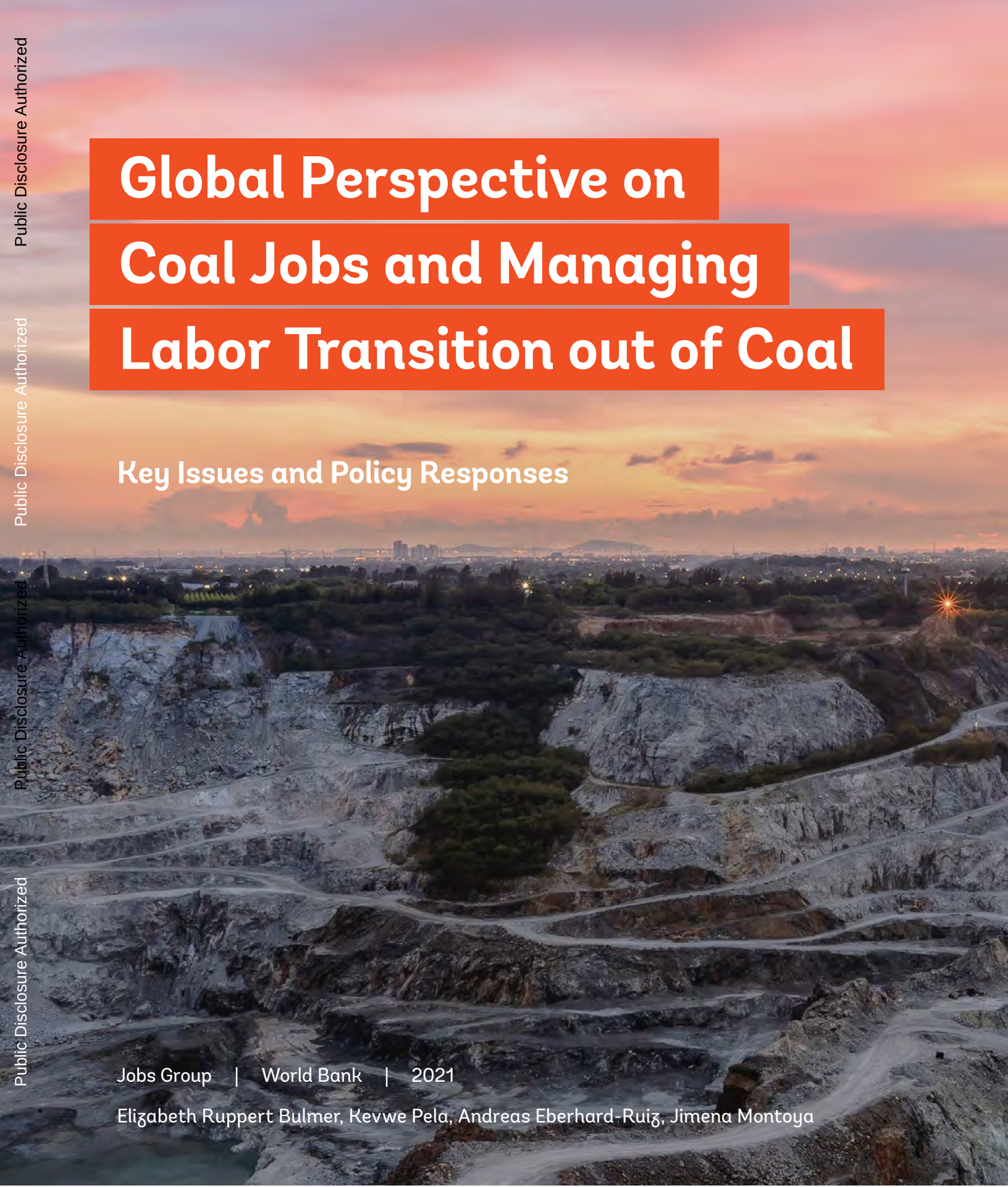
Global Perspective on Coal Jobs and Managing Labor Transition out of Coal

Key Issues and Policy Responses



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Elizabeth Ruppert Bulmer, Kevwe Pela, Andreas Eberhard-Ruiz, Jimena Montoya

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Executive Summary

The widely-shared objective of transition to cleaner energy and reduced dependence on coal presents tremendous challenges, not only to coal sector producers and workers, but because of the broader implications for other sectors in coal-producing nations. A large proportion of energy infrastructure is built around coal-fired power plants (even in non-coal producing countries), economic production structures are energy-intensive, and coal value chains are long. In regions where coal mining takes place, the effects of transition cut very deeply, especially in small, remote mining communities where the local economy depends on coal. The transition can create multiple disruptions: to jobs – both direct and indirect, to household incomes, to local economies heavily tied into the coal supply chain, to community well-being and social capital, and to local and regional government capacity and fiscal solvency.

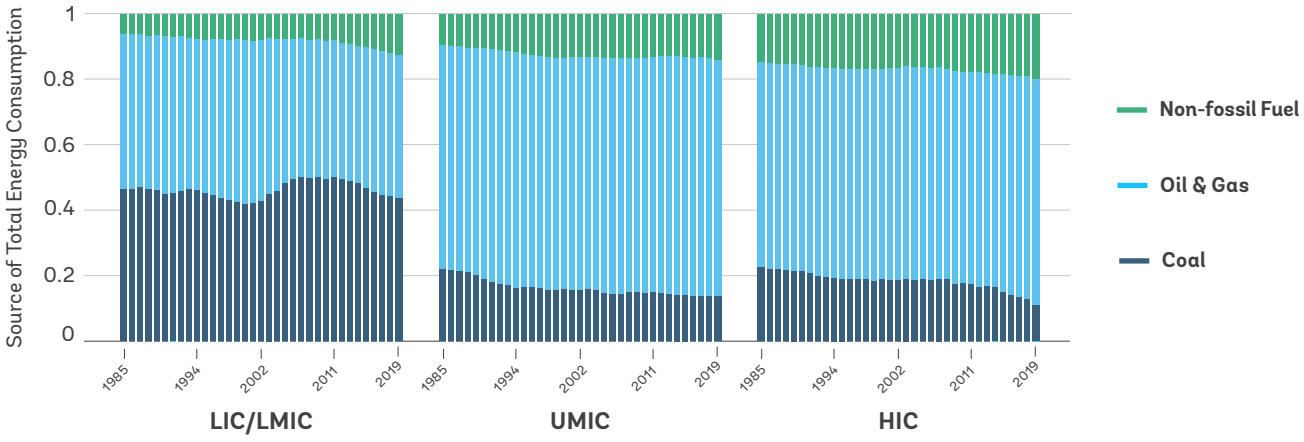
This issues paper analyzes the status of coal phase-out around the world, the magnitude and character of coal mining jobs and their spillovers in local economies, and the challenges associated with future labor transition. The analysis exploits differences in transition stages to draw lessons from countries that have experienced coal mine closures in the past, and uses these lessons to inform policy responses in the context of future decarbonization, with particular attention to facilitating the transition of directly and indirectly affected workers – whether formal or informal – into alternative employment.

This report is part of a broader multi-sector effort by the World Bank to support coal regions confronting the realities of decarbonization and help lay the groundwork for achieving a just transition for all. The World Bank framework of support comprises three pillars: institutional governance, people and communities, and environmental remediation and repurposing land and assets. By focusing on pillar two, this paper deepens existing analysis and extends the policy discussion beyond issues related to displaced mine workers to consider the wider implications for local labor markets and sustainable recovery of regional economies. The policy framework articulated in this global report is intended to guide future country-specific engagements through which detailed policy recommendations could be developed to address a particular country or sub-regional context.

At the global level, coal-based energy production has risen steadily over the past 40 years, to a large degree driven by rising energy demand in the industrializing economies of the world. Many countries undergoing rapid structural transformation since 1991 depend on coal. As former coal powerhouses in Europe as well as the U.S. transitioned away from coal and shifted their priorities toward alternative sources of power generation, they have been replaced by rapidly scaling coal extraction in other regions of the world. Increased electricity consumption is the main component of this energy demand, and coal is the largest fuel source for electricity worldwide. The developing world more than doubled its per capita electricity consumption since 1990.

Figure 0.1

Energy consumption by source (1985-2019)



Note: Country income classification on the basis of 1991 WB classification

Source: Author's calculations based on BP Statistical Review of World Energy

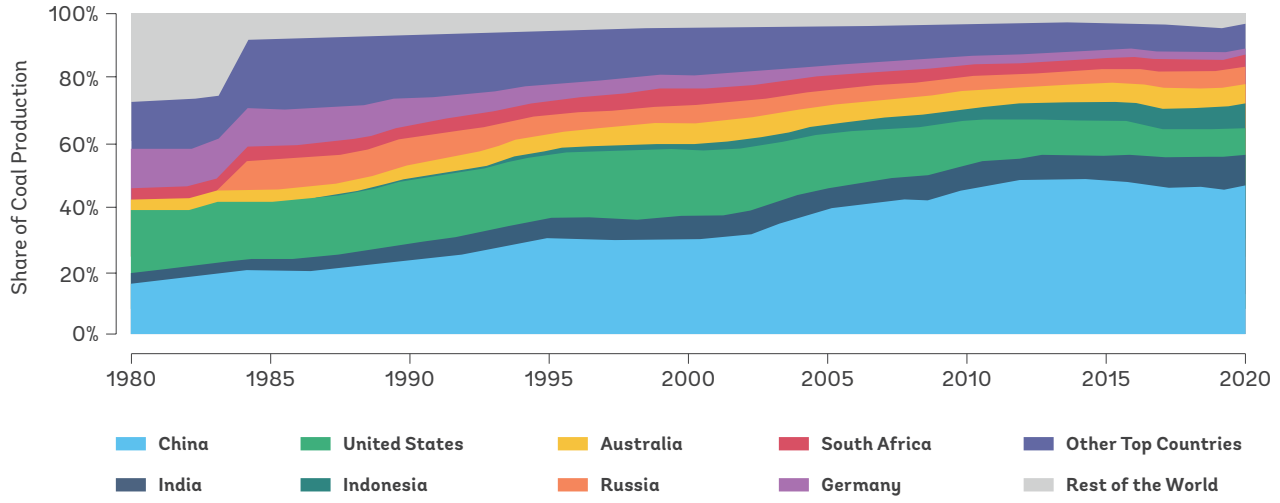
Inexpensive coal-based energy has played a prominent role in many countries' economic development, especially in the early stages of structural transformation. Structural transformation occurs as jobs shift from low-productivity primary sectors into higher productivity industry and ultimately into more skilled services sectors. As low and lower-middle income countries industrialized, they increased both their coal consumption and their coal dependence. Part of this is due to higher electricity demand and the prevalence of coal-fired power generation, but part stems from the use of coal-derived products other than electricity in many manufacturing subsectors, such as the steel industry. And in countries that are coal producers, these effects are magnified, suggesting that access to inexpensive energy helps to accelerate industrialization. In upper middle-income and especially high-income economies that are in more advanced stages of structural transformation, we observe a decline in coal dependence, due to increasingly services-centered economies and an accelerating shift to cleaner and more sustainable sources of energy and electricity generation. Coal meets nearly half of low and lower-middle income countries' energy needs and more than half of their electricity consumption, but coal-intensity declines as country incomes rise.

The world's increasing demand for coal is being met by a shrinking pool of large coal producers. China is dominant – it accounts for about half of global production and consumption – but other countries are increasingly exploiting their coal deposits, and have ramped up coal production activities. Six countries supply four-fifths of the world's annual coal consumption, marking a dramatic change since 1980, when the U.S., Germany, Poland and Former Soviet Union countries were much bigger suppliers.

This shift in coal production is reflected in heterogeneous patterns at the country-level, and is the result of various factors. There are countries that rapidly expanded coal production, others that saw tepid contraction,

Figure 0.2

Global coal production shares



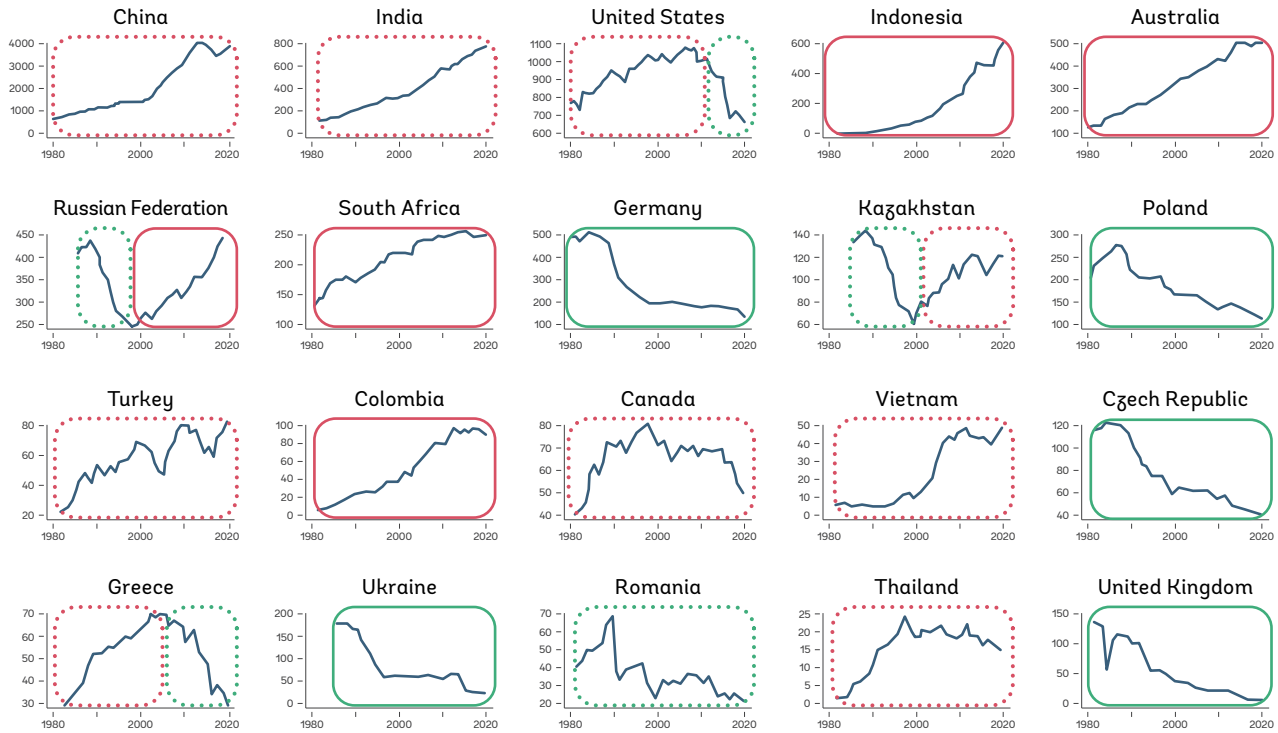
Source: BP Statistical Review of World Energy June 2020

and still others that experienced periods of sharp fluctuations in both directions. Some coal producers faced stiff competition from oil and gas, or headwinds from tighter government regulations to curb carbon emissions. Some countries were motivated by technology-induced productivity increases, or strategic national objectives related to energy security or local employment preservation. Some countries pursued new export markets as the global coal landscape shifted. Some countries expanded production of coking coal used in steel production and other chemical manufacturing processes.

The world's top 20 coal-producing countries share some common features, and can be categorized into 4 groups: advanced coal transitioners (denoted by a solid green line in Figure 0.3), partial transitioners (dotted green), accommodators of rising domestic demand (dotted red), and expanding coal exporters (solid red). Some countries have phased out of coal mining, or at least to a significant degree, reflecting a commitment to transition (with the caveat that "commitment" may not be perfect or may experience setbacks or fluctuating political will). This group includes the United Kingdom, Germany, Poland, Czech Republic, and Ukraine. Other countries have more recently moved in the direction of a cleaner energy mix, notably Romania, Canada, Greece, and the U.S. The reasons for the delayed shift appear linked to internal rather than external factors, including recent declines in domestic coal demand. The tremendous production increases in China

Figure 0.3

Coal production trends in the top 20 coal producers 1980-2020 (million tonnes)



Source: BP Statistical Review of World Energy June 2020

and India were primarily driven by the rising energy needs of their large and fast-growing domestic economies, whereas Indonesia and Australia, among others, have been motivated by export opportunities.

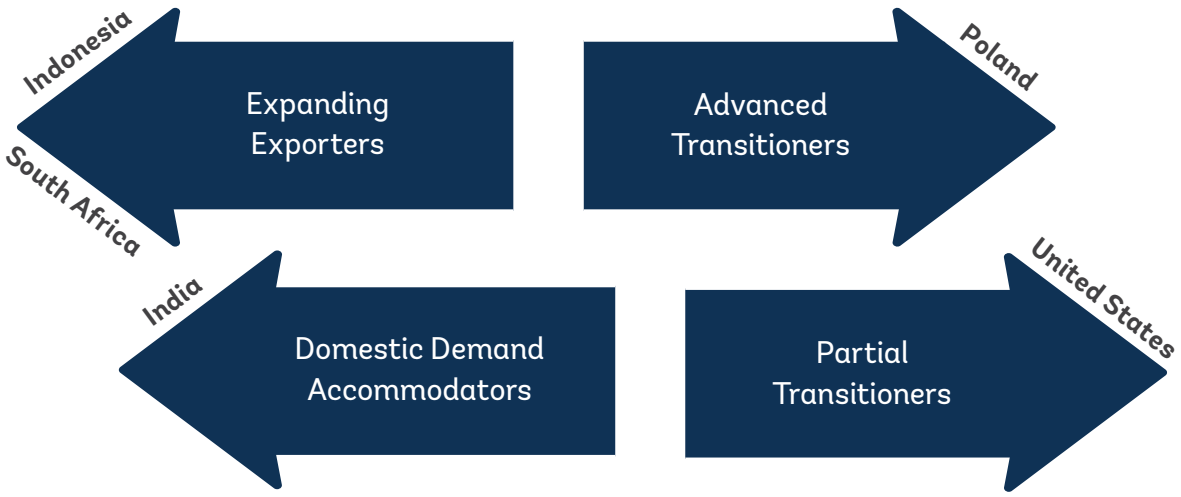
The total number of workers directly engaged in coal and lignite mining is currently 4.7 million globally, accounting for a very small and declining share of total employment, even within the major coal producing countries. Despite expanding coal production, coal jobs are being shed; over 2 million coal mining jobs have been lost in the last decade. This aggregated picture reflects coal phase-out in some countries, expansion in others, and sector productivity gains in most countries, as extraction technology has become more capital-intensive. Not surprisingly, China accounts for the largest number of jobs in the coal mining sector, numbering around 3.2 million in 2018, more than double the sum of coal mine jobs in all other countries combined. India is the next largest coal employer, at 416,000 direct coal mining jobs, followed by Indonesia (240,000) and Russia (150,000). Several countries' coal employment levels are in the range of 75,00-110,000 – specifically South Africa, Poland, Vietnam, and Ukraine – while Australia, Colombia, Turkey, and the U.S. each employ nearly 50,000. Note that these data do not reflect employment in the coal sector value chain beyond mining.

Whereas the level of coal mining jobs is modest, they generate significant indirect jobs across economic sectors and have a disproportionate influence on local labor markets. Although not easily measured using available data, coal mining jobs have a positive impact through high job spillovers in other sectors due to increased economic activity along the coal supply chain (e.g., in complementary activities) as well as through indirect demand for local goods and services by coal mine workers and their families (often referred to as induced effects). On the other hand, the high wages earned by mine employees – much higher than most other sectors, both on average and when controlling for individual characteristics – can distort local wages in other sectors, effectively crowding out economic activity and depressing labor demand. In addition, the boom and bust cycles typical of extractives industries tend to limit economic diversification in coal regions, making local economies vulnerable to large demand swings that undermine long-term growth. These natural resource curse effects are well-documented in the literature, and are illustrated in this report's country-level analysis. Evidence from Indonesia shows the distorting impact of coal mining jobs, namely that well-paid coal jobs spurred job creation in other sectors and pulled up their wages to some degree, but at the same time these positive spillovers were in fact smaller in very coal-intensive districts, which also experienced relatively slower wage growth in non-coal sectors.

The report examines five countries in detail to understand how their coal production patterns link to coal employment patterns, and some of the factors behind the observed country-level differences. These deep-dives examine the effects of coal jobs on local labor markets and in the broader national labor market context, exploring the extent to which coal employment contributes to or works against better job outcomes and stronger economic development. The analysis sheds light on the complexities associated with past and present coal production and employment outcomes in different country contexts. The selected countries – Poland, U.S., Indonesia, South Africa and India – represent the four different categories of our typology of coal producers.

Figure 0.4

Five country studies



The country case studies illustrate that many coal mining jobs are of good quality, but not all. The types of occupations, contract terms, compensation and working conditions can vary widely between formally and informally employed coal mine workers. Formal coal mining jobs tend to be highly paid and well-regulated, due to their hazardous nature, and in some countries are highly unionized and/or in the public sector. They tend to involve semi-skilled production and machine operation occupations, which in other sectors are remunerated substantially less. Even large formal mining companies employ workers on informal contracts, however; these could be deemed semi-formal from the perspective of occupation or pay, even if they do not benefit from labor code protections, union representation, or access to severance/pension benefits or social insurance. Indonesia's coal sector saw a proliferation of small mine operations concentrated in rural districts with limited opportunities for waged employment; coal mining jobs were a relatively attractive option. In addition to this segment of coal employees, there are many informal own-account and micro-enterprise workers engaged in the sector who lack written contracts or other protections, earn very low incomes and are highly vulnerable to demand fluctuations. The case study on India highlights this segment of informal coal sector workers. The significant segmentation evident in coal sector employment implies quite disparate outcomes with respect to job quality, and calls for differentiated policy interventions in the context of future transition associated with coal phase-out.

Two-thirds of the world's top coal producing countries shed coal mining jobs in the last decade, including countries with rising coal output. Similar to the heterogeneity observed in coal production patterns, coal employment manifests disparate trends across countries and over time. Differences in coal type, extraction methods and technologies affect the size and skills-mix of the coal sector labor force in each country. Non-coal factors also affect the size and nature of coal sector jobs,

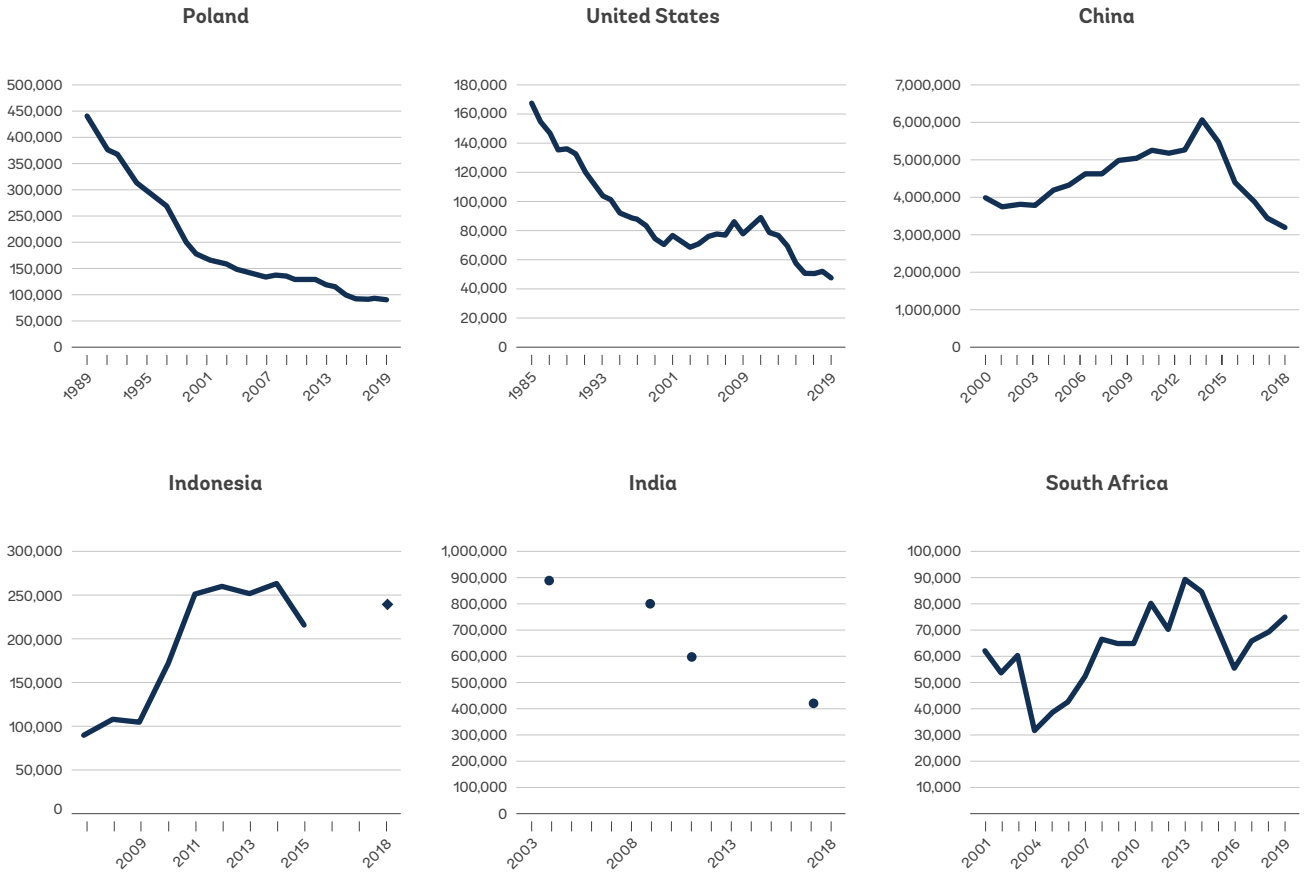
such as the skills composition, wages and availability of alternative work opportunities in other economic sectors, mining operators' agility to adjust to demand fluctuations, the relative mobility of workers to shift between different jobs, and governments' policy stance toward transitioning away from coal. It is notable that even in countries that aggressively expanded coal production – for example, China and India – productivity gains in the coal industry have resulted in significant labor shedding.

Past episodes of coal transition in Poland and the U.S. provide some useful lessons for policymakers and local authorities who anticipate future coal phase-out. Although many of these experiences were negative, they are nevertheless informative.

- **Transition takes a long time.** When many workers, businesses and communities are implicated, fundamental change to an industry cannot happen quickly, even with the best advance planning and post-closure transition policies in place.

Figure 0.5

Coal mining employment trends in 6 countries



Note: Employment level measured on the y axis. Employment data includes formal and informal workers employed in the coal and lignite mining sectors.

Sources: Poland data from energy.instrat.pl; US Bureau of Labor Statistics; China Coal Technology & Engineering Group; Indonesia LFS (Sakernas); India EUE and PLFS; South Africa LFS.

- **Transition requires a comprehensive approach** with complementary initiatives, policies and incentives to sway the many actors along the coal value chain, including those with vested interests like utility monopolies and manufacturers of mining equipment.

- **The timing and speed of transition are subject to political economy dynamics.** Uncertainty around commodity prices makes it difficult for communities to transition because prices affect both willingness and capacity to diversify toward other industries. Where actors are public (e.g., Poland), governments have the power to act quickly but risk the future support of the electorate. Where actors are private but unions are strong and/or regulatory authority is weak or captured by private interests (e.g., the U.S.), boom/bust cycles can be exacerbated, which could create obstacles to both the design and implementation of effective transition policies.

- **Transition assistance programs targeting formal mine workers fall short of meeting the needs of informal workers in and around the mines.** Even large mine operators employ a significant share of their workforce on temporary and/or informal contracts. Informal coal sector workers are at greater risk than their formal counterparts and less equipped to weather income shocks.

- **Remoteness and small market size are mutually reinforcing impediments to transition.** When communities are not connected to larger markets, workers cannot access jobs elsewhere and local businesses are limited by their small local client base.

- **The advantages of inducing voluntary job separations through generous compensation packages are offset by the risk of inflicting long-term damage on local economies.** High reservation wages dampen local labor demand and economic recovery through diversification, which can undermine public fiscal health.

- **Severe social dislocation and local economic viability may pass a point of no return.** The risk is higher where long-term dependence on coal has delayed acceptance of transition.

- **Economic diversification is essential and requires help from both local and higher level government with respect to planning and financial resources.** Advance planning, investment in infrastructure, addressing environmental degradation and attracting private investment are key ingredients of economic diversification, requiring significant local and regional institutional capacity and coordination.

Recent developments in the coal industries of Indonesia, South Africa and India share some common themes, and especially some common factors affecting the path and speed of transition. These include: rising market demand for coal – whether domestic (India) or external (South Africa, Indonesia) – to meet electricity needs; costly replacement of coal-based technologies with renewable sources; limited economic diversity in coal communities; weak regulation and capture by vested interests; political economy pressures that shape government decision-making; and the potentially disruptive impact on livelihoods and the economic viability of coal communities.

Even among countries committed to transitioning away from coal, the marginal cost of continued coal extraction to power electricity generation is much lower than the cost to replace installed generation capacity.

The outsized impact of coal mining jobs in small and/or remote communities makes them vulnerable to significant dislocation in the event of mine closure, which poses a risk of destabilizing local economies. Energy transition in coal regions will impact workers directly engaged in mining operations and along the coal supply chain, but also workers with indirect connections to coal activity, such as retail, restaurants, and recreation service providers to coal miners and their families. In this context, government planning will be essential to mitigate the negative effects on livelihoods and the sustainability of local economies. Where coal is an important employer, political considerations can delay the energy transition and resulting mine closures, but delays may in fact increase existing distortions and exacerbate segmentation, making future transition even more challenging.

Addressing these challenges effectively requires a solid understanding of the scope and nature of the potential impacts of transition. Policymakers need to understand the ways in which a future transition away from coal may affect the livelihoods of both coal and non-coal workers and their surrounding communities, in order to implement policies and programs for managing transition effectively. Policy design is further complicated by the fact that informal workers – an important segment of the coal sector value chain – fall beyond the reach of many policies. The World Bank's three-pillar framework for supporting energy transition in coal regions articulates labor policies to help displaced coal mine workers navigate the lay-off process and access retraining and other assistance to ease the transition to alternative employment. In the present paper, we use the lessons from past transitions together with the case study findings on coal-related labor market challenges in Indonesia, South Africa and India to motivate the design of a comprehensive, multi-channel policy framework for managing coal transition. The policy framework presented here extends the World Bank (2018a) framework by incorporating a broader group of affected workers, such as informal coal mine workers, those employed in coal supply chains, and those within coal communities that may suffer negative economic shocks due to mine closure.

To achieve an effective and just transition for all, it will be necessary to address the informal and formal segments of the affected workforce through a combination of local and national policies and programs. The concept of "just transition" extends to national priorities of inclusive, sustainable and broad-based economic growth. Understanding the potential welfare losses by workers is only part of the challenge; weighing the trade-offs and risks of prioritizing some stakeholders over others is the fundamental task of strategic policy design. Given the complex systems of implicit- and cross-subsidy of energy generation and its links to industrial sector production and jobs, it is important to understand who currently benefits from these existing systems, and the economic and fiscal costs and benefits associated with these systems. A just transition is one in which the costs and benefits are shared more equitably.

Traditional labor policy instruments that support the transition of displaced workers to new jobs are necessary but not sufficient. In addition to extending the World Bank's coal transition policy framework to address all types of affected workers, this paper also incorporates complementary policies for ensuring a sound environment that fosters economic diversification. Income support is an effective tool for smoothing consumption in households affected by job loss; it also helps to sustain demand for local goods and services and the businesses that provide them. Temporary income support such as through the national safety net should be the minimum policy response for affected informal workers. Although income support can address immediate and short-term needs, longer-term interventions are needed to help workers move into alternative employment – whether local or elsewhere – and to create an environment conducive to business development and private job creation.

There are five main channels through which public policies and programs can facilitate workers' transition:

(i) Temporary income support (e.g., employer severance pay, national social safety net)

(ii) Increasing workers' capacity to qualify for jobs in new sectors (e.g., through skills or entrepreneurship training)

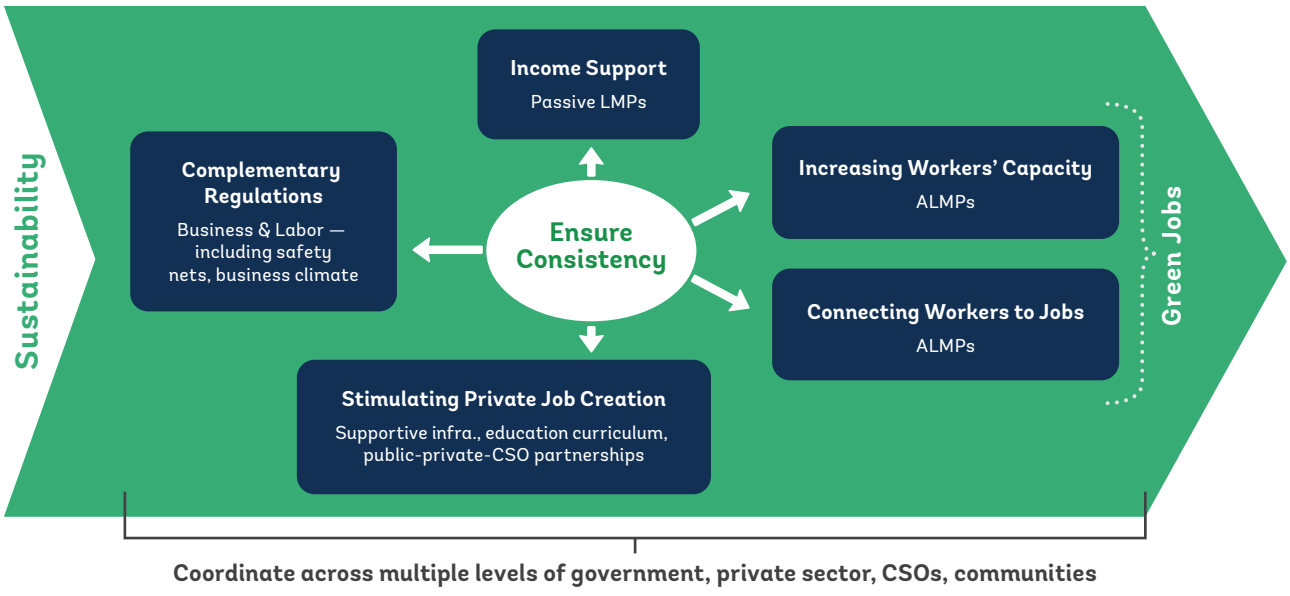
(iii) Connecting workers to potential employers (e.g., through job search assistance, mobility grants)

(iv) Stimulating private sector labor demand and local or regional business development (e.g., through investment incentives aligned with strategic national, local and/or regional priorities, matching grant programs); and

(v) Ensuring the business environment and labor regulations are conducive to private sector investment and job creation.

Figure 0.6

Five policy channels to support transition

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A sustainability lens could be added to these policy channels to ensure that workers displaced from coal sector jobs do not simply transition to alternative but equally unsustainable sectors. Introducing sustainability criteria would also support the parallel objective of stimulating green economic transition.

These policy channels are relevant across different phases of the transition; the policy framework developed in this report is organized into four phases, ranging from before the mine closure decision is taken through to the period following layoffs and closure. The motivating objectives of this framework are to enhance the welfare of affected workers and promote the medium-term viability of local and/or regional economies.

Phase 1 focuses on broader economic development planning to lay the groundwork for absorbing the negative economic shock of mine closure. This entails measures to enhance the capacity and resilience of the local economy through diversification toward new economic sectors and occupations, and requires upstream planning, significant investment, close coordination with national authorities, and partnership with a range of local, regional and national CSOs and private sector organizations.

Phase 2 comprises pre-closure analysis of the labor situation, including the number and profiles of workers likely to be affected, and assessing existing programs available to affected workers, including safety net coverage and qualifying criteria for passive and active labor market policies. Any safety net or ALMP program adjustments or regulatory reforms need to be implemented prior to the announcement of layoffs.

Phase 3 begins with the announcement of mine closure and layoffs, and requires communicating the various types of assistance that will be made available to workers and providing support services such as benefit eligibility advice or career counseling, with the goal of empowering individual workers to prepare for and shape their own post-layoff transitions.

Phase 4 comprises the delivery of post-layoff assistance including temporary income support to displaced workers and implementation of active labor market programs. A key aspect will be monitoring program take-up and effective job placements to enable timely program adjustments to improve effectiveness.

Government's role in the transition process needs to be multi-faceted and proactive. A well-planned and systematic process of coal mine closure and layoffs is essential for supporting the reallocation of affected workers to alternative jobs and at the same time mitigating the economic, social and political costs of transition. Governments do not have to deliver everything themselves, but they do need to provide strategic direction and leadership, coordinate across stakeholders, arbitrate competing interests, and mobilize adequate financing that represents an investment in transition.

Figure 0.7

Policy framework for managing labor transition

Source: Authors' extension of the (formal) labor policy approaches developed in Fretwell (2017), World Bank (2018a) and Cunningham and Schmillen (2021)

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