Indo-German Energy Forum

On behalf of:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

# COVID-19 and a Just Transition in India's Coal Mining Sector

Study by:

SAIS JOHNS HOPKINS SCHOOL of ADVANCED INTERNATIONAL STUDIES

ISEP

# Imprint

**Commissioned on behalf of**
Federal Ministry for Economic Affairs and Energy (BMWi), Govt. of Germany

**Commissioned by**
Indo-German Energy Forum Support Office (IGEF-SO) and
c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
1st Floor, B-5/2 Safdarjung Enclave
110029 New Delhi, India
Email: info@energyforum.in
Website: www.energyforum.in
Tel.: +91 11 4949 5353

**Responsible**
Tobias Winter, GIZ GmbH

**Authors**
Prof. Johannes Urpelainen
Prince Sultan bin Abdulaziz Professor of Energy, Resources and
Environment, Johns Hopkins SAIS
sais-isep@jhu.edu

Setu Pelz
PhD candidate, Reiner Lemoine Institute, Berlin

**Advisors/Reviewers**
Sandeep Pai
Michaël Aklin
Brian Blankenship
Noah Zucker
Christoffer Brick

**Content**
This short report discusses the uncertainties within the coal mining sector in India following the COVID 19 pandemic, highlighting the importance of a just transition for coal mining communities. It provides policy recommendations for new directions in public finance within and outside the energy sector to support job creation and industrial development against the backdrop of an increasingly uncertain coal value chain.

**About ISEP**
The Initiative for Sustainable Energy Policy (ISEP) is an interdisciplinary research program that uses cutting-edge social and behavioral science to design, test, and implement better energy policies in emerging economies. Hosted at the Johns Hopkins School of Advanced International Studies (SAIS), ISEP identifies opportunities for policy reforms that allow emerging economies to achieve human development at minimal economic and environmental costs. The initiative pursues such opportunities both pro-actively, with continuous policy innovation and bold ideas, and by responding to policymakers' demands and needs in sustained engagement and dialogue.

**Version:** 1.4, August 2020
**Design and Layout:** Aspire Design

# Key Findings

1. Although coal mining will play an important role in India for many years to come, the sector's growth prospects are limited and planning for a just transition should start as early as possible.
2. Government of India and State Governments in coal-dependent areas should design a green stimulus program that gradually shifts public finance away from the coal value chain and toward renewable energy and new industries.
3. Public Sector Undertakings (PSUs) should be used to create job opportunities in coal-dependent states.
4. A regional hub strategy should be embraced to enable job creation and regional economic development in coal-dependent states.

# Executive Summary

The COVID 19 pandemic hit India hard in early 2020, with negative GDP growth and a surge in unemployment. In the energy sector, coal fired power generation was already under pressure from overcapacity, low electricity demand growth, and increasingly competitive renewables. COVID 19 exposed coal's vulnerabilities to economic uncertainty, raising questions about the outlook for thermal power generation and coal mining sectors in the coming decade and beyond. The increased uncertainty could cause severe social and economic problems in India's coal -dependent states (Chhattisgarh, Jharkhand, Odisha, and to a lesser extent West Bengal and Madhya Pradesh). They have made limited progress in economic diversification, and millions of people depend on coal mining directly or indirectly for their livelihoods. A less dynamic coal mining sector would further exacerbate problems of unemployment and underemployment. To mitigate these uncertainties, a just transition away from coal dependence across India's coal belt is both prudent and necessary. Policy intervention must look to the future and focus on strengthening community resilience to economic shock through expanding access to alternative, sustainable livelihoods.

Addressing these difficulties requires recognizing new opportunities after the COVID-19 pandemic. With an uncertain outlook for coal and the need to stimulate the Indian economy without accumulating unsustainable public debt, new ideas are necessary. Although coal mining will play an important role in India for many years to come, the sector's growth prospects are limited and planning for a just transition should start as early as possible. Here a key opportunity is the global disruption in supply chains, which India should take advantage of to establish new industries and diversify its economy. At the national level, India can identify key sectors for new industry development to first satisfy domestic and later on global demand, spurring resilient economic growth. At state level, limited industrial capacity among India's coal -dependent states suggests that they will need support and investment in job creation through Public Sector Undertakings and Micro, Small, and Medium Enterprises.

Based on this analysis, Government of India and State Governments in coal-dependent areas can take several steps to effect a just transition:

1. Design a green stimulus program that gradually shifts public finance away from the coal value chain and toward renewable energy and new industries.
2. Use Public Sector Undertakings (PSUs) to create job opportunities in coal-dependent states.
3. Embrace a regional hub strategy to enable job creation and regional economic development in coal-dependent states.

# Index

# Introduction

The COVID-19 pandemic hit India hard in early 2020. Unemployment had risen to 26% by April 19th, and India's economic growth rate may turn negative for the 2021 financial year (Vyas, 2020; Ray, 2020). Despite a national lockdown imposed on March 24th, COVID-19 has continued to spread, with the daily count of new cases exceed 10,000 on June 12th.

In the Indian power sector, COVID-19 has exacerbated uncertainties in coal consumption growth estimates, leaving experts questioning whether the necessary capital will be available for the expansion of coal extraction and thermal power generation envisioned over the next 10 years. Already before the pandemic, coal-fired power generation struggled with overcapacity in an environment characterized by slower than expected electricity demand growth and intense competition from alternative energy sources, notably wind and solar power. With the COVID-19 shock adding to these uncertainties, both coal miners and those indirectly dependent on coal mining see their livelihoods under threat. Such loss of livelihoods in India's coal-dependent states would contribute to a prolonged economic recession and widespread human suffering. India has struggled with job creation, and coal mining communities have few obvious alternatives to offer.

This brief evaluates the impact of COVID-19 on the Indian coal mining sector and discusses the possibility of a just transition away from coal dependence over time. Here, a just transition away from coal dependence is defined as a diversification of available livelihoods away from coal mining without negatively impacting the rights and livelihoods of the workers in the coal value chain, from mining and transportation to power plants and industry. In India, a just transition must look beyond coal job replacement alone if it is to achieve a diverse and resilient economy providing access to alternative, sustainable livelihoods. This would require creating new jobs for millions of workers, including those who are soon to enter into a young and rapidly growing labor market. At this time, a worldwide pandemic recession and the risk of mounting public debt limit the options available to Government of India and State Governments.

The brief begins with an overview of the outlook for Indian coal mining and coal-fired power generation, with a particular emphasis on how this outlook has been affected by COVID-19. An analysis of the challenges and opportunities created by COVID-19 follows. While COVID-19 presents a serious challenge, the crisis opens a rare window of opportunity for India's policymakers to change course by directing public investment away from coal and toward renewable energy, sustainable livelihoods, and industries of the future.

The final section summarizes our three policy recommendations to reinvigorate the Indian economy while promoting low-carbon development and protecting rights and livelihoods in India's coal-dependent states.

# A Just Transition for Indian Coal Mining

The majority of India's coal consumption is in the power sector, where uncertainties in electricity demand growth due to the economic slowdown and strong competition from low cost renewables threaten thermal power shares. At the same time India's labor pool continues to grow, requiring rapid economic diversification and growth to provide decent jobs for all. As the transition towards a low carbon energy mix approaches, policy intervention targeting coal workers alone will not trigger the macroeconomic changes necessary for new industries to replace coal-dependent livelihoods. A just transition for coal dependent regions must be developed as part of a broader strategy to accelerate job creation for the vast and growing labor market across India.

India is a major producer and consumer of coal worldwide. Estimated coal reserves amounted to 319 billion tonnes in 2018 as shown in Table 1, making these the fifth largest in the world. The main enterprise exploiting these resources is Coal India Limited (CIL), a state-owned company that contributes to over 80% of the total national coal production. CIL was founded as a holding company in 1975, following nationalization of the coal industry in 1971. The Government of India owns 69.05% of CIL, while the remaining 30.95% is owned by members of the public.

*Table 1 - The details of state-wise geological resources of Coal (million tonnes), source: (Indian Bureau of Mines, 2019)*

| State | Proved | Indicated | Inferred | Total |
|---|---|---|---|---|
| **Total** | **148,787** | **139,164** | **31,069** | **319,020** |
| Jharkhand | 45,563 | 31,439 | 6,150 | 83,152 |
| Odisha | 37,391 | 34,165 | 7,739 | 79,295 |
| Chhattisgarh | 20,428 | 34,576 | 2,202 | 57,206 |
| West Bengal | 14,156 | 12,869 | 4,643 | 31,667 |
| Madhya Pradesh | 11,958 | 12,154 | 3,875 | 27,987 |
| Telangana | 10,475 | 8,576 | 2,651 | 21,702 |
| Maharashtra | 7,178 | 3,074 | 2,048 | 12,299 |
| Andhra Pradesh | - | 1,149 | 432 | 1,581 |
| Bihar | 161 | 813 | 392 | 1,367 |
| Uttar Pradesh | 884 | 178 | - | 1,062 |
| Meghalaya | 89 | 17 | 471 | 576 |
| Assam | 465 | 57 | 3 | 525 |
| Nagaland | 9 | - | 402 | 410 |
| Sikkim | - | 58 | 43 | 101 |
| Arunachal Pradesh | 31 | 40 | 19 | 90 |

Table 2 lists all CIL coal producing subsidiaries operating in distinct coal fields as well as the centralized exploration and planning subsidiary working across all of India. In addition, CIL has a foreign subsidiary in Mozambique, namely Coal India Africana Limitada (CIAL). The mines in Assam, i.e. North Eastern Coalfields, are managed directly by CIL.

*Table 2 - Structure of Coal India Limited Subsidiaries in India, source: (Coal India Limited, 2020)*

| **Planning and Exploration** | **Production Subsidiaries** | **States of Operation** | **2nd Tier Subsidiaries** |
|---|---|---|---|
| Central Mine Planning & Design Institute Limited (CMPDIL) | Mahanadi Coalfields Limited (MCL) | Odisha | MJSJ Coal Limited<br>MNH Shakti td<br>Mahanadi Basin Power Ltd<br>Neelanchal Power Transmission Company Private Ltd |
| | Eastern Coalfields Limited (ECL) | Jharkhand and West Bengal | |
| | Bharat Coking Coal Limited (BCCL) | Jharkhand and West Bengal | |
| | Central Coalfields Limited (CCL) | Jharkhand | Jharkhand Central Railway Ltd |
| | Western Coalfields Limited (WCL) | Maharashtra and Madhya Pradesh | |
| | South Eastern Coalfields Limited (SECL) | Chhattisgarh and Madhya Pradesh | Chhattisgarh East Railway Ltd (CERL) Chhattisgarh East- West Railway Ltd (CEWRL) |
| | Northern Coalfields Limited (NCL) | Madhya Pradesh and Uttar Pradesh | |

As a state owned enterprise, CIL operations are regulated under a series of policies and regulations ranging from coal pricing for the domestic market to employee welfare, land acquisition and environmental protection. A detailed description of all regulations and policies is provided in the appendices. A notable amendment to these regulations is the opening up of the coal sector to commercial coal mining in the Mineral Laws (Amendment) Act, 2020. This reflects a shift in direction for coal mining in India towards market liberalization.

Despite owning the fifth largest coal reserves in the world, India continues to import over 200 million tonnes of coal annually (Government of India, 2020). Table 3 and Figure 1 describe trends in coal production and consumption in India. National coal consumption grew by 350 million tonnes between 2007 8 and 2017 18. In response, coal reserves continue

to grow year on year through rapidly accelerating exploration activities controlled and operated by CMPDIL. In 2019 20, CMPDIL achieved 95% of their target exploration target, drilling 890,000 meters (Sengupta, 2020). Of the newly explored reserves, fully explored blocks are now set to be auctioned to commercial miners rather than operated by CIL subsidiaries. Quickening exploration and planned privatization of explored blocks reflects a shift in strategy towards maximizing coal availability in the market over the profitability of CIL mining subsidiaries. Nevertheless, international investor confidence in the Indian coal mining sector as well as the ability of enterprises other than CIL to manage complex political and bureaucratic processes associated with opening new coal mines in India remains uncertain (Carbon Copy, 2020).

*Table 3 – Domestic dispatches of coal by industries, (million tonnes) source: (Indian Bureau of Mines, 2019)*

| **Industry** | **2015-16** | **2016-17** | **2017-18** |
|---|---|---|---|
| **Total** | **632** | **646** | **688** |
| Electricity | 502 | 535 | 576 |
| Iron & Steel | 12 | 10 | 11 |
| Sponge iron | 8 | 6 | 9 |
| Fertilizer | 2 | 2 | 2 |
| Cement | 9 | 6 | 8 |
| Others | 99 | 87 | 82 |

Overall, the framing of coal mining in India as necessary to maintain the energy security of the country remains a central government narrative. This narrative is typically linked to a utilitarian argument for powering the economy and improving livelihoods of everyday Indians through access to coal powered electricity (Lahiri Dutt, 2016). Although coal is indeed the primary energy source in India, experts caution against the dichotomization of the energy mix between coal and renewable energies (RE), arguing that while RE has it's challenges, the generation cost has fallen below the variable fuel cost of coal power generation in several regions across India, especially in the south and west of the country (Tongia, 2018). Although realizing the transition and displacement from coal to renewable energy power generation is constrained by the capabilities of the national grid to, manage variable renewable energy (VRE) generation, displace daytime VRE generation to evening peaks with battery storage, and ensure safe operation of existing coal assets that cannot simply be turned on and off, the trends point towards coal demand in the Indian electricity sector peaking over the next decade (Spencer, et al., 2018). This suggests that while coal will likely remain crucial to India's growth in the coming decade, the government must establish forward thinking industrial and energy policy that prepares the Indian economy for the inevitable transition towards low carbon energy sources.

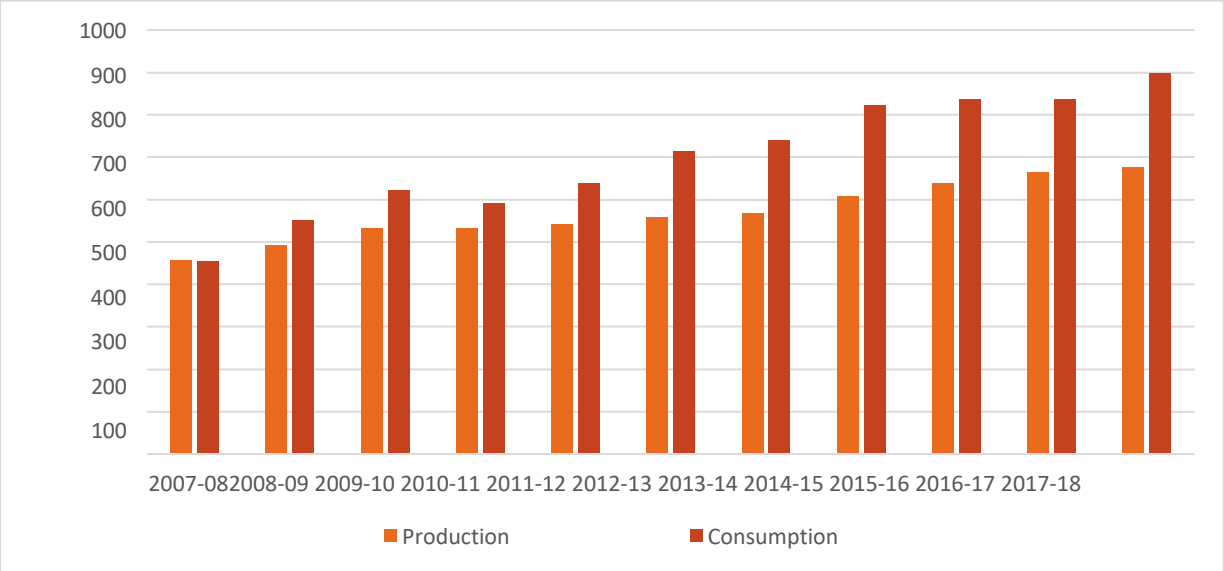


*Figure 1 - Coal production and consumption trends (million tonnes), source: (Government of India, 2020)*

As shown in Table 4, subsidies for the production of coal have remained relatively stable over the past five years, declining only marginally from approximately 15,660 crore INR to 15,456 crore INRE between financial years 2014 and 2019. In contrast, subsidies for renewable energy generation peaked at 15,313 crore INR in 2017, and dropped down to 9,930 crore INR in 2019, however these are expected to rise again based on recently announced policy measures (Garg, et al., 2020). Despite the current imbalance in state subsidies, the growing competitiveness of renewable energy and the increased salience of air pollution and climate change add pressure on coal mining jobs.

*Table 4 - Central government support (in INR crore), source: (Garg, et al., 2020)*

| **Energy Subsidy Type** | FY 14 | FY 15 | FY 16 | FY 17 | FY 18 | FY 19 |
|---|---|---|---|---|---|---|
| **Transmission & Distribution** | 41,252 | 51,525 | 63,604 | 70,378 | 78,448 | 79,671 |
| **Coal** | 15,660 | 15,834 | 14,855 | 16,003 | 13,875 | 15,456 |
| **Oil and Gas** | 158,482 | 88,471 | 51,147 | 40,762 | 47,662 | 67,679 |
| **Renewable Energy** | 3,224 | 4,851 | 8,748 | 15,313 | 13,769 | 9,930 |
| **Electric Vehicles** | 3.8 | 9 | 79 | 162 | 1,356 | 1,673 |
| **Total** | 218,622 | 160,691 | 138,433 | 142,619 | 155,110 | 174,408 |
| **Electricity Sector Bailout** | 1,500 | 400 | 92,113 | 74,228 | 20,154 | 10,177 |

Prior to the COVID 19 pandemic, Government electricity demand projections suggested that

India needed to almost double the installed power generation capacity from 344GW to 619GW between 2017 and 2027 (Spencer, et al., 2018). The absolute installed thermal power generation capacity was envisioned to increase 21% from 198GW to 238GW while the relative share of thermal power in the energy mix was to reduce from 57% to just 38%. Although these plans were based on pre COVID demand growth expectations, the notable drop in thermal power share was expected to be filled by expansion of renewable power generation. This reflects the continued drop in the levelized cost of electricity generation (LCOE) using ground mounted solar, which expected to fall from 2.87 INR/kWh to 2.3 INR/kWh between 2017 30 (Spencer, et al., 2018). Setting aside the need to recalibrate demand growth expectations, the price competitiveness of solar already applies pressure on coal jobs in two ways. Firstly, in most parts of India, the current ground mounted solar LCOE is below that of new coal power plants, threatening to displace these in favor of solar installations. Secondly, approximately half of the total installed coal power generation capacity generates at a variable fuel cost higher than 2.5 INR/kWh and is thus vulnerable to replacement with cheaper renewables (Spencer, et al., 2018). Finally, growing public concern around the social and economic costs of air pollution and climate change increases pressure to decarbonize the Indian economy (Garg, et al., 2020).

A key central Government argument for supporting the coal mining sector is the employment it generates in rural areas with limited alternatives. The coal mining sector provided just under 300,000 formal jobs through CIL and its subsidiaries in 2019 (Coal India Limited, 2019). The true extent of total coal employment in India, however, extends far beyond those jobs formally provided by CIL. Alongside formal CIL employees, approximately 200,000 people were estimated to be contracted by CIL through third party firms in 2014 (Lahiri Dutt, 2016). An estimated further 400,000 people earned their livelihoods through illegal subsistence coal mining across India's coalfields in 2014 (Lahiri Dutt, 2016). These subsistence coal miners work in small scale mines run by local leaders on land often bounding CIL mines. Subsistence coal miners do not receive any form of wage or social security guarantee, and often work in dangerous conditions outside of regulation and unionization. The coal mined by these workers is typically transported by cycle to warehouses or points of sale. In aggregate terms, across these three coal mining economies, over 1 million Indian workers are estimated to be directly reliant on coal mining for their livelihoods.

The Indian coal mining sector also generates a large employment multiplier. According to interviews with academic experts and executives in Coal India Limited and Central Coalfield Limited, every formal coal job generates anywhere between 3 10 additional jobs in the coal mining districts (Urpelainen, 2020). While this statistic inevitably carries a degree of uncertainty, it highlights that a transition from coal will not only impact those directly employed in the coal mining sector, but will also threaten the livelihoods of several million citizens indirectly benefiting from coal incomes across India's coal belt.

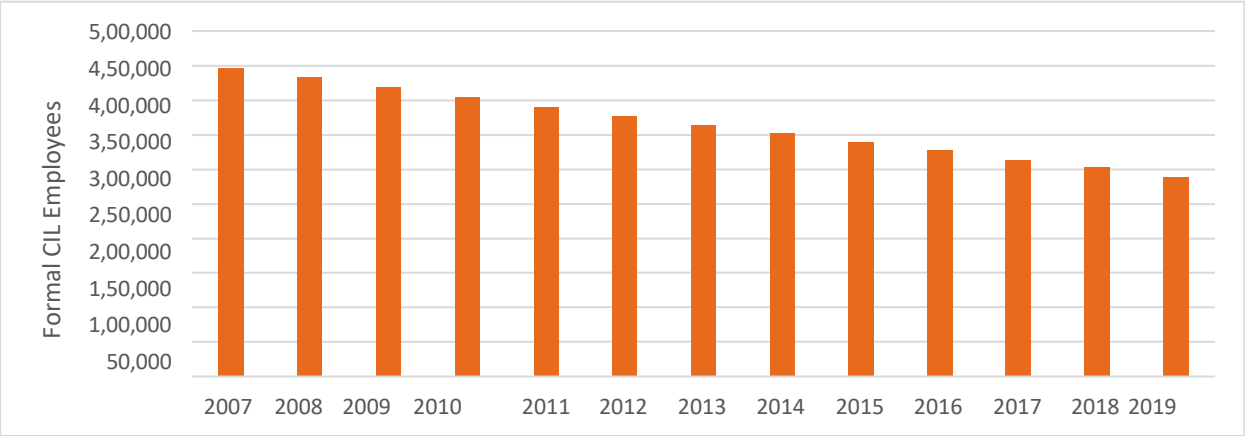


*Figure 2 - Formal CIL employees, sources: (Coal India Limited, 2018; Coal India Limited, 2013; Coal India Limited, 2019)*

While these numbers suggest that the coal mining sector is an important source of livelihoods in India's coal belt, trends shown in Figure 2 indicate that these jobs will become less important relative to the expected labor market growth over the next decade. Formal coal employment in India has decreased because of automatization and other efficiency improvements. Yet productivity still remains approximately half that of the global average (Spencer, et al., 2018). It is therefore expected that CIL employment rates will continue to fall in the coming 5 years as productivity increases. According to CIL estimates, from 2020 the number of annual retirees is expected to reach 10,000 against a maximum of 3,000 new jobs offered.

These trends suggest that the relative importance of coal mining jobs will lessen against the demand for decent work within India's young and growing labor pool. A just transition for coal workers in India must therefore be seen as a component of a broader strategy to develop rural industries that create new jobs rather than just replacing those livelihoods lost in the coal mining sector.

# COVID 19 as a Transition Accelerator

The COVID 19 pandemic and global economic downturn presents a new opportunity to meet India's economic challenges, especially in the states across India's coal belt. Firstly, it has highlighted the importance of livelihoods diversification in the face of increasing uncertainty in the coal mining sector. Secondly, it has created an immediate urgency to reinvigorate the economy without taking on excessive debt. This will require rethinking of existing government expenditures and fossil fuel subsidies towards job creation and social security. Thirdly, the global impact of the pandemic has created an opportunity for the development of new industrial and services sectors across India to meet both local and growing global demand as countries seek to strengthen vulnerable supply chains.

The COVID 19 pandemic and corresponding Government response has had severe implications on the Indian economy. A complete national lockdown was initiated on March 25th for an initial period of 21 days. Despite these measures, steadily climbing infection rates prompted the Government to extend this lockdown until May 3rd and once again to May 31st. This was extended once more on May 30th, stipulating a graduated lockdown framework, with specific containment zones locked down until June 30th.

As a result of these measures, some areas of India have suffered under a complete lockdown of over two months, affecting several sectors of the economy. At the same time, millions of informal and day labor workers have been forced to return to their rural homes under harsh conditions following job loss and resulting inability to cover city living expenses, despite government statements requiring that their jobs be retained. These hardships have also translated into reduced demand for electricity in urban centers, directly affecting thermal power profitability. Although electricity demand is trending upwards once more, following graduated lifting of the national lockdown, Figure 3 shows that average thermal power generation in May 2020 remained almost 20% below that in May 2019.

The unprecedented economic challenges brought about by the COVID 19 pandemic accelerate India's just transition processes for two distinct reasons. First, they increase uncertainty in coal demand projections and thermal power plant investment risk. Second, they exacerbate the severe job creation challenges facing the vast and growing labor market in the states across India's coal belt.

## 3.1 COVID 19 as a Transition Accelerator: Increased thermal power plant investment risks

The thermal power generation sector was already facing challenges in maintaining asset performance prior to the current economic downturn caused by the COVID 19 pandemic. Between 2000 and 2015, overall electricity demand in India grew year on year by a compound annual growth rate (CAGR) of 6.9% (Ali, 2018). At the same time, average thermal power generation plant load factors (PLF) peaked at 80% in 2008 09 and have dropped to 61% in 2017 18, largely due to the high cost of imported coal, lower than expected electricity demand, increased competition from renewables as well as payment challenges faced by struggling electricity distribution companies (Ali, 2018). Nevertheless, while coal remains the dominant source of electricity, the COVID 19 pandemic and resulting lockdown have

given glimpse of a future where cheaper renewables steadily erode the coal monopoly in India's electricity mix.

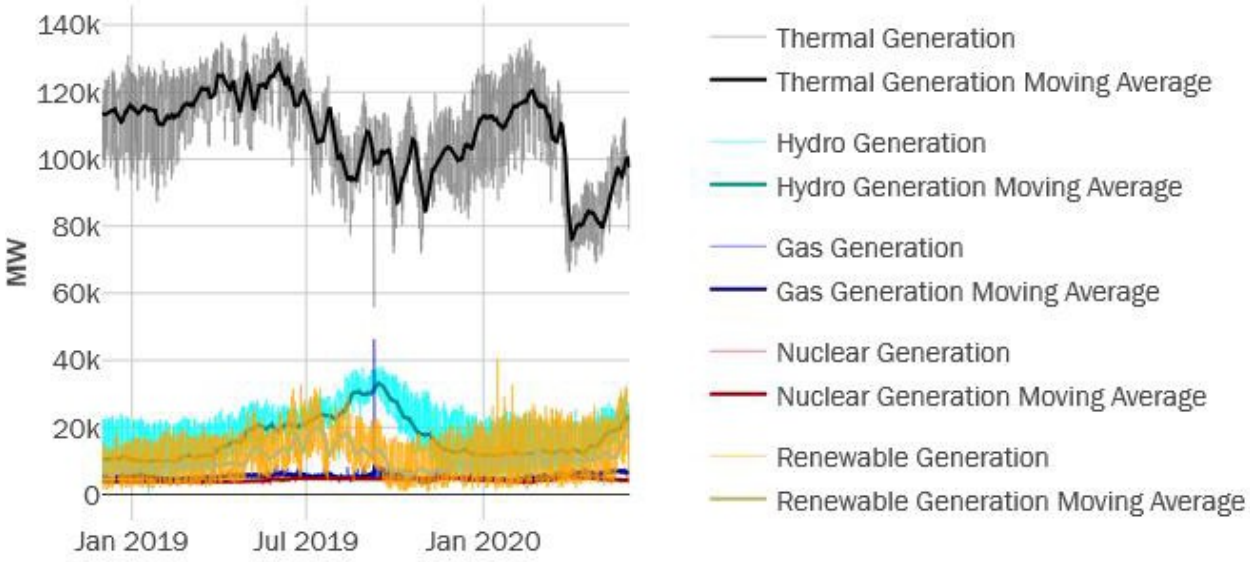


*Figure 3* – The Brookings India Electricity and Carbon Tracker, *December 2018 – May 2020, source: (Brookings India, 2020)*

Although the long term effects of the COVID 19 pandemic on thermal power generation shares remains speculative, the outlook has certainly worsened. Prior to the COVID 19 outbreak, modelling efforts indicated that electricity demand was expected to grow between 5.4% to 7.4% CAGR between 2015 30 (Ali, 2018). Industrial and residential consumers were predicted to remain the largest consumers of electricity in 2030, with the latter considered to carry the most uncertainty relating to their ability to diversify appliance stock through the purchase of energy intensive appliances such air conditioners (Ali, 2018). Considering the current economic situation, however, the uncertainty in electricity demand across all sectors has grown. Although this will affect both RE and thermal power generation, flatter demand growth within the industrial and residential sectors due to the economic downturn would most likely force more thermal power plants to run at even lower PLFs due to the must run regulations for RE in India. At the same time, although the RE industry also faces difficulties due to the supply chain disruptions between India and China, the shocks felt in the energy sector may have more lasting impacts on future thermal power investments than renewables as investors seek to reduce risk and look to cost competitive energy generation technologies in light of an uncertain demand trajectory.

This has implications for the Government's recently announced commercial coal auction initiative. Despite increasingly uncertain demand projections, the Government remains optimistic that India both needs to and can absorb aggressive expansion in coal production and thermal power generation (GoI, 2020). Previous coal auctions indicate, however, that investors may not be as confident. Although previous coal auctions were restricted to public sector undertakings (PSUs), the most recent auction in 2019 managed to find just 6 bids for a total of 27 offered coal blocks, though concentration of coal blocks in the west of India, far from demand in the east, as well as coal block quality was cited as a concern for investors

(IANS, 2020). The current coal auction also faces uncertainties due to proposed opening up of heavily forested coal blocks and associated environmental regulatory requirements (Nandi, 2020). It remains unclear whether firms other than PSUs will be willing and able to navigate and secure the necessary permits. Furthermore, the typical lead time of 3 4 years from auction to coal production will factor heavily into risk assessments as the economic slowdown takes hold.

### 3.2 COVID 19 as a Transition Accelerator: Increased urgency for decent job creation

Long term decent job creation remains a key challenge for Indian policy makers. New labor market entrants in the coal belt states of Andhra Pradesh, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, and Odisha are estimated to total 45 million by 2030 (Spencer, et al., 2018). Even if we just consider the male share of this population, which unfortunately continues to remain more likely to seek and gain employment in these states, 24 million new workers will need jobs between now and 2030. This vastly eclipses those livelihoods dependent on the coal mining sector in these states. The challenge is therefore not only to provide alternatives for those threatened by uncertainties in the coal mining sector, but to encourage macroeconomic shifts that will provide decent employment to the rapidly growing labor market as a whole.

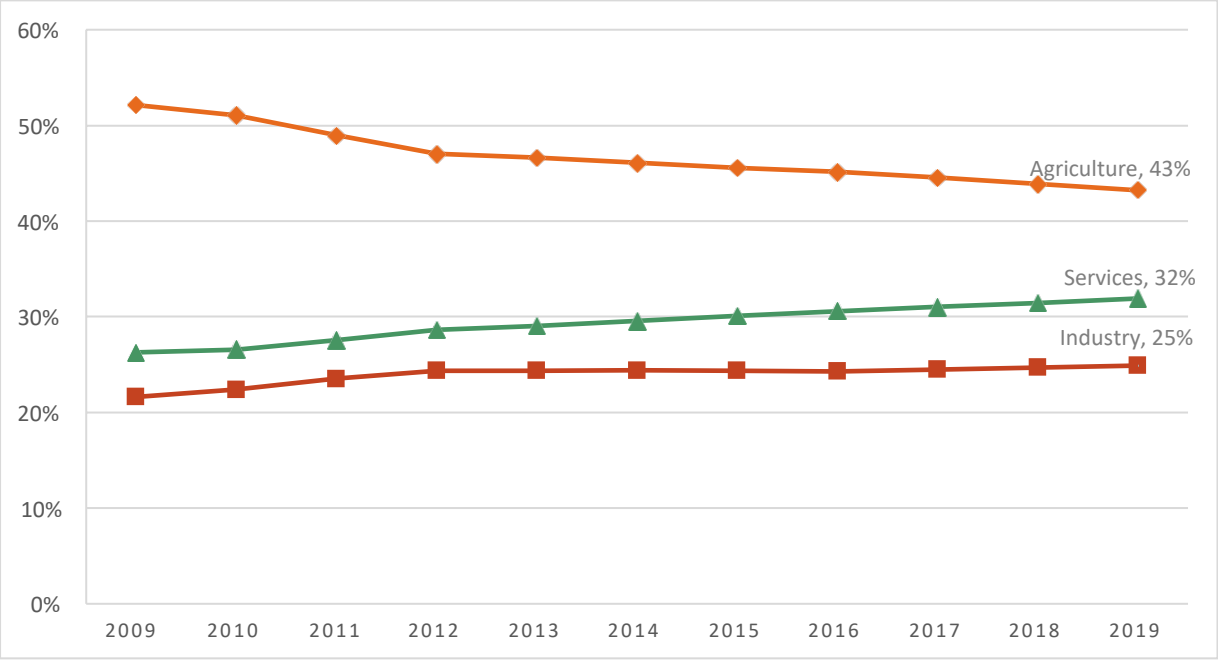


*Figure 4 - Distribution of the workforce across economic sectors from 2009 to 2019, source: (World Bank, 2020)*

Looking back over the last decade, the shift away from low productivity agricultural jobs jobs shown in Figure 4 corresponds to the strong growth seen in the Indian economy. However, this has had little impact on the transition from unorganized to organized employment, driven rather by shifts from unorganized agricultural employment to unorganized service employment (ILO, 2019). Although the unemployment rate has remained below 3%, unorganized or informal jobs remain the mainstay of the Indian economy, representing over 75% of total jobs.

Unorganized and informal jobs were also the most severely affected by the COVID 19 lockdown despite government statements to protect such workers. Of the approximate 122 million jobs lost in April 2020, over 90 million belonged to small traders and laborers (CIME, 2020). At the same time, the economic shock may have long term consequences on the number of decent, formal jobs. Although 21 million jobs were added again in May, survey data indicates that laid off salaried workers were the sole sector where the recovery was not seen (CIME, 2020). This highlights the dual challenge of precarious underemployment vulnerable to economic shock as well as job losses in organized employment due to the COVID 19 pandemic.

Finally, muted employment growth in industry overall reveals another gap in current policy measures. Relative to services, industrial employment has not improved over the last decade. Economic diversification through investment and support for the industrial sector is necessary to increase employment opportunities and build resilience against shocks such as those currently facing India's economy. Without policy intervention, trends indicate that underemployment will continue and remain vulnerable to economic downturns, severely affecting the vast majority of India's workforce (Majid, 2019).

### 3.3 COVID 19 as a Transition Accelerator: The opportunity

Although the government has remained steadfast in its support for thermal power generation, the COVID 19 pandemic throws this decision into the spotlight and encourages debate as to whether this course of action reflects forward thinking industrial policy necessary to support and sustainably grow coal belt state economies following the imminent economic slowdown.

The cost of renewable electricity, especially ground mounted solar, continues to drop in India with a record breaking international bid of just 2.55 INR / kWh fixed over 25 years for a 2GW solar installation announced in April 2020 (Buckley, 2020). This is almost half the generating cost of new thermal power plants which generate at approximately 4 5 INR / kWh, and directly competes with half of the existing installed Indian thermal power capacity generating at a variable cost of over 2.5 INR / kWh. At the same time, investment in thermal power plants have reduced by 80% between 2016 20 relative to 2010 15 (Buckley, 2020). These signals indicate that both foreign and domestic private sector actors are ready to invest in renewables, while the same cannot be said for the ailing thermal power sector. Nonetheless, the Government is adamant that a push towards self reliance following the COVID 19 pandemic includes expansion of Indian coal production capacity, standing by plans requiring 40GW in new thermal power plants by 2026 27. This is mirrored in the Government's national self reliance coal mining initiative and deregulation towards domestic coal market liberalization, which would substantially increase coal production to meet expected, but increasingly uncertain, demand growth.

Despite Government optimism, market trends challenge the narrative that thermal power generation expansion is necessary for maintaining energy security in India. Instead, recent examples of foreign investment into renewables in India suggest that existing fossil fuel subsidies may be better spent supporting the expansion of a domestic renewable energy industry. Subsidies to the fossil fuel industry amounted to approximately 12.4 billion USD in 2019, relative to just 1.5 billion USD for renewable energy. Recent modelling suggests that repurposing these subsidies and aggressively supporting renewable energy capacity expansion could double the number of full time employees in India's energy sector, reaching 2.3 million full time jobs by 2030 despite the expected rise in unemployment in the coal industry (IASS, 2019).

A strong renewable energy industry will not be enough to secure livelihoods for vulnerable populations dependent on the coal mining sector. Simply transitioning existing coal mines to renewable energy generation plants alone is unlikely to replace lost jobs purely due to the size of coal mines and their relative solar and wind power generation potentials (Pai, et al., 2020). Another challenge is the geographic clustering of jobs lost in the coal mining sector across India's coal belt, while those gained in the renewable energy sector are likely to be concentrated in the south and west of the country. Pursuing an RE job creation strategy will require further analysis of skills transferability and worker mobility, among other factors.

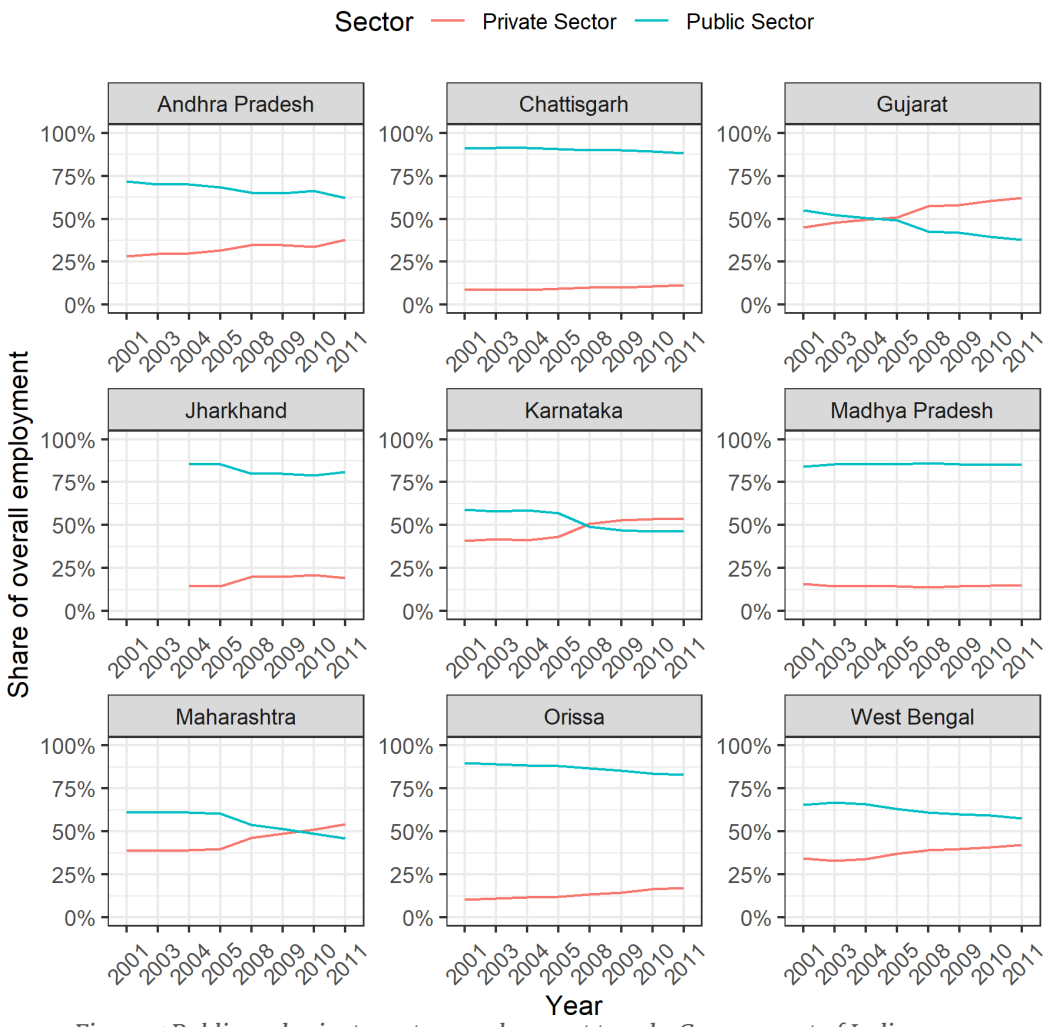


*Figure 5 Public and private sector employment trends, Government of India*

Diversification of available livelihoods through the development of the industrial sector in coal belt states could provide much needed decent work while helping satisfy both domestic consumption and preparing for growing global needs to diversify and strengthen supply chains that have weakened under the impacts of the COVID 19 pandemic. Indeed, the Government of India has already laid an important foundational stone for this transition in the announcement of a 21,000 crore INR economic stimulus package "Aatma Nirbhar Bharat Abhiyan" or Self reliant India Movement. This comprehensive package provides relief to the most vulnerable while also supporting the recovery of India's economy with a focus on local production. A timely report by the CEEW argues that MSMEs can function as the engine for this transition to a self reliant India if given the support they require (CEEW, NIPFP, 2020). MSMEs already represent almost half of the industrial output of the country, however many of these firms remain without formal banking integration and are poorly represented due to lack of data on their operations and needs.

This is not without its own challenges, however, as public sector jobs dwarf those in the private sector across coal belt states as shown in coal belt states as shown in Figure 5, indicating the severe lack of private MSMEs in these states. The development of a robust MSME sector will not be possible without creation of new industries that create demand for component manufacture and services provision. Public sector undertakings (PSUs) could

function as a vehicle to create the macroeconomic growth necessary to provide decent jobs for the young and growing labor market. This is especially true in coal belt states due to the weakness of the private sector relative to those with established export oriented private sectors such as Gujarat and Karnataka. Taking the example of Jharkhand, where coal mining rents represent 10% of the economy (Spencer, et al., 2018), diversification efforts could include the supporting the development of sustainable high value forestry industry, domestic tourism, expansion of the established tussar silk industry, or the expansion of the engineering industry that takes advantage of non coal mineral resources including mica, iron, copper and others (IBEF, 2020; GoI, 2020).

# Findings and Policy Recommendations

COVID 19 has had a large negative impact on the Indian economy. In the energy sector, electricity demand growth estimates are increasingly uncertain in the face of a longer recession and thermal power plants, already under financial strain, face a bleak short term outlook. At the same time, the broader Indian economy has struggled to create jobs and livelihoods for a growing population. These problems were already immense in India's coal dependent states before COVID 19, and the pandemic has significantly exacerbated them.

In the aftermath of COVID 19, India has a window of opportunity to rethink its economic development strategy and prepare for a just transition away from coal. Incumbent arguments for continuing along carbon intensive expansion pathways are no longer above debate. The increased uncertainty in thermal power generation investment risks, low PLFs and high costs underscore the benefits of shifting subsidies and public investment away from coal and toward cleaner alternatives, notably solar and wind power. While coal is not going away any time soon, expanding domestic coal mining seems a risky development strategy. Given that India finds itself in an economic recession that may last years, a new direction for public finance is essential as India must find a way to reinvigorate the economy without accumulating unsustainable levels of public debt. Redirecting public investment toward new industries both within and outside the energy sector could support job creation and industrial development against the backdrop of an increasingly uncertain coal value chain.

To seize the opportunity, both Government of India and State Governments with substantial coal mining sectors need to formulate and implement cost effective policies. Based on our research, we describe three programmatic recommendations for government agencies.

1. Design a green stimulus program that gradually shifts public finance away from the coal value chain and toward renewable energy and new industries.

With coal's accelerated decline, public investment should shift away from coal and toward renewable and new industries with potential for value addition and economic diversification. This general principle can be turned into a number of specific recommendations:

- Ministry of Micro, Small & Medium Enterprises (MSME) should support the MSME sector as a key mechanism for job creation, with a particular emphasis on in coal dependent states. Because MSMEs remain the backbone of non agricultural employment, they are the most effective way to create jobs in coal dependent states in the short run. Possible measures include worker training programs, improved access to finance, and enhanced market access. These measures are not without uncertainties and would benefit from further research in coal belt states. This includes, i) detailed skills mapping and analysis of state specific industrial and services sector development opportunities, ii) financial analysis of MSME operating accounts to de risk working capital loans, iii) analysis of inefficiencies and constraints in MSME distribution channels for domestic and export markets. All these require greater formalization and better information systems for effective targeting of job creation support.

- Ministry of Commerce and Industry should identify promising sectors for high value manufacturing and services in a low carbon world economy. While MSMEs are the engine of job creation in India, they are often not productive enough to generate export revenue for rapid economic growth. The COVID 19 pandemic has perturbed global supply chains, and India now has a window of opportunity to embrace export led growth in a low carbon world economy. The supply chain disruptions will likely have lasting effects on the world economy, as countries increasingly emphasize resilience and self resilience. The continued geopolitical conflict between China and India further highlights the dangers of India's depending on Chinese supply chains. Developing new industries will, however, require a strategic approach to industrial policy that emphasizes the most promising industries. The Ministry of Commerce and Industry must strike the right balance between too much targeting (`picking winners') and too little focus (`laissez faire'). Recent success stories in industrialization, from Bangladesh to Mexico and South Korea, suggest that a combination of industrial policy and market driven development can work well.

- State Governments in coal dependent states should prepare and fund transition plans. Each coal dependent state faces different circumstances and coal's accelerated decline underscores the urgency of preparing for the decline. The transition plans should include concrete measures for social security, job creation, and economic development in a scenario of declining coal demand. State Governments should also request financial support from Government of India, which has historically benefited greatly from tax revenue and royalties from coal mining. Without sufficient support from Delhi, State Governments may not have the necessary resources to re orient their economies. One possible approach to funding the transition plans is the District Mineral Foundation (DMF), which channels mining royalties back to the mining districts. If DMF revenue is used to promote infrastructure development and livelihood promotion, it can facilitate the transition away from dependence on coal mines.

- To fund these programs without accumulating unsustainable levels of debt, reduce subsidies for electricity, coal, and oil & gas. Although energy access and affordability remain problems in India, the cost of energy subsidies is increasingly unsustainable given India's economic difficulties. Dismantling subsidy programs for electricity consumption (e.g., heavily subsidized agricultural loads), coal, and oil & gas can release the funds needed to effect a just transition in India's coal dependent states.

2. Use Public Sector Undertakings (PSUs) to create job opportunities in coal dependent states.

Because private sector presence in India's coal dependent states is limited, PSUs must play a central role in the just transition away from coal. This includes coal sector entities, such as Coal India and its subsidiaries:

- PSUs, including Coal India and its subsidiaries, should adopt a new strategic role focused on job creation to promote an orderly transition. Because India's coal dependent states have limited private sector presence, PSUs are currently the only plausible organizations to implement job creation and transition strategies. Coal India

and its subsidiaries, in particular, have a strong presence in coal mining areas. They should play a central role in implementing a just transition by investing in economic diversification and supporting job creation through MSMEs. Because PSUs are controlled by the government, they can take a more holistic and nuanced approach to a just transition than their private sector counterparts. While a private coal company might not invest in alternative livelihoods to coal mining, a PSU will do so as long as officials emphasize this as a priority.

- PSUs should create opportunities for the MSME sector to grow and create jobs through procurement programs. Because MSMEs have the greatest potential for job creation in India's coal dependent states, PSUs should support their expansion. An effective way to achieve this goal would be a procurement program aimed at MSMEs, with simple and fast formalization and bidding processes.

- State Governments should develop long term plans to attract private investment for large scale industrial and commercial development. Although PSUs will have to carry a lot of weight in the short run, long run success requires private capital. State Governments should develop long term strategies to attract private sector investment, with PSUs playing a catalyzing role. Possible measures include investments in infrastructure and market access, appropriate investment incentives in priority sectors, and measures to create an enabling environment. These long run development strategies will be challenging, and State Governments should approach them with patience.

3. Embrace a regional hub strategy to enable job creation and regional economic development in coal dependent states.

India's coal dependent should embrace economic diversification as a long term growth strategy. This strategy is best achieved with a regional hub strategy, which invests in industrial and commercial hubs in coal dependent states and reinvigorates local economies based on these hubs.

- State Governments in coal dependent states should invest in creating regional hubs for industry and commerce, with an initial emphasis on MSMEs and a strategy for climbing the value ladder. The regional hubs would enable MSMEs to join supply chains by providing goods and services to larger companies, including PSUs. The MSMEs would both contribute to job creation and support the development of large scale industry and services in coal dependent states.

- State Governments should encourage and support rural urban migration in coal dependent states, with appropriate safeguards for public health and worker protection. Although rural urban migration is problematic as long as COVID 19 continues to spread in India, it has indisputable benefits in the long run. India's coal dependent states should encourage rural households to send workers to regional hubs for industry and commerce, possibly with transportation and housing subsidies. This strategy would enhance productivity and increase job creation, as cities and towns have far greater potential for industry and commerce than villages. Although COVID

19 has shown the risks associated with rural urban migration, the long term prospects for economic development depend heavily on regional clusters of economic activity.

- State Governments should initially offer basic income support to households and communities that face hardship because of COVID 19 and the resulting economic recession. While the aforementioned measures focus on economic recovery, basic income support is necessary in the short run. On the one hand, migration to cities and towns is a public health hazard as long as COVID 19 continues to spread. On the other hand, lost livelihoods have already caused great financial hardship and compromised food security. Thus, while rural development is unlikely to be an engine of economic growth at the macro level, immediate relief is necessary as long as the pandemic and economic recession contribute to hardship in the villages.

# References


Ali, S., 2018. The future of Indian electricity demand: How much, by whom and under what conditions?, New Delhi: Brookings India.

Brookings India, 2020. The Brookings India Electricity and Carbon Tracker. [Online] Available at: https://carbontracker.in/ [Accessed 20 June 2020].

Buckley, T., 2020. Who Would Still Fund a New Coal Power Plant in India, s.l.: Institute for Energy Economics and Financial Analysis.

Carbon Copy, 2020. Who will bid for India's newly auctioned coal blocks?. [Online] Available at: https://carboncopy.info/who-will-bid-for-indias-newly-auctioned-coal-blocks/ [Accessed 24 June 2020].

CEEW, NIPFP, 2020. Jobs, Growth and Sustainability: A New Social Contract for India's Recovery,
New Delhi: CEEW.

CIME, 2020. 21 million jobs added in May. [Online]
Available at: https://www.cmie.com/kommon/bin/sr.php?kall=warticle&dt=2020-06-02%2011:43:41&msec=800
[Accessed 20 June 2020].

CIME, 2020. The Jobs Bloodbath of April 2020. [Online]
Available at: https://www.cmie.com/kommon/bin/sr.php?kall=warticle&dt=2020-05-05%2008:22:21&msec=776
[Accessed 20 June 2020].

Coal India Limited, 2013. 2012-13 Annual Reports & Accounts: Deeper insights into India's progress,
s.l.: Coal India Limited.

Coal India Limited, 2018. Annual Report & Accounts 2017-18, s.l.: Coal India Limited. Coal India Limited, 2019. Annual Report & Accounts, 2018-19, s.l.: Coal India Limited.
Coal India Limited, 2020. Corporate Structure. [Online]
Available at: https://www.coalindia.in/en-us/company/structure.aspx [Accessed 24 April 2020].

Garg, V. et al., 2020. Mapping India's Energy Subsidies 2020: Fossil fuels, renewables and electric vehicles, s.l.: International Institute for Sustainable Development.

GoI, 2020. Invest India - Jharkhand. [Online]
Available at: https://www.investindia.gov.in/state/jharkhand [Accessed 20 June 2020].

Government of India, 2020. Coal Directory. [Online]
Available at: http://www.coalcontroller.gov.in/pages/display/16-coal-directory [Accessed 1 May 2020].

IASS, 2019. Future skills and job creation with renewable energy in India: Assessing the co-benefits of decarbonising the power sector, s.l.: International Climate Initiative: Mobilising the Co-Benefits of

Climate Change Mitigation through Capacity Building among Public Policy Institutions.

IBEF, 2020. India Brand Equity Foundation - Jharkhand State Report. [Online] Available at: https://www.ibef.org/download/Jharkhand-March-2020.pdf [Accessed 20 June 2020].

Indian Bureau of Mines, 2019. Indian Minerals Yearbook 2018 (Part-III: Mineral Reviews), Nagpur: Ministry of Mines, Government of India.

KPMG, 2020. India: Government and institution measures in response to COVID-19. [Online] Available at: https://home.kpmg/xx/en/home/insights/2020/04/india-government-and-institution- measures-in-response-to-covid.html
[Accessed 1 June 2020].

Lahiri-Dutt, K., 2016. The diverse worlds of coal in India: Energising the nation, energising livelihoods.
Energy Policy.

Majid, N., 2019. Structural change and employment in India, Geneva: International Labour Office.

Pai, S., Zerriffi, H., Jewell, J. & Pathak, J., 2020. Solar has greater techno-economic resource suitability than wind forreplacing coal mining jobs. Environmental Research Letters.

Ray, A., 2020. India's GDP growth in 2020-21 to remain in negative territory: RBI. [Online] Available at: https://www.livemint.com/industry/banking/india-s-gdp-growth-in-2020-21-to-remain- in-negative-category-rbi-11590122207688.html
[Accessed 25 May 2020].

Sengupta, D., 2020. Coal India arm achieves 95% exploration target till December. [Online] Available at: https://economictimes.indiatimes.com/industry/indl-goods/svs/metals-mining/coal- india-arm-achieves-95-exploration-target-till-december/articleshow/74178127.cms

Spencer, T., Raghav, P., Renjith, G. & Vohra, S., 2018. Coal transition in India, New Delhi: TERI.

Tongia, R., 2018. RE “versus” coal in India – A false framing as both have a role to play, New Delhi: Brookings India.

Urpelainen, J., 2020. Author's interviews in Ranchi, Jharkhand, Washington DC: ISEP. Vyas,

M., 2020. Unemployment rate touches 26%. [Online]
Available at: Centre for Monitoring Indian Economy (CIME)
[Accessed 24 Apri 2020].

World Bank, 2020. DataBank. [Online]

Available at: https://databank.worldbank.org/home.aspx
[Accessed 01 June 2020].

www.energyforum.in