

# **BEST GLOBAL PRACTICES FOR JUST TRANSITION IN COAL SECTOR**

**May, 2023**



**Prepared by:  
Central Mine Planning & Design Institute Limited**



# Best Global Practices for Just Transition in Coal Sector

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## Acknowledgement

“Central Mine Planning and Design Institute Limited” (CMPDIL) would like to express its sincere gratitude to the Ministry of Coal (MoC) and Ministry of Power (MoP), Government of India, for providing this opportunity to undertake an important study on **“Best Global Practices for a Just Transition in Coal Sector.”** Their guidance and support throughout the study have been invaluable.

We would also like to express our sincere gratitude to Sri Amrit Lal Meena, Secretary, Ministry of Coal (MoC), and Sri B.P. Pati, Joint Secretary, MoC, for their valuable inputs, who have greatly contributed to the success of this report.

We would like to thank the reviewers who provided their expertise, especially Sri Pramod Agrawal, Chairman, Coal India Ltd. (CIL); Dr. B. Veera Reddy, Director (Technical), CIL and Sri Manoj Kumar, Chairman-cum-Managing Director, CMPDIL for their constructive and valuable feedback on the report. Their comments have greatly enhanced the relevance and quality of this report.

We would like to extend our appreciation to the World Bank as an international partner for their invaluable support and guidance in preparing this report in general and for Best Global Practices in the Coal /Lignite Sector and Financing Mechanism adopted in Various Countries for Just Transition, in particular.

We extend our sincere thanks to all those who have provided us with valuable information, feedback, and support throughout this study. Their contributions have been essential to the completion of this report. We look forward to continued collaboration with these esteemed organizations in addressing the challenges facing the coal sector and promoting sustainable development.

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## Foreword



**Sri Amrit Lal Meena**  
Secretary  
Ministry of Coal

With great pleasure, I introduce this report on “Best Global Practices for a Just Transition in Coal Sector.” This study was undertaken by the Central Mine Planning and Design Institute Limited (CMPDIL) as the domestic partner with contributions from the World Bank as the International Partner, under the guidance of the Ministry of Coal (MoC) as part of the priority area (iv) Universal Access to Clean Energy and Just, Affordable, and Inclusive Energy Transition Pathways of the ETWG under the G20 Presidency of India.

The study aimed to explore and identify best global practices for a just transition in the coal sector, taking into account the challenges and opportunities facing the sector today. The report examines various global practices that have been implemented in different countries and assesses their effectiveness in supporting a just transition.

This report is an important step in understanding the challenges and opportunities for a just transition in the coal sector, and it is hoped that the findings and recommendations contained will not only be useful to G20 countries but also to other countries having coal as a major source of energy.

On behalf of the Ministry of Coal, I would like to extend my sincere appreciation to the World Bank and CMPDI for their efforts in conducting this study, and to all the stakeholders who contributed to its development.

I sincerely hope that this report will gain widespread attention and be utilized as a resource for shaping policy and decision-making in the coal sector, ultimately promoting a fair transition that benefits both workforce and communities alike.

## Preface

G20 member countries, which are party to the Paris Agreement, account for about 75 percent of global energy demand and thus hold a significant responsibility and strategic role in pushing for cleaner energy future. There are large variances amongst G20 member countries in terms of energy resource endowment, energy intensity of the GDP, financial, technological capabilities and economic development. It is thus, of critical importance that G20 discourse examines and captures the growth challenges and transformation opportunities in the context of clean energy transition.

Energy Transition Working Group (ETWG) is one of the working groups under India's G20 Presidency with Ministry of Power (MoP) as nodal agency.

MoP has identified 6 priority areas under ETWG, namely, - (i) Energy Transition through Addressing Technology Gaps (ii) Low-cost Financing for Energy Transition (iii) Energy Security and Diversified Supply Chains (iv) Energy Efficiency, Industrial Low Carbon Transitions and Responsible Consumption, (v) Fuels for Future (3F) and (vi) Universal Access to Clean Energy and Just, Affordable, and Inclusive Energy Transition Pathways.

Under the leadership of Ministry of Coal (MoC) for the priority area (vi) Universal Access to Clean Energy and Just, Affordable, and Inclusive Energy Transition Pathways, a study has been carried out on "Best Global Practices for a Just Transition in Coal Sector" by CMPDI (Domestic knowledge partner) in consultation with the World Bank (International knowledge partner).

The Scope of the study report has been finalized by MoC as given below–

Sl. No.	Scope of the Study	
1	Just Transition – An Introduction	
2	Coal/Lignite Sector - Present Scenario & Future Outlook in India	
3	Best Global Practices of Just Transition in Coal/Lignite Sector	
4	Financing Mechanism adopted in various countries for Transition in Coal/ Lignite Sector	
5	Recommendations for Just Transition in the Context of Coal/Lignite Sector	
	5.0	Suggested Framework and Institutional Governance for Coal/Lignite Sector
	5.1	Best fit Processes for adoption by Coal/Lignite Sector
	5.2	Any other Recommendation for Coal/Lignite Sector

A three-tier review was also conducted at CMPDI, CIL and MoC level to finalise the study report.

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## Acronyms & Abbreviations

BCCL	Bharat Coking Coalfields Limited
CBDR-RC	Common but Differentiated Responsibilities and Respective Capabilities
CBM	Coal Bed Methane
CCO	Coal Controller's Organization
CCS	Carbon Capture and Storage
CER	Corporate Environmental Responsibility
CIL	Coal India Limited
CMM	Coal Mine Methane
CMPDIL	Central Mine Planning and Design Institute Limited
COP	Conference of Parties
CSR	Corporate Social Responsibility
ETWG	Energy Transition Working Group
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GSI	Geological Survey of India
GW	Gigawatt
IIT	Indian Institute of Technology
INR	Indian Rupees
JTM	Just Transition Mechanism
LT-LCDS	Long-Term Low Carbon Development Strategy
MCP	Mine Closure Plan
MECL	Mineral Exploration Corporation Limited
M&E	Monitoring and Evaluation
MIGA	Multilateral Investment Guarantee Agency
MMDR	Mines and Minerals (Development and Regulation)
MoC	Ministry of Coal
MoEFCC	Ministry of Environment, Forests and Climate Change
MoP	Ministry of Power
MW	Megawatt
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
NLCIL	Neyveli Lignite Corporation of India Ltd

NITI	National Institute for Transforming India
OC	Opencast
PPP	Public-Private Partnership
PSU	Power Supply Unit
SCCL	Singareni Collieries Company Limited
SECL	South Eastern Coalfields Limited
SHG	Self-Help Group
SPE	Special Purpose Entity
TJTP	Territorial Just Transition Plan
UG	Underground
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America

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## Executive Summary

The Energy Transition Working Group (ETWG) is one of the working groups set up under India's G20 Presidency, with the Ministry of Power (MoP) as the nodal agency. The MoP has identified one of the six priority areas as Universal Access to Clean Energy and Just, Affordable, and Inclusive Energy Transition Pathways which is led by the Ministry of Coal (MoC). The Ministry of Coal entrusted the World Bank and the Central Mine Planning and Design Institute Limited (CMPDIL) as international and domestic knowledge partner to conduct study on "Best Global Practices for Just Transition in Coal Sector" under the Priority Area.

Coal industry is playing a crucial role in the economy and energy security of India. The rise in population of the country and improved access to electricity has led to a continuous rise in energy demand fueled by rising economy and developmental needs. Despite thrust on renewables, coal will continue as a primary source of energy, with projections suggesting increase in coal demand up to 1.5 BT by 2030 and peak demand is foreseen around 2040.

At the same time, India understands the gravitas of climate change and uphold its "Panchamrit" commitments and push for low carbon and climate friendly growth model. Accordingly, the country has chosen a middle path of 'the climate justice' and aims to pursue a balanced growth model based on the principles of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC). Alternative use of coal and other sources of energy like coal gasification, blue hydrogen, methanol, ethanol etc. are also being explored. Gasification of 100 million tonnes of coal by 2030 is targeted.

The growth impact in coal sector on account of increasing share of renewable energy resources and mine closure may have an impact on the livelihood of the community that needs to be taken into account as coal dependent countries transit to a low carbon economy. Coal mining is a crucial source of employment in central coal-producing districts of India. Formal (direct) employment in coal mines is estimated at 0.5 million and many more are indirectly dependent on coal for livelihood.

The closure of coal mines needs to be handled in a scientific and objective manner in order to ensure that the livelihoods of the impacted people are secured. In this regard, the idea of "*Just Transition*" – refers to a just, fair and equitable transition for all stakeholders impacted by closure of coal mines. The just transition pathways aim to support the following in coal regions of coal dependent countries:

- Supporting social and physical infrastructure
- Ecological restoration of affected areas
- Building capabilities of communities
- Seeding new livelihood generating economic activities

India has framework for restoration of mined out areas in place and is implemented (issued in 2009, subsequently in 2013 and 2020; and for mines closed prior to 2009 the framework issued in 2022). The coal mining industry, under the guidance of MoC is proactive to mitigate the effects of mine closure by providing a large amount of funds in the form of Escrow Fund and also through CSR. Arguably, this is the largest mandatory support to address the issues arising out of mine closure. India is follows a comprehensive policy

to mitigate any adverse impact during coal mining as well as after the closure of the coal mines. Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RTFCTLARR) provides a very attractive price for the persons providing land for coal mining. Coal India limited (CIL – the largest mining company in India – a Central Sector Public Undertaking) is providing compensatory employment to the land providers.

With introduction of new ecofriendly technologies, direct employment in the coal mining industry has gone down considerably worldwide. The lessons learnt from various countries can be summarized by three thematic pillars to mitigate the impact of loss of employment in coal mining, namely, Institutional Governance - Central /Regional/Local; People and Communities; Repurposing Land and Infrastructure Assets.

The Best Global Practices included in the report are for different group of countries having different geopolitical and economic conditions that covers a wide spectrum of socio-economic strata are as under.

- Ukraine, Romania and Russia;
- USA, Canada and Germany;
- European Member States, Czech Republic, Greece, Poland, Slovakia and Kosovo and
- Turkey
- India

In India, the impact of closing of coal mines will be gradual as coal production may continue to increase till around 2040. The provision of funds is in place and a structured and coordinated use of such funds can largely result in Transition. Keeping the existing welfare schemes in view, the available funds and resources may be aligned to achieve the overall objective of Just Transition.

Coal dependent countries would be required to plan and prepare for a long term Just Transition in the sector. Global experience on Just Transition varies considerably on roles and responsibilities of different stakeholders with respect to technical and environmental closure of coal mines and obligations to support impacted people and communities. Just Transition planning starts well before mine closures with inclusive dialogue across a diversity of stakeholders shaping the vision for transition. Informed decisions come from understanding broader linkages of coal with the local economy where social impacts from closure are widely distributed across varying parts of the labor force and communities. Thus, the G20 or developed countries may support the just transition process in coal dependent countries by providing requisite financial and technological assistance to adopt low carbon economic activities for sustenance of coal dependent communities in coal regions.



## Section-1

# Just Transition – An Introduction

## 1.0 Preamble

Coal has been one of the dominant energy sources world-wide for more than a century. Its geologically wide distribution has made it an accessible fuel to a significant percentage of the world's population.

However, with the advent of global warming and climate change, the importance of long-term low emission development strategies is gaining traction along with a thrust on moving towards non-fossil fuel-based energy sources.

The term "*Just Transition*" became prominent during the United Nations Climate Change Conference (COP 21, held in Paris in 2015) as a part of the shift towards low carbon energy systems to keep global warming within acceptable limits. It was emphasized that such a transition becomes a "*Just Transition*" by ensuring that livelihoods of the impacted people are secured.

## 1.1 Just Transition – Indian Context

Indian coal industry has played a crucial role in the economy and energy sector of this country. As per available literatures, Indian population has grown from 169 million in 1800 to 243 million in 1900s, followed by 376 million in 1950, rising to 1 billion in 1997 and currently stands at approx. 1.4 billion<sup>1</sup>. This has led to a continuous rise in energy demand fueled by rising economy and developmental needs. Thus, maintaining an efficient and stable energy matrix is crucial in order to fulfil the aspirations of a developing country like India, and coal has played a vital role owing to its affordability and availability as an indigenous resource.

At the same time, India understands the gravitas of climate change and uphold its *Panchamrit* commitments and push for low carbon and climate friendly growth model. Accordingly, the country has chosen a middle path and aims to pursue a balanced growth model based on the principles of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC).

It must also be noted that India's per capita consumption of coal in 2019 was half of the world's average. Hence, instead of a singular focus on lowering coal consumption, the key element for overall strategy is based on lowering total emissions<sup>2</sup>.

Thus, despite thrust on renewables, coal will continue as a primary source of energy, with projections suggesting increase in coal demand up to 1.5 BT by 2030 and peak demand may be foreseen around 2040.

The closure of coal mines need to be handled in a scientific and objective manner in order to ensure that the livelihoods of the impacted people are secured. In this regard, the idea of "*Just Transition*" – refers to a just, fair and equitable transition for all stakeholders impacted by closure of coal mines.

<sup>1</sup>Population of India 1800-2020 | Statista

<sup>2</sup>MoEFCC. (2022). India's long-term low-carbon development strategy. Ministry of Environment, Forest and Climate Change, Government of India

## 1.2 Rise of the Coal Industry in India

Coal has been part of India's economic growth history, since 18<sup>th</sup> century. It was first commercially mined in 1774 from Raniganj coalfield, West Bengal. With the advent of the Industrial Revolution during the 1850s and the thrust on the development of railway networks in the subcontinent by British interests, commercial demand for coal led to the development of coal mines.

After gaining Independence, and with the advent of 5-year plans, the need for increasing coal production efficiently through systematic and scientific development of the coal industry was deemed crucial. The rise of coal production in India since independence till date has been presented in Figure 1.

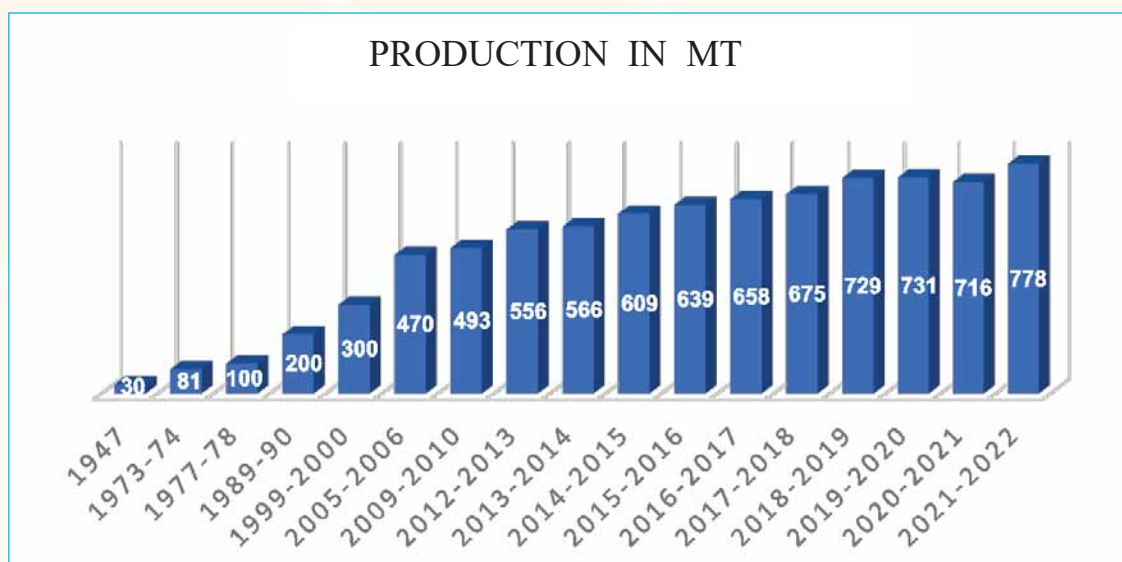


Figure 1: Rise of Raw Coal Production in India after independence

## 1.3 Coal Reserves in India

India does not lack coal deposits: tertiary era deposits located in the northern states of Assam, Jammu and Kashmir, brown coal scattered in states far apart (Tamil Nadu in the south, Gujarat and Rajasthan in the west), and Gondwana coal account for 95.5% of India's solid fuel reserves. The coal deposits are concentrated in the states of Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana, Maharashtra, Bihar, Andhra Pradesh, Uttar Pradesh, Meghalaya, Assam, Nagaland, Sikkim & Arunachal Pradesh.

The inventory of Geological Resources of Indian Coal (as of 01.04.2022)<sup>3</sup>, prepared by the Geological Survey of India, is based on resources estimated by CMPDI, GSI, MECL, SCCL, and some Private / Public entrepreneurs. The highlights of the inventory are:

<sup>3</sup>Coal Inventory | Central Mine Planning & Design Institute Limited, CMPDI

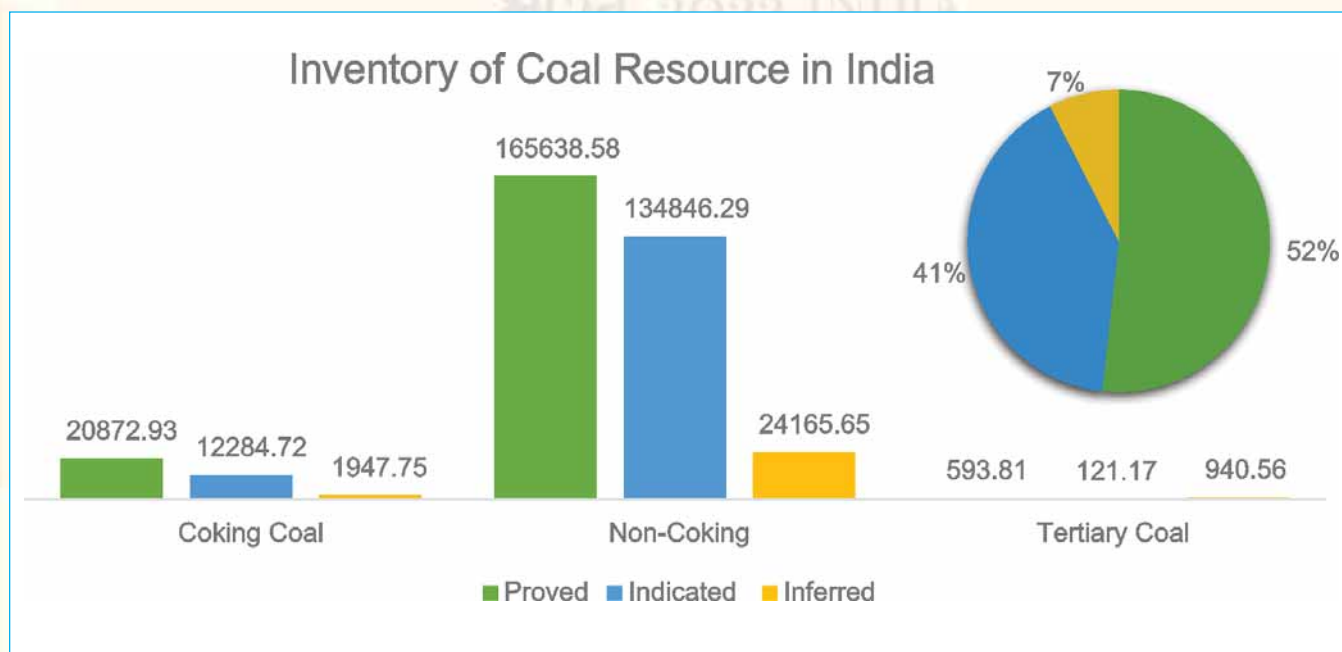
- 361 Billion Tonnes of geological resources of coal have so far been estimated in India, up to the maximum depth of 1200 m. (Ref. Table 1)

Table 1: Inventory of Coal Resource in India (as of 1/04/2022)

(Resource in million tonnes)

Coal Type	Proved	Indicated	Inferred	Total	% share
Prime Coking	4673	645	0	5318	1
Medium Coking	15670	10648	1761	28080	8
Semi Coking	530	992	186	1708	0
Sub-Total of Coking	20873	12285	1948	35105	10
Non-Coking	165638	134846	24166	324651	90
Tertiary Coal	594	121	941	1656	0
Grand Total	187105	147252	27054	361411	100
% share	52	41	7	100	

Source: The Inventory of Geological Resources of Indian Coal (as of 01.04.2022), prepared by GSI



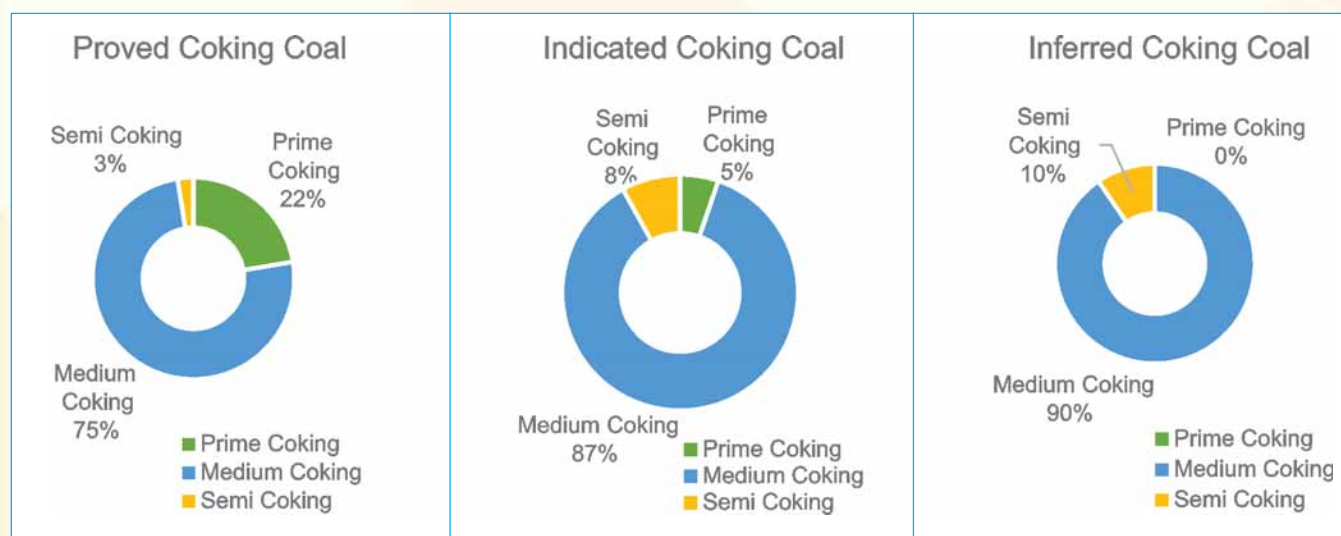


Figure 2: Inventory of Coal Resources in India (Million Tonnes)

The depth-wise and category-wise break-up of Indian coal resources presented in Table 2 below:

Table 2: Depth-Wise and Category-Wise Break-up of Indian Coal Resource

(Resource in million tonnes)

Depth Range (m)	Proved	Indicated	Inferred	Total	% share
0-300	129497	61630	7695	198822	55
300-600	36445	66027	12796	115268	32
0-600 (for Jharia only)	14366	442		14808	4
600-1200	6798	19153	6563	32514	9
<b>Total</b>	<b>187105</b>	<b>147252</b>	<b>27054</b>	<b>361411</b>	<b>100</b>

Source: The Inventory of Geological Resources of Indian Coal (as of 01.04.2022), prepared by GSI

The estimation of total resources of coal, as on 1<sup>st</sup> April 2022, has increased by 9285.49 Mt as compared to last year, whereas 'Measured/Proved Resources' has increased by 9926.38 Mt, as shown in Table 3 below:

Table 3: Comparative Resources for the Last Two Years

(Resource in million tonne)

Inventory as on	Proved	Indicated	Inferred	Total
1 <sup>st</sup> April 2022	187105	147252	27054	361411
1 <sup>st</sup> April 2021	177179	146949	27998	352126
<b>Difference</b>	<b>9926</b>	<b>303</b>	<b>-944</b>	<b>9285</b>

Source: The Inventory of Geological Resources of Indian Coal (as on 01.04.2022), prepared by GSI



## 1.4 India's NDC

India has consistently made ambitious commitments at the UNFCCC and its Paris Agreement. India's Nationally Determined Contribution (NDC) submitted to the UNFCCC in 2015, inter alia, committed to

- 1) To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.
- 2) To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030
- 3) To create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.

In line with these commitments, the emissions intensity of India's GDP had already reduced by 24 percent from 2005 levels until 2016<sup>4</sup>. Also, as of January, 2023, the share of non-fossil fuel sources in the country's installed electricity generation capacity had climbed to 42.36%<sup>5</sup>.

This indicates that India has overachieved one of its Nationally Determined Contributions (NDCs) announced at Paris Climate Summit (2015) by already meeting 40 percent of its power capacity from non-fossil fuels as of November 2021 – almost nine years ahead of its targeted commitment. The country is thus on track to meeting its NDC targets.

Further, building upon Hon'ble Prime Minister, Narendra Modi's *Panchamrit* pledges (five nectar elements) at COP26 in Glasgow, including the target of net-zero emissions by 2070, India updated its NDCs in August 2022 with the following targets:

- a) *Meet 50 % of India's cumulative electric power installed capacity from non-fossil sources by 2030.*
- b) *Reduce the emission intensity of GDP by 45 % below 2005 levels by 2030.*
- c) *Put forward and further propagate a healthy and sustainable way of living based on the traditions and values of conservation and moderation, including through a mass movement for LiFE – Lifestyle for Environment as a key to combating climate change.*
- d) *To create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.*



Figure 3: COP 26 Glasgow Panchamrit Goals

<sup>4</sup>MoEFCC. 2021. India: Third Biennial Update Report to The United Nations Framework Convention on Climate Change. Ministry of Environment, Forests and Climate Change, Government of India. [https://unfccc.int/sites/default/files/resource/INDIA\\_%20BUR-3\\_20.02.2021\\_High.pdf](https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf)

<sup>5</sup>MoP.2023: <https://powermin.gov.in/en/content/power-sector-glance-all-india>



## 1.5 Just Transition – Strategies & Actions for India

As iterated in India's long-term low carbon development strategy (LT-LCDS) submitted to UNFCCC by MoEF&CC, safeguarding India's energy supply can only be achieved through maintaining a diverse mix of supply sources, which includes rational utilization of coal. In this regard, "*Just Transition*" in the Indian context will require a focus on the following aspects<sup>6</sup>:

- Supporting social and physical infrastructure
- Ecological restoration of affected areas
- Building capabilities of communities
- Seeding new livelihood generating activities

This needs to be complemented with requisite financing mechanisms and institutional frameworks involving coal companies, stakeholders as well as administrative and regulatory bodies.

MoC has also placed a major thrust on Just Transition in Vision India @ 2047, considering its importance and long-term impact. MoC has identified the following sub-goals towards achieving *Just Transition* and has defined strategies and actions required to achieve the same:

- Developing a comprehensive mine closure plan
  - ✦ Creating & enabling statutory regimes and institutional arrangements
  - ✦ Building a roadmap for mine closure till 2047 and beyond
- People & communities
  - ✦ Ensuring the livelihoods of affected people
  - ✦ Sustenance of social and other infrastructures
- Leaving a sustainable environment
  - ✦ Environment remediation
  - ✦ Repurposing land and asset

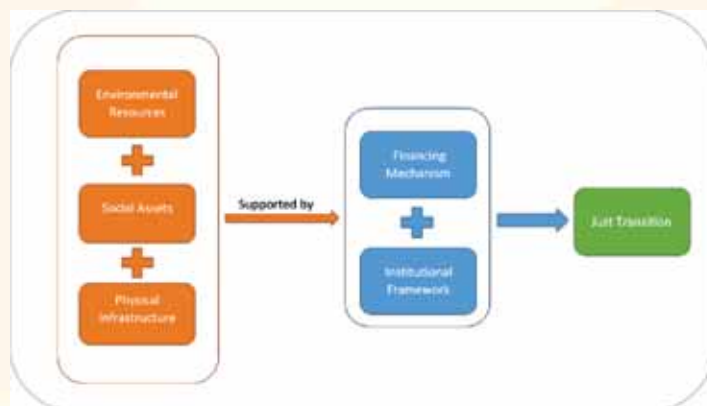


Figure 4: Aspects under Just Transition



Figure 5: Strategies & Actions for Just Transition as per Vision India @ 2047

<sup>6</sup>MoEFCC. (2022). India's long-term low-carbon development strategy. Ministry of Environment, Forest and Climate Change, Government of India

## Section-2

# Coal/Lignite Sector - Present Scenario & Future Outlook in India

## 2.0 Indian Coal Sector – Present Scenario

Across the globe, India is the second-largest producer of coal, preceded by China<sup>7</sup>. Coal has remained the mainstay of India's energy sector over the years, and it still accounts for about 50% of the present primary energy mix.

As India grows economically, its energy needs will continue to be met by coal, even though renewables will play a major role. Total coal consumption in India is yet to peak. With the present trend of evolving the energy sector, it is likely that coal demand may peak around 2040 or beyond and subsequently undergo a gradual tapering given the rise of share from renewables.

India's coal imports have also increased alongside production, primarily to bridge the demand-supply gap for various industrial sectors, mainly thermal power plants, cement, and sponge iron plants. With the drive to reduce imports to favor domestic production, it is expected that coal production in India would increase in the medium term.

Revenues from taxes and levies also constitute a major source of income for the State & Central governments. Coal transportation by rail is a major source of revenue for Indian Railways. Any impact on the coal sector will affect the railway sector as well. Fig 7 depicts the volume of coal transported by the Indian Railway<sup>8</sup>.

Besides being intricately woven into the country's economic fabric, coal plays a central role in the social construct, particularly in mining regions.

Coal mining is a crucial source of employment in central coal-producing districts of India. Although the formal (direct) employment in coal mines is estimated at 0.5 million,<sup>9</sup> due to the high proportion of informal works associated with the coal sector, it is estimated that many more are indirectly dependent on coal for livelihood.

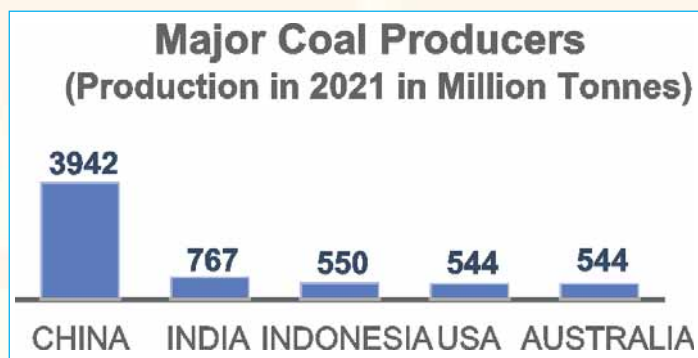


Figure 6: Major Coal Producers Across the Globe

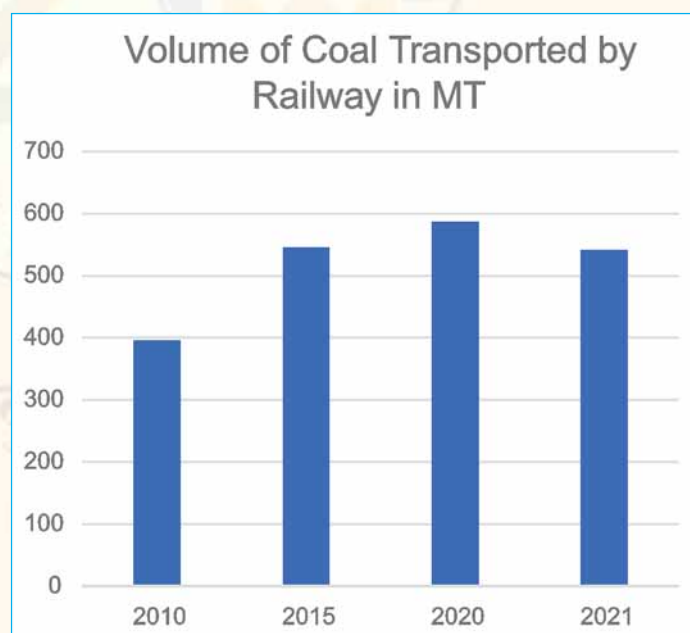


Figure 7: Volume of Coal Transported by Indian Railway

<sup>7</sup><https://www.globaldata.com/data-insights/mining/the-top-five-coal-producing-countries-million-tonnes-2021/>

<sup>8</sup><https://www.statista.com/statistics/1201974/india-coal-transported-by-railway/>

<sup>9</sup>IEA, India 2020, Energy Policy Review

Coal mining in India is led by Coal India Limited (CIL), having around 80% contribution to total domestic coal production. The number of running coal mines in the country is 400 – of which CIL operates 318 mines, SCCL operates 42 mines, NLCIL operates one mine and balance 39 mines operated by captive and others.<sup>10</sup>

## 2.1 Indian Coal Sector - The Transition Phase, Until 2030

Hon'ble Prime Minister of India, during his 75<sup>th</sup> Independence Day speech, has mentioned that India will have to pledge to become energy independent before its 100 years of its Independence. At present India is heavily dependent on imports for its oil and gas needs. Considering the requirement of diversification of energy sources and keeping in mind the need to provide support to communities impacted during transition phase, alternate energy sources must be explored and promoted.

Coal gasification is considered as cleaner option as compared to burning of coal especially when carbon is captured in the form of urea *etc.*

Coal gasification efforts were renewed with advancement of technology. Talcher Fertilizer Limited (TFL), an upcoming plant, is going ahead with mixing of pet coke in high ash domestic non- coking coal for urea production.<sup>11</sup> Ministry of Coal has taken several steps in order to achieve targeted 100 MT coal gasification projects in India by 2030.

## 2.2 Vision India@2047<sup>12</sup>

In order to minimize the carbon footprints of coal mining, coal and lignite companies are keen on promoting renewables. Coal companies are going for both roof-top solar and ground-mounted solar projects. It is also planned to build solar parks in some of the reclaimed mining areas. As of 31<sup>st</sup> March, 2022, coal and lignite PSUs had installed solar capacity of about 1598 MW and windmill capacity of 51 MW. During the next five years, it is planned to install 5560 MW of renewable capacity.<sup>13</sup>

As per Vision India@2047, prepared for the resource sector, the period till 2047 will witness the highest growth of our economy. The salient points of growth are likely to be as under:

- Increased population (~ 1.6 billion by 2047) and per capita income (\$22,593 by 2047) are expected to drive energy consumption
- India's energy consumption growth rate (CAGR of ~ 3%) will be one of the largest globally
- Energy requirement will grow till ~ 2045 and is then projected to flatten
- Clean energy transition will significantly increase demand for new-age minerals (lithium, rare earth elements, etc.)
- Overall emission is projected to peak around 2045, though emission intensity will reduce significantly

The resources sector will provide a strong impetus for India's economic growth. It is envisaged that by 2047, India will be:

- Among the top 3 countries in RE capacity – ~ 90% of electricity capacity from non-fossil sources
- Leader in Climate Action – delivering on enhanced climate commitments

<sup>10</sup> As per submission by Ministry of Coal in response to Parliamentary Question No. 1310 in Rajya Sabha | [AU1310.pdf \(pqars.nic.in\)](#)

<sup>11</sup> National Coal Gasification Mission, MoC, [ncgm21-09-21.pdf \(coal.gov.in\)](#)

<sup>12</sup> India Vision@2047 for Resource Sector

<sup>13</sup> Promoting Renewable - Moving towards net zero carbon, Ministry of Coal, <https://coal.gov.in/en/sustainable-development-cell/promoting-renewable>



- Export hub for green hydrogen – annual production of 25 million tonnes
- Among the top 2 countries in refining & petrochemicals – doubling of refinery capacity by 2047
- Enhanced electrification of the economy – doubling the share of electricity in the energy mix
- Global leader in biofuels – ethanol, compressed biogas, biodiesel, etc.
- Self-sufficient in strategic minerals – achieve full exploration of Indian geography

### 2.3 Renewable Energy

Although the share of non-fossil fuel sources in the country's installed electricity generation capacity has climbed to 42.36 percent, efforts are still on to support the development of new & renewable energy in the country.

India has committed to achieve 500 GW of installed energy capacity from non-fossil fuel sources by 2030. To achieve the same, numerous measures are being taken, such as, permitting Foreign Direct Investment (FDI) up to 100% in the automatic route, waiver of Inter State Transmission System (ISTS) charges w.r.t sale of solar & wind power commissioned by Jun'25, setting up of Ultra Mega Renewable Energy Parks and Project Development Cells, schemes like Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM), Solar Rooftop Phase II, 12000 MW CPSU Scheme Phase II and Green Energy Corridor Scheme, among others.<sup>14</sup>

### 2.4 National Circumstances

The national circumstances govern India's policy outlook on the basis of equity, in accordance with the principles of CBDR-RC. India aims to pursue its development goals according to national circumstances while keeping within its fair share of the global carbon budget.

The following factors are to be taken into account –

- India is still a developing economy and substantial efforts are still needed to provide a reasonable quality of life to the community.
- The composition of the energy mix will depend upon available options to provide reliable and quality power to the community.
- The renewable energy resources are characterized by uncertainty in output through temporal and seasonal variations. In addition, they have the additional problem of grid integration.
- Gasification of coal in India is slightly different from other countries as our coal is of drift origin, with high ash content and it varies considerably within the seam and from seam to seam. Gasification of Indian coal requires altogether a different technological set up which may be available in future.
- The estimated coal reserve in India is adequate to meet the country's requirement in future and provides a dependable and cost effective source of energy.
- The role of critical minerals for energy transition is essential and will require self-sufficiency. The import of such minerals is another issue that will play a crucial role for energy transition.
- Coal is not the sole resource that contributes to GHG emissions but oil and natural gas sector is also contributor to GHG emissions.

<sup>14</sup> Extracted from reply submitted against Parliamentary Question by MNRE ([AU441.pdf](#) ([pgals.nic.in](#)))

## 2.5 The Path Ahead – Road to Net Zero by 2070

As per the existing national circumstances, it is evident that India has to ensure development on one hand and on the other, it has to fulfil the commitment made to UNFCCC for reduction of emissions. The energy mix of India will therefore have share of all the energy resources like coal, oil, gas, renewable energy, etc. Nevertheless, India will continue to work towards achieving the targets of renewable energy for the clean energy transition. However, it is sensible not to depend solely on one source of energy but rather on a combination of energy resources to safeguard the energy security of the country. In practice, India may need to retain a mix of different technologies in the energy sector for some time until the renewables plus storage ecosystem gets fully robust. It would require considerable R&D and building human and infrastructure capacity to evolve technologies and methodologies that address issues in CCS related to high capital costs, safety, logistics, and high auxiliary power consumption.

### 2.5.1 Ethanol Economy

On the occasion of World Environment Day, 5 June 2021, Hon'ble Prime Minister Shri Narendra Modi released the report of the **Expert Committee on Roadmap for Ethanol Blending in India by 2025**.<sup>15</sup>

The government of India has started the production of flex-fuel in India. These are classified as E95, E90 and E85 depending on the petrol-ethanol ratio. Toyota Corolla Altis Hybrid is a first-of-its-kind pilot project vehicle that is based on Flexi-Fuel Strong Hybrid Electric Vehicles (FFV-SHEV) technology



Figure 8: Ethanol Blending in India

### 2.5.2 Green Hydrogen Mission

The Union Cabinet, chaired by the Hon'ble Prime Minister Shri Narendra Modi, has approved National Green Hydrogen Mission on 04.01.23.<sup>16</sup>

The Mission will result in the following likely outcomes by 2030:

- Development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonnes) per annum with an associated renewable energy capacity addition of about 125 GW in the country
- Over INR Eight lakh crore in total investments
- Creation of over Six lakh jobs
- Cumulative reduction in fossil fuel imports over Rs. One lakh crore
- Abatement of nearly 50 MMT/annum greenhouse gas emissions

<sup>15</sup> <https://www.niti.gov.in/expert-committee-roadmap-ethanol-blending-india-2025>

<sup>16</sup> Cabinet approves National Green Hydrogen Mission: 04 JAN 2023 4:14PM by PIB Delhi: <https://pib.gov.in/PressReleasePage.aspx?PRID=1888547>



The Mission will have wide ranging benefits- creation of export opportunities for Green Hydrogen and its derivatives; Decarbonisation of industrial, mobility and energy sectors; reduction in dependence on imported fossil fuels and feedstock; development of indigenous manufacturing capabilities; creation of employment opportunities; and development of cutting-edge technologies.

## 2.6 Just Transition – Present Scenario & Future Outlook

At present, the closure of mines in India is governed by Mine Closure Guidelines (issued in 2009 & recently amended in May 2020). The salient features of the existing guidelines include the need for a progressive as well as final Mine Closure Plan (MCP), the need for Escrow Fund against planned mine closure activities, and regulation by Coal Controller's Organization (CCO). In India, CCO is the administrative authority to grant permission for the opening, regulating and closing of mines, amongst others.

### 2.6.1 Existing Mine Closure Guidelines

The existing mine closure guidelines aim to restore the area back to its original as far as practicable or to an improved condition. Every Mine Closure Plan (MCP) has two parts –

- Progressive MCP addressing mine closure activities during mining – reviewed every 5 years
- Final MCP addressing mine closure activities towards the end of mine life, till completion of restoration – to be revised and approved at least 5 years before end of mine life

The post-closure period is considered as 3 years for UG & small OC mines and 5 years for big OC mines (stripping ratio > 6). The final MCP is treated as complete, and the certificate is issued by CCO after the completion of final closure activities and 3rd party audit.

Additionally, guidelines were also recently issued on 28.10.2022 for mines discontinued/abandoned/closed before 2009:

- To ensure the scientific closure of such mines,
- To ensure benefits to coal dependent communities,
- Prevent illegal mining & ensure safety,
- Repurposing of the mined-out land

### 2.6.2 Existing Mine Closure Financing Mechanism

The total Mine Closure fund is calculated based on the land area (@ INR 9 lakh per hectare for opencast mines and INR 1.5 lakh per hectare for underground mines) and adjusted for Wholesale Price Index (WPI) considering 01.04.2019 as the base date. The total Mine Closure fund calculated is then distributed across the life of the mine and compounded to incorporate an annual increment of 5%. The coal company (owner) is required to deposit the annual Mine Closure fund so calculated, in an Escrow Account (being a tripartite account between Bank, Owner and CCO) as security. Based on the certified expenditures incurred towards the progressive mine closure activities, upto 50% of the amount accumulated in the Escrow Fund or actual expenditure on progressive mine closure activities whichever is less, may be released every 5 years. On

completion of all mine closure activities, the remaining fund in the Escrow Account, is released back to the owner. As for the management of mines discontinued/abandoned/closed before 2009, mine closure may be done by respective coal companies, in line with the Mine closure guidelines updated from time to time and coal companies can impose cess on coal production for proper closer of these mines.

### 2.6.3 Implications of Coal Mine Closure

The closure of mines may pose one or more of the challenges - Re-employment potential and job creation potential in coal mine employees as well as other people engaged in ancillary enterprises

- Loss of revenue to the states on account of the cessation of revenue streams from royalty, coal cess, and DMF
- Withdrawal of support on social ventures like hospitals, schools, other CSR avenues, and infrastructures associated with electricity & water supply

In the Indian context the coal demand is yet to peak so the implications of the mine closure will take almost a decades time to come and will be gradual.

### 2.6.4 Just Transition – Way forward

In order to work towards a “Just Transition”, it is imperative to focus on the following aspects-

- Environmental Resources & Physical Infrastructure
  - Technical & Biological Restoration
  - Repurposing land & mine assets
- Social Assets
  - Sustenance plan for existing social infrastructures
  - Short term & long-term livelihood support for the impacted community
  - Reskilling & redeployment of existing manpower
  - Capacity building for communities
- Funding mechanism & Institutional Framework
  - Role of coal companies
  - Role of Central / State / Local governments
  - Stakeholder consultations

The present mine closure framework speaks about the reclamation of mined out areas. The aspects associated with the sustenance of impacted local communities, provisions for continuing community infrastructures may be addressed through active role of Central / State / Local governments or SPE.

The above aspects combined together will encompass not only the physical & environmental aspects of closure but one that also ensures sustenance of livelihood for the people and communities dependent on these mines.

It is to be mentioned that the CBA (A&D) Act, 1957 did not have any provision for using the land acquired under the act for any other purpose except for coal mining. But MoCs OM dated 22.04.2022 has made it

possible to use this land for energy related infrastructure and other projects also, such as Washery, Power plants (Both Coal and Renewable), Railway Sidings, Roads, R&R projects, Hospitals, etc.

## 2.7 Stakeholders

It is crucial to consider the suggestions and inputs from key stakeholders to ensure a smooth and efficient *"Just Transition"* for the parties involved. The major stakeholders include the coal companies, communities dependent on the coal mining sector (economically poor people residing in resource-rich regions), transportation sector (mainly railways), steel & cement sector, allied industries, as well as state and central government (who benefit immensely from taxes and royalties paid by the coal companies).

## 2.8 Good Practices in Indian Context

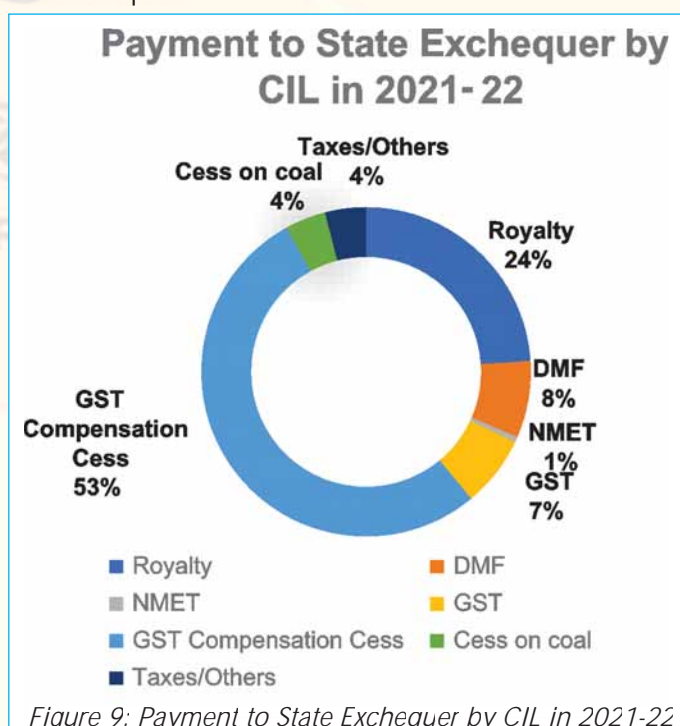
The Good Practices, both with respect to International Scenario and Indian Context, are detailed in the next section. However, some of the leading practices in the Indian Coal Mining Sector are as below-

- Mine water in old abandoned quarries is being used to supply potable water to nearby habitation.
- Irrigation water being supplied to encourage farming.
- Pisciculture in old water filled quarries/ left out final mine void.
- Infrastructures like Schools, Hospitals and Houses handed over to local Government for their continuous use.
- Eco-parks are being developed in reclaimed mined out lands and linking them to the tourism circuit. (Saoner, Ananya Vatika, Gunjan Park etc.)
- Orchards and Agriculture being developed in reclaimed mined out land. (Muraidih Mine, BCCL)

## 2.9 Existing Contribution of Coal Sector for Indian Economy

The Indian coal sector is guided by the MMDR, Act, 2015; Companies Act, 2013 and other statutory guidelines and contributes through the following towards the state exchequer:

- Royalty on the sales of the coal produced as per applicable norms. The existing rates of royalty in respect of major minerals (excluding coal, lignite and sand for stowing) were last revised vide gazette notification number G.S.R. 574(E) dated 13.8.2009. The rates of royalty in respect of Coal including Lignite were revised vide notification number G.S.R. 349 (E), dated the 10<sup>th</sup> May, 2012 by the Ministry of Coal. The rates of royalty in respect of Sand for Stowing were revised vide notification number G.S.R. 214(E) dated the 11th April, 1997 by the Ministry of Coal. The rate of royalty on coal shall be @ 14% ad-valorem on price of coal, as reflected in the invoice, excluding taxes, levies and other charges whereas that for lignite is 6%.



- District Mineral Fund (DMF) for mine area development as per applicable norms, which shall not be more than 33% of royalty paid.
- National Mineral Exploration Trust (NMET) fund to undertake coal exploration as per applicable norms, which shall be 2% of the royalty paid.
- GST Compensation Cess @ Rs 400 per tonne of coal as per the directive of the Government of India
- Funding for Corporate Social Responsibility (CSR) as per the Indian Companies Act, 2013, or CSR Policy of coal companies.
- CER as per the directive of MoEFCC, Government of India.
- Mine Closure funding through opening of an escrow account with the Coal Controller of India.

### Box- 1

#### Socially Inclusive Indian Coal Sector

In the existing framework, the coal mining companies are operating on the principle of sustainable and socially inclusive coal mining. The just transition is not an activity to be taken up on closure of mine, but continues along with the mining operations. The measures taken by coal companies are:

- The redeployment of its workforce affected due to mine closure,
- R&R of project affected families,
- Development of resettlement sites and providing basic amenities at such sites,
- Intensive CSR measures, CER activities and implementation of activities arising out of public consultation.
- CIL alone spent over US \$ 6 billion on various taxes, levies, CSR *etc.* in the financial year 2021-22 and over US \$ 5 billion on salary, wages and welfare of its employees. Other coal PSU also spend on taxes, levies and company employees.



## Section-3

# Best Global Practices for a Just Transition in Coal/Lignite Sector

### 3.0 Global Trends—Supporting Coal Regions for a Just Transition

The global experience on disruption within coal mining and associated coal mine closure is dominated by the effect of (a) automation and digitization to improve operational efficiencies, and (b) resulting job losses where coal mining substitutes capital for labour, which is prevalent even when production remains constant or increases. A profound loss of labour, with the associated impacts on communities, has been ongoing for decades. Looking back to the 1980s, coal mining employment was over 416,000 in Poland, 365,000 in Germany, and 172,000 in the United Kingdom (UK). In these countries, governments took measures to shed a significant share of workers in an effort to recover loss-making operations, a strategy that served only to delay the inevitable—the unscheduled closure of many coal mines. Today, Germany’s coal mining employment is under 15,000, and in Poland, where mining activities are ongoing, total coal mining employment is around 93,000. The trajectory in the United States (US) has been relatively gradual, dictated more by market forces, dispersed private ownership, and new open-pit investments in western states.

No coal producing nation has yet to complete a just transition in relation to coal mine closure, but many have yielded valuable lessons learned along the way. These lessons have been considered in the design of the just transition framework, which is structured around the following *three thematic pillars* and is now being used by multilateral development banks (MDBs) and other external agencies.

**Pillar 1: Institutional governance: Central and regional governments must lead by strengthening policies, regulations, and the coordination of processes.** Successful planning for regional transition hinges on input from a broad range of diverse stakeholders, often concentrated at the local/regional level. National, subnational, regional, and local leadership play important and varying roles in the evolving energy economy and should lead a just transition that satisfies local needs and respects the community’s vision for the future. Agile government actions, that are highly coordinated and have clarity on roles and responsibilities across a broad stakeholder group, ensures strong communication and consultation, so that communities are enabled to drive change and build the future.

**Pillar 2: People and communities: These form the core consideration of any just transition away from coal.** The physical closure of a coal mine marks the abrupt and often difficult beginning of a social and labour transition. It is critical to have a clear understanding of the poverty and social impacts and to engage labour (organized and informal), and communities in the preparation, management, and repurposing of land and infrastructure. Reskilling workers, rebuilding the local economy, and repurposing can lead to a regional transformation and new investments and opportunities.

**Pillar 3: Repurposing land and infrastructure assets: Environmental remediation and protecting the remaining assets and natural resources for beneficial future use is a financially demanding process.** Coal production and consumption will have degraded the surrounding environment for decades. Policies and regulations often need reform, so that they do not require the land to be reinstated to the condition that it was prior to coal use, but rather to remediate it to a condition that de-risks new uses. Remediating land with an array of



potential new uses in mind ensures more efficient use of scarce public resources working in partnership with private sector investors. The public-private partnerships approach can be implemented by establishing a single entity, called a special purpose entity (SPE), to manage repurposing on a dedicated basis. An SPE can have varied composition, with governance shared between state and non-state actors. Its responsibilities could range from pure remediation and repurposing to additional scope on skilling and retraining and even work on investment attraction. Importantly, the use of an SPE can improve inter-agency coordination with the departing coal enterprise and facilitates market sounding and investor feedback on potential new uses.

### 3.1 Global Case Studies

#### 3.1.1 United States<sup>17</sup>

##### 3.1.1.1 Background

The Appalachian region is the main coal mining region in the eastern United States. The region includes all of the state of West Virginia and parts of 12 other states: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia. It is perhaps one of the most studied in terms of the drivers that have led to an incomplete socio-economic transition following significant coal mine closures. A World Bank commissioned study reviewed over 70 published research papers, resulting in an extensive set of findings.

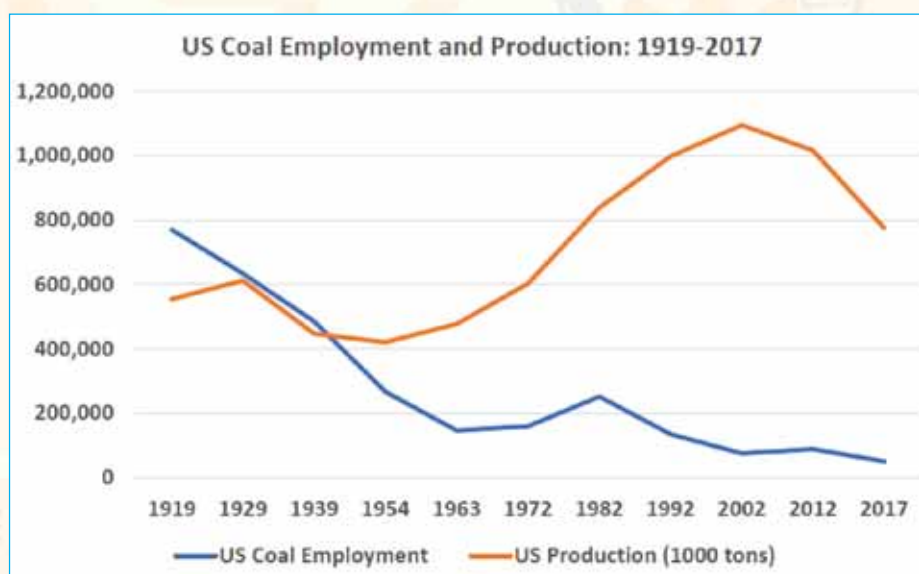


Figure 10. US Coal Employment and Production, 1919–2017

Within the United States, technology advances, higher-quality coal, and the lower production costs drove a geographical shift away from Appalachia coal regions to the American west, where Wyoming coal mines had eight times the labour productivity of the average Appalachian mine.<sup>18</sup> This resulted in significant coal employment losses across the Appalachian region, even though aggregate coal production in the US increased, as shown in Figure 10.

<sup>17</sup> Lobao, L., Partridge, M., Hean, O., Kelly, P., Chung, S., Ruppert, B., & Elizabeth, N. 2021. *Socioeconomic Transition in the Appalachia Coal Region : Some Factors of Success*. Washington, D.C.: World Bank

<sup>18</sup> *Ibid*.

The Appalachian Regional Commission was established in 1965 to address the negative economic shock faced by the Appalachian communities due to the declining coal industry. Very few Appalachian counties have managed a positive transition from coal dependence. Of the 222 Appalachian Regional Commission counties with a high level of coal activity at some the period after 1950, only four (Athens, Noble, Laurel, and Sequatchie) successfully managed to transition out of coal and remain economically viable communities with sustained population growth.

In 2016, the federal government initiated programmatic support for Appalachia by establishing the 2016 Power Plus Plan, which offered a comprehensive plan to address lost coal mining jobs and other legacy costs. This plan proposed: (a) funds for economic diversification, job creation, and employment in other sectors; (b) investments in mine workers' health and pension funds; and (c) cleanup costs for abandoned mines. The growth of solar and wind jobs can potentially absorb coal layoffs and offer long-term employment in a low-carbon economy, but there is a potential disconnect between needy workers located in the eastern states and the areas where the solar and wind jobs are to be found. The 2017 federal budget allocated US\$75 million for retraining costs and investments in the pension funds of laid-off workers in Appalachia; however, this is a small amount in comparison to overall need. Since 2017, there have been several millions of dollars invested annually to fund development activities in the region.

### 3.1.1.2 Learnings

- Coal-dominated communities fair worse according to welfare outcomes such as poverty, incomes, employment, population growth, and other measures of wellbeing. Coal mining is one of the industry sectors in the US that appears to differentiate communities that win or (more commonly) lose in the national economy.
- The time period of change matters. Communities tend to become heavily dependent on coal mining, assuming that low price cycles are temporary and that conditions will return to extended prosperity.
- Three barriers stand out in the transition from dependency on coal: (a) the degree of remoteness from cities, (b) the degree to which alternative economic opportunities are available, problems in mining areas, in part because of overspecialization where mining appears to crowd-out other industry sectors, and (c) population vulnerability, as indicated by relatively low education attainment in coal mining regions.
- The quality of the local environment and the presence of natural amenities matters—the environmental remediation of post-mining lands is essential. Locally environmentally degraded conditions hamper future development and the ability to attract tourism and other non-extractive industries.
- There is a fear of shifting to non-coal employment, include fear of potential job loss and business closures, detrimental effects on schools and retail businesses, as families leave, lack of affordable housing elsewhere, and high attachment to the community. Moreover, coal mining employment over generations creates a community bond and identity with the industry, putting blame on perceived overly restrictive policies and regulations placed on coal mining, while ignoring the larger role of markets, particularly price competition with renewable energy.
- Appalachian communities with a greater share of coal employment tend to have a lower share of sole proprietors, higher disability rates, and a proportionately higher share of people living in poverty, creating a drag on the introduction of innovative new industries. Moreover, as coal mining employs a higher proportion of men, women tend to have fewer local employment opportunities. Low capacity of local

governments is a barrier to transition. The overriding problem is replacing and stabilizing income streams, limited administrative leadership capacity (for example, little or no planning staff); limited staff, which limits the ability to apply for federal and state assistance; and low fiscal autonomy, which limits local budgeting authority.<sup>19</sup> The benefits from economic development policies typically appear to be modest and strategies tend to be overly focused on retaining or attracting a single *large* employer rather than micro, small and medium enterprises (MSMEs), which has been the more successful experience within Europe.

### 3.1.2 Poland, Ukraine, Romania and Russia: Lessons from World Bank Support<sup>20</sup>

#### 3.1.2.1 Background

As Russia, Ukraine, Poland, and Romania transitioned from centrally-planned to market-based economies in the 1980s, these countries underwent profound economic reforms. These reforms involved structural changes, which had a substantial impact on the energy markets in those countries and, in particular, on the coal sector. Coal consumption and prices were already coming under pressure in the 1980s, because of increasing competition from low-cost, less-polluting natural gas and oil. The macroeconomic reforms of the late 1980s and early 1990s added to the downward pressure on coal consumption and prices, as market-based energy pricing brought about more-efficient fuel use by households and communities and as heavy industry contracted and reduced its use of coal.

#### Box - 2

##### Lessons Learnt: Broad Policy Interventions to Address Common Economic Impediments

- *Enhance connectivity*: Remote communities need connectivity—whether in the form of roads or digital connections—to larger markets to grow, achieve scale economies, match excess labour with nearby job markets, and even to connect people to recreation and tourism opportunities.
- *Invest in human capital*: Enhancing human capital through investments in education and health will improve residents' wellbeing and help raise workers' productivity, allowing them to compete for better, higher skilled jobs and generate more added value.
- *Seek economic diversification to ease "boom and bust" cycles*: Coal-dependent communities must move beyond volatile coal boom-bust cycles associated with long-term economic and social costs. Government and civil society must facilitate new economic activities and attract investment in new job-creating enterprises that serve local or regional markets, or beyond.
- *Build local institutional capacity*: Diversifying sectors for economic activity requires institutional capacity to develop a suitable business environment.
- *Coordinate economic development strategies*: Coal districts that are economically constrained need a coordinated set of economic development strategies and approaches to (a) foster larger economic agglomeration and/or linkages to larger regional/national/global markets, and (b) exploit natural amenities in a sustainable manner that can attract demand for local services.

Source: Lobao, *et al.* 2021. Socioeconomic Transition in the Appalachia Coal Region. Washington, D.C.: World Bank.

<sup>19</sup> See World Bank. 2021. *Global Perspective on Coal Jobs and Managing Labour Transition out of Coal: Key Issues and Policy Responses*. Washington, D.C.: World Bank.

<sup>20</sup> See World Bank. 2020. *Supporting Transition in Coal Regions: A Compendium of the World Bank's Experience and Guidance for Preparing and Managing Future Transitions*. Washington, D.C.: World Bank.



For Russia and Ukraine, the coal adjustment that took place in the 1990s was an unforeseen rapid adjustment for which governments, coal industries, and coal-producing regions and communities were unprepared. In Romania, where World Bank assistance was for the overall mining sector, not just coal, the initial adjustment moved into a managed state which later evolved into more of a steady progression of mine closures over time. However, in the case of Poland, where a comprehensive hard coal sector restructuring program was approved in 1998 before any coal sector adjustment took place, adjustment can be characterized as more of a managed but relatively rapid set of closures.

Furthermore, Russia experienced significant loss of employment in coal mining while coal production increased. Coal sector adjustment started in the late 1980s and coal production fell sharply by about 1/3 from 1990 to 1994 due to falling coal sales. Government leadership established the Inter-Agency Commission for Socio-Economic Problems of Coal-Producing Regions in mid-1993 to advise the government on coal industry restructuring and a Russian Coal Reform Program approved in 1995 was undertaken with six main targets: (a) mine closure; (b) workforce reduction; (c) subsidies; (d) social protection; (e) commercialization and demonopolization; and (f) investment. By today's definition, the structural reforms had many elements aligning with just transition support. The Russian coal mining industry, having recovered from the shock of the large financial losses and having shed a significant number of workers through extensive mechanization/automation, recovered with coal production increasing.

For Russia and Ukraine, the coal adjustment that took place in the 1990s was an unforeseen rapid adjustment for which governments, coal industries, and coal-producing regions and communities were unprepared. In Romania, where World Bank assistance was for the overall mining sector, not just coal, the initial adjustment moved into a managed state which later evolved into more of a steady progression of mine closures over time. However, in the case of Poland, where a comprehensive hard coal sector restructuring program was approved in 1998 before any coal sector adjustment took place, adjustment can be characterized as more of a managed but relatively rapid set of closures.

Furthermore, Russia experienced significant loss of employment in coal mining while coal production increased. Coal sector adjustment started in the late 1980s and coal production fell sharply by about 1/3 from 1990 to 1994 due to falling coal sales. Government leadership established the Inter-Agency Commission for Socio-Economic Problems of Coal-Producing Regions in mid-1993 to advise the government on coal industry restructuring and a Russian Coal Reform Program approved in 1995 was undertaken with six main targets: (a) mine closure; (b) workforce reduction; (c) subsidies; (d) social protection; (e) commercialization and demonopolization; and (f) investment. By today's definition, the structural reforms had many elements aligning with just transition support. The Russian coal mining industry, having recovered from the shock of the large financial losses and having shed a significant number of workers through extensive mechanization/automation, recovered with coal production increasing.

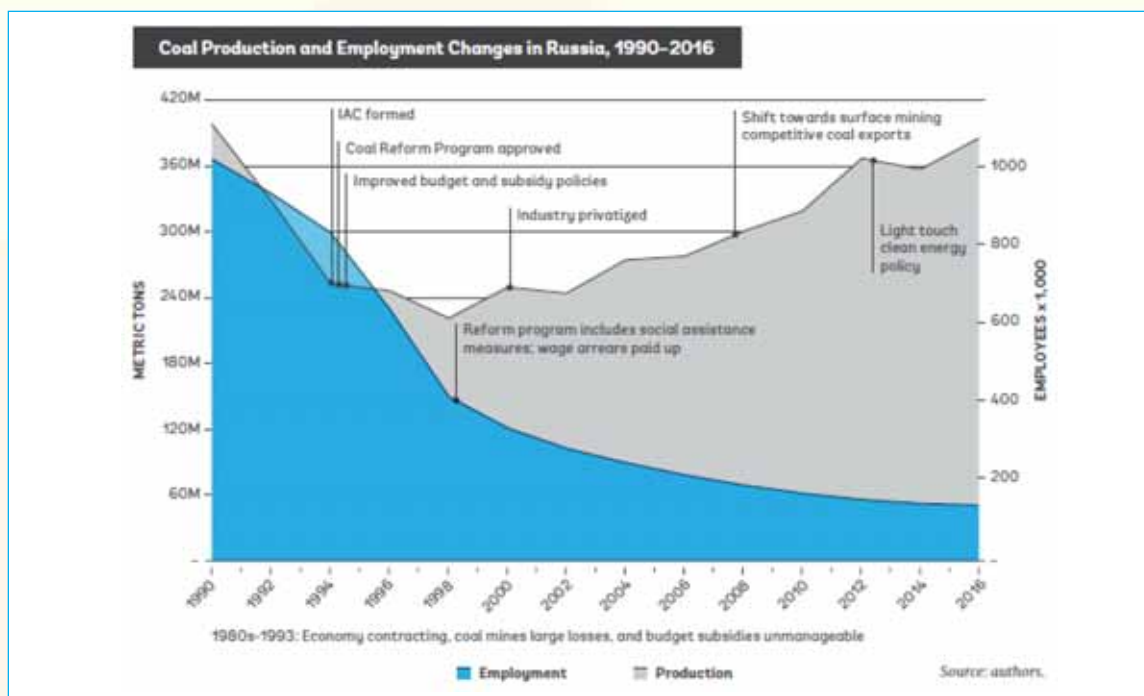


Figure 11. Coal Production and Employment Changes in Russia, 1990–2016<sup>21</sup>

### 3.1.2.2 Learnings

A range of different lessons were learned. The seven main program lessons are as follows:

- Employment downsizing and adjustment is driven not only by mine closures, but also by mining mechanization and by the shift from smaller less efficient to larger more efficient mining operations.
- Large-scale coal sector adjustment can be accomplished, but is a challenging process that will likely take decades, rather than years, and cost much more than initially expected.
- Countries that undertook early preparation and strategically planned their coal sector adjustment and downsizing were more efficient and better able to manage the negative impacts of large-scale mine closures than those that took an ad hoc approach.
- Irrespective of the country, mine closures and job losses were immediate, whereas creating alternative employment opportunities, sustaining social assets, and building community-level capacity are activities that can take many years and even decades.
- Social mitigation and rebuilding the economic base of mono-industry regions and communities, especially those that are not well connected to other areas with strong economic activity, are difficult and costly and the results may be modest relative to job losses, with the result that decades later many previously coal-dependent communities still lag socially and economically behind other areas of the country.
- Physical mine closure and post-closure monitoring and maintenance are demanding, but can be accomplished in a timely and efficient manner if updated mine closure requirements, good institutional capacity, an adequate regulatory framework, and strong planning are in place. Governments also need to ensure that the necessary, and often very substantial, funding is in place.

<sup>21</sup> World Bank. 2020. *Supporting Transition in Coal Regions: A Compendium of the World Bank's Experience and Guidance for Preparing and Managing Future Transitions*. Washington, D.C.: World Bank.



### Box - 3

#### Polish Example SRK—A Special Purpose Entity for Implementing Coal Mine Closure Work

Since the beginning of the 1990s, the Polish mining industry has been going through a process of transformation and consolidation. Hard coal production decreased from 177.4 million tons in 1989 to 55 million tons in 2021. Over the same period, employment in the Polish hard coal mining sector decreased from 407,000 to 78,900 employees (May 2021). Losses were particularly heavy in the Silesia coal mining region, where coal directly accounts for 4 percent of total employment and over 7 percent of male employment.

The Silesia region of Poland provides example of the use of a special purpose entity (SPE) to deliver more efficient coal mine closures and draw labour and other resources from the closed coal mines. In year 2000, Poland established Spółka Restrukturyzacji Kopalń S.A. (SRK)<sup>1</sup> to carry out the physical work of closing 16 of the countries coal mines between 1997 and 2002. SRK's responsibilities covered all aspects of closure, remediation, and reclamation. SRK managed assets and sold properties owned by the liquidated mines, including the removal of mining damages and reclamation of post-mining land. Land repurposing extends beyond mine closure and requires long-term involvement and developing land for further use, which requires an entity that has the competences or ability to lead the activities from conceptual phase to the fully repurposed land.

### Box - 4

#### Lessons Learnt: World Bank Support for the Coal Sector Adjustment in Poland, Ukraine, Romania and Russia

- Managing the social and labour impacts from coal mine closure is best achieved when multiple agencies participate in the policy development. Coordination across agencies is a significant challenge, as the impacts of coal mine closure span a variety of topics from social protection to a need for environmental remediation of land and infrastructure assets, leading to the economic diversification of the coal region.
- Meeting the substantial budget needs for mine closure is also a challenge given the short-term, high costs required. Often funds that have been set aside are insufficient, requiring bridging financing from external sources until such time as social protection funds can accrue and return sustainability to mine closures.
- Genuine stakeholder consultation starting at the planning stage and continuing throughout the closure process can significantly reduce the possibility of social conflict. Workers and coal enterprises must be consulted from the outset, along with community leaders and regional governments.

### 3.1.3 Canada and Germany<sup>22 23</sup>

#### 3.1.3.1 Background

In November 2015, the Canadian province of Alberta committed to a phase-out of coal power by 2030. In Alberta, the phase-out will involve the retirement of over 40 percent of Alberta's 2016 installed capacity and the de facto phase-out of local thermal coal mines.

Alberta's coal phase-out is part of the province's wider Climate Leadership Plan. To implement the phase-out, Alberta's government relies on three pillars. First, it announced a Canadian \$1.1 billion payout to coal power companies under Off-Coal Agreements that aim to ensure political longevity and foster a positive investment climate. Second, Canadian \$45 million has been allocated in programming to transition coal workers and communities. The funding for Off-Coal Agreements and transition support to workers and communities comes from carbon tax revenue. Third, Alberta launched a new electricity market design to bring in replacement power. While public opinion is still divided, Alberta's solution has gained the support of organized labour, power companies, public health advocates, environmental non-governmental organizations (NGOs), and the federal government.

- Alberta was proactive in finding ways for workers, communities and companies to endure the transition. The government recycled industrial carbon taxes into a payout for the coal power companies and designed programming for affected communities and workers.
- These actions created support for the coal phase-out in surprising places, notably among labour unions and the coal power companies. While the coal power companies may have been weakened by sustained low power prices, their size, Albertan ownership and importance as the likely developers of new electricity provided them with significant leverage.
- The labour unions were supportive of the Climate Leadership Plan and played an active role in visiting communities and providing information to workers in the absence of communication from the government. Ultimately, the labour unions influenced the extent and design of government's just transition programming.

#### Box - 5 : German example

##### **RAG Foundation—A Special Purpose Entity for Implementing Coal Mine Closure Work**

At the beginning of the 20th century, Germany was the third-largest producer of hard coal worldwide, after the US and the UK. Following World War II, hard coal formed the cornerstone of West Germany's economic, social, and political reconstruction. However, in 2018, hard coal production ended after the implementation of a 2007 law, bringing about the end of a 150-year plus industrial history.

<sup>22</sup> Gürtler, K., Low Beer, D., and Herberg, J. 2021. "Scaling Just Transitions: Legitimation Strategies in Coal Phase-Out Commissions in Canada and Germany." *Political Geography* 88: 102406.

<sup>23</sup> Vriens, L. 2018. "The End of Coal, Alberta's Coal Phase Out." International Institute for Sustainable Development (IISD), 10 May 2018. <https://www.iisd.org/publications/report/end-coal-albertas-coal-phase-out>

The RAG-Foundation is an example of a coal company restructuring itself to ensure a just end to German hard coal mining. In 2007, Ruhrkohle AG (RAG), the largest coal-producing company in Germany, restructured itself to put a large share of the assets of the group, including real estate, into the RAG Foundation. The RAG Foundation is responsible for the accumulation of capital from the foundation's assets to finance the responsibilities and liabilities left behind from 2019 into perpetuity.

The experience of the RAG is notable in having a German company subsidized at the national level and interconnected at the regional level with cities as shareholders and politicians as trustees. The state made a political decision to end coal and so bore the cost of subsidies, while the polluter-pays principle is very present in the assets built into the RAG Foundation. As Germany's longest-term investor, RAG exists to meet the perpetual liabilities left behind by the mining sector, which cannot be met by traditional business models.

#### **Lessons Learnt: Coal Enterprise as a Change Agent**

- Germany's experience is that only 20% of land was suitable for re-use, the other 80% was nationalized to be managed in perpetuity.
- This was done effectively through the nationalization of productive coal assets to create the RAG Foundation, which invested successfully over years to create an income stream that covers the cost of ongoing land management.
- The success in Ruhr Valley and by RAG Foundation was made possible through high levels of engagement by local and regional governments with the private sector.
- Through prudent management, the RAG Foundation has turned a few revenue generating assets with enormous liabilities into a private equity powerhouse capable of so much more.

#### **3.1.3.2 Learnings**

- Canada and Germany established stakeholder-driven commissions to develop proposals for just transition pathways for phasing out coal production and consumption.
- The Canadian task force showed commitment to collecting and reflecting the needs of communities in its coal regions, and to communicating these to the federal government.
- In the German coal commission, legitimization strategies focused mainly on the broad representation of interests, and on government spending for affected regions, workers, and industries. In that case, a compromise was reached that satisfied many of the diverse requirements.

#### **Box - 6**

##### **Lessons Learnt: The Case for Reforms**

- Governments (national, subnational, and local) play a critical role in just transitions through how they choose to allocate economic development dollars and direct social support. The government used the carbon tax to compensate affected electricity companies and tied that money to some level of support for workers and communities.

- A government-led intervention that included all affected parties—unions, municipalities, coal mining companies, workers, indigenous groups and the power companies—may have resulted in a more holistic solution.
- Organized labour partnered with environmental organizations to publish forward-looking reports with concrete recommendations for government.
- Organized labour served as the advocates for the municipalities with government and the Advisory Panel, as they recognized that the transition of the communities would be necessary for a just transition for workers.

### 3.1.4 European member states and accession candidates: Czech Republic, Greece, Poland, Slovakia and Kosovo<sup>24</sup>

#### 3.2.4.1 Background

This section contains case studies on the just transition of Europe's most coal-dependent regions: Ústecký Kraj (Czech Republic), Western Macedonia (Greece), Upper Silesia (Poland), Horná Nitra (Slovakia) and Obiliq (Kosovo). These aim to serve as background for necessary political and policy decisions surrounding a phase-out from coal. The following points can be drawn from these case studies:

- Local actors contribute to the transition.
- In Slovakia and the Czech Republic, initiatives to start designing transition strategies came from the coal regions themselves and were then taken to the national level. In Greece local mayors were looking for alternative ways for Western Macedonia to develop. In Poland and Kosovo, protests formed in villages affected by the expansion of mining activities.
- While transition strategies benefit from being driven by local stakeholders, guidance and policy frameworks from the national level are key as they provide stability and enable long-term planning.
- Among civil society voices, labour unions – take on different roles region by region. In Western Macedonia, Greece's largest trade union has shown support for transition efforts in the region. Environmental NGOs in all of these regions supported the transition away from coal and, in some instances, such as the Roadmap for the Transition of the Western Macedonia Region to a Post-Lignite Era, proposed how a transition away from coal could happen, but their influence in most countries is limited.
- The European Union (EU) plays a central role in supporting these processes. Those countries ascending the EU and, as part of the energy community, are already influenced by the EU's climate and energy policy. In its member states, the EU sets targets for national climate and energy policy and the EU budget is a powerful tool to support the transition away from coal.
- Moreover, nearly all coal regions are pilot regions of the EU's Coal Regions in Transition Platform. This engagement may foster a just transition but only if it is organized in an inclusive way for all local stakeholders, in particular those that are a driving force for a transition.

<sup>24</sup> REBEKKA POPP. 2019. *A Just Transition of European Coal Regions Assessing Stakeholder Positions Towards the Transition Away from Coal*. E3G Briefing Paper.



### 3.1.4.2 Learnings

A review of experiences within the Western Balkans and Ukraine by a broad group of NGOs has identified the need to (re)establish trust and bring about predictability within processes guided by strong principles, including the following:<sup>25</sup>

- **Principle 1: Be goal oriented.** Set clearly defined, consistent and measurable goals, tracked using core performance indicators, and set up within a clear time frame for planned closures.
- **Principle 2: Consult continuously across a diverse stakeholder group.** Many different stakeholders need to have a voice and influence decision-making processes. They include direct/indirect workers along the coal value chain, local community leaders and members, marginalized groups, NGOs, trade unions, educational institutions, and local businesses, etc. All of these stakeholders must be involved in planning and preparation, design of transition strategies, the selection of pilot regions, and project selection and implementation. This principle of inclusivity must apply on all levels (central, regional, local), so that planning processes are bottom-up, based on local community engagement in coal regions, while guided by leadership from the top.
- **Principle 3: Provide resources matched to commitments.** Funding must be conditioned upon local, participatory planning, using incentives to define a pathway unencumbered by opposition that leads to political reversals that keep workers and communities locked in prolonged uncertainty and indecision.
- **Principle 4: Leave no one behind in the transition.** Strong formal planning processes based on the principles of a just transition that are in alignment with national energy and/or climate plans and Nationally Determined Contributions<sup>26</sup> under the Paris Agreement.<sup>27</sup>

#### Box - 7

#### Lessons Learnt - EU

- Set clearly defined, consistent and measurable goals for a just transition.
- Consult continuously across a diverse stakeholder group.
- Provide resources matched to commitments.
- Leave no one behind in the transition.
- Principles of a just transition should be in alignment with national energy and/or climate plans.

<sup>25</sup> Excerpted, and modified to be more globally contextual, from CEE Bankwatch, *et al.* 2020. *Four Principles for a Participatory Just Transition in the Western Balkans and Ukraine*. Joint Position, December 2020.

<sup>26</sup> Implementation of the Paris Agreement requires economic and social transformation, based on the best available science. The Paris Agreement works on a five-year cycle of increasingly ambitious climate action carried out by countries. By 2020, countries submit their plans for climate action known as Nationally Determined Contributions (NDCs). See <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

<sup>27</sup> The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. See UNFCCC The Paris Agreement | UNFCCC

### 3.1.5 Turkey

In 2015, Turkey decided to build its new airport on abandoned open pit coal mines through a public-private partnership (PPP).

#### Box - 8 : Turkey Example

#### Istanbul Airport built on a repurposed opencast mine-private-public partnership project case study

##### Background.

- The new airport is located 40 km north-west of Istanbul (on the European side), bordering the Black Sea coastline.
- The project site was selected by the government of Turkey prior to the involvement of the PPP project company, the Istanbul Grand Airport consortium (iGA).
- The land within the project area boundary was primarily government-owned, with only 20 percent (approximately) privately owned.
- A portion of the site was operated by six mining companies (16 companies had licenses to mine, of which 10 licenses were inactive).
- Most of the remainder of the land was operated by Turkey's Ministry of Forestry and Water Affairs.

##### Public-private partnership model

- The project was competitively procured, with the bidding criterion being the amount of lease payments to be made to the Government of Turkey for a 25-year concession.
- The winning bid of about €22 billion was offered by a consortium of firms engaged in the construction, energy, tourism, mining, port, and airport sectors.
- The winning bidders formed a SPV company, iGA, to act as the PPP project company.
- iGA entered into a build-operate-transfer (BOT) PPP implementation agreement with Turkey's Airport Authority.
- iGA also entered into agreements with creditors and subcontractors
- iGA's projected total investment cost is about €10 billion
- Economic impact
- The new airport is expected to make the following contributions to Turkey's economy by 2025.



Abandoned open pit coal mines in Yeniköy, Turkey, in 2015



Source: Istanbul Airport Environmental and Social Impact Assessment (2015); "IST Airport", presentation at the 2021 Istanbul PPP Week Conference; Sengur, F. 2020. "Public-Private Partnerships in Airports: The Turkish Experience. *World Review of Intermodal Transportation Research* 9(3): 217–244

New Istanbul Airport, delivered as a PPP project in 2018



Photo credits: Nick Hobbs, at <https://nickhobbs.myportfolio.com/kanal-istanbul-8920-book-photos-in-order> and Sam Chui, at [https://www.youtube.com/watch?v=m-ga7DtW4&ab\\_channel=SamChui](https://www.youtube.com/watch?v=m-ga7DtW4&ab_channel=SamChui)

## 3.2 Best Practices Drawn from Case Studies in India

### 3.2.1 Eco-Restoration of Degraded Mine Sites

- The coal mining operations can lead to the emergence of mined wastelands, which impacts on the ecosystem and results in a decline in the overall productivity of the area.
- Conventional reclamation and rehabilitation efforts often aim at afforestation using large-scale introduction of fast-growing exotic species such as *Leucaena leucocephala*; Australian Acacia (*Acacia auriculiformis*), *Gliricidia sepium*, silver oak (*Grevillea robusta*), and eucalyptus species. However, in areas with fragile ecosystems and rich biodiversity, reclamation efforts need to be site-specific and tailored to support the native flora and fauna and provide ecological services.
- In such contexts, the eco-restoration of mined areas is the most appropriate considering ecological and socio-economic features. The ecological restoration of natural ecosystems attempts to recover as much historical authenticity as can be reasonably accommodated, for which it is desirable to use native species in order to assure rejuvenation of the ecosystem components. As these species have evolved through natural selection and adapted to specialized edaphic environment, using these species in the restoration of derelict lands may speed the succession process, helping the system to become stable, and matching the area with undisturbed natural forests within short span of time.
- In 2011, Bharat Coking Coalfields Limited (BCCL), a subsidiary of Coal India Limited, in association with Forest Research Institute (FRI), Dehradun and Centre for Environmental Management of Degraded

#### Box - 9

##### Lessons Learnt –Eco-Restoration

With the help of eco-restoration measures applied on degraded mine sites, the area can be transformed into an area compatible with the local ecology. This can help in restoration of ecology and biodiversity. These sites can be designed to generate sustainable income for the local community, thereby helping in the just transition of mines.



Ecosystem (CEMDE), Delhi University, started the ecological restoration of mined out, degraded land and overburden dumps. Efforts were specifically made to select species that were native to the region; that could generate a large quantity of biomass to enrich the soil; that had the ability to stabilize the soil structure; and that were of utility to the local community. Therefore, species of trees, shrubs, herbs, and grasses with multiple use value (as fuel, fodder, fruit, and medicine) were used.

- Subsequent to the success of the pilot projects, BCCL has identified surplus manpower for implementing ecological restoration departmentally. BCCL has drawn up a plan for the ecological restoration of about 226 hectares of mine degraded land in 5 years. Ecological restoration has been done over 294 hectares of mined out land/overburden dumps.
- The ecological restoration work being done by BCCL on mined out degraded lands has been recommended for adoption at other degraded mine sites.



*Figure 12. Eco-restoration of mined out areas in Sijua Tetulmari undertaken by BCCL*

### 3.2.2 Sustainable Livelihood Activities on Reclaimed Open Cast Mines: A Technology Enabled Integrated Approach

- A research project was undertaken at Muraidih mine of BCCL to develop reclaimed opencast mines for sustainable livelihood activities.
- The objective was to assess the suitability

#### Box - 10

#### Lessons Learnt-Sustainable Livelihood Generation through Reclaimed Lands

The study revealed that, through appropriate interventions, the degraded mine sites could be developed into ecologically beneficial and socio-economically productive sites and local people could be trained to form SHGs and develop entrepreneurship skills – both of which will help in achieving a just transition.



potential of ecologically beneficial and socio-economically productive post-mining land use, develop permanent green cover using mycorrhiza and various plant species of economic importance, and develop entrepreneurship and vocational skill among members of local self-help groups (SHGs) in the community, with a focus on women and other marginalized and vulnerable sections of the society.

- Through vegetation analysis at Belmi Forest Reserve near Ranchi, 17 tree species native to the region were recognized and authenticated. Based on the same, 6 species—sal (*Shorea robusta*), shisham (*Dalbergia sissoo*), bel (*Aegle marmelos*), arjun (*Terminalia arjuna*), gamaru (*Gmelina arborea*) and kachnar (*Phanera variegata*)—were raised and 14,000 saplings planted on 5 acres of land during the monsoons of 2016 and 2017. Grass seeds of *Stylosanthes hamata* and *Pennisetum pedicellatum* (deenath grass) were spread using seed ball techniques to enhance the organic carbon and nitrogen content of the soil. The saplings and soil were also inoculated with mycorrhiza to impart strength, and drip irrigation was used. Monthly monitoring was done to check for growth in terms of height and girth.
- For the linkage of forest regeneration with livelihood, the project attempted to cultivate medicinal plants and seasonal vegetables and planted fruit trees suitable to the region. The project also tested edible plant parts in the laboratory to ensure food safety standards. In addition, a micro-watershed development plan was initiated to create a manmade wetland ecosystem.
- Need assessment and resource assessment surveys in eight villages of Baghmara block were conducted to identify possible sustainable livelihoods. The capacity building activities and financial linkages were also discussed with the villagers.
- Subsequently, the expert team from The Energy and Resources Institute, School of Advanced Studies (TERI SAS) initiated capacity-building programs for local communities in various phases at the Barora Vocational Training Centre, Muraidia, with a focus on understanding the market and financial linkages in their respective sectors of work. Initial hand-holding support was also provided to enable them to start their own enterprises.

### 3.2.3 Development of Aqua Eco-System for Pisciculture and Water Tourism in Mine Voids

- Bishrampur Opencast is a closed mine site under the command of South Eastern Coalfields Limited (SECL) located in the Bishrampur Area in Surajpur District, Chhattisgarh. Quarry 6 of this mine, which covers an area of 10.57 hectares, has been developed for pisciculture and water tourism.
- The site was conceived by SECL in cooperation with the District Administration with a vision to provide a sustainable source of income to the surrounding community and create a recreational/tourism site for the local public.
- The pisciculture/water tourism site was conceptualized and developed by the Chhattisgarh State Fisheries Department, with a funding of INR 19,700,000 provided by SECL through the Mine Closure Fund for the Bishrampur area. The project's important

#### Box - 11

##### Lessons Learnt-Pisciculture and Water Tourism

The mine pit lakes in Indian coal mines could be used for various purposes like water supply, irrigation, pisciculture, and tourism. With support from engineering interventions and the training of local community, mine pit lakes can be developed as a source of sustainable income generation for the local community, which will help in the just transition of the coal sector.

features include deploying 32 pisciculture cages, a floating restaurant, and boating facilities. The implementation process began in February 2018 and was completed one and a half later in July 2019.

- This site was then handed over by the District Administration to an SHG, consisting of 30 to 40 people from the surrounding villages, who are looking after site operations and maintenance.
- The site has become a popular tourism site with a footfall of about 100 persons per day. The site has also reported an annual harvest of about 800 quintals of fish from the pisciculture cages. Thus, the success of the project has brought about sustainable livelihood opportunities for the local communities.



*Figure 13. Pisciculture & water sports centre developed at abandoned quarry no. 6 of its Bishrampur OC mine by SECL*

### 3.2.4 Mine Water Management

#### 3.3.4.1 Tourism in an artificial lake in reclaimed area and development of mini zoo–NLCIL

Abandoned mine pits in afforested areas can serve as a bowl for the collection of rainwater, creating artificial lakes. NLCIL has developed three such artificial lakes, converting the area around them into park lands and picnic spots, with flowering trees, fruit trees, and rest shelters, covering a total area of 46 hectares. A mini zoo has also been developed with spotted deer, rabbits, and peacocks, as well as boating facilities. Fish are reared in the aquarium in the park. In addition, a nursery has been established. The area around these water bodies provides a sanctuary for migratory birds, and more than 250 species of birds have settled in the area.

The mine eco-tourism park has attracted people from the local community, especially school and college students, who can spend half a day at the afforestation areas weekly. Students enjoy boating on the artificial lakes and other facilities. NLCIL has tied up with Puducherry Tourism Development Corporation Ltd (PTDC). During the festival of Vijayadashami in 2022, a memorandum of understanding was signed between NLCIL and PTDC, and the first batch of tourists visited the mine eco-tourism park. The following facilities are available at the site:

- Boating
- Birds watching
- Rainwater harvesting ponds
- Children's play area
- Mini zoo
- Spotted deer enclosure
- Cafeteria surrounded by lawns and ornamental plants/garden
- Mine viewpoint
- Divine plant area

NLC has incurred expenditures to the tune of INR 21 million for Mine-I and INR 22 million for Mine-II. The local project-affected people are engaged in eco-park projects. School children, college students, and the general public are benefitting by enjoying the area. The average yearly footfall is around 8,000 people.

#### 3.2.4.2 Use of Mine Water Agriculture and Domestic Purpose–NLCIL

NLCIL has a vision for the sustainable development of the villages surrounding its projects. At Neyveli, in Tamil Nadu, three mines (Mine-I, Mine IA, and Mine II) are in operation. Around all these mines a network of surface canals has been established for the conveyance of mine water for irrigation and domestic purpose. At Mine-II, water is conveyed through the Eastern Garland Canal, which eventually joins the Paravanar River. All the fields in Kolakudi, Valaimadevi, Kathazhai, Karunkuzhi, Nainarkuppam, Madhuvanaimeedu, and other villages are being irrigated by the Paravanar River along its banks. At Mine IA, water is discharged into nearby streams, which irrigate lands in the villages of Kalkunam, Vanathirayapuram, Thenkuthu, and Reddypalayam, Parvathipuram, among others. A portion of water is also discharged at the cut face of Mine-IA from which point water is pumped to Chennai for drinking purposes.

Along the cut face of Mine-I, the Mine water is discharged into the canals on the western side established for irrigation in the villages of Vadakuvellore, Ammeri, Adhandarkollai, Seerankuppam, Seplantham, and Mettukaupaam, among others. In total, about 40 villages are benefiting, and 25,000 acres of land is being irrigated with water from the mines. As the water is made available perennially, three crops are cultivated per year. In addition, 40 million liters per day of water is pumped to Chennai for drinking purpose. Furthermore, for the effective flow of water, the above canals/streams are desilted by the NLCIL for the benefit of farmers. NLCIL is committed to maintaining its sustainability through the economic growth and well-being of the local communities.

#### Box - 12

##### Lessons Learnt – Mine water for Agriculture and Domestic use by Community

In the Indian context, the best practice is to use terminal mine pits for conservation and mine water. The mine pit lakes developed are being used to meet the requirement of local communities, enhance the local ecology, and for pisciculture and water tourism. The reclaimed sites can also be developed into eco-parks. Such sites can be linked to income generation for local communities and to conservation.



### 3.2.4.3 Eco-Park at Gautham Khani Opencast–SCCL

On the reclaimed mined-out area in Gautham Khani Opencast, an eco-park is being established by SCCL, which is likely to be completed by January 2023.

- Development of Lawns and gardens along with theme plantation
- Development of Cacti and succulent garden
- Butterfly garden
- Water fountains
- Boating arrangement in the water reservoir
- Bird-watching arrangement on OB dumps
- Park for children
- Vinayaka Vanam
- Canteen and Rest Rooms.

The key beneficiaries of the project are residents of Rudrampur, Goutampur, and nearby villages.



*Figure 14. Eco-park developed at Gautham Khani Opencast Project, SCCL*



## Section-4

# Financing Mechanisms Adopted in Various Countries for a Transition in Coal/Lignite Sector

### 4.0 Role of Finance in a Just Transition

The role of finance in delivering a just transition is pivotal, including implementing the necessary transition policies and strengthening financial markets. The question of a just energy transition is equally, if not more, about financing and investment than about technical aspects. Implementing coal mine closure with the goal of ensuring a just transition primarily entails evaluation and the identification of necessary costs and financial instruments, and the subsequent mobilization of financial resources.

When looking at the cost drivers for coal mine closure, it is essential to consider aspects of a just transition before financial resources can be allocated and mobilized. The costs are influenced by national laws and policies pertaining to: (a) severance, unemployment benefits, and minimum wage etc.; (b) standards of environmental remediation of mine sites; (c) the ability to recycle, reuse, or repurpose lands; and (d) energy access and pricing. Costs are influenced by the government's interpretation of what is a "just transition", including the definition of workers to be covered by packages (direct and indirect), whether the goal of transition should be towards a sustainable economic recovery, determination of what is considered a "coal region", decisions about whether or not to address structural barriers to transition (infrastructure, pre-existing unemployment, and so forth).

Finally, costs are dependent on regional and geographical factors. A key test of how energy transition and investments can support the just transition is how capital is delivered at the local level. A just transition has profound geographical dimensions and will play out differently across and within countries, making a differentiated place-based approach essential. Finance will need to respond to the specific needs of localities and regions, as they implement ambitious climate transition plans.

Several key factors determine the costs of a just transition. The experiences of different countries<sup>28, 29, 30</sup> and regions suggest<sup>31, 32</sup> that these factors can be broadly grouped into six categories (see Figure 15). The costs associated with each of these components are country and context specific, and consider the scale of operation of coal industry in the country, the type of industry (public, private), the distribution of employees and workers, the development status of the country and social infrastructure, existing government policies and programs for land, environment, labour, social welfare, and so forth.

<sup>28</sup> Pollin, R., and Callaci, B. 2016. *The Economics of Just Transition: A Framework for Supporting Fossil Fuel-Dependent Workers and Communities in the United States*. Political Economy Research Institute (PERI) University of Massachusetts-Amherst.

<sup>29</sup> Furnaro, A., et al. 2021. *German Just Transition: A Review of Public Policies to Assist German Coal Communities in Transition*. Resources for the Future and Environmental Defense Fund.

<sup>30</sup> Cruywagen, M., Davies M., and Swilling, M. 2020. *Estimating the Cost of a Just Transition in South Africa's Coal Sector: Protecting Workers, Stimulating Regional Development and Accelerating a Low-Carbon Transition*. Centre for Complex Systems in Transition, Stellenbosch University, Stellenbosch, South Africa.

<sup>31</sup> European Investment Bank Group. 2020. *Coal Regions in Transition. Overview 2020*. European Investment Bank Group.

<sup>32</sup> Neal, A. 2000. *How Coal Country Can Adapt to the Energy Transition*. Environmental and Energy Study Institute. Environmental and Energy Study Initiative.



Figure 15. Key Cost Factors in a Just Transition

- **The costs of closure of coal mines**, are country and region specific, and depend on the country's regulatory provisions related to mine closure. However, experiences of mine closure costs show that often the real costs of closure are underestimated. For example, an evaluation of mine closure practices and costs in Australia based on the case of Latrobe Valley in the state of Victoria revealed the underestimation of scientific closure costs by about US\$143 million.<sup>33</sup> The mine closure assessments also conclude that, if the actual management and reclamation costs of closure are not accounted for, mining companies will leave without closing these mines properly. This worsens problems with environmental pollution and land subsidence associated with mining activities, fire, and so forth, and adds to the existing burden of abandoned mines. Therefore, emphasis needs to be placed on proper mine management throughout the life of the mine and progressive closure.<sup>34</sup>
- **The economic diversification** of coal mining areas post closure<sup>35</sup> is one of the core cost components and is aimed at providing decent employment opportunities and ensuring the reclamation and repurposing of industrial land and infrastructure.<sup>36</sup> For example, through the Structural Development Act (2020) of Germany, several investment areas were aligned with the economic diversification of its coal regions. These include investments in the reclamation and repurposing of coal-related infrastructure, investments in tertiary sector activities, such as tourism, digital infrastructure, businesses, and so forth. Other national-level measures outlined in the document include the relocation of central government offices to the regions and various business support programs.<sup>37</sup>
  - ✦ Coal mine land has also been repurposed as hubs for renewable energy, such as Sullivan Mine in British Columbia, Canada, where mine land was used to build a solar power plant with 1.05 MW capacity.

<sup>33</sup> Lock the Gate. 2016. *Mine Rehabilitation and Closure Cost: A Hidden Business Risk*. Lock the Gate Alliance

<sup>34</sup> *Ibid*.

<sup>35</sup> Pai, S. 2021. *Building Bridges to a Just Transition: Connecting India's Challenges and Solutions with International Experience*. International Institute for Sustainable Development.

<sup>36</sup> Deutscher Bundestag. 2020. "Bundestag Passes Coal Phase-Out Law." Deutscher Bundestag.

<https://www.bundestag.de/dokumente/textarchiv/2020/kw27-de-kohleausstieg-701804>

<sup>37</sup> *Ibid*

- ✦ A wind park was developed on overburden dumps in Ruhr, Germany<sup>38</sup>. Wind parks offer coal mining companies an opportunity to transition to other sustainable businesses, as done by RAG Aktiengesellschaft through its subsidiary RAG Montan Immobilien GmbH, on around 9,000 hectares of land in Germany.
- ✦ Initial just transition efforts outlined by the Governments of Scotland and Spain include key components of economic diversification and development with respect to fossil fuel dependent regions. For example, the Scottish government's commitment to establish a £500 million (US\$ 563.61 million) fund for affected regions emphasizes economic transformation through measures to support local supply chains, developing markets, and fostering local resource-based sectors, such as agriculture.<sup>39</sup> The Spanish government's initial tripartite agreement, as well as its broader just transition strategy also places substantial importance on economic diversification aimed at the restoration of degraded mining areas and supporting businesses.<sup>40</sup>
- ✦ It can be deduced from global experiences that economic diversification and development includes infrastructure investments, business support, mine land repurposing, other infrastructure repurposing, and the relocation of government agencies and associated infrastructure development.
- **The costs of direct support to the affected workforce** in terms of supporting labour can be categorized broadly into three components, financial support for transition, reskilling, and securing long-term pension support; with various sub-factors related to each.<sup>41</sup> <sup>42</sup> Financial support for transition is aimed at assistance with reskilling and career support for the re-employment of eligible workers, including any relocation and family support required.
- **Social welfare costs** include ensuring the provision of social services and development of social infrastructure, which are often supported through existing government programs. However, in regions or countries where such provisions are suboptimal, this can be a substantial part of just transition efforts. For example, in countries in the global South, such as South Africa, the achievement of a just transition has been aligned with the country's broader development objectives. Besides job substitution and creation of income opportunities for coal mining and coal-based power workers, due attention (and intended intervention) to just transition planning and investments is directed towards ensuring universal access to drinking water, clean energy, education, healthcare, sanitation, public transport, as well as at making local infrastructure climate resilient. Considering the global attention, the key costs components associated with social welfare can be grouped under three categories: investment in social services infrastructure, ensuring welfare benefits (apart from pension, as already covered under labour support), and other social benefits.

<sup>38</sup> Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development. 2022. *Achieving a Successful Post Mining Transition with Renewable Energy*. IGF Case Study. International Institute for Sustainable Development (IISD).

<sup>39</sup> Just Transition Commission. 2021. *Just Transition Commission: A National Mission for a Fairer, Greener Scotland*. Government of Scotland. Energy and Climate Change Directorate, Government of Scotland.

<sup>40</sup> Government of Spain. 2018. *Framework Agreement for a Fair Transition of Coal Mining and Sustainable Development of the Mining Communities for the Period 2019–2027*. Government of Spain.

<sup>41</sup> International Labour Organization. 2019. *Boosting Skills for a Just Transition and the Future of Work*. Geneva: ILO.

<sup>42</sup> Furnaro, A., et al. 2021. *German Just Transition: A Review of Public Policies to Assist German Coal Communities in Transition*. Resources for the Future and Environmental Defense Fund.



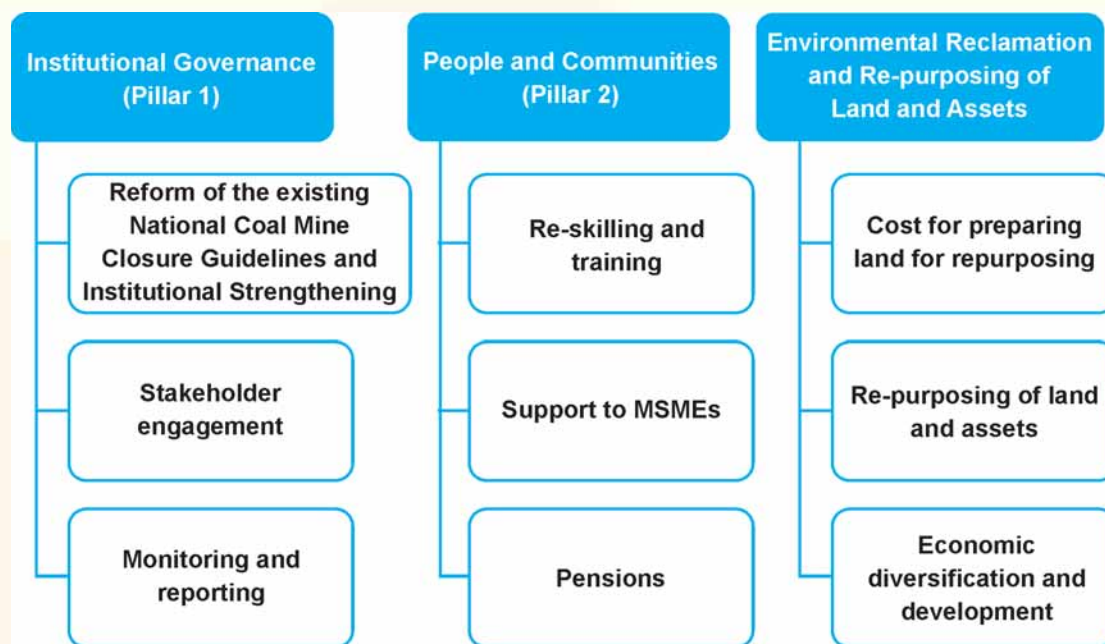


Figure 16. Summary of Cost Drivers Involved in Implementing a Just Transition under the Three Thematic Areas (Source: World Bank's three-by-three matrix)

## 4.1 Financing Mechanism

Global experiences show that the financial requirements for just transition can be quite significant. While the amount of funds required varies substantially between countries due to varying conditions and scenarios, the cost of just transition is generally runs into several billion dollars.

- In **Germany**, under its Coal Exit Act (2020), the government has earmarked €4.35 billion (about US\$ 4.28 billion) to pay power plant owners for the phased closure of about 21 GW of lignite-based capacity.<sup>43</sup> Furthermore, to implement the Structural Development Act (2020), and provide coal/lignite regions with financial aid for important investments that can help the regions to deal with structural changes and secure employment until 2038, €14 billion (about US\$13.78 billion) has been earmarked. The Federal Government under the Coal Exit Act has earmarked an additional €26 billion (about US\$25.59 billion) for transition investments, such as in physical infrastructure (rail and road) to improve connectivity, attract businesses and create jobs.<sup>44</sup>
- Similarly, the **Government of Spain** has received €800 million (US\$789.5 million) from the European Just Transition Fund for economic diversification and training support for workers.<sup>45</sup> The Government has allocated a further €300 million under the Governments Recovery, Transformation and Resilience Plan for various just transition related activities, including mine restoration and employment generation, training for working, and investment in research and development (R&D) for clean energy development.<sup>46</sup> Considering that the Plan Del Carbón allocates about €250 million (US\$ 246.72 million) for 1,677 mine workers, the cost of workers' support per worker comes to US\$0.15 million.

<sup>43</sup> Nienaber, M. 2020. "Germany Agrees 40-billion-Euro Coal Exit Deal for States, Companies." *Reuters*.

<sup>44</sup> Library of Congress. 2020. *Germany: Law on Phasing-Out Coal-Powered Energy by 2038 Enters into Force*. Washington, D.C.: Library of Congress.

<sup>45</sup> World Resources Institute. 2021. *Spain's National Strategy to Transition Coal-Dependent Communities*. World Resources Institute.

<sup>46</sup> Government of Spain. 2021. *Just Transition Agreements*. Update September 2021. Government of Spain



- In the **United States**, as per a study by the University of Amherst (USA), about \$600 million will be necessary per year for the just transition of fossil fuel dependent workers in the US. The funds will primarily cover three components: income, retraining, and relocation support for workers facing retrenchment; worker pensions in affected industries; and supporting effective transition programs for what are now fossil-fuel dependent communities.<sup>47</sup>
- The **European Union** provides another example of comprehensive financial planning for multi-country funding to ensure a fair transition to a carbon neutral economy. As part of the European Green Deal, the European Commission has introduced the Just Transition Mechanism to mobilize €65–75 billion (US\$ 64.1–74.02 billion) in investment between 2021–2027 for regions most affected by the phasing out of coal. The funding is designed to support coal community redevelopment, promote private projects through budgetary guarantees and advisory support under Invest EU Just Transition Scheme, and promote public projects under a facility that provides a mix of grants and loans.<sup>48</sup>
- **Australia's** resources minister has proposed setting up a government-run Australian \$250 billion (US\$180 billion) lending facility for the country's coal industry in return for supporting a net zero carbon emissions target by 2050.<sup>49</sup> No private investment figures are available for Australia, but public investment figure in case of Australia normalized by production is in line with Germany's public investments.

Ideally, financing a just transition will require funds to be accumulated over time, by governments, utilities and mining companies, in advance of mine closures. This secures the necessary financing to repurpose a site as a productive asset that provides jobs and revenue. Where such financial assurance or guarantee mechanisms have not been replenished or are insufficient, early identification of the future productivity of the asset is critical. This allows for funding instruments to be created that can generate revenue streams today to finance the remediation and short-term social costs of a just transition tomorrow, for all. Where there is no identifiable future revenue stream, the private sector often finds it difficult to participate in funding the transition. Such a scenario creates a dilemma in which, on the one hand, there is greater reliance on existing pools of capital, external resources, and other tools to optimize the environment for commerce to provide jobs and replace loss tax revenue, while, on the other hand, post mining areas may become underused, derelict, and abandoned. The medium-term consequences are that municipalities are saddled with very low productive lands and potentially perpetual liabilities that require financing from public sources.

Public and private financing both play an intricate role in implementing a just transition for coal mine closures and the repurposing of mines. The public sector's role in ensuring institutional governance and creating a suitable environment for supporting private capital mobilization remains critical and varies across countries, depending on country-specific characteristics and the local economic and institutional context. Public sector leadership is needed specifically in the pre-closure phase, but also at later stages of closure by ensuring the de-risking of investments for private sector capital in general, though, for example, first-loss investments or performance guarantees. However, the public sector needs to avoid or minimize the moral hazard and

<sup>47</sup> Pollin, R., and Callaci, B. 2016. "The Economics of Just Transition: A Framework for Supporting Fossil Fuel-Dependent Workers and Communities in the United States." *Labour Studies Journal* 44(2).

<sup>48</sup> European Commission. n.d. "The Just Transition Mechanism: Making Sure No One Is Left Behind." European Commission. (accessed January 8, 2023), [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en)

<sup>49</sup> Energy World.com. 2021. "Australia Resources Minister Floats \$250 bln coal lending facility." *Economic Times*, 7 October 2021. <https://energy.economictimes.indiatimes.com/news/coal/australia-resources-minister-floats-a250-bln-coal-lending-facility/86832225>

potentially large contingent liabilities associated with taking on first losses or junior/equity tranches. Strong state capacity and legal frameworks, together with mechanisms to monitor investment projects, will be helpful to ensure that de-risking does not lead to fiscal losses, especially given the limited fiscal capacity of many coal producing countries globally.

The social costs of transformation (social housing, unemployment) are generally underwritten by the state or municipality, and the investment funds are used specifically for repurposing or investment by piece. However, this is not like typical health or infrastructure development programs, because it is cross-cutting, cross-sectoral, long-term, and tied to social economic identity, requiring the participation of non-government stakeholders to determine their future. The government should, therefore, be the catalytic capital provider to crowd in private sector capital at scale, working with base-level grants and concessional financing to leverage other types of capital. Such an approach is supported by governments that wish to see post-mining lands and related assets repurposed and, therefore, catalyzed for new economic development. The more economic activity generated on these lands, the better: as it addresses labour and environmental concerns and brings in the private sector more rapidly, thereby lessening the financial burden on municipalities and regional governments. This in turn allows public sector financing to focus on other important priorities associated with the just transition agenda.

The management of environmental reclamation and the repurposing of land and assets as the coal mine closes ideally requires funds to be accumulated over time by mining companies and governments in advance of closure. This secures the necessary financing to ensure proper reclamation and repurposing of a site as a productive asset that provides jobs and revenue. A contemporary approach to classical remediation strategies tries to “mine for closure”, so that by the time the mine’s activities have wound down, the land is already in a position to be developed for new use. The strategy is to not allow mining lands and associated assets to sit on balance sheets and become liabilities. Therefore, when focusing on key funding gaps in the overall repurposing process, it appears that if the initial repurposing funding requirement can be resolved, private capital is likely to follow in the form of productive investments.

Private capital at scale is key to delivering a just transition, as public finances are not sufficient. The private sector can play an important role in providing the capital needed to realize a just transition to net-zero. Private finance can respond to the specific needs of localities and regions, as they implement ambitious climate transition plans. For example, more than 70 industrial projects in the basic materials sector (steel, chemicals, cement) with breakthrough clean technologies are planned across the EU, including in Central and Eastern Europe. Across the region, banks and institutional investors are starting to take action to support the just transition. In France, Finance for Tomorrow, a group of financial institutions, has launched the Investors for a Just Transition Coalition. In the UK, the Financing the Just Transition Alliance brings together more than 40 financial institutions and other stakeholders. Activity is also underway in Italy and Poland, in the latter especially around financial mechanisms to support the early retirement of coal centred on the newly established National Energy Security Agency (NABE). Financial institutions can make considerable contributions to the just transition through their own efforts, but their scope for action is ultimately influenced by the policy regime in terms of the need to correct market failures, regulate the financial system and allocate public finance to generate public goods.

Multilateral and bilateral development partners play an important role in bridging financing needs and can contribute grant funding, concessional financing, and structured financial solutions to properly address social

and environmental liabilities, thereby creating an enabling environment for the public and private sectors to (re-)invest in coal regions and sustain livelihoods through regional transformation.

There are, therefore, several funding paths, depending on a site's potential and the availability of capital:

- Public finance: Public sector remediates and repurposes
- Private finance: Private sector remediates and repurposes
- Hybrid: Public sector remediates, and private sector repurposes
- Foundations: The government puts assets into an SPE to form a well-invested foundation to fund the liabilities of the just transition.
- Public-private partnerships: A debt-constrained public sector can form an SPE as the contracting entity; the private sector works with the SPE to repurpose the site.

Several instruments may be available both for public and private sector financing of just transition support. Table 4 provides some examples of financing instruments:

*Table 4. Various Instruments Available Both for Public and Private Sector Financing of Just Transition Support*

Public tools	Private tools
1. <i>Project preparation facilities</i> —available from multilateral development banks (MDBs); might be deployed for feasibility studies, due diligence, and environmental impact studies undertaken by an SPE	1. <i>Commercial lending</i> —issued by commercial banks as social/just transition bonds.
2. <i>Concessional loans or guarantees via the Multilateral Investment Guarantee Agency (MIGA)</i> —used by governments to provide the insurance needed by investors, either in the form of payments over time or upfront payments; may be provided to countries to undertake the remediation of mines	2. <i>Public-private partnerships</i> —where land is given to a developer on the condition that they remediate and repurpose the land according to a detailed criteria under guidance of an SPE; 100% of the upside is given to the developer
3. <i>Project bond credit enhancement</i> —backstopping of project bonds with a guarantee that improves credit ratings on loans made for remediation (for example, World Bank guarantees, MIGA, reinsurance and donor funds)	3. <i>Public-private partnerships</i> —where land sits in an SPE, the developer remediates land to investment-ready brownfield status with planning permission at own cost, and the increase in value achieved by the SPE on sale to private equity is split with the <i>developer</i>
4. <i>Viability gap funding</i> —relevant in some instances when the projected revenue or proceeds post-remediation do not cover the costs and liabilities	4. <i>Carbon credits</i> —generated in the transition from fossil fuels; valuable for investors looking for environmental, social and governance (ESG) opportunities and reputation enhancement
5. <i>Land value capture</i> —more applicable near town and cities and has been used to great effect, especially with transport projects. Land near the coal site would be given as a grant to the developer. When the project is complete the value of that land increases as payment to the developer.	5. <i>Income strips</i> —where land is sold and leased back to provide the developer with a government-backed yield, with ownership returning at the end of the term



Mobilizing financial resource and establishing an implementation structure is crucial for a just transition. Just transitions are extremely complex undertakings. The effective implementation of a just transition for coal mine closure can be done either using an approach primarily reliant on the public sector or through a PPP, which both requiring significant private capital mobilization.

A public sector approach to implementation is delivered by one of, or a combination of, the following entities:

- Government ministry or a combination of ministries
- Pre-existing state-owned enterprise (SOE)
- Special purpose entity (SPE) created by the state to carry out the program

A PPP approach to implementation is designed to take advantage of the private sector's ability: (a) to innovate, and (b) to deliver complex projects effectively and efficiently, while allowing the government to have full oversight of the process and to achieve "value for money" in the delivery of a just transition program. This approach can be implemented by establishing a single entity, called an SPE, to manage repurposing on a dedicated basis. This approach relies on two critically important techniques, namely:

- Having the government as a party in the PPP transaction (as the contracting authority) and having bidders competitively tender for the project for just transition support, using output specifications (as opposed to input specifications, as in the case of traditional procurement projects)
- Having a PPP contract under which payments are only made to the winning bidder (the entity that will form the PPP project company) when just transition support and activities are being effectively delivered

An SPE's structure can be varied, with governance shared between state and non-state actors. Its responsibilities could range from pure remediation and repurposing to additional scope on skilling and retraining and further work on investment attraction. An SPE not reaches from bottom up to top down, it can also broker the difference in the scale of funds and assistance coming from the top down by aggregating demand from the bottom up (for example, taking kick-start projects from concept to feasibility stage). Such a reach into both local and regional strategies is essential in identifying prospective sectors to attract new private sector investment into a region. The possibilities must go beyond tourism and construction (energy/infrastructure), the green economy, and renewable energy into sectors that provide long-term sustainable sources of local employment and economic diversification.

The goal of an SPE is to morph into an entity with structured profitable enterprises that fund its activities, and to supply data and records to a platform for knowledge sharing. It could be born from a national or state budget, as a public entity for community engagement and the establishment of a just transition commission, center, and dedicated fund. Accountability and ownership should be held by relevant ministries and gradually shared with stakeholders, civil society, and industry. As it grows, the SPE may raise environmental, social and governance (ESG) or private capital, aggregate resources for specific purposes until it evolves into a self-funding entity, or a private venture arm maybe spun out in time. Germany, Poland, and the United Kingdom have examples of such evolution of an SPE in practice.

In conclusion, given the complexity of the repurposing of projects and the variety of financing options, there may be a need for an SPE to improve coordination across government agencies at all levels, and to act as the interface between public and private investment. One of the essential roles of an SPE is to ensure the continuity of strategies beyond closure when the coal enterprise may have either departed the region or remains, but is no longer engaged in operating coal assets.



## Section-5

# Recommendations for Just Transition in the Context of Coal/ Lignite Sector

### 5.0 Suggested Framework and Institutional Governance for Coal/Lignite Sector

Until now, the coal/lignite sector has absorbed employees when jobs were lost due to mine closure through re-location to new mines. However, as the sector is moving towards peak coal production, it is likely to face a situation of decreased jobs, one of the main factor being greater mechanization of the processes. Another factor being the geographical shift of the location of new mines.

India may implement the transition program according to the dependency of energy security of the nation on the coal sector. These include environmental measures for remediation, as well as bringing in alternate economic activities to support livelihoods. The countries having coal as a major source of energy may integrate best global experiences and practices to create a robust just transition framework.

The Paris Agreement 2015 required parties to consider the imperatives of a just workforce transition and create decent work and quality jobs. These activities are to be executed by following nationally defined development priorities. Furthermore, in 2010, Rosemberg highlighted that “job losses are not an automatic consequence of climate policies, but the consequence of a lack of investment, social policies and anticipation.”<sup>50</sup>

Therefore, the mandate of a just transition endeavour is to nourish and recreate those livelihoods that are in danger of being adversely affected. The process, its participants, and its goals are the keys to success. Workers, employers, civil society, and governments are active and collaborative partners in developing plans for transition and transformation that simultaneously consider the environment, social justice, and poverty alleviation. There are several welfare schemes undertaken by coal-dependent countries for the welfare of employees, project-affected families, CSR activities around mining areas, environmental amelioration activities, and the implementation of activities arising out of public consultation. It is, therefore, essential for any country having coal as major source of energy to identify the gaps that need to be bridged to achieve a just transition in a holistic way.

Many factors influence development mechanisms. While these include the overall governance experience of a country and the history of the transition in a specific region, the primary factor is the existing institutional framework, with advantages and disadvantages:

<sup>50</sup> Rosemberg, A. 2010, “Building a Just Transition: The linkages between climate change and employment.” *International Journal of Labour* 2(2): 125-162, International Labour Office, Geneva.

Table 5. Factors Influencing Development Mechanisms for Just Transition

	Advantages	Disadvantages
<b>Top-down approach</b>	<ul style="list-style-type: none"> <li>• Quick decision-making</li> <li>• Short-term efficiency</li> <li>• Alignment with national priorities</li> </ul>	<ul style="list-style-type: none"> <li>• Tendency to ignore specific regional needs</li> <li>• Lack of broad of stakeholder engagement</li> <li>• Risk of encountering local opposition</li> <li>• Obstacles in the implementation stage, due to the inadequate inclusion of local authorities</li> </ul>
<b>Bottom-up approach</b>	<ul style="list-style-type: none"> <li>• Locally generated transition plans</li> <li>• Local engagement is ensured</li> </ul>	<ul style="list-style-type: none"> <li>• Requires a strong bond with the central government to secure funding</li> <li>• Policies between levels of government may not be aligned</li> </ul>
<b>Hybrid approach with a special purpose entity (SPE)</b>	<ul style="list-style-type: none"> <li>• Governance levels are aligned depending on their vision regarding the transition</li> <li>• Wide range of stakeholders</li> <li>• The vehicle can serve to improve management, implementation, and monitoring</li> <li>• Distinct roles and responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>• The distribution of roles and responsibilities per governance level must be clear to avoid overlap</li> </ul>

Source: World Bank. 2020. *A Road Map for a Managed Transition of Coal-Dependent Regions in Western Macedonia*. Washington, D.C.: World Bank.

## 5.1 Best Fit Processes for Adoption by Coal/Lignite Sector

The suggested structure for institutional governance for managing the just transition process has to be a participatory symphony between the federal/central government, province/state government, local government, civil society, coal companies and other stake holders. There are specific roles for each of these entities within this framework:

- **Federal/Central government**—Makes policy and regulatory changes to aid the development of just transition mechanism that addresses both the environment and the people and that brings in both public and private capital to recreate livelihoods.
- **Province/State government** – Implementation of Rehabilitation and Resettlement (R&R) policy, implementation of specific as well as general welfare schemes to mine closure affected population, and providing support to local government bodies.
- **Local government**—Assists with a synergistic approach to mine repurposing, through closer integration with the local development plans; ensures that the social protection network supports affected people and communities during project progress; supports the working and maintenance of public infrastructure available after the closure of a mine, with adequate staffing and supporting infrastructure.
- **Coal Companies** – to focus on Environmental Resources & Physical Infrastructure including Technical & Biological Restoration and Repurposing land & mine assets
- **Civil society**—An important stakeholder during the design stage, assists executing authorities

This framework corresponds with a hybrid approach. The various governance levels are mandated to perform their assigned tasks, per constitutional and legal provisions, with distinct responsibilities. Stakeholder consultation is facilitated, and an embedded layer of M&E is in place.

Special purpose entities (SPEs) may be well suited to deliver social equity and sustained economic progress in repurposing released land. India has extensive experience designing SPEs that have delivered good results in infrastructure and urban development sectors. Since their inception, SPEs in India have changed to cater to the dynamic needs of growing cities. The post-liberalization period of the Indian economy (after 1992) saw an increase in the demand for industrialization, commercial activities, and infrastructure. Through improved planning and better utilization of available resources, SPEs have been able to play a greater role in development by implementing critical projects such as housing, roads, flyovers, and metro rails, among other things.

SPEs address the problems arising from the involvement of multiple agencies in developing the same area, city, or region. In a repurposing project, this can arise from the following authorities with overlapping roles in the same geography:

- Municipal corporation/municipality
- Town planning agency
- Local industrial corporations
- Local housing and urban development agencies
- Village administration—gram panchayats

As SPEs are flexible in nature, their composition, scope, funding mechanism etc. can vary from country to country or even from region to region. They can be tailor made to address specific problems of a particular region or there can be a common framework at the national level.

## 5.2 Other Recommendations

- The transition is likely to require significant financial resources (e.g., for ecological restoration in legacy mines, developing new employment opportunities, industries, reskilling and retraining etc.). Moreover, the coal mine closures in the short and long term are likely to adversely affect the finances of coal-bearing regions that are already typically resource starved. Therefore, the G20 countries should support the just transition process in coal regions of coal-dependent countries by providing requisite financial assistance beyond the means of the existing provisions of concerned countries.
- As a global just transition model emerges based on experiences in Europe and North America, the framework for countries having coal as a major source of energy need to be prepared with due diligence taking specific energy security, environmental and social concerns into account, and be robust.

The G20 or developed countries may support the just transition process in coal dependent countries by providing requisite financial and technological assistance to adopt low carbon economic activities for sustenance of coal dependent communities in coal regions.



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