value of a worker's experience and skills can be inferred from their skill category, education, and training. In practice, it is strongly correlated to acknowledgement and recognition of a worker's skills. Further, physical and mental well-being also play a critical role in shaping the worker's human capital.

The study of the KSTPS workforce informs that the human capital is differentiated by the worker's skill category, education and spatial location or physical work environment.

Unskilled and semi-skilled workers often accumulate technical skills through experience and exposure at the plant. Many semi-skilled workers claimed to have acquired proficiency in certain technical skills during their work at KSTPS. However, they find a formal recognition of the same amiss, preventing them from accessing associated benefits of (higher) wages and (better) livelihood opportunities.

Further, it was observed that skilled workers are typically the most qualified among the contractual workforce at KSTPS. Most workers in the category hold at least matriculation, and most recent recruits possess ITI diplomas. The qualifications of the remainder of the KSTPS and fly ash industry workforce are broadly similar, with most workers having studied up to primary or middle school.

The activities at KSTPS may be broadly classified as civil, electrical, and mechanical work. A majority of skilled workers at the plant are engaged in electrical work, whereas mostly semi-skilled and unskilled workers are engaged in civil and mechanical work.

The Factories Act categorises power-generating industries in India as sites involving hazardous processes. Due to the perilous character of the enterprise, the contractual workforce at KSTPS is exposed to high occupational risk. However, the degree of occupational hazards in different sections of the plant varies significantly. Most of the plant's skilled workers are engaged in operations and maintenance at sites such as the electrical and mechanical control rooms, boilers, and outgoing switching sub-station. In comparison, a significant number of unskilled and semi-skilled workers are stationed at the coal yard and ash handling plant (AHP). These locations have a hazardous work environment as workers have high exposure to dust and toxic materials.

Sharing their experiences, respondents in the coal yard of KSTPS mentioned that coal handling causes many to lose their sight by the end of their tenure. Similarly, fly ash workers are highly vulnerable to health risks. For instance, prolonged exposure to fly ash increases the propensity for asthma, inflammation, and respiratory diseases, including cancer (Shah and Narayan 2020). Workers at the coal yard reported that despite working in hazardous environments, they receive no compensation for loss of livelihood due to health-related inability to continue their services. Deterioration of eyesight is highlighted as a key concern because of which workers at the coal yard often lose their livelihood.

### 3.3 Social Capital

Individual capacity to cope with loss of livelihood needs to be understood in the context of the intersectional position occupied by a person across their various group identities. The social capital of workers is an indicator of the resources accessible to them through network ties and informational channels. Based on the broad caste composition of the different categories of workers, and their neighbourhood and community relations, the varied social capital of the workforce groups is discussed here.

The skilled workforce showcases the most diverse caste composition. The degree of homogeneity with respect to caste constitution increases as one moves towards the bottom of the workforce pyramid. While the semi-skilled workforce includes

persons from Other Backward Castes and Scheduled Castes (Dalits), the unskilled workforce primarily includes Scheduled Castes and Scheduled Tribes (Adivasi).

Most of the workers in the KSTPS workforce are either locals or migrants from nearby areas such as Tonk, Newai, and Jhalawar. These workers are likely to have long-standing local social networks through neighbours, co-workers, and relatives. On the contrary, a large proportion of the fly ash workers are migrants from other regions of Rajasthan, MP, UP, and Bihar. The local social networks of migrant workers are feeble.

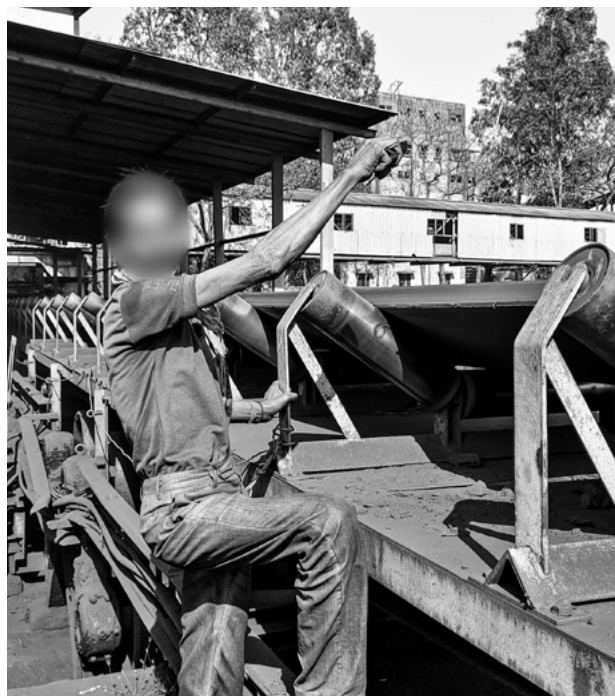
### 3.4 Political Capital

Political capital determines one’s ability to influence policy decisions and negotiate favourable outcomes through the intervention of the State or its concerned entity. This section discusses the differentiated political capital of different categories of KSTPS workforce as a function of their social position, location, and civic participation.

Skilled workers are mainly locals with secure land tenure, which allows them firm positioning to participate in local decision-making. On the other hand, the participation of semi-skilled and unskilled residents is less secure due to the high concentration of informal housing in these categories.<sup>9</sup>

There are six registered trade unions at KSTPS, among which three are contractual workers’ unions, and the remaining are the plant’s permanent workers.<sup>10</sup> Unions of permanent technical workmen were observed to be visibly active and vocal, while the unions of the contractual workers were largely dormant. Notably, one of the three registered unions for contractual workers is led by a contractual employer.

Enquiry with representatives of unions revealed that contractual workers across the workforce categories rely on permanent workers’ unions to push their demands. It was observed that in terms of participation in union and related



*Image Description: (top) A contractual worker of KSTPS’ coal yard working at the conveyor belt. (bottom) A mobile phone message confirming the deposit of EPF by the employer.*

9. Securing proofs of local residence necessary for voter registration was discussed to be difficult for workers residing in dwellings with the absence of formal tenure rights.

10. The registered trade unions include Thermal Power Theka Mazdoor Sangh, Kota; Rajasthan Vidhyut Utpadan Karamchari Sangh; Thermal Karamchari Sangh (INTUC); Thermal Thekedar Workers Union; Kota Super Thermal Power Workers Union; and Super Thermal Power Plant Contract Workers Union.

activities, the skilled workers appeared the most dynamic group in vocalising their concerns. No involvement from women from the permanent or contractual categories in union and related activities was observed, suggesting a significant gender imbalance in political representation.

While the participation of contractual workers in union activities is sub-optimal, the presence of unions plays a critical role in providing workers with a sense of employment security. Respondents from the contractual workforce shared that the collective power of the unions ensures existing workers can secure re-employment at the plant despite the changes in the contractual employers taking place every two years, highlighting the crucial role of unions in ensuring de facto employment stability.

For workers of the fly ash brick industry, which exists at the periphery of the town, the spaces for political expression are

scant. The migrant workers, forming a majority of the industry, reside in single-room quarters provided by employers at the industry units. As participants in an unorganised sector, the fly ash workers do not enjoy the rights of unionising or the advantages accorded by them. The workforce at the fly ash units is thus subject to frequent changes.

As captured in Table 2, a worker's capabilities are a function of their economic, social, human, and political capital. However, even amongst the segregated workgroups, some workers are likely to be more disadvantaged than others. For instance, workers handling coal report frequent skin and respiratory issues, along with accelerated loss of sight. This implies that the workers are likely to bear a relatively higher healthcare burden, and they are less likely to be in optimal health conditions for meaningful employment later in life.

Understanding the broad spectrum of capabilities is critical to

*Image Description: A contractual worker of KSTPS (extreme right) sharing insights with CEEP's team member in front of a local salon near the entrance gate of the plant*



map the vulnerabilities of the workers (and their families) in the context of an external event such as loss of livelihood. For the most marginal, the impact may be multi-generational as the household's nutrition, education, and health are at risk. For instance, respondents from workers' households reported during group discussions that they depend on schools and healthcare facilities operated by KSTPS.

The wage and economic differential between the skill-based workforce groups is apparent. The disparity is further aggravated by systemic challenges such as capability reflective skill recognition, ability to pursue additional economic opportunities, and access to finance. Semi-skilled and unskilled workers were observed to be more exposed to hazardous environments and employment-associated risks. This includes exposure to thermal discharge, coal dust, fire, and explosion hazards, etc.

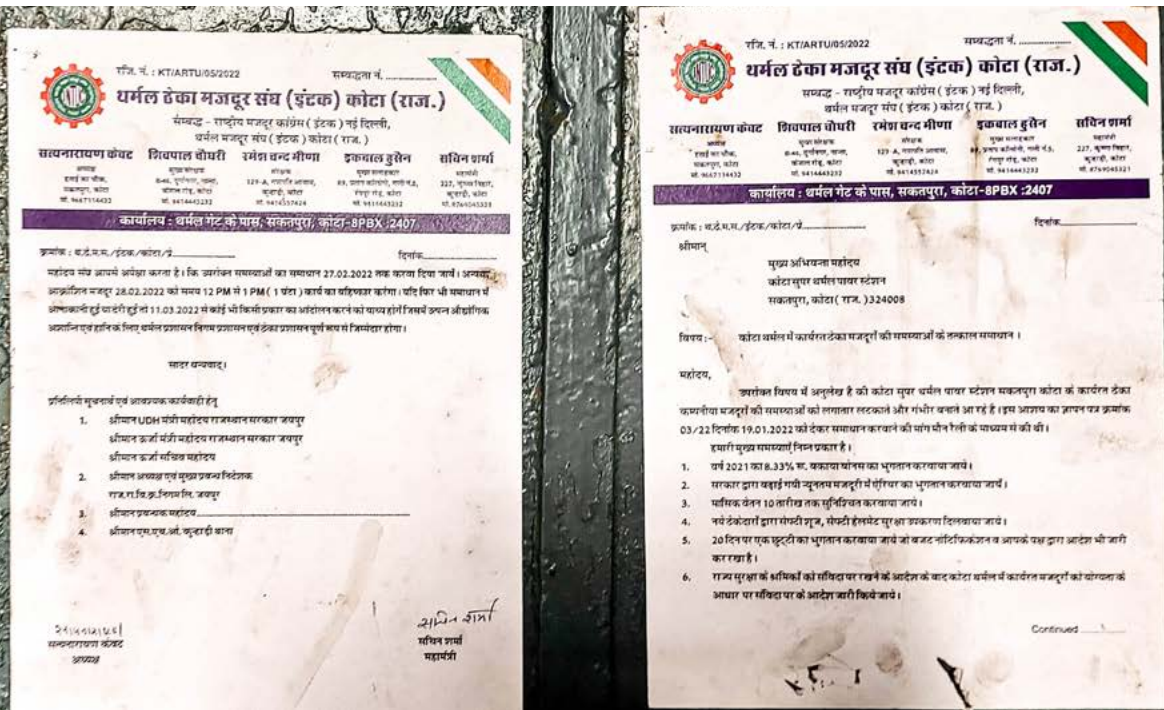
Notably, it is primarily the unskilled workers who occupy hazardous locations such as coal and ash handling. Such exposure is observed to have a long-term detrimental impact on the health and well-being of the concerned workers. For instance, many workers who have spent their lifetime in coal handling complain of degradation of eyesight and blindness. Similarly, workers involved in fly ash brick industries (allied jobs) are directly exposed to hazardous waste. Both groups of workers reported high instances of skin and respiratory issues, including silicosis. Such employment locations, while

being low-paid, carry high long-term risks for the workers and high financial costs associated with chronic health issues. The associated degradation of health and well-being may severely impact their ability to work and sustain themselves.

Exploration of the social configuration of worker groups associated with the TPP further highlights their intersectional vulnerabilities. Skilled workforce displays a heterogenous social composition, and includes persons from the General category, Other Backward Castes, and Scheduled Castes. However, social configuration becomes increasingly homogenous as we move to semi-skilled and unskilled workers. Semi-skilled workers primarily belong to Other Backward Castes and Scheduled Castes; unskilled workers are primarily from Scheduled Castes and Scheduled Tribes. The disadvantages that arise from social position are reflected in community support systems and collective vulnerability. Large groups of marginal workers from disadvantaged backgrounds serving the TPP have high collective vulnerability. Consequently, this reduces their resilience to deal with the impact of an event such as the repurposing of a thermal plant because of high exposure at the community level.

Furthermore, the ability of workers to voice their challenges and demand safeguards for a just transition through policy intervention is a function of their political capital. Observably, political capital drastically diminishes as one moves from the skilled to the unskilled category. While skilled workers are

Image Description: A copy of a notice by a labour union of KSTPS, demanding the management to address their concerns



active and vocal members of labour unions, the participation and engagement amongst semi-skilled workers are inconsistent. Further, the participation of unskilled workers in union activities is tokenistic and their representation in union leadership is usually absent. Political capital of semi-skilled and unskilled workers is also lower by virtue of their social positions, informal nature of their settlements and their voting status. The latter is a function of the fact that most unskilled workers are migrants from different backward regions of the state and the country.

It is worth noting that women are estimated to constitute approximately 10% of the contractual workforce engaged by thermal power plants in Rajasthan (CEEP 2022). They are primarily engaged as unskilled labour for menial jobs such as gardening, cleaning, etc. The associated fly ash brick industry employs a larger number of women below minimum wages. The gendered impact of possible repurposing is yet to be understood. However, it is clearly observed that women's voices are grossly under-represented, while they are likely to be more vulnerable because of structural gender-based inequalities in India.

Re-employment and alternative employment for the impacted workforce is uncertain and therefore likely to have a significant detrimental impact on marginal workers and their families. The

economic impact of KSTPS' closure is likely to considerably diminish the potential value of these enterprises. In the absence of alternative income, capital assets, and appropriate social security nets, the impacted families are vulnerable to debt traps, displacement, hunger, and other forms of exploitation.

Given the varied capabilities of workers to cope with the loss of livelihood, affirmative policy interventions require a nuanced understanding of the vulnerabilities of impacted workers and their families as a function of the skill level of the workers, caste, gender, family demography, and other socio-economic factors. It is evident that the discourse on just transition needs to look beyond re-employment and upskilling to a sustained quality of life. This shall imply that impacted workers and households at least have guaranteed access to education, healthcare, and nutrition in the event of a sudden loss of livelihoods. A comprehensive social security plan must be the first step towards delivering a just transition for the workers impacted by the repurposing of thermal power plants.



*Image Description: Members of the labour unions, Thermal Karmachari Sangh (INTUC) and Thermal Contractor Workers Union, protesting in front of KSTPS' main gate, demanding timely payment of wages, the release of arrears, and resolution of other issues (March 11, 2022)*



## 4. People's Perspectives on Transition Away from Thermal Generation



The ecosystem of institutional actors and relevant stakeholders for KSTPS, as discussed earlier in Section 1, extends far beyond its contractual and informal workers. The gamut of stakeholders interviewed, covering KSTPS, the labour department, the state pollution control board, district administration officials, relevant public health care providers, and owners of fly ash brickfields broadly, are discussed in Section 2.3. The perspectives of the diverse set of actors shall have a bearing on the political economy shaping key decisions on transition and transition management at the local level.

Reluctance to acknowledge or address the possibility of KSTPS' repurposing in the absence of a formal mandate to that effect emerged as a common thread across all key agencies consulted during the fieldwork. Broadly, the authorities remained reticent in sharing their perspectives on repurposing. The following sections represent the voices and perspectives of key stakeholders engaged in the study.

#### 4.1 Labour Officials

Senior labour officials acknowledged the relevance of KSTPS as an essential livelihood provider and applauded its continued functioning. Officials highlighted that concerns related to delayed payment of wages, bonuses, and working hours have previously come up from the plant. A key official shared that the government shall decide the course for permanent employees and their livelihoods shall be safeguarded with prior policy planning. However, the treatment of contractual workers is likely to be uncertain. Therefore, fulfilling legal obligations toward them becomes crucial, including remittance of dues, compensation, etc.

A senior official from the Provident Fund department shared that the existing policy of the central government is highly industry-focused and not pro-labour. While recommending adherence to statutory compliances toward workers during repurposing, he shared that the statutory requirements mandated by labour laws are rendered sparse, as the quantum of compensation available to contractual workers is reduced.

#### 4.2 Rajasthan State Pollution Control Board (RSPCB)

Against enquiry about the requirements for environmental compliance in the event of repurposing, a scientist at the RSPCB shared that the process shall be governed partly by the municipal rules (Nigam rules) and partly by environmental regulations. Construction and building waste shall be treated according to the rules, scrap metal shall be tendered to an authorised recycler, and solid waste shall be disposed of at Nigam's designated dumping sites.

Discussing the role of the Board (RSPCB), an official of the Board shared that KSTPS is required to submit an application regarding the plant's closure. Subsequent to this, a team from the Board's regional office shall inspect the sites that have been declared non-operational. Ultimately, everything will be disposed of through tenders. He shared that in mining activities, there is a requirement for the restoration of land, but no such provisions exist for thermal units.

It was further shared that shutting down KSTPS shall not be an easy venture. There must be equivalent livelihood alternatives for a plant of such a scale before it is repurposed. He shared that although the units were established long ago and are very old, they have upgraded themselves following relevant pollution control measures by installing the necessary equipment (noting that such equipment is fairly expensive). In his view, the plant is in compliance with appropriate environmental norms.

#### 4.3 Fly Ash Brick Industry

RIICO environmental and industrial area is purposed for fly ash brickfields and is largely populated by the fly ash brick industry. A disruption in the supply of fly ash shall directly impact the industry and its viability. It was articulated that such a scenario shall pose administrative hurdles in inviting alternative industries to the area. On a separate note, an elected representative of the fly ash brick industry association shared that there is a lot of unaccountability in the industry, and the implementation of regulatory standards is poor.



Overall, any discussion related to the closure of KSTPS came across as a matter of grave concern for the fly ash brick industry stakeholders. Sharing apprehension about the possibility of plant closure, an owner of one of the fly ash brick units exclaimed that the plant should not shut down. He shared that KSTPS supports the highest number of fly ash factories, some of which have been functioning for 25 years. If the plant shuts down, the cost of production will increase as factory owners will have to procure fly ash from distant sources such as Chhabra and Tawai. The use of alternative materials such as cement was also reported to be unviable.

## 4.4 KSTPS Workforce

### 4.4.1. Permanent Technical Workers

A key representative of the plant's permanent workers' union shared that there has been immense pressure from the government to close down four of the plant's seven units due to their age.<sup>11</sup> However, workers have been continuously agitating to prevent the closure of the plant units.

Concerns regarding the gradual reduction of permanent technical workmen were shared, with the number being reduced to 240 permanent workers at the time of consultation. There have been no recruitment drives at the plant since 1997 and some requirements were met via the transfer of workmen from Chhabra, Suratgarh, and other plants under a one-time transfer policy.

The majority of the workers at the plant were reported to be contractual. Among permanent employees, the strength of engineers and other officials was reported to be higher than technical workers. In the event of the closure of four units, the engineers shall be transferred to other plants, and the technical workmen shall be adjusted within the functional units of KSTPS. It was highlighted that over a thousand contractual

workers and their families shall bear the chief brunt of the closure of KSTPS units.

Some of the key demands of the technical workers concern delays in the remittance of overtime remuneration, reduced incentives for workers, and payment of conveyance allowance. At the time of consultation, the workmen claimed that RRVUNL was yet to adopt the Rajasthan Government Health Scheme,<sup>12</sup> although the company was expected to implement the same in the near future. The need for better and more exhaustive on-the-job training for existing employees was also expressed.

### 4.4.2. KSTPS Officials

The KSTPS officials consulted as part of the research work displayed strong reservations against the repurposing of the thermal plant, citing its good performance and significant residual life of approximately 1.5 to 2.0 lac hours.<sup>13</sup> The general perception of the officials strongly favours the continued operation of its units beyond the current retirement plan. Moreover, the officials expressed little concern regarding their employment security citing that they shall either be absorbed in other existing thermal plants or new plants constructed in future.

The collection of voices associated with KSTPS as discussed in the previous sections represents (in a minimal manner) views and perspectives toward the plausible closure of KSTPS. It is important to note that perspectives in such instances are influenced by individuals' historical relationships with the institution and vested interests. The concerned voices are likely to oppose the closure or repurposing of any unit of KSTPS or at least advocate for replacement by suitable capacity.

---

11. Presently, the closure of the four units is moved to 2027.

12. RGHS is a beneficial health insurance plan for beneficiary category, including Ministers, MLAs, ex-MLAs, All India Services, Serving and Retired employees of State Government and of State Autonomous Bodies. All RGHS beneficiaries will have access to the cashless medical facility based on the Central Government Health Scheme (CGHS) package rates as per the applicable medical rules for the respective RGHS category. (RGHS)

13. Based on internal residual life assessment study.

## 5. Conclusion



Beyond powering Rajasthan, Kota Super Thermal Power Station has played a unique and significant role in shaping the economy of Kota city. The city has expanded significantly in the last four decades, becoming an economic powerhouse, and the ecosystems in the vicinity of the thermal plant are deeply linked to it. This includes many industries, service providers, small entrepreneurs and labourers. The thermal power plant shapes a strong local political economy that advocates and facilitates its preservation. Hence, the closure of any unit(s) is likely to manifest as a politically sensitive subject, with negative spillover effects compounding local challenges.

The capability and resilience of a worker to deal with the impact of loss of livelihood is a function of their basic capital – economic, human, social and political. Similarly, a worker is exposed to intersectional vulnerabilities of caste, class, and gender. The observations that surfaced during this qualitative research highlight how intersectionality affects workers of thermal power plants. Therefore, interventions for ‘just transition’ must take cognizance of and be sensitive towards the intersectional vulnerabilities of TPP workers.

The stakeholders and agencies associated with KSTPS appear seemingly reluctant to acknowledge that sooner or later the closure of the plant is inevitable. This report doesn’t advocate for early closure of the thermal plants, nor attempts to provide any timeline for the same. The aim of the report is to highlight

the profound and possibly drastic implications for many families and agencies due to any sudden and unplanned closure of a thermal plant or any of its units. In addition, the redeployment of labour and capital in sectors and firms allied with KSTPS has to be factored in as well.

Finally, this work seeks to advocate a pathway for a ‘just energy transition’. Towards this objective, it does not articulate binary solutions and seeks to develop a meaningful understanding of the deep impact of the energy transition. However, the broad pathways emerging from the work that may guide a just transition in the sector are discussed as follows.

#### ■ Dialogue and Consensus Building

Despite the continuous advocacy from various sections for continued operations of KSTPS, its closure is an eventuality that cannot be denied. This has implications for Rajasthan’s energy security, Kota’s economy and associated stakeholders. A transformative approach towards transition planning and management that mitigates risks and leverages opportunities is certainly desired. However, a transformative just transition shall not be feasible without a broader engagement and consensus at the policy level, firm level and community level.

#### ■ Impact Assessment

The report attempts to highlight the risks associated with the transition away from coal in the power generation sector.

*Image Description: Team CEEP in discussion with the representatives of Rajasthan Vidyut Utpadan Workers Union, Kota*



However, especially for disadvantaged worker groups, the actual transition journey is likely to be far more complex. Many threats and risks are difficult to envisage for external observers and experts until such time that their implications manifest in reality.<sup>14</sup> Ensuring (recognition) justice for impacted groups in the course of transition shall require a comprehensive, interdisciplinary and participatory effort to develop a meaningful understanding of transition complexities and explore pathways for a just energy transition.

- **Representation and Inclusion**

The decision for closure of a thermal power plant largely rests with the (Central or State) government and the concerned electricity generation company. Existing governance constraints, reduce the feasibility of direct engagement between concerned authorities and impacted stakeholders in the decision-making on the fate of the thermal plant. However, it is pertinent to recognise that the exclusion of the concerned groups from transition risk management goes against the principle of ‘procedural justice’. For meaningful and inclusive participation, policy and firm-level interventions may be required to include contractual workers and other associated disadvantaged, low-income workers and service providers.

- **Building Safeguards and Strengthening Social Security**

India has several social security mechanisms that are implemented by the State Government and Central Government. This includes the guaranteed rights to health, education, food, and income security schemes for the vulnerable sections. The schemes are broadly classified as a.) labour and employment, b.) pension, c.) skill development, d.) women and child development, e.) social justice and empowerment, and f.) special schemes. While many of these welfare programmes and schemes can be aligned to facilitate a just transition, anecdotal information suggests that much needs to be done to improve access and efficacy of the programmes. This is particularly observed in the implementation of Employee State Insurance (ESI) and

Employee Provident Fund (EPF) for contractual workers.

- **Leveraging Transition Opportunities**

The transition away from coal is a likely eventuality that offers various new opportunities along with challenges, a few of which are discussed earlier. Concerted efforts and planning are key for facilitating the exploration and uptake of localised opportunities which will have important implications for the redeployment of local capital. However, such opportunities, including repurposing of a thermal power plant to serve clean energy goals and facilitating alternative economic opportunities are critical decisions that shall require broader consensus, socio-economic evaluation, and mobilisation of finance. Further, new opportunities may be leveraged through comprehensive firm-level (RRVUNL) planning. Reskilling and upskilling the existing workforce may also facilitate human resource adequacy for powering the energy transition. Consequently, opportunities may be leveraged in the domain of repurposing of thermal plants, repurposing, clean energy technologies or other local economic opportunities. The energy transition is unlikely to create sufficient local opportunities to replace jobs and livelihoods displaced by transitioning away from coal. Hence, broader interventions for creating livelihoods and social security are important.

- **Responsible Governance**

Just energy transition shall require broad deliberations on how different stakeholders, including the Government, navigate energy transition. Therefore, mechanisms for building consensus, mediating conflicts, making decisions, and arriving at collectively recognized principles and values (including rights) and procedures are categorically vital for a just transition. A coordinated effort shall be required between the State, the firm (power generation company) local capital, trade unions and civil society. Consequently, the distribution of roles, along with transparency and accountability shall be critical. Principles and elements of transition justice may also be integrated with the corporate governance policy of power generation companies and associated industries.

---

<sup>14</sup> As scholars and authors of this report, we humbly acknowledge the many limitations of the report toward providing an exhaustive understanding of energy transition impact and the vulnerabilities of various groups.

# References

- Bourdieu, P. 1986. "The Forms of Capital." *In Handbook of Theory and Research for the Sociology of Education*, by J. Richardson (ed). New Yor: Greenwood.
- Sen, Amartya. 1997. "Human Capital and Human Capability ." *World Development 1959-1961*.
- Schuller, Tom. 2001. "The Complementary Roles of Human and Social Capital." *www.oecd.org*. Accessed July 12, 2022. <https://www.oecd.org/innovation/research/1825424.pdf>.
- Coleman, James S. 2000. "Social capital in the creation of human capital." *In Social Capital, A Multifaceted Perspective*, by Ismail Serageldin (eds.) Partha Dasgupta. The World Bank .
- Schugurensky, Daniel. 2000. "Citizenship Learning and Democratic Engagement: Political Capital Revisited." Ontario Institute for Studies in Education, University of Ontario. 417-422.
- Reserve Bank of India. 2008. "Publications." 04 Septmber. Accessed August 1, 2022. <https://www.rbi.org.in/scripts/PublicationsView.aspx?id=10494>.
- Khanna, Madhulika, and Shruti Majumdar. 2020. "Caste-ing wider nets of credit: A mixed methods analysis of informal lending and caste relations in Bihar." *World Development Perspectives 100265*.
- Shah, Dharmesh, and Shweta Narayan. 2020. *Coal Ash in India, A Compendium of Disasters, Environmental and Health Risks*. Health Energy Initiative.
- Schlosberg, David. 2014. "Climate Justice and Capabilities: A Framework for Adaptation Policy." *Ethics & International Affairs* 445-461.
- Routh, Supriya. 2014. *Enhancing Capabilities through Labour Law: Informal Workers in India*. London & New York: Routledge Taylor & Francis Group.
- Sen, Amartya. 2005. "Development as Capability Expansion." *In Readings in human development: Concepts, Measures and Policies for a Development Paradigm*, by Fukuda Parr Sakiko and Shiva Kumar A.K. OUP India.
- Robeyns, Ingrid. 2005. "Selecting Capabilities for Quality of Life Measurement ." *Social Indicators Research* 191 - 215.
- Sen, Amartya. 1979. *Equality of What?* . Stanford, 22 May.
- . 1999. *Development as Freedom*. Oxford University Press.
- PIB. 2022. "India's Stand at COP-26." *pib.gov.in*. 03 February. Accessed September 06, 2022. <https://pib.gov.in/PressReleasePage.aspx?PRID=1795071>.
- CEA. 2018. "National Electricity Plan ." *cea.nic.in*. January. Accessed September 06, 2022. [https://cea.nic.in/wp-content/uploads/2020/04/nep\\_jan\\_2018.pdf](https://cea.nic.in/wp-content/uploads/2020/04/nep_jan_2018.pdf).
- MoP. 2022. "Power Sector at a Glance." *powermin.gov.in*. 30 June. Accessed September 06, 2022. <https://powermin.gov.in/en/content/power-sector-glance-all-india>.

- Times of India . 2021. “Rajasthan government not to phase out Kota thermal plant’s two units.” <https://timesofindia.indiatimes.com>. 29 June . Accessed September 06, 2022. “Utilisation of Flyash from Coal or Lignite Based Thermal Power Plants.” *environment.rajasthan.gov.in*. 14 September . Accessed September 06, 2022. [https://environment.rajasthan.gov.in/content/dam/environment/Env/Notification/notification\\_14091999.pdf](https://environment.rajasthan.gov.in/content/dam/environment/Env/Notification/notification_14091999.pdf).
- MoEFCC. 2016. “Ministry of Environment, Forest and Climate Change Notification.” *parivesh.nic.in*. 25 January. Accessed September 6, 2022. <https://parivesh.nic.in/writereaddata/ENV/HSM/note7.pdf>.
- CPCB. 2016. “Environmental Regulations.” *cpcb.nic.in*. Accessed September 6, 2022. [https://cpcb.nic.in/uploads/Thermal\\_Power\\_Plant\\_overview.pdf](https://cpcb.nic.in/uploads/Thermal_Power_Plant_overview.pdf).
- IEA . 2021. “India Energy Outlook 2021.” *iea.blob.core.windows.net*. Accessed September 07, 2022. [https://iea.blob.core.windows.net/assets/1de6d91e-e23f-4e02-b1fb-51fdd6283b22/India\\_Energy\\_Outlook\\_2021.pdf](https://iea.blob.core.windows.net/assets/1de6d91e-e23f-4e02-b1fb-51fdd6283b22/India_Energy_Outlook_2021.pdf)
- Luo, Tinayi, Deepak Krishnan, and Shreyan Sen. 2018. *Parched Power: Water Demands, Risks, and Opportunities for India’s Power Sector*. Working Paper, World Resources Institute.
2015. “Paris Agreement.” [https://unfccc.int/sites/default/files/english\\_paris\\_agreement.pdf](https://unfccc.int/sites/default/files/english_paris_agreement.pdf)
- Glasgow Climate Pact . 2021. “Decision -/CP.26.” [https://unfccc.int/sites/default/files/resource/cop26\\_auv\\_2f\\_cover\\_decision.pdf](https://unfccc.int/sites/default/files/resource/cop26_auv_2f_cover_decision.pdf)
- Data obtained by CEEP’s research team from RRVUNL under the Right to Information Act, 2005
- Nussbaum, Martha C. 2011. *Creating Capabilities: The Human Development Approach*. Harvard University Press.
- Gopal, Dr. Brij, Manohar S Rathore, and Dr. R. Dalwani. n.d. “Benchmarking the Water Resources & Developing Siting Criteria for Establishment of Industrial Areas and Water Intensive Units.”
- NGT . 2019. *Report on implementation of action plan to achieve 100% fly ash utilisation by the Thermal Power Plants (TPPs)*. Report on Implementation of Norms, National Green Tribunal.
- Gopal, Dr. Brij, Manodar S. Rathore, and Dr. R Dalwani. 2020. *Benchmarking the Water Resources & Developing Siting Criteria for Establishment of Industrial Areas and Water Intensive Units*. Benchmarking Analysis (forthcoming publication, copy available with the authors), National Institute of Ecology.
- Omar, Md Abdullah, and Kazuo Inaba. 2020. “Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis.” *Journal of Economic Structures* 2.
- UN HABITAT. 2015. “HABITAT III ISSUE PAPERS.” [www.habitat3.org](http://www.habitat3.org). Accessed March 28, 2023. [https://habitat3.org/wp-content/uploads/Habitat-III-Issue-Paper-22\\_Informal-Settlements-2.0.pdf](https://habitat3.org/wp-content/uploads/Habitat-III-Issue-Paper-22_Informal-Settlements-2.0.pdf).
- Dsouza, Swati, and Kavya Singhal. 2021. *Socio-economic impacts of coal transitions in India: Bottom-up analysis of jobs in coal and coal-consuming industries*. New Delhi: National Foundation of India.
- Pai, Sandeep. 2021. “Fossil Fuel Phase Outs to Meet Global Climate Targets: Investigating the Spatial and Temporal Dimensions of Just Transitions.” Vancouver, June.
- Bhushan, Chandra, Mandvi Singh, and Yukti Chaudhary. 2022. *Just Transition of Coal-Based Power Plants in India. Policy Report*,

New Delhi: Sustainability Innovation and Advisories Private Limited.

Williams, Stephen, and Andreeanne Doyon. 2019. “Justice in energy transitions.” *Environmental Innovation and Societal Transitions*.

Biswas, Anna. 2022. *Just transition: Leaving no one behind*. 4 March.

UNFCCC. n.d. *United Nations Climate Action*. <https://www.un.org/en/climatechange/net-zero-coalition>.

Paris Agreement. 2015. “[https://cea.nic.in/wp-content/uploads/pdm/2021/06/list\\_power\\_stations\\_2021.pdf](https://cea.nic.in/wp-content/uploads/pdm/2021/06/list_power_stations_2021.pdf)”

Sharma, Anjali, and Rangan Banerjee. 2021. “Framework to analyze the spatial distribution of the labour impacts of clean energy transitions.” *Energy Policy* 112158.

CEA. 2021. “List of Thermal Power Stations As on 31.03.2021.” [https://cea.nic.in/wp-content/uploads/pdm/2021/06/list\\_power\\_stations\\_2021.pdf](https://cea.nic.in/wp-content/uploads/pdm/2021/06/list_power_stations_2021.pdf)

RGHS. n.d. *Rajasthan Government Health Scheme*. Accessed March 24, 2023. <https://rghs.rajasthan.gov.in/RGHS/home/>.

Ministry of Environment, Forest and Climate Change. 2022. “Commitments made under CoP 26.” pib.gov.in. 12 December. <https://pib.gov.in/PressReleasePage.aspx?PRID=1882840>.

Government of India . 2022. “India’s Updated First Nationally Determined Contribution Under Paris Agreement.” *unfccc.int*. August. <https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf>.

Chaliawala, Nehal. 2022. *Many India Inc majors may be Net-Zero by 2050*. New Delhi, 17 October.

Ministry of Coal. n.d. *About Sustainable Division*. Accessed August 24, 2023. <https://coal.nic.in/en/sustainable-development-cell/about-sdc>.

Bhushan, Chandra, and Srestha Banerjee. 2023. “Five R’s A cross-sectoral landscape of Just Transition in India.”

Banerjee, Srestha, Chinmayi Shalya, and Diana Ann Joseph. 2022. “Korba Planning a Just Transition for India’s Biggest Coal and Power District.” New Delhi.

Ministry of Power. 2023. *Phasing out of coal-based thermal power plants and adoption of super-critical technologies in thermal power plants*. New Delhi, 10 August.

CEA. 2023. *National Electricity Plan* . Electricity Plan, New Delhi: The Gazette of India.

The World Bank. 2021. *Coal Plant Repurposing for Ageing Coal Fleets in Developing Countries*. Technical Report, Washington: The World Bank.

RRVUNL. n.d. “Kota Super Thermal Power Station.” *energy.rajasthan.gov.in*. Accessed September 06, 2022. <http://103.122.36.131/content/raj/energy-department/en/departments/rvunl/our-plant/thermal/ktps.html>

RRVUNL. 2020-21. “Annual Report.”

# Annexures

Annexure 1: List of cement industries dependent on KSTPS' fly ash

Unit Number	Industry utilising KSTPS' fly ash
Unit 1	Associated Cement Company Limited
Unit 2	Associated Cement Company Limited
Unit 3	Birla Cement Works Limited
Unit 4	Grasim Industries Limited
Unit 5	Grasim Industries Limited
Unit 6	Mangalam Cement Limited, Shree Cement Limited
Unit 7	Grasim Industries Limited, Shree Cement Limited

Annexure 2: The number of different categories of contractual workers at KSTPS as on 31.03.2022

S.No.	Circle/ Department	Category				Total
		Highly-skilled/ other	Skilled	Semi-skilled	Unskilled	
1	SE (Opr.)	7	69	16	27	119
2	Se (C&I.M)	25	31	36	-	92
3	Se (TM)	11	21	08	28	68
4	SE (CHP-Opr.)	50	43	125	148	366
5	Sr. Chemist	12	11	-	29	52
6	Xen (Fire Fighting)	13	44	01	16	74
7	SE (Comml.)	01	01	01	01	04
8	P&A	-	03	04	11	18
9	SE (BM)	04	70	44	96	214
10	SE (Civil)	03	19	11	146	179
11	SE (CAM - AHPM)	50	85	64	61	260
12	XEn (C&P)	-	-	-	44	44
13	SE (CHP - Mtc & Rly)	82	79	65	40	266
14	XEn (O&M-Stores)	14	2	17	5	38
15	SE (EM)	44	102	49	23	218
	<b>Total</b>	<b>316</b>	<b>580</b>	<b>441</b>	<b>675</b>	<b>2012</b>



### Annexure 3: List of stakeholders consulted for the purpose of this report

#### Annexure 3.1: List of identified residential localities of KSTPS contractual workers

- Nanta (Badla)
- Chambal Colony
- Bapu Nagar
- Bhil Basti
- Balita
- Riddhi Siddhi Colony
- Housing Board Colony
- Naga Kheda
- Sinta
- Kunhadi
- Sakatpura

Among these, Chambal Colony, Sakatpura, Bhil Basti, and Nanta (Badla) were selected for our research, based on the high concentration of contractual workers in these areas.

#### Annexure 3.2: List of respondents from government agencies and departments

Department/Board	Number of public officials interviewed
KSTPS (Chief Engineers, Executive Engineers, Assistant Engineers, Secretary of Cooperative Society)	6
District Collector and his Accounts Officer	2
EPF Commissioner	1
Labour Inspector, Kota	1
Additional Labour Commissioner, Joint Labour Commissioner	2
State Pollution Control Board Office, Kota	2
Public Healthcare Centre, Nanta	2
ESI Dispensary, KSTPS	2
ESI Hospital, Kota	1
Public Healthcare Centre, Sakatpura	1

#### Annexure 3.3: List of respondents from the fly ash and cement industry

Category of respondents	Number of respondents
Fly ash brick unit owners	3
Labour Contractor of fly ash brick units	1
Chairperson, Fly Ash Brick Industry Association	1
Cement industry employees at KSTPS silos	2

#### Annexure 3.4: List of respondents from KSTPS' contractual workforce and women representatives from households of contractual workers in selected localities

Location of interviews	Number of male respondents	Number of female respondents
KSTPS coal handling site	10	
KSTPS boiler & generator sites	6	
KSTPS switch-gear site	4	
KSTPS fire department	1	
KSTPS fly ash silo	1	
Chambal colony	9	6
Sakatpura	3	4
Bhil Basti	4	4
Hanuman Basti		
Nanta (Badla)		2

#### Annexure 3.5: List of respondents from contractual workers of the fly ash industry

Category of respondents	Number of male respondents	Number of female respondents
Fly ash unit workers	4	9
Fly ash transport operators	5	

## Annexure 3.6: List of informal workers interviewed

Category of respondents	Location	Number of respondents
Tea stall owners	Cluster of shops at the KSTPS main gate	2
Tailor	Cluster of shops at the KSTPS main gate	1
Barber	Cluster of shops at the KSTPS main gate	1
Dairy owners	Nanta	2

## Annexure 4: Cases recorded in the ESI dispensary no. 1, Kota, from 2016 to 2020 of insured persons and their families

S.No.	Name of the disease	Year-wise data of insured persons					Year-wise data of families				
		2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
1	Diarrhoea and gastro-enteritis of presumed infectious origin	60	209	170	136	154	130	305	279	231	294
2	Other intestinal infectious diseases		11	0	2	0				7	0
3	Other viral hepatitis		2	0	1	8					
4	Mumps								1	1	4
5	Other viral diseases				1	0					
6	Hookworm diseases			1					6		
7	Other helminthiases	9	1	3	3	1	4	4	26	14	12
8	Malignant neoplasm of colon	51	9	0	0	0	29	11	0	0	0
9	Malignant neoplasm of recto sigmoid junction, rectum, anus and anal canal				6	0				5	0
10	Malignant neoplasms of mesothelial and soft tissue								2	2	2
11	Malignant neoplasm of breast								1	5	16
12	Malignant neoplasm of cervix uteri								2	0	0
13	Other malignant neoplasms of male genital organs								2	0	0
14	Iron deficiency anaemia								2	0	0
15	Other anaemias	1046	279	199	128	116	1164	538	370	309	186
16	Other disorders of thyroid	18	11	14	3	10	65	41	31	20	38
17	Diabetes mellitus	119	86	88	53	24	117	98	133	137	93
18	Malnutrition				5	0					
19	Other mental and behavioural disorder				4	2				4	15

S.No.	Name of the disease	Year-wise data of insured persons					Year-wise data of families				
		2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
20	Epilepsy	1		2	0	0	5	13	6	0	2
21	Cerebral palsy and other paralytic syndromes	10	1	0	0	0	18	2	0	0	0
22	Other diseases of the nervous system	6	7	1	0	0	3	2	0	0	0
23	Other diseases of the eye and adnexa	137	68	104	86	83	71	46	72	67	55
24	Other diseases of the ear and mastoid process	57	34	47	50	31	47	41	28	28	36
25	Chronic rheumatic heart disease		29	0	4	16					
26	Essential (primary) hypertension	315	246	189	167	152	358	272	204	163	141
27	Other heart diseases	46	46	50	44	27	18	16	13	13	14
28	Intracranial haemorrhage										5
29	Phlebitis, thrombophlebitis, venous embolism and thrombosis					6					4
30	Varicose veins of lower extremities		6	22	18	1		5	38	3	0
31	Haemorrhoids	54	46	34	62	48	41	22	29	39	24
32	Acute pharyngitis and acute tonsillitis				3	2				1	1
33	Other acute upper respiratory infections	1955	2185	1649	1425	1530	2016	2401	1593	1207	1143
34	Influenza							9	0	0	0
35	Acute bronchitis and acute bronchiolitis			4	9	18		1	6	9	35
36	Chronic disease of tonsils and adenoids		2	0	0	0					
37	Bronchitis, emphysema and other chronic obstructive pulmonary diseases		3	0	0	0					
38	Asthma	86	46	55	36	37	111	80	61	35	34
39	Dental caries	216	57	37	28	30	130	37	29	17	14
40	Other disorders of teeth and supporting structures		53	7	0	0		18	0	0	0
41	Other diseases of the oral cavity, salivary glands and jaws	12					12				
42	Gastric and duodenal ulcer							54	0	0	0
43	Gastritis and duodenitis	623	522	553	526	369	383	437	333	321	182
44	Other diseases of oesophagus, stomach and duodenum						1				

S.No.	Name of the disease	Year-wise data of insured persons					Year-wise data of families				
		2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
45	Diseases of appendix			1	0	0					
46	Other hernia	6	10	17	1	1		2	1	2	2
47	Other diseases of liver							1	0	0	0
48	Acute pancreatitis and other diseases of the pancreas							60	0	0	0
49	Other diseases of the digestive system							55	0	0	0
50	Infections of the skin and subcutaneous tissue	1204	750	762	553	615	976	592	586	491	385
51	Other diseases of the skin and subcutaneous tissue		65	0	109	0					
52	Arthrosis	55					14				
53	Other disorders of joints	384	201	268	240	231	215	143	104	136	137
54	Cervical and other intervertebral disk disorders									1	0
55	Soft tissue disorders	1						1	7	0	0
56	Disorders of bone density and structure	279	454	432	397	447	304	416	346	246	195
57	Osteomyelitis	20									
58	Other glomerular diseases				2	0				2	7
59	Urolithiasis						3				
60	Other diseases of the urinary system	15	11	57	36	18	30	19	55	37	29
61	Hyperplasia of prostate	2		13	6	9	4		4	5	0
62	Other disorders of prostate				1	2					
63	Redundant prepuce, phimosis and paraphimosis			1	0	0					
64	Other diseases of male genital organs								2	0	0
65	Inflammatory disease of cervix uteri							2	0	0	0
66	Other inflammatory diseases of female pelvic organ	12	8	6	1	0	87	88	115	82	66
67	Female genital prolapse				39	0		23	0	0	0
68	Other disorders of genito-urinary tract	20	5	0	0	0	30	19	0	0	0
69	Other pregnancies with abortive outcome	14	2	2	3	2	206	50	55	108	37
70	Oedema, proteinuria and hypertensive disorders in pregnancy, childbirth and the puerperium							7	14	0	0

S.No.	Name of the disease	Year-wise data of insured persons					Year-wise data of families				
		2020	2019	2018	2017	2016	2020	2019	2018	2017	2016
71	Single spontaneous delivery					1					
72	Other congenital malformations of the nervous system			3							
73	Abdominal and pelvic pain	49					107				7
74	Fever of unknown origins	237	174	206	206	139	308	273	317	323	141
75	Fractures of other limb bones	15	14	3	11	0	11				
76	Fractures involving multiple body regions	40	75	34	28	37	13	26	3	8	2
77	Dislocations, sprains and strains of specified and multiple body regions		8	0	0	0					
78	Intracranial injury				6	15				3	1
79	Injury of other internal organs									1	0
80	Other injuries of specified, unspecified and multiple body regions	258	262	264	340	270	165	208	183	229	108
81	Effects of foreign body entering through natural orifice		1	0	0	0					
82	Burns and corrosions	24	13	14	21	19	15	9	7	8	6
83	Poisoning by drugs and biological substances				1	0			1	1	0
84	Toxic effects of substances chiefly nonmedicinal as source		3	6	8	8	1		3	7	2
85	Other and unspecified effects of external causes	3		5	1	3			5	8	4
86	Persons encountering health services for other reasons	0		1	0	0	0				
	<b>Total</b>	<b>7459</b>	<b>6015</b>	<b>5324</b>	<b>4810</b>	<b>4482</b>	<b>7212</b>	<b>6447</b>	<b>5075</b>	<b>4336</b>	<b>3479</b>



CENTRE FOR ENERGY, ENVIRONMENT & PEOPLE

II Floor, Plot 15, Usha Colony, Calgary Road,  
Malviya Nagar, Jaipur, Rajasthan – 302017

Email: [ceep@ceep.co.in](mailto:ceep@ceep.co.in),

Website: <https://www.ceep.co.in>