SMALL AND MEDIUM ENTERPRISES: ENERGY EFFICIENCY KNOWLEDGE SHARING

VOLUME 13 | ISSUE 4 | DECEMBER 2022

# SAMEEEKSHA NEWSLETTER

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## Inside...



Promoting Energy Efficiency in SMEs

SAMEEEKSHA

### VISION

SAMEEEKSHA envisages a robust and competitive SME sector built on strong foundations of knowledge and capabilities in the development, application, and promotion of energy-efficient and environment-friendly technologies.

Bureau of Energy Efficiency

SHAKTI SUSTAINABLE ENERGY FOUNDATION

The Energy and Resources Institute

A PLATFORM FOR PROMOTING ENERGY EFFICIENCY IN SMEs

## IN THIS ISSUE...

The theme of this issue is 'just' energy transition; a concept which recognizes the need to achieve energy transition away from fossil fuels towards clean energy sources through 'just' pathways that protect the rights and interests, and enhance the economic and social well-being, of all those who might be adversely affected by the transition.

The theme article describes the huge and snowballing economic and social impacts that energy transition will have in countries such as India, which are rich in coal deposits as well as heavily dependent on coal for generating electricity and for meeting thermal energy requirements in industry and other sectors. Within the industry sector, coal-based MSMEs are likely to be much more severely impacted than large industries because of low awareness levels, lack of options to replace existing coal-based technologies, difficulties in raising financial resources, lack of avenues to upgrade workforce skills, and other such intrinsic constraints.

The article highlights key queries and challenges for which policy-makers must find answers and solutions while formulating an energy transition strategy for India, and underlines the need to undertake comprehensive studies to gather qualitative and quantitative data on the entire coal value chain. As an important step forward in this direction, TERI is undertaking studies in two closely linked domains: (1) the coal mining industry, and (2) selected coal-dependent MSME sub-sectors. These studies will identify measures to safeguard the millions of people employed in coal mines and in the selected MSME sectors against the impacts of energy transition, such as providing alternative employment avenues, re-skilling opportunities, green technological options, and so on. Above all, the studies are intended to make policy makers aware of the sheer magnitude of the challenges that India must overcome as it strives to transition away from coal to green energy.

*SAMEEEKSHA Secretariat*

# 'JUST' ENERGY TRANSITION: THE CHALLENGES FOR INDIA AND ITS MSME SECTOR

## What is 'just' energy transition?

Even as nations across the world strengthen their commitments and actions to cut down greenhouse gas emissions by transitioning away from fossil fuels to low/zero-carbon energy options such as clean electricity produced from renewable energy (RE) and green hydrogen, there is growing recognition that such a large-scale energy transition away from fossil fuels will bring about massive societal disturbances. This is because there are countless millions of people who now depend for their livelihoods, directly or indirectly, on the extraction, processing, transport and usage of fossil fuels. Energy transition will be a hugely disruptive force in their lives; indeed, the impacts of the transition could potentially be far more immediate and devastating for them than the looming impacts of climate change.

Hence, all nations must strive to achieve energy transition through 'just' pathways that protect the rights and interests, and enhance the economic and social well-being, of all people whose lives will be adversely affected, directly or otherwise, by the transition.

> "Energy transition is about more than reaching a carbon neutral society. It is also about ensuring that all groups in society can equally benefit from the transition, and especially, that it does not come at the expense of certain groups..."
>
> —University of Leiden
>
> 'Just Energy Transition'. Livable Planet Programme
>
> *[https://www.universiteitleiden.nl/en/liveable-planet/case-studies/just-energy-transition]*

> "Just transition is not a fixed set of rules, but a vision and a process based on dialogue and an agenda shared by workers, industry, and governments that need to be negotiated and implemented in their geographical, political, cultural, and social contexts"
>
> —International Institute for Sustainable Development
>
> *['Just Transition'; https://www.iisd.org/topics/just-transition]*

The importance of ensuring justice in energy transition has found clear expression in recent international discussions and agreements on climate change. For instance, the COP27 summit held in Sharm El Sheikh in November 2022 called for *"accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition."*[1]

## Snowball effects of energy transition

While just energy transition now features prominently in the global discourse on climate change, so far the focus has tended to be on the points of fossil

[1] https://unfccc.int/sites/default/files/resource/cop27_auv_2_cover%20decision.pdf

**Coal mine** *(Source: CIL. https://www.coalindia.in/news-media/gallery/)*


**Dumpers transporting coal from coal-face** *(Source: CIL. https://www.coalindia.in/news-media/gallery/)*

fuel extraction—specifically, on coal mines and the workers and communities that directly depend on coal mining. However, in countries such as India that are rich in coal deposits as well as heavily dependent on coal for generating electricity and for meeting thermal energy requirements in industry and other sectors, the transition away from coal towards alternative (green) energy options will bring huge and snowballing economic and social impacts: not only among those directly dependent on coal mining, but also down the entire coal value chain to sweep across the much wider communities whose lives are centred around and sustained by the usage of coal, directly or indirectly. It is hence essential to expand the discussions, studies and strategizing on energy transition beyond coal mines, to cover the much larger socio-economic ecosystems that will be as seriously affected by the contemplated transition away from coal.

**Look beyond coal mines!**

India's vast MSME sector includes tens of thousands of traditional small-scale industries that are based on coal, which is often locally available and the cheapest source of energy. Examples are brick kilns, direct reduced iron (DRI)/ sponge iron-based steel units, steel re-rolling mills having reheating furnaces, cupola-route foundries, textile dyeing industries having coal-fired boilers, and many others. These industries provide direct and indirect livelihoods to millions of people, and will be severely impacted by the transition away from coal. Many will face closure, putting at risk not only the livelihoods of millions of workers but also adversely impacting the local/ regional economies.

## What does transition mean for India?

Coal has been, and will continue to be, a critical driver of India's economic growth. Coal accounts for 55% of India's total energy consumption, and more than 70% of India's electricity generation comes from coal-fired power plants. India has the world's fifth largest reserves of coal, and ranks second in the world in coal production after China.

"Coal will remain the bulwark of India's energy system for decades. It is no doubt the dirtiest of fuels, but it remains amongst, if not the cheapest, source of energy. Plus hundreds of thousands depend on the coal ecosystem for their livelihood. The option of phasing out coal whilst environmentally compelling is not yet a macroeconomic or social possibility."

—Vikram S Mehta

Chairman and Distinguished Fellow, Centre for Social and Economic Progress

*[https://indianexpress.com/article/opinion/columns/decarbonisation-path-russia-ukraine-conflict-8355563/]*

Coal is used in many large core industrial sectors like cement and steel, as well as in myriad small and medium scale industries in sub-sectors such as clay and ceramics, basic metals, textiles and food processing. These coal-based industries and allied enterprises provide employment and entrepreneurial opportunities for tens of millions of people, in the coal-rich regions of eastern India as well as far beyond. As the Indian economy continues to grow, the demand

for coal too is increasing, from the power sector and from industry. The coal demand is met by indigenous coal mines as well as imports. The overall production of raw coal in India during 2021–22 was over 778 million tonnes (Mt) compared to 716 Mt the previous year (a positive growth rate of 8.67%)[2,3]. Coal demand is projected to peak at between 1.3–1.5 billion tonnes by 2030; and coal production is being ramped up to meet that demand[4,5].

Not surprisingly, India is currently also a significant contributor of annual global emissions, accounting for about 2310 Mt of $CO_2$ emissions in 2019, equivalent to about 7% of the world's total $CO_2$ emissions during that year (IEA, 2019). However, as a developing nation, India has contributed only a miniscule share to the cumulative global carbon emissions. Under the circumstances, India needs not adopt drastic and abrupt measures that could imperil millions of people whose livelihoods are involved with the coal value chain. It is critically important for the country to keep the rights and welfare of all affected people in central focus while planning for and undertaking the energy transition away from coal.

**Panchamrit: India's emissions reduction targets**

Towards reducing emission levels, India has already set itself the following specific time-bound targets called Panchamrit :

- Reduce emissions intensity of its GDP by 45% by 2030, from 2005 level
- Achieve non-fossil fuel energy capacity of 500 GW by 2030
- Achieve about 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030
- Reduce projected carbon emissions by one billion tonnes by 2030
- Achieve net-zero emission levels by 2070

As India progressively transitions away from coal to green energy options over the coming decades, many barriers and challenges will have to be overcome: in the domains of technology, finance, policy, regulation, and most importantly, social action and social development. Many of these challenges are difficult to discern or define because of the sheer complexity and extent of the coal value chain, touching as it does people and communities in different socio-economic strata and in different geographic areas, and impacting not only those directly connected with coal mines and coal-based industries but virtually every sector of the economy.

In such a scenario, how can India draw up a strategy for energy transition which ensures that the welfare and future of all affected people are safeguarded equitably, while supporting the nation on its path of socio-economic development?

**Many unknowns; many challenges**

While formulating an energy transition strategy for India, policy-makers must find answers and solutions to queries and challenges such as the following:

- How to generate nationwide awareness on energy transition away from coal, and its diverse implications for different sections of the populace? How to identify, sensitize and engage with key stakeholder groups and institutions in order to formulate strategies and plans for just transition?
- How to go about studying and understanding the entire coal-based value chain? How to map the linkages between its different actors and components, extending from the coal mines to the end-users of products and services that have been created by the usage of coal at some stage?
- How to prioritize sectors for initiating the transition?
- How to tackle sectors that present the greatest difficulties in transition (for example, the 'hard-to-abate' coal-using industrial sectors like cement, iron & steel, etc.)?
- How to formulate plans of action for bringing about the transition for each impacted sector/region/community, while ensuring that each action plan forms a dynamic component of the overall (nationwide) transition strategy?
- What are the institutions that have to be created or strengthened to oversee the implementation of these action plans? Who will lead them and guide them?
- How to establish and manage information systems for the constant monitoring, feedback and assessments of actions, and to undertake course corrections as and when needed?
- How to design and deliver social security safety nets for those whose lives and livelihoods will be impacted severely by the transition—from coal mines and coal-based industries

[2] Provisional figures. Ministry of Coal, Government of India: https://coal.gov.in/en/major-statistics/production-and-supplies

[3] Economic Survey 2021–22; https://www.indiabudget.gov.in/economicsurvey/ebook_es2022/index.html

[4] https://pib.gov.in/Pressreleaseshare.aspx?PRID=1808702

[5] https://www.livemint.com/industry/energy/india-will-achieve-1-5-bn-coal-production-by-2030-minister-11669908623285.html

to the larger communities impacted by the phasing-down of coal (for example, the entire townships that have come up around coal mines and coal-based industrial clusters)?
- How to raise the required resources for these safety nets—finance, housing, healthcare, education, and so on?
- The (new and expanding) green energy sector is unlikely to be able to absorb all those displaced from their erstwhile coal-based livelihoods. How and where to open up fresh avenues for the displaced people to find fair, decent and sustainable employment?
- How to conceptualize, develop and deliver the required re-skilling and entrepreneurship training programs for people displaced by the transition? Which are the training institutions that can undertake this task? Where will the faculty, funds and infrastructure come from?

## Challenges for Indian industry

The industry sector presents unique challenges for transition. Industry is a major consumer of coal, and accounted for about 762 Mt (33%) of India's total $CO_2$ emissions in 2019. Core industry sub-sectors like iron & steel, brick, and cement are among the largest consumers of coal; but they are also expanding to meet the burgeoning demands from sectors such as building & construction, infrastructure, rail and roadways, etc. As a result, the $CO_2$ emissions from industry are predicted to rise: for example, emissions from the iron & steel sub-sector are estimated to rise from about 300 Mt in 2019 to 800 Mt by 2050[6].

At the same time, industry is driving India's economic development, and directly or indirectly supports the livelihoods of tens of millions of people. Furthermore, major coal-using industry sub-sectors like brick and DRI (sponge iron) are situated at the very apex of the overall industry sector, providing core inputs to other downstream industrial sub-sectors; and any disruptions in their operations or closure of the industrial units—as might result with the transition away from coal—will potentially have huge and cascading adverse effects on the entire economy, ranging from job losses and displacement of people to widespread shortages and increased prices of a vast range of products.

In general, the following major obstacles need to be overcome for industries to be able to reduce emissions on a scale that would be compatible with achieving net-zero emissions levels:

[6] TERI. 2020. Towards Low Carbon Steel Sector: Overview of the Charging Market, Technology, and Policy Context for Indian Steel. The Energy and Resources Institute. New Delhi

Coal pulverizer in steel rerolling mill

- For successful energy transition, low-carbon technologies of suitable scale should be readily available and affordable. However, in many industry sub-sectors such technologies are presently not commercially available; they are either at conceptual or R&D stages. In some cases—for example, the small-scale brick kilns that make up the major portion of the brick industry in India—such green technology options simply do not exist at present.
- The development and commercialization of green technologies requires radical (perhaps disruptive) innovations, long-term R&D, and extensive trials/demonstrations, entailing very large investments that industries themselves may not be able or willing to make. Collaborative models involving industry, research & academic institutes, government and international agencies will be needed to drive such initiatives forward.
- Transition from the existing coal-based technologies to green solutions will have far-reaching, potentially disruptive impacts on the entire value chain—plant designs, production processes, markets for raw materials and finished products, human resources (e.g. re-training/skilling of personnel), vendor enterprises, and so on. For industries, these potential impacts represent uncertainties and risks that have to be assessed, fully understood and addressed before decisions are made on the transition.
- Many industries will have made huge capital investments on their existing coal-based technologies, with paybacks yet to be realized in full. Energy transition therefore carries major financial implications for these industries as well as for their creditor-banks/FIs, shareholders, etc., thus acting as a deterrent to adopting the new technology.
- Many 'core' industry products such as steel are traded internationally in competitive markets, with margins that are too slim to absorb elevated production costs and encourage first movers to adopt new (green) technologies.

## Coal-based MSMEs: unique challenges that need unique solutions

The coal-based MSMEs in India are likely to be much more severely impacted than large industries by the imminent energy transition, constrained as MSMEs typically are by barriers such as low knowledge and awareness levels regarding better (EE) technologies/operating practices, the lack of options to replace existing coal-based technologies, inability to access cleaner fuels and/or electricity at affordable costs, difficulties in raising financial resources, lack of skilled workforce coupled with lack of avenues to upgrade skills, and so on.

**Coal gasifier system in steel rerolling mill**

At the same time, the socio-economic importance of the MSME sector makes it vital to ensure its survival and development. Not only do the 63 million-plus units in the Indian MSME sector provide employment to an estimated 110 million people;[7] but they also underpin rapidly growing industrial sectors like automobiles, engineering goods, chemicals, and textiles, by supplying input materials and components for large industries, OEMs and commercial enterprises. For India to achieve energy transition while retaining its economic growth trajectory, it is therefore critical to ensure that the coal-based MSMEs in India can successfully transition to green technologies (such as electrification of thermal processes and adoption of RE options) while ensuring that the workforce is not adversely impacted.

The challenges are formidable. The sheer size, diversity, and complexity of the Indian MSME sector—in terms of numbers of units and workers, geographical spread, technologies and operating practices, products and markets, extent and inter-connectedness of value chains—rules out any 'one size fits all' transition solution for this vital economic sector. Specific solutions have to be found for each of the many MSME sub-sectors that are directly or indirectly linked to coal consumption, particularly in the states of Jharkhand, Chhattisgarh, Odisha and West Bengal which meet most of India's coal requirements as well as host a large number of coal-based industries. Each solution will have to incorporate plans and actions in the overlapping domains of policy, regulation, finance,

[7] Ministry of MSME, Annual Report 2020–21. Quoting statistics from National Sample Survey (NSS) 73rd Round, 2015–16.

Coal yard in DRI unit

technology, social infrastructure, and capacity; and all the solutions will have to feed into and complement the overall (country) strategy for the energy transition.

## The road ahead

Clearly, coal will continue to be the major source of energy for India, at least in the near term. At the same time, India is charting a course aimed at the progressive adoption of green technologies (RE and electrification) and improvements in energy efficiency (EE) across all sectors. These measures will help India achieve its goal of becoming a net-zero economy by 2070. They will also form essential elements of India's strategy for a progressive transition away from coal towards green energy.

It is also clear, from the immense and complex challenges to achieving a just transition as briefly described above, that the drawing up of a nationwide transition strategy will require investments on an unprecedented scale by both state and non-state actors in terms of time, research, field studies, pilot projects, analyses, planning and finance.

The first all-important step will have to be undertaking comprehensive, in-depth studies to map and gather qualitative and quantitative data on the entire coal value chain. The studies will cover communities at all levels of society in diverse sectors of the economy that are linked, directly or indirectly, with the production and consumption of coal; for, they will all be impacted to different degrees of severity by the transition. They will, for example, include people working at every level in coal mines and coal-based industries; in downstream industries; and in all the various enterprises that support and sustain people living in the townships that have sprung up around coal mines and coal-using industrial clusters.

These studies will help in understanding the potential snowball effects that will result from the transition and the consequent transformations in energy availability, energy costs, and energy usage patterns down and beyond the coal value chain. Based on this understanding, a clear, long-term strategic map for energy transition can be drawn up that addresses and mitigates the (predicted) adverse impacts on different social and economic sectors; a map that covers the entire period of transition.

The pathways to energy transition will then have to be traced and developed in a participatory manner, involving all stakeholders in all sectors from policy to grassroots levels. These pathways must be founded on a clear, long-term vision for socio-economic development up to and beyond the transition; yet they should be flexible enough to cope with the many uncertainties and conflicts of interest and priorities

among different stakeholders that the coming decades will bring, and to allow for any modifications and course corrections that are needed.

As an important step forward in grappling with these challenges to just transition, TERI is undertaking studies in two broad and closely linked domains: (1) the coal mining industry, and (2) selected coal-dependent MSME sub-sectors. The studies are aimed at identifying measures that will have to be taken to safeguard the rights and interests of the millions of people employed in coal mines and in these MSME sectors against the impacts that energy transition will bring. The measures will include creation of alternative employment avenues, re-skilling opportunities, green technological options, and so on.

The studies are intended to make policy makers aware of the sheer magnitude of the challenges that India must overcome as it strives to transition away from coal to green energy. They will attempt to reveal the extent and depth to which coal underpins India's socio-economic well-being and growth; and how coal inextricably links the lives and fates of seemingly diverse and remote sections of the populace—coal miners in Jharkhand with coal furnace operators in Raipur steel rerolling mills and coal-fired boiler operators in Surat textile dyeing units; coal loaders and dumper drivers in Odisha with the countless millions who work in coal-fired brick kilns across the country.

Above all, the studies are intended to make policy makers aware of the sheer magnitude of the challenges that India must overcome as it strives to transition away from coal to green energy. They will attempt to reveal the extent and depth to which coal underpins India's socio-economic well-being and growth; and how coal inextricably links the lives and fates of seemingly diverse and remote sections of the populace—coal miners in Jharkhand with coal furnace operators in Raipur steel rerolling mills and coal-fired boiler operators in Surat textile dyeing units; coal loaders and dumper drivers in Odisha with the countless millions who work in coal-fired brick kilns across the country. The studies will emphasize the urgency for drawing up a comprehensive long-term just transition strategy, and serve as a guide on how such a strategy can be implemented in the coal mining sector as well as in the coal-consuming MSME sub-sectors—both of immense socio-economic importance to the nation.

## ABOUT SAMEEEKSHA

SAMEEEKSHA is a collaborative platform aimed at pooling the knowledge and synergizing the efforts of various organizations and institutions—Indian and international, public and private—that are working towards the common goal of facilitating the development of the Small and Medium Enterprise (SME) sector in India, through the promotion and adoption of clean, energy-efficient technologies and practices.

SAMEEEKSHA provides a unique forum where industry may interface with funding agencies, research and development (R&D) institutions, technology development specialists, government bodies, training institutes, and academia to facilitate this process.

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