

WORKING PAPER: BUILDING A JUST FUTURE

Policy Solutions for South Africa's Coal Workforce Transition – Insights from Global Experience

Simbarashe Mhaka

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JUSTSA

On behalf of:

Federal Ministry
for the Environment, Climate Action,
Nature Conservation and Nuclear Safety

of the Federal Republic of Germany

IKI INTERNATIONAL CLIMATE INITIATIVE

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ABOUT JUST SA

This publication is a product of the Just Transition to a Decarbonised Economy for South Africa (JUST SA) Project. JUST SA is a project funded by the International Climate Initiative (IKI) through the German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN) and with the Department of Forestry, Fisheries and Environment (DFFE) as the political partner.

JUST SA is implemented through a consortium led by the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) and comprises of the Trade & Industrial Policy Strategies (TIPS), the National Business Initiative (NBI), and the World Wide Fund for Nature (WWF SA). JUST SA is implemented in close collaboration with the Mpumalanga Green Cluster Agency and Indalo Inclusive. The project also collaborates closely with critical national and provincial stakeholders, including the Presidential Climate Commission (PCC), the Just Energy Transition Project Management Unit (JET PMU), the Mpumalanga Provincial Government, and other key partners to ensure a coordinated and inclusive transition process.

The JUST SA project supports the implementation of pathways towards a Just Transition to a low-carbon economy and climate resilient society taking a multi-level approach.

At national level, the project contributes to the implementation of key policy documents and facilitates dialogue forums and information sharing among multiple stakeholders, ensuring an inclusive and results-oriented process.

At provincial level, the project assists stakeholders in Mpumalanga to initiate alternative development pathways for a diversified regional economy, while also building the capacity of targeted SMMEs to unlock their growth potential and Improve access to finance.

At the local level, just transition activities are established in selected municipalities, empowering affected communities and marginalized groups through inclusive, bottom-up approaches to community development.

Furthermore, solutions to sustainably rehabilitate coal mining land and water are sought through collaborative research, policy implementation and community engagement.

For more information, visit: justsaportal.org.za, or contact us on justsa@giz.de

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Trade & Industrial Policies Strategies (TIPS) is an independent, non-profit, economic research institution established in 1996 to support economic policy development. TIPS undertakes quantitative and qualitative research, project management, dialogue facilitation, capacity building and knowledge sharing. Its two areas of focus are trade and inclusive industrial policy; and sustainable growth.

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List of Abbreviations

ALMPs	Active Labour Market Policies
APR	Action Program Ruhr
BCE	British Coal Enterprise
CAS	Comprehensive Adaptive Support
CWTP	Coal Workforce Transition Program
DBE	Department of Basic Education
DDM	District Development Model
DSM	Dutch State Mines
DPR	Development Program Ruhr
DHET	Department of Higher Education and Training
FICSR	Future Initiative for Coal and Steel Regions
IDP	Integrated Development Plan
IEA	International Energy Agency
IFMEREE	Institute of Renewable Energy and Energy Efficiency Training Jobs
JET	Just Energy Transition
JET-IP	Just Energy Transition Investment Plan
JETP	Just Energy Transition Partnership
MPRDA	Mineral and Petroleum Resources Development Act No. 28 of 2002
MSP	Mining Social Package
NBI	National Business Initiative
NDCs	Nationally Determined Contributions
Nedlac	National Economic Development and Labour Council
NRW	North Rhine-Westphalia
OKD	Ostrava Karvina Coal Mines
POWER	Partnerships for Opportunity and Workforce and Economic Revitalization (US)
PLMPs	Passive labour market policies
PCC	Presidential Climate Commission
SAA	Structural Adjustment Assistance
SDA	Structural Development Act (Germany)
SDS	Skills Development Scotland
Seda	Small Enterprise Development Agency
SEDFA	Small Enterprise Development and Finance Agency
SETA	Sector Education and Training Authority
SEIAS	Socio-Economic Impact Assessment System
SIBG	School Infrastructure Backlogs Grant
SLP	Social and Labour Plan
SPARC	Strengthening Photovoltaic and Renewable Careers (US)
TAA	Transitional Adjustment Assistance
TVET	Technical and Vocational Education and Training
UIF	Unemployment Insurance Fund
UK	United Kingdom
US	United States

Introduction

Globally, numerous economic transitions have unfolded, many of which have failed to deliver just outcomes in certain dimensions. These transitions often disproportionately impact workers and low-income populations. In South Africa, the collapse of the Free State Goldfields during the 1990s and 2000s exemplifies the profound social, economic, and environmental consequences of unmanaged transitions. The downscaling of gold mining activity in the Free State, alongside the closure of related businesses, devastated the province, particularly for workers dependent on gold mining (Strambo and Atteridge, 2021). Employment in the Free State Goldfields plummeted from over 180 000 in the late 1980s to approximately 35 000 by 2010, the population declined from nearly 500 000 in 1991 to around 380 000 in 2010, and poverty rates surged from 39% in 1996 to 52% in 2006 (Marais, 2013).

Today, the world faces intensifying acute and chronic bio-physical impacts of climate change. The growing climate change impacts have prompted a global push to a low-carbon transition, which gained mainstream political prominence after the Paris Agreement was signed by 195 parties in 2015. The goal of the Paris Agreement is to limit global warming to below 2 °C, with efforts to stay within 1.5 °C (UN, 2015). In response, countries submitted Nationally Determined Contributions (NDCs) outlining how they will cut emissions and build climate resilience. South Africa is among the signatories of the Paris Agreement and is expected to face a major economic and social transformation with an ambitious target to reach net zero emissions by 2050 (DFFE, 2020; NPC, 2012; PCC, 2022).

The need to mitigate the adverse effects of the transition away from coal on workers is huge.

Coal mine workers and those working in the coal value chain are likely to endure most of this energy transition. At present, coal mines in South Africa employ over 97 000 people. Administrative tax data shows that the median real monthly wage in coal mining (R35 871) is more than three times higher than that in the broader formal sector (R11 032) (Bhorat et al., 2026), while the majority (around 80%) of coal workers have, at most, a matric qualification (Makgetla et al., 2019). This combination of relatively high earnings and lower formal education levels limits prospects for comparable alternative employment, as workers are often well paid relative to their qualifications. The absence of an effective transition assistance policy package for “at risk” coal mine workers will increase economic insecurity, jeopardise public support for national climate change goals, and worsen poverty, inequality, and unemployment.

The need to mitigate the adverse effects of the transition away from coal on workers is therefore huge. Through the various policy options and strategies that are available, and how to implement them successfully, South Africa can draw valuable lessons from international experiences and craft effective policies that minimise hardships for workers while supporting sustainable growth.



This report seeks to provide South African policymakers with instruments that can be used for managing job displacements from an international perspective and an evaluation of applicability in the South African context. Where relevant, the report also engages on the institutional and financial arrangements and mechanisms underpinning the labour market and social protection policies in other countries that have contributed to their success.

Extensive work is underway to identify alternative economic opportunities for coal workers.

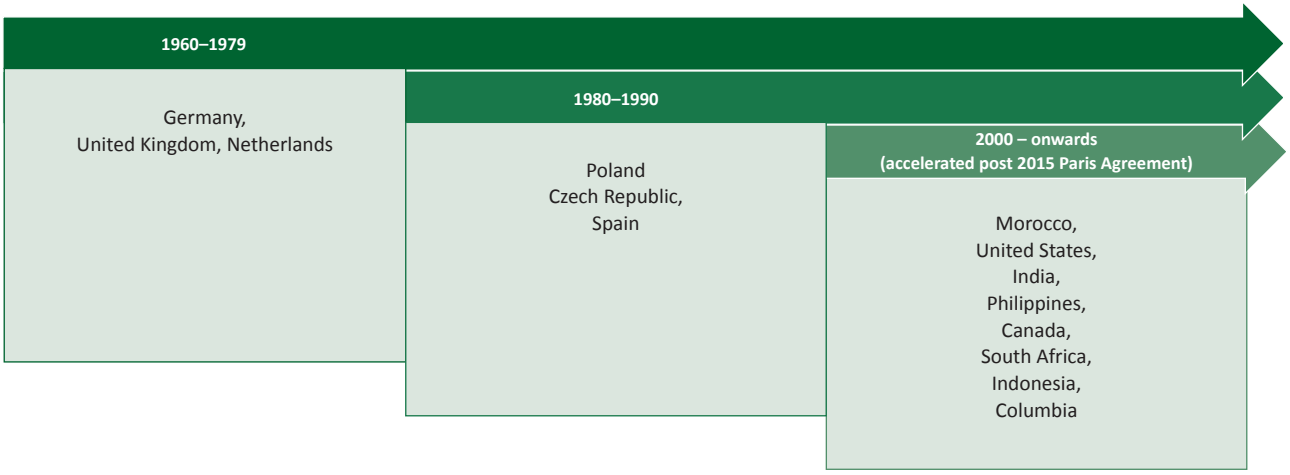
While it is recognised that a just transition requires both labour supply and demand policies, this report focuses only on supply-side transition assistance policies. Evaluation of labour demand interventions is therefore beyond the scope of this report, as extensive work is underway to identify alternative economic opportunities[1] for coal workers. With such opportunities emerging in coal regions, the critical question becomes: how effectively can we transition workers out of the coal sector?

The findings and policy packages in this report are informed by a desktop review of government reports, international case studies, and the International Energy Agency's (IEA) database on just transition policies. Evidence is found primarily in the Global North, which has a longer history of transitioning away from fossil fuels, especially coal.

As shown in Figure 1, Germany, Poland, the United Kingdom (UK), United States (US), Czech Republic, Spain, and the Netherlands were first wave coal transitioners,[2] driven not by climate change concerns but by economic decline (Germany, UK, Poland, Spain), political change (Czech Republic), or new energy discoveries (natural gas in the Netherlands and US).

In the second wave,[3] climate change and environmental pressures gained prominence, with stronger emphasis on just transition principles. These experiences offer valuable lessons both in what to replicate and what to avoid as we shape transition approaches suited to our own socio-economic realities.

Figure 1: Timeline of just transition policies between countries



Source: Author's compilation.

1 *Among others, TIPS under the JUST SA project is undertaking a provincial research study on "Unpacking Practical Pathways for Diversifying the Mpumalanga coalfields' Economy" and The Presidential Climate Commission (PCC) has spearheaded the development of a short-term, private sector-led employment strategy for Mpumalanga aimed at catalysing economic opportunities, and thus creating jobs, in the Mpumalanga province by 2030.*

2 *The first wave transitioning countries refers to countries which started the transition away from coal before year 2000; their reasons for coal phase out were not climate change related.*

3 *This report classifies the second wave transition as the period after year 2000, when climate change increasingly became a topic of discussion.*

A Conceptual Framework for Understanding Just Transition Policy Support for Coal Workers

This section outlines the conceptual framework guiding worker transition assistance strategies, drawing on international experience. The section begins with a brief discussion of the link between labour supply and social protection tools.

International experience shows that countries commonly combine labour supply and social protection tools to support transitioning workers. Employment-focused policies were seen as the first line of defence against poverty before welfare support. Therefore, labour market tools form an integral part of the social protection strategy (Figure 2).

Figure 2: Labour market policies as an integral part of the social protection strategy



Source: Salvini and Bolits, 2021.

The assessment of worker transition assistance policies draws on a conceptual framework by Green and Gambhir (2020). The framework is based on two key variables: the scope of losses and policy objectives. Workers in a transition incur both financial and non-financial losses. A narrow scope of losses considers financial losses only, while a broad scope of losses considers both financial and non-financial losses.

The objective of the transition assistance policies can be conservative (backward-looking) or adaptive (forward-looking). Conservative policies seek to restore workers to the conditions they faced before the transition, while adaptive policies focus on helping workers adjust to a new low-carbon economy. International experience reflects a mixture of policy strategies that varies in the scope of losses addressed and policy objectives pursued. Policymakers must therefore consider both variables when designing support packages for transitioning workers.

Based on the framework, the report uses four worker-centric transition assistance strategies that are shown in Figure 3, in identifying and analysing international experience on worker transition policies. The strategies are:

1. **Compensation strategies** (grandfathering) are conservative and narrow, offering unconditional support for financial losses through passive labour market measures. Most countries in this report have used compensation strategies for workers in transition.

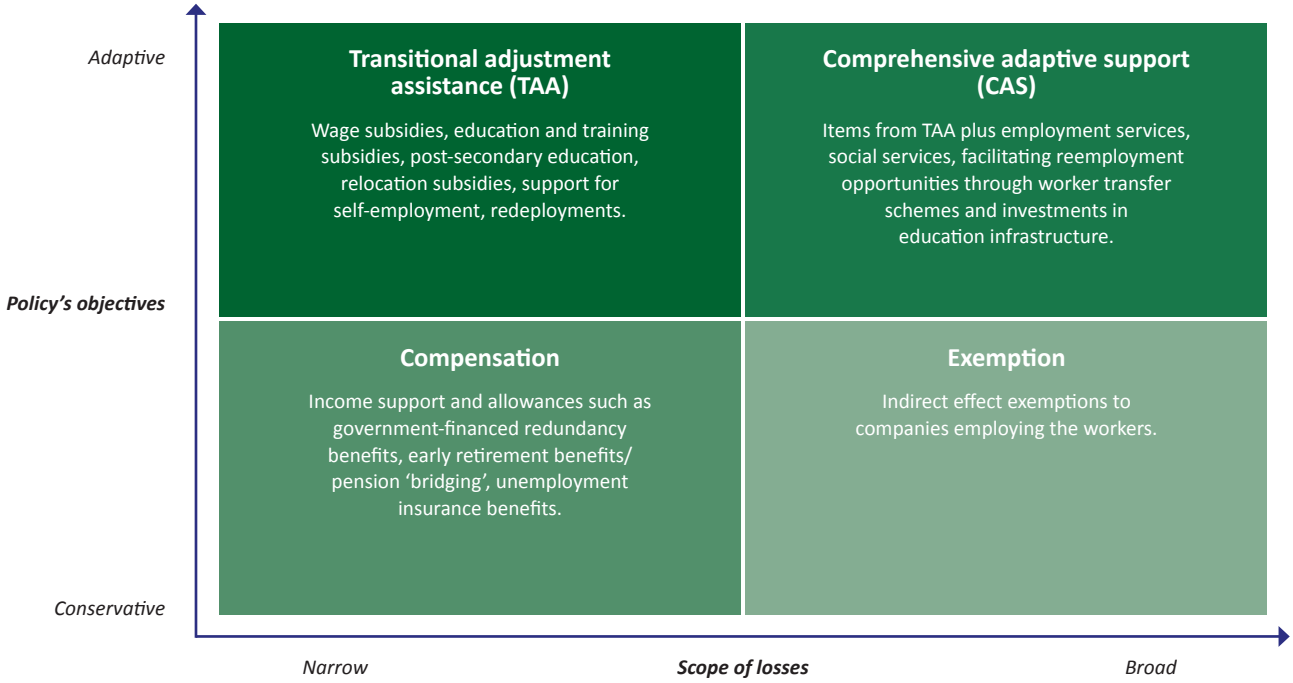
2. **Exemption strategies** are conservative but broad, legally preserving pre-transition conditions to offset financial and non-financial losses. Exemption strategies make use of both active and passive tools.

3. **Structural Adjustment Assistance (SAA)**, as defined by Green and Gambhir (2019), refers to adaptive and narrow support measures that provides conditional cash or in-kind assistance to help workers adjust to structural change. In this report, the term Transitional adjustment assistance (TAA) is adopted to emphasise its forward looking and adaptive nature. TAA strategies therefore include both active and passive measures with a limited scope of addressing primarily financial losses.



4. **Comprehensive Adaptive Support (CAS)** strategies are adaptive and broad, combining active and passive tools to address a wide range of losses. CAS strategies offer the most potential for a just transition but are more complex and costly to implement.

Figure 3: A framework for worker transitional assistance policy strategies



Source: Author's compilation.

Worker-centric Just Transition Policies: Insights from around the world

Insights from past energy transitions around the world show that countries typically rely on a mix of compensation measures, tax-exemption, transitional adjustment assistance, and comprehensive adaptive support. Although these four broad strategies differ in focus and design, most labour supply-side transition assistance instruments used to support workers fall within two main policy domains: passive labour market policies and active labour market policies.

The international strategies are therefore analysed through the lens of passive labour market support and active labour market support. A third category of worker participation policies is included to reflect global lessons on strengthening transparency, consultation, and worker and community voice in transition planning. Accordingly, the next section is organised into three parts: passive labour market policies (PLMPs); active labour market policies; and policies that strengthen worker participation. Each subsection introduces the relevant strategy, draws on international experience to illustrate impacts and institutional arrangements, and concludes with a brief reflection on applicability in South Africa.

Passive labour market policies to support workers in a transition

Losing a job comes with an immediate financial strain, especially for workers without alternative sources of income. PLMPs provide financial protection to workers during periods of displacement. In the context of the just transition, these measures help stabilise income and reduce short-term vulnerability while workers adjust to economic change. During energy transitions, countries have used two main PLMP strategies that have been covered by this section: (1) compensation in the form of direct income support and allowances; and (2) social assistance-based compensation and exemptions.

Losing a job comes with an immediate financial strain, especially for workers without alternatives sources of income.

Compensation in the form of direct income support and allowances

For immediate financial relief, compensation strategies have been commonly used by some countries to ease the transition for workers. The most used compensatory instruments in the first wave of transitions were early retirement schemes, severance payments, welfare allowance, and voluntary redundancy schemes. The instruments yielded different impacts in different countries (see Table 1).

A) Early retirement schemes

The mining sector usually has special retirement conditions separate from the general pension system, allowing miners to retire early. For instance, in Poland, the option of early retirement is given to mining industry employees who have reached the age of 55 and have worked 20 years for women and 25 years for men, with at least 10 years of mining work; or 50 years in the case of those who worked 15 years in mining; or at any age if the person has worked in mining underground full time for 25 years (Bukowski et al., 2018).

In South Africa there are specific pension rules for miners, differing from the standard retirement age of 60–65 (DPSA, n.d.). The early retirement option is given to mine workers between 50–60 years and 53–63 years for underground and surface workers, respectively (Bhorat et al., 2024). Relaxing eligibility criteria complimented with financial compensation has been a common strategy for helping workers nearing retirement to exit the labour force with financial security, particularly in countries such as Germany, Poland, Czech Republic and Spain.

Table 1: Summary of compensation strategies and impact by different countries

COMPENSATION	COUNTRY	POLICY NAME	IMPACT
Unemployment benefits	Germany	Development Program Ruhr (1968)	Ensured basic living standards and prevented poverty.
Early retirement scheme, severance pay, welfare allowance and voluntary redundancy schemes	Germany	Act to Finance the Termination of Subsidized Coal Mining (2007)	Many displaced workers found new jobs, while older ones took early retirement.
		Transition payments system (1972)	By July 2022, two million people claimed pensions at age 63.
	Poland	Miners leave and welfare allowance (1993)	By December 1993, 1600, people received social benefits and 99 people received miners leave.
		Mining Social Package (1998)	Closure of 13 mines and employment in coal fell by 102 600.
	Czech Republic	Early 1990s restructuring in Moravskoslezský: Remedial measures	Many coal miners left for severance and compensation, leading to a decline in the workforce of Ostrava Karvina Coal Mines (OKD).
		The 2016 pension system reform and other measures	Only a few workers used the new system.
	Spain	Early retirements from all other coal plans between (1990–2018)	Eliminated surplus labour.
		Coal Plan (1997–2005)	Coal workers dropped by 16 190 and production fell over five million tonnes.
		2006-2012 Coal Plan	Employment and coal production declined.
		2013–2018 Activity Framework	349 workers applied for early retirement scheme.
	UK	1960s Option to take redundancy benefits or transfer to another mine.	Older generation of miners mostly left the industry. Younger workers stayed on for longer.
In-kind allowance	Poland	Coal allowance for mining pensioners, 2012–2018	In 2013–2014, about 13 600 people were eligible for the coal allowance.

Source: Author's compilation from Szpor, 2018; Szpor and Ziółkowska, 2018; Śniegocki et al., 2022; Bhushan and Banerjee, 2023; European Commission: Directorate-General for Energy et al., 2024.

GERMANY

Based on the country's transition payments system, a legal framework was introduced in 1972 to provide ongoing financial support for coal industry workers (European Commission: Directorate-General for Energy et al., 2024). The framework combines compensation and exemption strategies to support workers nearing retirement to transition out of the labour force.

As part of transition support, workers eligible for early retirement were offered monthly financial bridging support until they qualified for regular pension benefits. The benefit was initially available to underground coal miners over 50 years and surface miners over 57 years. Over time, eligibility for early retirement benefits was changed, allowing only workers with at least 35 years of unemployment insurance contributions to retire at 63 under the 2014 pension reform.

In addition to the early pension benefit, the framework allowed beneficiaries to supplement their income with additional earnings and benefits, such as tax exemptions to offset wage reductions for retired workers who were willing to find other lower-paying jobs in non-coal sector. Under the same legislation, coal mine companies were mandated to provide grants if the adjustment payments was below 60% of a worker's previous salary, ensuring adequate financial compensation (European Commission: Directorate-General for Energy et al., 2024). The legislation is still active in Germany and provides support for coal workers in transition. Early retirement scheme has successfully managed coal sector employment, with close to two million people in Germany retiring at 63 instead of 66 by July 2022 (Expat, 2025).

In the second wave of the coal transition, Germany enacted the Coal Exit Act in 2020. The Act, among others, allocated €5 billion to support workers and communities affected by coal plant closures (Bhushan and Banerjee, 2023; International Energy Agency, 2024; Wettengel, 2020). The Act relaxed the eligibility criteria for early retirement. Instead of qualifying for an early retirement benefit at the age of 63 as amended in 2014, the Act lowered the age for coal plant workers to 58 years for workers who lose their jobs due to plant decommissioning. Beneficiaries receive financial compensation for up to five years (depending on the number of years they have contributed to a pension fund), bridging the gap until they qualify for their pensions.

POLAND

Poland has a long history of implementing early retirement measures supporting the retirement cohort to transition out of the labour market. The Polish government has implemented early retirement schemes on separate occasions, which differed according to eligibility criteria and level of compensation.

Initially, the early retirement scheme known as the "miners' leave" of 1993 allowed coal miners with fewer than three years left to receive pension benefits to retire early (Szpor and Ziółkowska, 2018). Early retirement was offered to all eligible underground miners who were facing retrenchment due to mine closures. As compensation, eligible miners received half of their salary until they qualified for pension. This payment could be taken either as a lump sum or in monthly instalments. The compensation would be reduced if the beneficiary found another job outside coal mining sector (Bhushan and Banerjee, 2023).

Beneficiaries also retained several privileges, including an annual bonus and a coal allowance provided either in-kind or as a monetary equivalent (Śniegocki et al., 2022). A year later, the monthly pension bridging amount was increased to 55% of the final salary (Szpor, 2017). Nonetheless, many eligible workers did not consider the compensation adequate to protect them from financial loss, resulting in very few taking up the offer (Karbownik and Bijańska, 2000).

As the initial miners' leave benefits in Poland failed to reduce employment significantly, the government adopted a plan called Reform of Hard Coal Mining in mid-1998 (Bhushan and Banerjee, 2023; European Commission: Directorate-General for Energy et al., 2024; Szpor and Ziółkowska, 2018). Under this plan a Mining Social Package (MSP), described

in detail in Box 1, was developed, which aimed to encourage voluntary layoffs and support mineworkers to transition out of the coal sector. The MSP had stronger protective miner's leave benefits. Besides relaxing eligibility criteria, the Polish government increased the early retirement compensation to make it more attractive. Eligibility was extended from three to five years, and compensation increased from 55% to 75% of the worker's previous salary. Unlike the 1993 miners' leave, the change in early retirement conditions and benefits in 1998 yielded a much better result. About 37 000 workers benefitted under the MSP and this was regarded as a success in reducing the size of the coal workforce (Śniegocki et al., 2022; Szpor, 2018).

In the second wave transition, Poland continued using the early retirement scheme. Under the 2021 Social Contract, coal workers within four years of retirement became eligible for mining leave benefits from 2020, with compensation raised to 80% of their salary, higher than in the 1998 MSP (Bhushan and Banerjee, 2023; European Commission: Directorate-General for Energy et al., 2024; Śniegocki et al., 2022).

CZECH REPUBLIC

Coal restructuring in the Czech Republic began in the 1990s after the end of one-party rule, driven by economic transition, industrial decline, lower energy demand, and rising environmental pressures (Rečková et al., 2017). To ease the transition, changes were made to the regulations concerning the early retirement scheme. The first regulation on early retirement associated with coal restructuring (Government Regulation No. 557/1990 Coll) in the Czech Republic was enacted in 1990. Under this legislation, miners could qualify for early retirement at the age of 50 if they met the following three criteria: (1) 25 years of work experience, with at least 15 years in mining; (2) completion of 5 600 underground shifts as per legal exposure limits; and (3) faced job termination before the end of 1991 or 1992 (European Commission: Directorate-General for Energy et al., 2024). Due to several controversies with the initial legislation, it was amended in 2009 and again in 2016. The pension system reform of 2016 allowed miners who had completed 3 300 underground shifts (about 15 years) to retire seven years earlier than the legal retirement age (Bradshaw et al., 2016).

The Czech Republic legal retirement age depends on the year of birth and, for women, the number of children raised as well (Czech Social Security Administration, 2022). For example, women born before 1971 and having raised at least five children could retire as early as 46, with the maximum early retirement age set at 58 if only one child is raised under the 2016 pension rules. While the new pension regulation of 2016 could have potentially benefitted about 3900 workers through early retirement, only a smaller number of eligible workers took advantage of the new arrangements (European Commission: Directorate-General for Energy et al., 2024).

SPAIN

Spain has a long history of providing early retirement to the retirement cohort transitioning out of the coal sector. The state-aid early retirement measures were implemented under several coal plans. The coal plans includes the Coal Reorganisation Plan (1990-1993), the Coal Industry Modernisation Plan (1994-1997) and the Action Framework for Carbon Mining and Mining Regions (2013-2018), among others (Del Rio, 2017). Spain's government set the conditions for early retirement in official legal documents. Pre-retirement salary was received through the mining company until beneficiaries reach legal retirement age. The pension bridging salary was reduced through the application of a 50% reduced coefficient[4] and calculated as a percentage of a worker's salary in previous years (Bridle et al., 2017).

Under a 1998 Ministerial Order, workers aged 52 and older with at least three years of service became eligible for early retirement (Del Rio, 2017). Subsequent coal plans up to 2018 prioritised early retirement benefits. The beneficiaries of the early retirement scheme received wages between €1 700 and €2 500 per month. This was two to three times higher than the national minimum salary of around €764 per month (Bridle et al., 2017). Without early retirement

4 *Reduction coefficients are factors applied to reduce the number of years needed to get official retirement. The 50% applied meant that each year worked in the coal sector would count as double for achieving the retirement status.*

compensation, workers would get up to two years of unemployment benefits (50%-70% of salary, maximum €1 600), making early retirement payments a more generous option (EURAXESS, 2025; Piero Viganego, 2025). By 2016, and with European Commission funding of €2.13 billion, miners aged 48 and older, with 25 years of contributions to the Coal Mining Social Security fund or 20 years with an affected company, were eligible for early retirement packages (Bhushan and Banerjee, 2023).

The early retirement plans in Spain were considered effective, given the country's socio-economic reality of high unemployment. The government managed to eliminate surplus labour, while containing the political and social cost of job losses. For instance, the Coal Plan (1997-2005) cut coal jobs by 16 200, while the 2006-2012 plan resulted in the reduction of nearly 5000 more jobs (Bridle et al., 2017). Through the 2013-2018 Activity Framework, about 349 workers applied for early retirement (European Commission: Directorate-General for Energy et al., 2024). In addition, Spain's coal plans successfully promoted participatory democracy. Besides good social dialogue in which diverse governmental and non-governmental stakeholders were engaged (European Commission: Directorate-General for Energy et al., 2024), Spain's coal plans were approved by labour unions, which contributed to their success (Del Rio, 2017). While these coal plans were aimed at phasing out coal, they provided an extensive package of benefits to affected miners.

Applicability of early retirement scheme for South African coal workers

Given South Africa's high unemployment rate and low economic growth, displaced coal workers are likely to face significant challenges in finding alternative employment without relocating. In this context, early retirement with financial bridging compensation for eligible workers emerges as a potential policy option within a tailored support package.

South Africa currently allows voluntary early retirement for mine workers aged 50 to 63, with eligibility varying by occupation and working conditions. However, existing decarbonisation plans provide limited clarity on how workers opting for early retirement would be supported beyond standard retirement benefits. Strengthening early retirement frameworks through more flexible eligibility criteria and improved compensation measures can help bridge workers to pensionable age and reduce transition risks.

International experience demonstrates the importance of structured and well-funded early retirement schemes. In countries such as Poland, Spain, and Germany, governments have contributed to financing income bridging payments until workers reach retirement age, often through co-financing arrangements with coal mining companies. This approach helps distribute costs between the public and private sectors, supporting worker stability while avoiding undue financial pressure on firms.

In South Africa, additional financing arrangements are particularly important given that the occupational pension is inadequate relative to former coal worker earnings, necessitating supplementary income protection for pensioners. While around 80% of mine workers contribute to retirement funds (Makgetla et al., 2019; Bhorat et al., 2024), these savings may not be sufficient to maintain pre-retirement living standards. The supplementary income in form of Old Age Grant of approximately R2400 per month (National Treasury, 2026) provides a basic safety net from age 60 but remains significantly below typical coal sector earnings. This highlights the need for adequate financial bridging mechanisms.

Early retirement schemes can play a stabilising role by maintaining household income, reducing poverty risks, and supporting local demand in coal dependent regions. Evidence suggests that such schemes have helped maintain living standards above the poverty line in several countries, while also easing labour market pressure during periods of high unemployment (Bridle et al., 2017). However, these schemes come with trade-offs. Long-term financial commitments can be costly, particularly if eligibility is extended to younger workers with many years remaining until retirement.

In addition to fiscal considerations, income adequacy remains a key concern. In several cases, financial bridging payments fall short of previous earnings. To address this gap, Germany's transition framework allowed early retirees to supplement their income through additional work and benefits, including tax exemptions to offset wage reductions in lower paying jobs outside the coal sector. Mining companies were also required to provide supplementary grants where bridging payments by government fell below a defined share of previous wages, helping to ensure more adequate compensation.

Beyond financial concerns, early retirement can have broader social and economic impacts. These include the loss of valuable skills from local economies, as well as social risks such as isolation, declining mental health, and community disruption. Experiences in countries such as Spain and Germany also show that early retirement schemes may contribute to outward migration from mining regions. There is also a risk of moral hazard, where generous compensation reduces incentives for retraining or re-employment.

Addressing these risks requires careful policy design. Early retirement schemes are more effective when combined with complementary support measures, including social and psychological support, skills development opportunities, and community-based initiatives that promote continued engagement. Such measures help ensure that early retirement is not only a financial exit mechanism but also a supportive transition pathway.

B) Severance payments, welfare allowance and voluntary redundance scheme

While early-retirement schemes can be tools for managing the retirement cohort in transition, they need to be complemented by additional financial measures to ensure financial stability. The youthful composition of the coal mining industry workforce (51% aged 15-34) suggests that the early retirement option is not viable for the majority of coal mine workers (Bhorat et al., 2024).

To compensate for financial losses incurred by all miners (including the young and middle-aged mine workers), the government needs to explore alternative options such as government-financed redundancy schemes, severance, and welfare payments. The UK, Poland, Spain, Czech Republic, Germany, and Canada have used these compensation measures, differing in compensation levels, implementation, and outcomes.

UNITED KINGDOM

The UK's response to coal transition in the 1960s highlights the consequences of reactive measures and inadequate support for workers. Most of the measures implemented by the UK government during the first wave of coal transition did not form a broad, coherent strategy (Fothergill, 2017). Instead, they were developed over time in a piecemeal fashion due to political pressure and worsening socio-economic impacts caused by mine closures.

Due to late action being taken in the UK, the coal sector workers suffered from a steep and unmanaged decline in employment, which in turn affected their livelihoods. In response, the UK government offered miners an option of redundancy, early retirement, and welfare benefits to leave their jobs or to be transferred to other open mines usually within commuting distance. This intervention resulted in most of the older generation of miners exiting the industry with

some financial support and perhaps early access to a coal industry pension. The younger workforce stayed on for longer. If they did leave the industry, it was often into other work even with reduced pay (Fothergill, 2017).

The UK's lack of a broad coal transition strategy and its reactive stance may not yield similar outcomes in South Africa if the same route is taken. This is because, first, unlike the UK's fully privatised coal mines and power stations which began operating in a liberal economy as of 1990 (Fothergill, 2017; Rentier et al., 2019), South Africa's power stations are state-owned under Eskom, making job losses politically sensitive. For example, Komati's closure in the absence of a coordinated plan to provide alternative employment led to substantial negative criticism (Ezeh, 2024; PCC, 2023). Second, UK coalfields are more accessible, near major towns and the people have high car ownership (Fothergill, 2017), while South Africa's coal areas, especially in Mpumalanga, are remote with low vehicle ownership (Eighty20, 2024), limiting mobility in a high unemployment environment. Last, the UK coalfields have more diverse economies, whereas municipalities like Emalahleni and Steve Tshwete remain heavily dependent on coal, with limited employment alternatives.

POLAND

Besides early retirement schemes, Poland also used voluntary redundancy measures, referred to as "welfare allowances" to support coal miners affected by restructuring. These allowances were first introduced in 1993 and later expanded under the 1998 Mining Social Package.

I. Welfare Allowances of 1993

Between 1993 and 1998, miners who did not qualify for pre-retirement benefits were offered compensation in the form of welfare allowances and other social benefits if they voluntarily terminated their employment (Bhushan and Banerjee, 2023; Śniegocki et al., 2022). The allowances were paid monthly up to two years. The benefits were halved if beneficiaries secured new employment during the benefit period. The welfare allowances benefited about 1600 people by the end of December 1993 (Karbownik and Bijańska, 2000). While employment decreased, it was less than what policymakers expected due to payments targeting only miners affected by mine closures, and compensation being too low to encourage voluntary exits.

II. The Mining Social Package of 1998

While the impact of the first welfare allowance programme was lower than expected in voluntarily reducing employment in the coal sector, the government of Poland responded by implementing the MSP (Box 1) under the Reform of Hard Coal Mining plan of 1998. The MSP was designed to address overproduction of coal and an oversized workforce. The plan was done in agreement with the largest and most influential unions active in the Polish coal sector (Bhushan and Banerjee, 2023).

The MSP offered stronger financial incentives to encourage voluntary departure for both underground and non-underground workers in the coal sector (Szpor and Ziółkowska, 2018). Under this programme the workforce would be reduced by more than 100 000 of the 243 300 mine workers employed in 1997 (Śniegocki et al., 2022). Monthly allowances were capped at 65% of average monthly pay and an unconditional "golden handshake" of 24 months' average mining pay was offered to workers ineligible for miners leave.

The MSP's measures were well received by mineworkers (Karbownik and Bijańska, 2000), mainly due to union involvement in its design, which helped avoid major protests (Śniegocki et al., 2022). In addition, the MSP was enshrined in the Adaptation of Hard Coal Mining to Functioning in Market Economy Conditions and Special Rights and Tasks of Mining Communities Act of 26 November 1998 (Śniegocki et al., 2022). This gave it more weight than previous restructuring programmes that were enacted only on internal government documents. This Act also outlined objectives, social support measures, funding conditions, and oversight (Szpor and Ziółkowska, 2018). Total funding for employment restructuring between 1998-2002 amounted to US$1.4 billion with at least 70% coming mostly from the Polish government and the rest contributed by mining companies (Szpor and Ziółkowska, 2018).

As indicated in Box 1, while the MSP financial compensation instruments succeeded overall in reducing the size of the coal workforce, there were some negative outcomes and unintended consequence with individual instruments used. Welfare allowance uptake was low; workers viewed it as too risky, given the retraining and re-employment requirements amid limited job-search experience, low education levels, and an uncertain local labour market (European Commission: Directorate-General for Energy et al., 2024; Śniegocki et al., 2022; Szpor, 2018; Szpor and Ziółkowska, 2018).

Box 1: Overview of the Poland's Mining Social Package: Key Instruments, Outcomes, and Lessons for Policy Design in a Just Transition

The MSP aimed to encourage voluntary layoffs and support mineworkers in transition out of the coal sector. It included both protective and activating measures. The package led to the closure of 13 mines and a workforce reduction of 102 600, yet its rapid implementation and limited job-seeking support resulted in large-scale workforce exits, impacting long-term economic stability.

Key Instruments of MSP

- *Miners' Leave:* The main protection instrument was early retirement: 75% of the monthly salary for those within five years of retirement, with full benefits at retirement age.
- *Redundancy Payment:* The main activating tool was a one-time, unconditional "golden handshake" equal to 24 months of average mining pay for those ineligibles for miners' leave.
- *Welfare Allowance:* Another activating tool was a voluntary redundancy allowance, paid monthly during retraining or job search, capped at 65% of average pay for up to two years.
- *Retraining Courses:* Single-course eligibility to help former miners find employment outside the mining sector.

Funding

The programme cost US$1.4 billion from 1998-2002, 70% funded by the government, the remainder by collieries.

Successes

- Union collaboration enabled fast, large-scale employment reduction with minimal unrest.
- Voluntary incentives exceeded expectations, with 67 000 workers exiting the sector and a 40% rise in productivity.

Challenges

- *Redundancy Payments:* Insufficient support led to high unemployment rates (35% by 2004), with payments spent mostly on consumption rather than saving or investment. MSP did not provide the support necessary to generate satisfactory outcomes for the workers who left the sector.
- *Welfare Allowance:* Limited uptake; only 419 opted for it. They considered it too risky, given their limited experience in job searching, lack of professional competences, low levels of education, and the uncertainties in the local labour market.
- *Economic Impact:* Over time, financial strain increased; by 2004, almost 13% of households struggled with basic expenses.
- *Training:* Retraining offered by public employment services to ex-miners was insufficient and in some cases the new skills offered did not match the needs of the labour market.

Source: Extracted from European Commission: Directorate-General for Energy et al., 2024; Śniegocki et al., 2022; Szpor and Ziółkowska, 2018.

Among those who took redundancy payments, a few started businesses, and most failed due to lack of experience and training support. A 2004 survey found that 35% of former mineworkers who benefited from these payments were left unemployed and, with financial hardship rising, households struggling to meet basic needs increased from 17.6% in 2001 to 30% in 2004 (European Commission: Directorate-General for Energy et al., 2024). Some beneficiaries used the payouts for immediate needs rather than saving or investing (Szpor, 2018; Szpor and Ziółkowska, 2018). With only one optional retraining course and no broader support, the scheme fell short, contributing to a large-scale labour market exit (Szpor and Ziółkowska, 2018).

Among those who took redundancy payments in Poland, a few started businesses and most failed due to lack of experience and training support.

III. Social Contract of 2021

The 2021 Social Contract for Mining Industry Transformation, signed by the Polish government, trade unions, coal companies, and local authorities, mandated a one-time severance payment of US$31 000 (approximately R535 000) for all coal mine and processing plant workers (Bhushan and Banerjee, 2023; European Commission: Directorate-General for Energy et al., 2024; Śniegocki et al., 2022). Despite challenges with unconditional financial compensation during the first transition (e.g., under the MSP), the Polish government still provided such compensation to affected coal workers through a social contract in the second wave of transition.

Poland's transition policy has long prioritised stakeholder engagement. The recent social contract was shaped through early negotiations between government, coal companies, and trade unions, aimed to prevent sudden closures and protect workers by extending the coal phaseout timeline and outlining compensation for affected employees (Śniegocki et al., 2022).

While no formal evaluations of the social contract have been conducted, Śniegocki et al. (2022) and European Commission: Directorate-General for Energy et al., (2024) raised some concerns, including:

- The lack of a clear closure timeline, which may weaken climate goals.
- Prolonged operations risk diverting funds from new alternative opportunities to fossil fuels.
- The costly schemes could strain public finances and, if poorly targeted, may reduce job-seeking incentives for those who might have found work independently.
- Without formal legislation, the contract lacks legal enforceability.

SPAIN

As part of the policy package, Spain used severance and voluntary redundancy payment schemes to compensate for financial losses during its coal restructuring. Under a 1998 Ministerial Order, workers who had contributed to the Special Social Security Regime for Coal Mining[5] for at least three years could apply to the voluntary redundancy scheme (Del Rio, 2017). Participation for the voluntary redundancy scheme was not limited to miners, but extended across the industry to include engineers and administrative staff (Bridle et al., 2017). Unlike Spain's specialised regime, South Africa lacks a dedicated unemployment or social security scheme for coal miners. Affected workers rely on the general Unemployment Insurance Fund (UIF) system.

The voluntary redundancy schemes ran across different government-initiated plans aimed to phase out coal. Among others, the plans include the Coal Reorganisation Plan 1990-1993, the Coal Industry Modernisation, Rationalisation, Restructuration and Activity Reduction plan 1994-1997, Coal Mining Plan 1998-2005 and the Action Framework for

5 *The Special Social Security Regime for Coal Mining is a mandatory employment insurance for employed persons engaged in activities related to coal mining*

Carbon Mining and Mining Regions 2013-2018 (Bridle et al., 2017). As of 2016, workers not eligible for an early retirement benefit received a severance pay of €10 000 plus 35 days' pay for every year of employment (Bhushan and Banerjee, 2023). Spain's voluntary redundancy schemes supported workers financially while enabling flexible exits and reducing surplus labour in the coal sector.

CZECH REPUBLIC

The remedial measures implemented in Czech Republic during the coal sector restructuring process in the Moravskoslezský region at the beginning of 1990s provided coal workers with an option to be transferred to other active coal mines or to receive severance payments. Those who opted for a severance pay received a lump-sum equal to 10 months wages, plus an additional four months for miners working in dangerous or difficult conditions, plus a bonus payment of CZK1 900 (5% below the 1991 statutory minimum wage)[6] a month for up to 36 months to facilitate re-employment in other sectors (European Commission: Directorate-General for Energy et al., 2024).

As a result of these measures, some coal miners opted to leave the mining jobs and receive the severance pay and other forms of compensations. This led to a decrease of the OKD workforce from more than 100 000 in 1989 to less than 50 000 in 1995 – a significant reduction in the country's coal mining workforce[7] (European Commission: Directorate-General for Energy et al., 2024). The OKD is one of the mining companies in Czech Republic, which have undergone restructuring and closure of part of its coal mines since 1990.

In 2016, the Czech government provided aid to cover closure-related costs at OKD, at a major coal mine, including severance, loyalty bonuses, and risk-based bonuses, demonstrating government commitment to a just transition (European Commission: Directorate-General for Energy et al., 2024).

GERMANY

Germany has implemented income support measures for transitioning workers since the 1958 coal crisis, including through the Development Program Ruhr (DPR) of 1968. During the country's first coal phase-out, the state government of North Rhine-Westphalia introduced the DPR, allocating €8.7 billion between 1968 and 1971 to address the economic and employment impacts of the crisis (Furnaro et al., 2021).

As part of the DPR, financial compensatory measures were provided in the form of unemployment benefits for up to 24 months, to help displaced coal miners maintain their standard of living and prevent extreme poverty. In addition, the government offered conditional subsistence allowances and coverage for training-related costs to workers who enrolled in retraining programmes. This is an example of transitional adjustment assistance support that could be included in a worker policy package for South African coal workers. However, South Africa's high unemployment, poverty, and inequality make its context far more socially vulnerable than post-war Germany, requiring stronger safety nets that could strain public finances.

6 The Czech Republic did not have a set statutory minimum wage in 1990. The minimum wage was reintroduced as part of labour market reforms.

7 OKD is Czech Republic's only hard coal producer which managed about 16 mines. The company has been affected by coal mine restructuring since 1990, resulting in closure of some units. The company remains operational, with extraction at its last active mine scheduled to end in January 2026.

CANADA

As a second wave transitioning country, Canada introduced a range of income support measures to assist coal workers, particularly in Alberta. In 2018, the provincial government of Alberta launched a CAD40 million Coal Workforce Transition Program (CWTP) following recommendations from an advisory panel that consulted with workers and communities (Hussey and Jackson, 2019). The CWTP provides financial assistance for re-employment, retirement, and relocation. Key components of this programme relating to this category are:

- A bridge-to-re-employment relief grant covering up to 75% of previous weekly earnings for up to 45 weeks.
- A bridge-to-retirement relief grant offering similar support for workers close to retirement until they become eligible for their employer pension or for up to 72 weeks; and
- Relocation reimbursement of up to CAD5 000 for moving-related expenses incurred by workers moving at least 40 kilometres for new jobs.

Applicability of redundancy, severance payments, and welfare allowance schemes for South African coal workers

Poland's MSP was funded by the government through a World Bank loan (70%) and mining companies (30%) (Szpor and Ziółkowska, 2018). In South Africa, similar funding could be drawn from the Just Energy Transition Partnership (JETP), World Bank support, and mining company commitments through the Social and Labour Plan (SLP) financial provisions for downscaling. The MSP's success was partly due to union involvement and its legal backing under the Adaptation of Hard Coal Mining to Functioning in Market Economy Conditions and Special Rights and Tasks of Mining Communities Act of 1998, which detailed support measures, funding, and oversight (Śniegocki et al., 2022). South Africa's Climate Change Act No. 22 of 2024 sets a broad just transition vision but lacks a legally binding, worker-focused support package. While frameworks like the Just Transition Framework and Just Energy Transition Investment Plan (JET-IP) exist, they offer no clear financial package or implementation plan for affected coal workers.

Poland's recent social contract, signed by government, coal companies and unions, made a commitment to prevent sudden coal mine closures by extending coal phase-out timelines and provide a clear compensation package for affected coal workers (Śniegocki et al., 2022). This gives government more time to plan for closures in a just and equitable way. However, under Eskom's Generation Continued Operations shutdown plan, the coal fleet will begin its phased 50-year end-of-life process in 2029 (Department of Electricity and Energy, 2025). The plan projects a 23 GW reduction in coal capacity by 2042. A clear plan for reduction of coal capacity is available, yet, unlike Poland, the country has no equivalent agreement guaranteeing compensation or protection for coal workers affected by the scheduled closures.

Currently, displaced coal workers in South Africa rely on UIF, the two-pot retirement system, severance pays and general social grants. These have serious gaps. The two-pot system risks short-term withdrawals that undermine long-term security (Fraser, 2024). UIF excludes informal workers and is limited to 365 days over four years (Department of Employment and Labour, n.d.), while German's unemployment benefits lasted for two years. Social grants fall far short of the income coal workers are used to receiving. The minimum severance pays required under South Africa's Basic Conditions of Employment Act No. 75 of 1997 of one week's salary for each year worked is grossly inadequate when compared to countries such as Spain, where workers received €10 000 plus 35 days' pay for every year of service.

To address these gaps, additional compensatory measures such as government-financed severance, welfare, or redundancy payments are needed in the policy package. In Poland, Spain, and the Czech Republic, such payments were offered ahead of closures to ease the transition. However, Poland's experience shows that unconditional redundancy payments often failed as some workers spent the money quickly, lacked business skills, and remained unemployed (Szpor, 2018; Szpor and Ziółkowska, 2018). Such experiences underscore the need for payments to be paired with financial literacy and entrepreneurship training. South Africa already has the National Consumer Financial Education Strategy and various financial education initiatives (National Treasury, 2013; Sibanda and Sibanda, 2016) that can be leveraged on. In addition, entrepreneurial support programmes such as the SheTradesZA Hub offered through the Small Enterprise Development and Finance Agency (SEDFA), can be scaled up in coal affected communities to reduce business failure rates and improve the prospects of sustainable business success.

Lessons from Poland show that conditional payments linked to retraining or business start-ups are more effective, even if less immediately appealing (Szpor, 2017). Unconditional payments often lead to regret, especially when funds run out and no job alternatives exist.

Drawbacks of redundancy, severance, and welfare payments include:

- **Risk aversion:** Conditions tied to retraining can deter uptake due to low education, job search inexperience, and labour market uncertainties.
- **Long-term unemployment:** Without additional follow-up support, payments are often spent quickly, worsening financial hardships.
- **High fiscal cost:** These schemes are costly especially if poorly targeted they may discourage job-seeking (moral hazard).
- **Unsustainable use:** Lump sums may go toward luxuries or "sin" goods rather than essentials.
- **Short-term relief:** Workers favour immediate cash, but conditional transfers promote long-term security.
- **No job creation:** Payouts do not generate new employment.

Social assistance-based compensation and exemptions

Job losses bring both financial and non-financial losses, as coal mine workers in South Africa often receive non-financial benefits like housing, healthcare, and nutrition under mining regulations (Centre for Applied Legal Studies, 2017; DMRE, 2019). The benefits outlined in the collective bargaining agreements must be factored into the design of a worker policy package. An adaptive and comprehensive support package needs to include social assistance and exemptions to address these losses and promote long-term stability, as seen in countries like Poland and Czech Republic.

POLAND

Poland's transition approach, which included in-kind social support in the form of coal allowances to affected workers, was an attempt to achieve both livelihood protection and livelihood promotion effects. The coal allowance has always been part of collective bargaining agreements in which coal mining companies provided coal allowances, either in-kind coal for heating or cash equivalents, to active miners and retirees (Śniegocki et al., 2022). However, by 2012, as the coal sector was declining, mining companies terminated these agreements for retirees, transferring the obligation to the State Treasury, which began paying cash equivalents. The coal allowance was paid through the Zakład Ubezpieczeń Społecznych (ZUS).

In 2017, the government ended monthly cash equivalents and introduced a law offering a one-time US$3 000 payment to settle coal allowance liabilities for pensioners, demonstrating a practical response to resolving legacy obligations during the transition (Śniegocki et al., 2022). The transfer of coal allowance payments from mines to government shows a level of state commitment to supporting workers during the coal transition.

The coal allowance given by the Polish government benefited around 13 600 workers (European Commission: Directorate-General for Energy et al., 2024). In 2017, after the law on compensation for the lost coal allowance came into force, it benefited about 235 000 workers (Śniegocki et al., 2022).

CZECH REPUBLIC

The Czech government committed to financing the costs related to closing coal mines including covering related social costs. Approximately CZK72 billion (€3 billion) was released from the state budget between 1992 and 2009, of which 40% was used on social health benefits for miners (Rečková et al., 2017). The government also provided compensation to miners for lost earnings, social allowances of CZK5 280 for three to 30 months depending on length of service, and regional transport allowances of between CZK1 000-CZK3 500.

In its second wave transition, after the closure of the OKD Paskov coal unit in 2017, the government provided aid to cover the costs of closure (European Commission: Directorate-General for Energy et al., 2024). As part of this aid, the government paid health benefits to 84 miners with occupational diseases – a special bonus for workers who had been exposed to the maximum occupational health risk in mines. Such a response depicts government's effort in achieving restorative justice by rectifying health damages caused by polluting activities.

Applicability of auxillary worker benefits for South African coal workers

In South Africa, the Labour Relations Act No. 66 of 1995 governs collective bargaining, requiring employers and unions to negotiate wages, working conditions, and employment terms. Labour unions engage in these negotiations with coal mine employers. While both collective agreements and legislation cover benefits such as housing, health, and education, among others, there is no clear direction as to how workers will receive these benefits post-mine closure. The South African Constitution (1996), however, guarantees access to healthcare, food, water, and social security, including assistance for those unable to support themselves (South African Government, 2025) but coal mine closures will add costs to the existing fiscal constraints. Various existing social grants may offer some relief, but coverage gaps and insufficient support would leave affected coal workers in jeopardy (Montmasson-Clair, 2021). Employees who have contracted diseases during their work in a coal mine are supported through the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993.

Active labour market policies to support workers in a transition

Active labour market policies (ALMPs) focus on improving workers' employability and supporting their re-entry into the labour market. These instruments are essential for helping displaced coal workers gain new skills, access job opportunities, and transition into emerging sectors. Ultimately, they are intended to shift the unemployed and certain other categories of economically inactive people off the "passive" benefit system, into employment and other sources of livelihoods (Meth, 2009).

Active labour market policies help reduce unemployment either because people move into alternative jobs or create their own sources of livelihood.

ALMPs help with reducing unemployment rates (Pignatti and Belle, 2018) either because people move into alternative jobs or create their own sources of livelihood. The following section discusses ALMPs for transitioning workers, which ranges from transitional adjustment assistance to comprehensive adaptive support. The section focuses on education and training, expansion of education infrastructure, employment services, self-employment strategies, and redeployment. International experience on ALMPs is summarised in Table 2.

Table 2: Summary of active labour market strategies and impact by different countries

	COUNTRY	POLICY NAME	IMPACT
Education Infrastructure	Germany	Development Program Ruhr (1968)	Expanded the university system in the Ruhr area.
		Action Program Ruhr (1980)	The northern Emscher built a technical college, and Ruhr cities set up technology centres.
		Future Initiative for Coal and Steel Regions (FICSR) (1987)	More technology centres were established.
Education and Training	Poland	Mining social package (1998–2002)	Retraining for ex-miners was often insufficient and poorly aligned with job market needs.
	UK	Skills Development Scotland (2008)	It was a clear improvement over the British Coal Enterprise (BCE) and well-received by stakeholders.
Redeployments	Poland	Mine Restructuring Company (2000–2018)	Took in 13 300 employees together with 16 mines that had been intended for liquidation.
	Czech Republic	Early 1990s restructuring in Moravskoslezský	Reduce the number of OKD mine workers by 20 000.
		Reemployments assisted by government	Some OKD-Paskov mine workers found new jobs in other sectors.
	UK	Transferring workers to operating mines	Ex-miners found jobs but often displaced other local jobseekers due to high unemployment.

	COUNTRY	POLICY NAME	IMPACT
Employment Services	UK	Partnership Action for Continuing Employment	Used by 40% of those facing redundancy – of these, 25% underwent training and 80% found employment within a year.
	UK	The British Coal Enterprise (1984)	Replaced approximately one in 14 jobs lost in the coalfields
Self-Employment	China	Shanxi Coking Coal Group Innovation centre (2016)	Facilitated the creation of 26 businesses
	Poland	Mining Social Package (1998)	Few started businesses, but most had to shut them down.

Source: Author's compilation from Szpor, 2018; Szpor and Ziółkowska, 2018; Śniegocki et al., 2022; Bhushan and Banerjee, 2023; European Commission: Directorate-General for Energy et al., 2024.

Education and training

As industries shift to low-carbon systems, education and training are vital to equip workers with in-demand skills. Ensuring a skilled (current and future) workforce provides the bedrock for economic stability, productivity, and competitiveness. Governments in Poland, the UK, Spain, and the US have actively supported worker education and training during energy transitions.

POLAND

Education and training are crucial instruments used by the Polish government to manage its energy transitions. As an example, a one-time retraining opportunity was offered to workers under the 1998-2002 MSP (described in Box 1). It should be noted, however, that the one-time retraining opportunity offered to ex-miners was insufficient and, in some cases, the new skills offered did not match the needs of the labour market (Śniegocki et al., 2022; Szpor and Ziółkowska, 2018).

Recently Poland's social contract for mining industry transformation of 2020, extended another one-time retraining opportunity to all workers in mines and coal-processing plants (Bhushan and Banerjee, 2023; Śniegocki et al., 2022). In 2022, Poland allocated €3.85 billion through its Territorial Just Transition Plans to coal regions, prioritising training for fossil fuel workers to support their shift to green industries (European Commission, 2022).

UNITED KINGDOM

The UK's coal transitions from the 1960s focused on privatisation and mine closures with limited training opportunities. The UK government later relied on the BCE to support workers, established 20 years after initial phaseout (Rising et al., 2021).

According to Hansard (1994) the functions of BCE included establishing "job shops" on every mine scheduled to close. The purpose of the job shops was to provide counselling, job search support, and training for current and former coal workers as well as support for self-employment and job creation in affected areas, including through business advice and subsidised premises.

The training offered by the BCE faced criticisms (see Box 2), including that training was imposed on workers instead of using workers preferences and abilities, which limited uptake.

Box 2: Overview of worker support during UK's historical coal phaseout and coalfield transition

The British Coal Enterprise was established in 1984, with the primary role of mitigating job losses in the coalfields. According to evaluator feedback, the BCE replaced approximately one in 14 jobs lost in the coalfields while evidence further suggests it did not adequately address the needs of ex-miners, with its support more frequently accessed by those with higher educational backgrounds in coalfields.

In 2004, Murray et al. (2005) interviewed over 40 former miners from South Yorkshire, revealing the significant barriers laid-off workers faced in reemployment and retraining. Sixty percent of workers received no retraining or job search support, and those who received support reported poor experiences. Advisers rarely consulted workers, often viewing pit workers as uneducated or unable to adapt. A six-month waiting period for retraining access lowered confidence and morale. Despite having transferable skills, over half considered self-employment but received no support, as agencies doubted their potential. Manager retraining was more appealing than that offered to pit workers, and many felt agencies focused more on meeting targets than meeting workers' needs. Such experiences offer lessons of what not to do.

SPAIN

Spain offered education and training support as an instrument for managing its energy transition in a socially compatible way. For example, the 1997-2005 Coal Plan included grants for education and support for specific training courses for workers impacted by coal restructuring (European Commission: Directorate-General for Energy et al., 2024). About 7.6% of the plan's total funds was dedicated towards training support (Del Rio, 2017). More recently, the Spain Just Transition Deal signed in 2018 between the Spanish government, trade unions, and coal companies to phase out coal mining, included labour support measures such as five-year training and retraining programmes for displaced coal workers (Bhushan and Banerjee, 2023).

In addition, Spain's Just Transition Agreements for Coal Power Plants are also crucial tools used for managing coal phase-outs. These agreements, signed between the government, trade unions, and coal mines aim to protect workers affected by coal plant closures. By March 2021, the agreements covered 3000 workers across 15 plants. These agreements commit the national government to collaborate with the Spanish National Employment Service to offer comprehensive support to workers in impacted areas by providing them with vocational training and employment services. Such support will be included in each Just Transition Agreement (International Energy Agency, 2022).

UNITED STATES

In the US, training and education programmes have been implemented to support dislocated workers. At a national level, the Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative, launched in 2015 by the Obama administration, supports workforce training and economic development in coal-dependent communities affected by the energy transition (Kok, 2017). The POWER initiative provides funding to help workers upskill, retrain, and access career pathways in industries beyond coal.

POWER funds are used for workforce services, industry-recognised skills training, and economic diversification. Training programmes focus on entrepreneurship, broadband development, tourism, and other emerging sectors (International Energy Agency, 2022). Since 2015, the Appalachian Regional Commission has invested US$485million through the POWER Initiative, which has supported 564 projects in 365 Appalachian counties (local county-level areas – districts), expected to create or retain 54 000 jobs, attract US$1.85 billion private investment, and prepare 170 000 people for

work in these targeted sectors (Appalachian Regional Commission, 2025). At a state level, the Colorado Department of Labour and Employment in collaboration with the local Colorado Workforce Centres provides notable examples for offering training, education, and apprenticeships through initiatives such as the Strengthening Photovoltaic and Renewable Careers (SPARC) programme. The SPARC Workforce Development Program supports Colorado's clean energy goals by fostering high-paying jobs in the renewable energy sector. It provides education, training, and career pathways through partnerships with community colleges, workforce centres, and state agencies (Colorado Department of Labour and Employment, 2024).

Prior to the Second Trump Administration, the United States had significantly ramped up reskilling and upskilling efforts to support worker adaptation to a low-carbon economy. Key initiatives included the Climate and Equitable Jobs Act, signed into law by Governor Pritzker on 15 September 2021, which, among other objectives, aimed to establish statewide clean energy workforce training programmes in Illinois (Illinois Department of Commerce and Economic Opportunity, 2024). At the federal level, the U.S. Department of Energy, in coordination with the U.S. Department of Labor and the American Federation of Labor and Congress of Industrial Organizations, launched the US$5 million Lithium-Battery Workforce Initiative to support pilot training programmes in the energy and automotive sectors (U.S. Department of Energy, 2022).

These initiatives reflected a strong commitment to preparing workers for emerging green industries. However, under President Trump's second term, federal policy has shifted away from climate action and green energy support toward fossil fuel expansion and regulatory rollback (Borunda et al., 2025). This policy reorientation has slowed certain renewable energy deployments, constrained financial support for clean energy initiatives, and resulted in the withdrawal of the United States from key international climate frameworks (The White House, 2026; Aeberhard et al., 2026). As a result, several workforce-oriented green economy initiatives initiated prior to this administration face increased uncertainty, with the potential for funding reductions, programme rollbacks, or delayed implementation.

Skills development for clean energy transitions in other countries

Early transitioning countries did not always specify the types of training programmes offered for affected workers. However, second wave transitioning countries are investing in reskilling and education to prepare workers for new low-carbon opportunities. Governments worldwide are developing vocational training, certification, and upskilling programmes to meet future skills demands in a low-carbon economy since the energy sector revolution is expected to drive employment (Hlongwane and Khobai, 2025; Rutovitz, 2010).

Proactive training efforts made today are key to securing jobs in a low-carbon economy. The International Energy Agency (2022) compiled a collection of case studies that highlight programmes designed to address skills development of workforces for energy transitions. These, among others, include:

- Canada's Energy Advisor Programme (CAD10 million over five years) targets workforce diversification, including Indigenous governments (10% of funds), and offers mentorship and training for certification.
- India's Skill Council for Green Jobs integrates green job training into schools and universities, conducts skills gap analyses, and certifies workers via training partners.
- Austria's Environmental Foundation to train at least 1 000 workers in the field of environmental and climate protection within three years.
- Philippines' Green Jobs Act (2016) promotes green employment through training, certification, and tax incentives for businesses offering skills programmes.
- Romania's Valea Jiului Academy reskills former coal miners for wind and energy distribution jobs.
- Barcelona Energy Advice Points was established to address energy poverty through building retrofits and job training.

Lastly, many South African coal workers face transition barriers partly due to low qualifications, with most holding only a matric (Makgetla et al., 2019). This can be addressed by increasing government investment in post-secondary education, as seen in Alberta, Canada, where workers received up to CAD12 000 in tuition vouchers through the Coal Workforce Transition Program for post-secondary education and training (Bhushan and Banerjee, 2023; Hussey and Jackson, 2019).

Applicability of education and training measures for South African coal workers

In the UK, British Coal Enterprise, a subsidiary of the British Coal Corporation,[8] supported worker training and employment because most coal mines were publicly owned. In South Africa, although the African Exploration Mining and Finance Corporation is a state-owned mining company, most coal mines are privately owned, placing the responsibility for worker training and retraining in private hands under the Minerals and Petroleum Resources Development Act. Nevertheless, South Africa can still foster partnerships between government and private mining companies by leveraging the Act, which mandates worker training and job placement support during mine closure or downscaling.

The State of Illinois and the Philippines enacted targeted laws such as the Climate and Equitable Jobs Act (2021) and the Green Jobs Act (2016), respectively, to support clean energy job creation through training, certification, and tax incentives. In contrast, South Africa's Climate Change Act No. 22 of 2024 supports a just transition but lacks detail on training and worker support. Nonetheless, progress is underway through the Just Transition Framework, which prioritises skills development, with R2.7 billion allocated under the JET-IP for 2023–2027 (Government of South Africa, 2022; PCC, 2022).

While South Africa lacks a dedicated law for large-scale, low-carbon workforce training, there are public-private initiatives available which provide a solid foundation for skills development for a just transition. These include the Just Energy Transition (JET) Skills Programme such as Africa Women in Energy and Power Just Energy Transition Skills Programme for women, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) supported initiatives such as Technical and Vocational Education and Training (TVET) for Green Economy and Career Path Development for Employment and Zimi Charge's Youth EV Learnership.

The National Business Initiative (NBI) is also implementing several training projects in Mpumalanga to support skills development for the JET. These include the Just Energy Transition Skilling for Employment Programme and the Installation, Repair and Maintenance Initiative. Government mechanisms such as the recently launched Just Energy Transition Skills Desk, Advisory Forum and Multi-Door Initiative, the National Skills Fund, Sector Education and Training Authorities (SETAs) and Public Employment Programmes under the Social Employment Fund (SEF) and the National Youth Service can be leveraged to support broader workforce readiness in emerging green or low-carbon industries. Building on and scaling these existing efforts, particularly in Mpumalanga, would strengthen the preparation of coal workers for future careers. While expanding training opportunities is important, there is growing concern that workers are being trained for jobs that do not yet exist, given the limited and uncertain demand in emerging value chains. This highlights the need for a balanced approach that strengthens both the supply and demand sides of the labour market.

8 *A nationalised corporation before it was dissolved in 1997*

Expansion of education infrastructure

Accessible quality education infrastructure such as technical and vocational training centres, schools, and digital infrastructure are key drivers of skills development, offering adaptive support for affected workers. Germany and Morocco offer an example of well-planned education infrastructure development during an energy transition.

GERMANY

Germany invested heavily in expanding education infrastructure during its transitions, through initiatives like the APR, DPR and the FICSR.

I. Development Program Ruhr of 1968

Germany's DPR of 1968-1971, among other areas, focused on developing educational and training facilities, expanding secondary schools, universities and training infrastructure (Bhushan and Banerjee, 2023).

The programme prioritised higher education, with a specific focus on engineering schools and pedagogical colleges (Furnaro et al., 2021). The programme aligned regional development goals with labour market policies by matching workforce capacities to local needs. Implemented at a state level, the programme was coordinated by Länder chancellery – an administrative body that supports the heads of government in Germany states, since the programme required high coordination across departments due to overlapping administrative authorities. In terms of funding, most of the funding for the programme came from regional government.

The DPR aligned regional development goals with labour market policies by matching workforce capacities to local needs.

The programme made significant contributions to the Ruhr region's education infrastructure. The DPR expanded the university system in the Ruhr area through funding for about five universities and several research institutes in the region. The expansion of the academic and research landscape in the Ruhr area can be regarded a success as no university existed in the Ruhr area before this programme (Dahlbeck and Gärtner, 2019). The DPR transformed the area into one of the densest science hubs in Europe, characterised by extraordinary diversity socially, culturally, and



academically (College for Social Sciences and Humanities, 2024). While the programme made a significant contribution to education infrastructure, a key barrier to its full success was its top-down design with minimal local or ground-up input. The limited consultation created resistance by existing companies on offering land to new companies, leading to a lock-in that hampered growth of new industries (World Resources Institute, 2021a).

II. Action Program Ruhr of 1980

The APR was implemented by the North Rhine-Westphalia (NRW) government as a response to the economic downturn caused by the 1979 oil crisis (Bhushan and Banerjee, 2023). Like the DPR, the APR was implemented and administered by the provincial government of NRW to complement national labour market programmes. Critical to its success, the programme combined existing and new assistance programmes to make improved labour market and workforce development policies. Among other aims, the programme sought to reduce unemployment in the area by developing information and training centres, and enhancing existing education initiatives. While a mostly top-down approach was used in its design, the APR became the first policy to include some local participation. The APR made use of multi-stakeholder conferences in which representatives of communities, municipalities, workers, scientists, and churches discussed regional problems and solutions (Furnaro et al., 2021).

The APR pioneered local participation by bringing communities and key stakeholders together to identify regional challenges and solutions.

Under the APR, education expansion was co-financed by NRW (70% of funding), municipalities, and the National Employment Agency. Efforts targeted unemployed individuals and focused on expanding schools, counselling centres, and vocational centres. As a result, education infrastructure was strengthened with a focus on underserved regions. As an example, the northern Emscher region, which is relatively underserved and experiences above-average unemployment rates, lower levels of income and education and high rates of child poverty (World Resources Institute, 2021b) managed to build a technical college (Arora and Schroeder, 2022). Technology centres were established across Ruhr cities, such as Dortmund's 1985 centre which promoted start-ups, innovation, and new industries beyond coal, employing over 8500 people across 280 firms by 2011 (Furnaro et al., 2021). The technology centre in Dortmund in cooperation with the Technical University Dortmund has developed into an important R&D site, specialising in microsystem technologies (Keil et al., 2014; Oei et al., 2020). Overall, the programme prepared workers for a larger variety of jobs, further underscoring the role of regional governments in enabling a just and in-time transition through infrastructure development.

III. The Future Initiative for Coal and Steel Regions of 1987

The FICSR (1987–1991) emphasised labour market improvements and educational and vocational training infrastructure (Bhushan and Banerjee, 2023; European Commission: Directorate-General for Energy et al., 2024; Furnaro et al., 2021). With this programme, support for coal regions became more decentralised, shifting the hierarchical focus from the national government to local actors. As Germany's first regionalised policy, each district had to develop plans through regional conferences involving local governments, unions, universities, and others. Decentralisation of powers demonstrate how a just transition can be achieved through making regions more independent and empowering them to create their own developmental strategies, based on their strengths and needs.

The FICSR decentralised support for coal regions by shifting the focus from national government to local actors and requiring districts to develop plans through regional conferences involving key local stakeholders.

Funding for this initiative was supported by provincial government, national government, and the European Community. A novel aspect of the FICSR was the creation of the Coal and Steel Regions Commission – a

group of experts in charge of overseeing the implementation of the programme. The commission was supported by participatory mechanisms that were used to increase public acceptance.

Through the involvement of local actors in decision making, the regions could make the most out of their own local strengths and resources (Furnaro et al., 2021). Residents of the Ruhr area viewed this novel approach positively, primarily because of the knock-on effects it generated in greater collaboration of regional stakeholders. More technology centres such as the Duisburg-Neudorf Technology Park (1989) were established to promote the new technologies (Keil et al., 2014).

IV. The Structural Development Act (SDA) of 2020

In the second wave transition, Germany implemented the Structural Development Act of 2020 with a total funding of €40 billion until 2038 (Bhushan and Banerjee, 2023). Unlike earlier transition investments in infrastructure, the SDA not only expanded schools and training centres but also broadband infrastructure crucial for digital access and remote learning as workers adapt to tech-driven sectors.

MOROCCO

As part of Morocco's strategy to grow its renewable energy sector and cut emissions, the government launched the Institute of Renewable Energy and Energy Efficiency Training Jobs (IFMEREE) in 2011. The institute trains technicians, operators, and executives in wind and solar maintenance. The development of the institute is part of an agreement by government to establish three vocational centres in Oujda, Tangier, and Ouarzazate, aiming to train 1 000 workers annually. The initial investment was €9 million per institute, with significant financial support coming from a European Union grant (€10 million), the French Development Agency (€10 million as a loan), and the Germany cooperation agency GIZ (€2 million for equipment and teacher training) (International Energy Agency, 2022). The remaining funding came from the government budget.

IFMEREE offers specialised diplomas for training in five areas: energy efficiency in buildings, wind systems, solar PV systems, solar thermal systems, and biogas. IFMEREE provides an estimated 10 000 training hours a year. The institute also offers ongoing training, research support, and technical assistance to companies in these regions.

According to the World Bank (2024), the first two training sessions (2019 and 2021) certified 28 and 31 companies, respectively. Testimonials on the IFMEREE website shows that employers are impressed with IFMEREE graduates from the training centre, citing their demonstration of strong practical skills in photovoltaic systems, ability to integrate into the industry with commitment, and enthusiasm and profiles aligning well with the needs of the renewable energy sector (IFMEREE 2021).



Applicability of education infrastructure policy for South African coal workers

South Africa has a broad network of education, training, career counselling, and guidance infrastructure that can support workforce development for a just transition. The infrastructure includes universities, TVET colleges, specialised training centres such as the South African Renewable Energy Technology Centre, and the ESKOM–Global Energy Alliance for People and Planet Komati Training Facility. Digital platforms like the National Career Advice Portal, managed by the Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET), also play a key role.

Large mining companies contribute with their own physical and digital training infrastructure. While these resources provide a strong foundation, they need significant support to expand and meet future training demands.

Expanding education and training infrastructure requires affected provinces to develop regional policies aligned with the just transition and ensure full funding. Currently, education responsibilities are split between the DBE, DHET and provincial departments. The DBE oversees schools from Grade R to Grade 12 and adult literacy programmes, while the DHET manages universities and other post-school education. The DBE sets policy and ensures schools have safe, appropriate infrastructure, working alongside provincial departments that finance and manage schools directly.

Unlike Germany's APR and FICSR, where infrastructure development became decentralised and funding shifted to local actors, South African provinces face major constraints. They have no authority over higher education and lack fiscal autonomy to implement fully regionalised policies. Provinces rely on national allocations through the Education Infrastructure Grant and the School Infrastructure Backlogs Grant (SIBG). Grants help construct, maintain, and upgrade school infrastructure, while the SIBG targets unsafe schools and provides water, sanitation, and classrooms. Although these grants offer a starting point, provinces need greater capacity and stronger financing mechanisms to develop policies that address local needs across both basic and tertiary education.

Adopting a decentralised model like Germany's Future Initiative for Coal and Steel Regions is possible but challenging. South Africa's District Development Model (DDM) and municipal Integrated Development Plans (IDPs) could integrate planning and mobilise resources in coal regions. However, fiscal and political constraints undermine local government autonomy. Despite constitutional equality, municipalities often face limited resources, top-down control, and overlapping responsibilities, weakening their ability to lead just transition planning (Manungufala, 2020; South African Cities Network, 2022). Fragmented initiatives and overlapping functions further limit local action, highlighting the need for stronger coordination.

Public participation was central to Germany's education and training infrastructure development under the APR, with regional conferences involving citizens. South Africa's Just Transition Framework also emphasises inclusivity, and participatory democracy is constitutionally mandated. Structures such as ward committees, public forums, traditional leadership, National Economic Development and Labour Council (Nedlac), the Presidential Climate Commission (PCC), and civil society organisations, can facilitate public inclusion for infrastructure development. However, these mechanisms often fall short due to fragmented processes, poor feedback, and perceptions of tokenism (The Presidency, n.d.). Strengthening participatory democracy therefore requires better communication, inclusivity, transparency, and accountability.

Finally, expanding education infrastructure in coal regions is critical, but two challenges remain: low demand for developed skills and reliance of economic growth in new sectors to absorb workers. Economic diversification plays a critical role in job creation and in ensuring that training translates into real employment opportunities.

Expansion of employment services

Comprehensive adaptive support includes employment services to help displaced workers transition into sustainable jobs. In most of the countries reviewed, being developed nations with low unemployment rates and having well-established employment services, no new employment services were introduced specifically for transitioning workers. The exceptions were Germany, Canada, and the UK.

GERMANY

Germany's APR-funded labour information centres to assist unemployed individuals in the Ruhr province.

CANADA

In Alberta, a CAD40-million transition fund for coal workers included two key employment services assistance components as shown by Hussey and Jackson (2019):

- Provision of career consultants and employment services to offer tailored plans, skills development, and information.
- Supporting employers and unions with a list of qualified facilitators whom they can hire to establish workforce adjustment committees and site-specific transition plans using labour market research.

UNITED KINGDOM

In the UK, Skills Development Scotland (SDS), a Scottish national skills body offering centralised employment and workforce development services (Rising et al., 2021), operates as a limited liability company whose board members represent a variety of backgrounds in the public and private sectors. Although Scottish ministers appoint board members, it operates independently from the Scottish Government with funding coming from state annual budget (Scottish Government, 2021).

SDS supports individuals facing redundancy through a range of employment services. Key offerings include programmes like the Employability Fund for those with uncertain employment paths, and skills planning to align training with labour market demands. SDS also provides redundancy support through the Partnership Action for Continuing Employment, which delivers career workshops, CV assistance, stress management resources, and guidance on training and funding opportunities.

Skills Development Scotland supports individuals facing redundancy through a range of employment services.

SDS is a unified agency that offers all services related to skills development in coordination with business associations, educational institutions, and policymakers (Rising et al., 2021). As a national organisation with a firm presence in communities across Scotland (Skills Development Scotland, n.d.), it acts as a one-stop-shop for all career services.

Applicability of employment services for South African coal workers

In South Africa, employment services are provided through both public and private entities. The Department of Employment and Labour provides public employment services via the Public Employment Services and the Employment Services of South Africa. Unlike Scotland's independent SDS model, these entities operate within government structures. South Africa still lacks a centralised public employment agency, structured as a limited liability company, that offers one-stop career services in all coal regions. In the private sector, initiatives such as Harambee Youth Employment Accelerator and Yes4Youth provide effective employment services support targeted at young people.

Both public and private employment services could be coordinated and scaled up to assist coal mine workers affected by mine closures, ensuring they transition effectively into emerging green economy opportunities.

Promotion of self-employment opportunities

A comprehensive adaptive policy support package aims to support workers to create their own sources of livelihood. Common instruments discussed in this section include exemptions, access to financial and fiscal support, start-up assistance, business training, and innovation centre development, which have been used in countries like Czech Republic, Spain, and China.

CZECH REPUBLIC

In the Czech Republic, restructuring in the Moravskoslezský region led to establishing an agency for business and employment support in 1992 to facilitate business start-ups. This agency operated through two business centres, offering loans, training, and other services to aspiring entrepreneurs, boosting job creation in affected areas. In addition, the Measures for the Restoration and Development of the Ostrava-Karvina Agglomeration Act (1991–1992) provided financial incentives, including two-year tax exemptions for new enterprises and reduced taxes for firms creating more than 20 jobs (European Commission: Directorate-General for Energy et al., 2024).

SPAIN

Several programmes supported business opportunities in coal-mining regions of Spain. These ran through the Coal Mining Plan (1998-2005), Coal Strategic Reserves National Plan (2006-2012), New Model of Sustainable and Holistic Development of Mining Regions, and Action Framework for Carbon Mining and Mining Regions (2013-2018). These initiatives funded new business projects through subsidies, soft loans, infrastructure development, and business training (European Commission: Directorate-General for Energy et al., 2024).

CHINA

In China's Shanxi Province, the country's largest coal-producing region, the Shanxi Coking Coal Group established an innovation centre in 2016 amid coal restructurings. This centre facilitated the creation of 26 businesses, 70% of which were launched by the company's employees, showcasing a successful model of supporting worker entrepreneurship during transitions (International Energy Agency, 2023).

Applicability of self-employment opportunities for South African coal workers

Financial support for self-employment activities without proper business training is not enough for a just transition. Poland's experience illustrates this well. The MSP offered generous redundancy packages, expecting beneficiaries to start businesses. However, without follow-up training, few succeeded. Most lacked entrepreneurial experience and eventually shut down.

South Africa takes a more structured approach. Support for start-ups comes from both public and private initiatives. SEDFA provides integrated support to small and medium enterprises through business development services, financial assistance, and cooperative banking support, aimed at improving enterprise growth, sustainability, and competitiveness. In Mpumalanga, several business incubators can be leveraged to assist worker-led start-ups. Provincial policies such as the Mpumalanga Economic Growth Agency and the Mpumalanga Provincial Co-operatives Development Strategy create a foundation for supporting small businesses and cooperatives that could benefit affected workers.

Private sector initiatives in Mpumalanga adds further opportunities. Seriti's Multifunctional Agri-Nodes model promotes fair food systems through local capacity building and climate-smart farming. In addition, Seriti's Work, Learn, Grow programme focuses on farming and agribusiness support for low-income communities, with special emphasis on women and youth. In contrast, the Mpumalanga Green Cluster Agency supports green enterprise development through mentorship, targeted initiatives, and access to funding. Indalo Inclusive South Africa has implemented various donor-funded projects, including the Dipaleseng JET Indalopreneurship Programme and the Nedbank Indalo Energy Resilience Fund, to strengthen small business initiatives. Despite the availability of small business support programmes, business exit rates in South Africa remain high, with over half of small enterprises reportedly failing to grow (World Bank, 2026; Stellenbosch Business School, 2026). Small businesses have consistently underperformed relative to other upper middle-income countries. Around 6% of working age adults are employers or self-employed, compared to 20% in comparable economies and 27% in China (TIPS, 2024). High levels of market concentration and dominance by large incumbent firms further constrain the growth of small enterprises (Lewis and Gasealahwe, 2017), reflecting a market structure that is not conducive to enterprise development.

In this context, while existing programmes in South Africa provide an important foundation for supporting workers transitioning into entrepreneurship, their success depends on more than programme availability alone. Stronger outcomes are linked to coordinated government support, improved access to finance, reduced barriers to entry, and an enabling business environment that promotes ease of doing business particularly in coal affected regions.

Redeployment

Historically, redeployment has been a common strategy used to support coal workers affected by mine closures. Redeployment typically involves transferring displaced workers to other operating coal mines or to alternative roles within the business. The strategy has been used by Czech Republic, Poland, China, Netherlands, United Kingdom, and others for mitigating the socio-economic impacts of coal mine closures.

CZECH REPUBLIC

During the early measures introduced at the beginning of the 90s, aimed at restructuring the coal sector, some miners in Czech Republic were transferred to other active coal mines or to other companies in the same sector (Rečková et al., 2017). The Agency for Business and Employment Support was established by the OKD mine in 1992 to manage the

redeployment of affected workers. To do this, the agency established a job shop and collaborated with other enterprises to find new roles for workers (European Commission: Directorate-General for Energy et al., 2024).

Between 2015-2016 additional measures were implemented to respond to the crisis of the main coal company, OKD, and more generally aimed at supporting coal production phasing out. While the OKD – Paskov mine was scheduled to close in May 2017, some employees had already found new positions in different sectors through a collaborative effort between different stakeholders including government departments, private sector, the mine companies and the Confederation of Industry (Rečková et al., 2017). The Confederation of Industry of the Czech Republic is the largest and most influential independent organisation of employers and entrepreneurs (Confederation of Industry of The Czech Republic, n.d.). Similarly, South Africa has organisations like the Chamber of Commerce and Industry and Business Unity South Africa that can play a comparable role.

POLAND

In Poland, the Mine Restructuring Company (2000–2018) was established to manage coal mine closures and safeguard infrastructure. All unprofitable mines were transferred to this entity, and miners were redeployed to maintain decommissioned sites or were assisted in finding new jobs within operating mines. Through this company, resources were used to ensure socially, economically and environmentally orderly mine closures (Śniegocki et al., 2022). This initiative was financed by national government budget to ensure the end of the support to coal mines but with programmes to support and redeploy affected workers.

The Mine Restructuring Company is a central actor in the employment restructuring of coal mining in Poland. From 1 May 2015 to 31 December 2018 the company obtained 13 300 employees together with 16 mines that had been intended for liquidation (SRK, n.d.). However, a major disadvantage to an initiative like this is the potential for moral hazard that may arise among mine owners who may be tempted to avoid closure costs and transfer the responsibility to this company (Śniegocki et al., 2022). Recently, the signed social contract in Poland guarantees coal miners and processing workers their jobs until retirement or employment at other operating mines if displaced (Bhushan and Banerjee, 2023).

CHINA

On 30 June 2015, China pledged in its Intended Nationally Determined Contribution to cut emissions intensity by 60%-65% by 2030 from 2005 levels (Bridle et al., 2017). As a result, in early 2016, China's government urged coal and steel companies to cut excess capacity (International Energy Agency, 2023). The government prioritised redeployment and professional training to mitigate job losses. Based on China's 13th Five Year Plan (2016-2020), the Ministry of Finance in 2016 set up the Industrial Special Fund to disburse €14 billion toward relocating displaced workers in the coal and steel sectors. The government also worked with coal companies to explore new business opportunities that would create jobs for the existing workforce. In Shanxi province, the largest coal-producing region in China, the regional government committed €0.3 billion to support job transfers, retraining, early retirement, and the creation of public service jobs.

Displaced workers were helped to find roles in other departments within existing mining company factories or in alternative local facilities. An estimated 31 600 redundant workers in Shanxi (99.8% of the redundant workers) were re-employed, while nationwide over 726 000 coal and steel workers from 1905 companies found new jobs in 2016 (International Energy Agency, 2022).

NETHERLANDS

In Netherlands, the transition away from coal was made easier because of the state-owned mine that began an alternative chemical business (Gales and Hölsgens, 2017). Instead of coal, the Dutch State Mines (DSM) continued as a chemical company. The DSM was founded as a state-owned company in 1902 (Jeannet and Schreuder, 2015). When the company and the Dutch government realised in the 1960s that coal mining was no longer economically viable, the

company moved into the production of chemicals. In the 1970s and 1980s the company expanded its chemical activities via various diversification routes (Jeannet and Schreuder, 2015) which with it preserved jobs. Workers were categorised by age and skill, and specific strategies were developed to prevent redundancies. Miners either found new jobs through worker reallocation, exited the workforce, or were retrained. Between 1965 and 1969, half of the workers transitioned to other jobs, 12% were foreign workers and repatriated, 30% retired or took disability benefits, and 6% worked in the so-called social workshops[9] (Gales and Hölsgens, 2017). While the company started in the chemicals and coal industry, it is now a world-leading innovation partner in nutrition, health, and beauty (dsm-firmenich, n.d.).

UNITED KINGDOM

In UK, the job losses in the 1980s from coal mining declining were softened by either providing workers with redundancy support or transferring them to other coal mines that remained open, usually within commuting distance (Fothergill,2017). However, as mine closures increased, choices dwindled, and many workers lost jobs out of necessity rather than choice.

Applicability of redeployment for South African coal workers

Given South Africa's high unemployment, redeployment can ease labour-market pressure. However, unlike Poland which has a dedicated Mine Restructuring Company to manage mine closures, land rehabilitation and worker redeployment, South Africa relies on existing legislative framework for guiding mine closures. As an example, the Mineral and Petroleum Resources Development Act No. 28 of 2002 (MPRDA) requires mining companies, through their Social and Labour Plans, to make provisions for downscaling, retrenchments, and management of mine closures. In practice, many companies' list redeployment as a mechanism to preserve jobs when retrenchments are unavoidable. However, compliance with Social and Labour Plans remains a persistent challenge.

Redeployment also has its limits. It works best in companies with diversified operations or those expanding into green industries. For example, BHP Billiton and Glencore are in other mining activities such as chrome, manganese and ferroalloys (BHP, 2003; Glencore, n.d.), while Exxaro recently bought manganese assets (Nozulela, 2025). Seriti Resources in contrast is branching into renewables after acquiring Windlab South Africa in 2022 (Seriti Green, n.d.; 2022). These activities make redeployment possible, at least for workers with the right skills. The challenge is that many of these opportunities lie outside Mpumalanga, creating relocation and logistical hurdles. Other challenges for redeployment include:

- Redeployment works best when workers move within the same industry and conditions.
- Moving workers to other coal mines may only delay but not prevent job losses as coal is under threat of being phased out.
- Poland and the Czech Republic used state-supported firms to absorb unprofitable mines, but this model strains the government fiscus.
- In high-unemployment regions, redeployment can displace other jobseekers, shifting rather than solving the problem.
- As coal declines, redeployment becomes less viable, highlighting the need for long-term transition planning.

9 *A social workshop is a protected workplace that provides adapted or lighter work for people who cannot easily find regular employment, often due to age, disability, or lack of skills. These workshops offer training, guidance, and support, helping workers maintain income, gain experience, and potentially transition to regular jobs (ChatGPT, 2025).*

- Redeployment can trigger local tensions, as relocating existing workers may clash with host communities' expectations, especially where mines must prioritise local hiring.
- As evidenced in China and the Czech Republic, effective redeployment depends on strong collaboration between government and the private sector.

Worker-focused stakeholder involvement

Worker participation policies ensure that employees have a voice throughout the transition process. These mechanisms build trust, support informed decision-making, and help align transition strategies with workers' needs and priorities. While the framework for worker transitional assistance considered in this report does not explicitly address procedural justice, it remains a critical element for achieving a just transition. International experience shows that meaningful worker and labour union participation is essential in shaping and implementing effective policies, while in Germany and Poland, limited worker involvement led to sub-optimal outcomes. Germany's Development Program Ruhr, designed with minimal worker input, faced resistance and ground lock10 from coal and steel companies (Oei et al.,2020), while Poland's early 1990s voluntary redundancy schemes also lacked public participation and proved ineffective. Conversely, successful worker policy packages in Germany, Canada, and Poland demonstrate the value of inclusive approaches. Germany's Action Program Ruhr included workers and local communities in planning and implementation, with a dialogue-based policy style that, despite coordination challenges, was viewed positively in retrospect (Dahlbeck et al.,2021; Furnaro et al., 2021).

In Canada, the Alberta Federation of Labour formed the Coal Transition Coalition, comprising eight unions representing half of Alberta's coal workforce. Through "town halls" and engagements with workers and families, they co-developed the Coal Worker Transition Fund (Śniegocki et al., 2022; Hussey and Jackson, 2019).

Similarly, Poland's Mining Social Package (1998-2002), developed with union collaboration, enabled large-scale job reductions with minimal protests (Śniegocki et al., 2022; Szpor and Ziółkowska, 2018). More recently, Poland's 2021 social contract for coal mine closures followed intensive negotiations with unions and communities after initial resistance, resulting in a signed agreement (Śniegocki et al., 2022).

Applicability of workforce engagements for developing a worker policy package in South Africa

To avoid resistance and institutional lock-ins, like Germany's experience in the Ruhr area, meaningful engagement with all stakeholders in the mining sector, including workers and the communities, is essential. Just transitions thrive on broad-based participation; without it, institutional barriers persist (Arora and Schroeder, 2022).

South Africa already has mechanisms to promote inclusive and participatory engagement in just transition planning. At the national level, Nedlac and the PCC play key roles. Provincially and locally, various forums and initiatives support bottom-up, community-driven processes. For instance, in Komati, Mpumalanga, following the shutdown of the Komati Power Station, a dedicated community development workstream was established to develop a protocol for procedural justice, involving a range of stakeholders.

At company level, Regulation 46(d)(i) of the MPRDA mandates the creation of Future Forums to facilitate dialogue between workers and management on mine viability and related issues. These structures can serve as platforms to discuss workers' needs for future policy packages. However, challenges remain: coordination is weak, consultation timelines are unclear, and some stakeholders are excluded or consulted too late often after decisions have been made. Strengthening the role of Future Forums would require broader and more inclusive participation, including local government, communities, workers and labour sending areas. Building effective partnerships is also critical to strengthen engagement, improve trust, and deliver better outcomes.

Lessons for South African Policymakers from International Experience

Lessons from international experience assessment are grouped under two pillars: policy planning and worker policy transition strategies. Transition instruments have their own pros and cons, as shown in Annexure A, therefore further Socio-Economic Impact Assessment System (SEIAS) analysis is required to assess the likely socio-economic impacts and suitability of these strategies in South Africa.

Policy planning and development

- **Effective worker and community consultation is key in designing transition policies:** Just transition policies succeed when workers and communities are meaningfully consulted. Other policies in Germany, Poland, and the UK used a top-down approach which triggered strikes, mistrust, and poor outcomes. In contrast, participatory processes in Germany's APR and Poland's 1998 MSP gained union and public support, reducing resistance. In the South African context, consultation needs to begin before decisions to close coal mines are made and continue throughout the transition process to minimise social conflict and improve outcomes.
- **Strengthen multi-level coordination for coherent just transition policies:** Managing the labour and social impacts of climate transition requires coordination across government levels and non-governmental stakeholders. Germany's DPR success shows the value of a dedicated planning body that aligned policies and maintained cross-agency communication. In South Africa, with its complex stakeholder landscape with varying authorities, policy coherence depends on strong coordination. A polycentric, integrated approach, spanning all spheres of government is essential.
- **Prioritise proactive planning to avoid costly reactive transitions:** Reactive policies are costly and often worsen transition impacts. In the UK, support came too late after social and economic harm had already taken place. This highlights the importance of designing comprehensive support packages well in advance of mine closures, including voluntary coal mining exit strategies, to better manage costs and mitigate transition risks.
- **Balance long-term vision with policy flexibility:** Long-term planning is essential for just transitions, but policies must remain adaptable to evolving socio-economic conditions. Germany's DPR was replaced earlier than planned to better meet regional needs; Poland overhauled its inadequate pre-1998 strategy; and Czech Republic continued adjusting pension schemes to encourage coal worker exits. In the South African context, this highlights the importance of combining clear long-term goals with regular policy review and adjustment to ensure interventions remain responsive, relevant, and effective.
- **Integrated policy approaches are key to effective just transitions:** Germany and Poland show that combining social, economic, and environmental goals into cohesive programmes delivers better results than isolated measures. This approach highlights the importance of integrating labour market support with broader development and climate goals to achieve balanced and coordinated outcomes.
- **Strengthen financing mechanisms:** Managing employment restructuring during a transition involves significant fiscal costs. Evidence highlights the importance of anticipating and planning for these costs when designing worker centred just transition measures. In the South African context, sustainable and predictable financing mechanisms are critical to support workers throughout the transition. This includes stronger collaboration between government and the private sector, particularly coal mining companies, to co-finance transition measures and ensure shared responsibility.

Worker policy transition strategies

- **Implement a comprehensive adaptive worker policy package:** A just transition requires a coordinated government strategy that addresses the full range of worker losses and supports worker's integration into new systems, rather than relying on isolated measures. Policy instruments can combine both protective and adaptive measures that are introduced early to enable voluntary exits while gradually building a comprehensive support package. Evidence shows that implementation costs can be reduced by leveraging existing labour market policies, social protection and company support. Therefore, this highlights the importance of strengthening existing legislative frameworks to ensure company compliance and sustained labour and social protection support for affected workers.
- **Tailor transition strategies to context, age, and skills:** Effective just transition policies reflect national and regional conditions and incorporate age and skills-based differentiation. Common instruments such as early retirement, reskilling, and redundancy support are more effective when adapted to worker profiles. For older workers, the transition often involves protective measures that facilitate a dignified transition into retirement, while younger workers benefit more from active labour market programmes, training, and re-employment support.
- **Align training with labour market demand while also considering workers' preferences, abilities, and career aspirations:** Training programmes are most effective when grounded in worker profiling, skills audits, and expressed preferences, rather than top-down assumptions. Aligning training with labour market demand and individual capabilities improves both uptake and employment outcomes. Early engagement, before job losses occur, helps ensure that training pathways match worker aspirations and emerging economic opportunity.
- **Prioritise structured support over once off compensation:** While financial compensation plays an important role, evidence suggests that unconditional once off payments alone may lead to short-term relief without long-term security. More sustainable outcomes emerge when income support is combined with structured follow up measures, including financial literacy, skills development, and business support services. Linking financial assistance to such programmes can strengthen long-term resilience among affected workers.
- **Rethink redeployment beyond the coal sector:** In earlier transitions, redeployment within the coal sector was often viable. However, ongoing coal sector decline limits this option. Current strategies therefore need to focus on facilitating movement into alternative industries. This requires aligning reskilling, job placement, and local economic development initiatives with emerging sectors to support durable employment transitions.



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Annexure A

Advantages and disadvantages of various transition policy instruments

TRANSITION POLICY INSTRUMENTS	ADVANTAGES	DISADVANTAGES
Early retirements	• Eliminate surplus labour • Can reduce coal production	• Employment losses often not fully compensated • Wastes experienced labour • Can lead to sociological health issues for retirees
Welfare allowance	• Decrease employment in coal sector	• Risky if tied to employment • May be misused on harmful • consumption (moral hazard) • Discourages job seeking • Provides only short-term relief
Severance/ Redundancy payments	• Effective in reducing employment • Results in large scale retreat from labour market	• Risk of misuse (moral hazard) • Costly for the public • Leads to hardship once funds run out • Hard to manage if unconditional
Social services provision	• Livelihood promotion effects • Livelihood protection effects	• Success depends on how recipients use the funds • If in kind, it is difficult to match individual workers needs with generic social services
Education and training	• Improves employability of workers • Supports the growth of emerging industries	• Ineffective if skills offered does not match the needs of the labour market
Education infrastructure	• Drives skills development • Drives economic development	• High public costs
Employment services	• Assists with reintegration of workers back into the labour market • Reduced job search times and costs	• If provided by private sector, providers may profit more than job seekers
Small Business Support	• Fosters economic resilience, inclusivity, job creation • empowers vulnerable groups	• Ineffective if financial support is given without follow up business development services
Redeployments	• Easier within the same industry • Supports during high redundancies or limited new jobs • Lowers resistance to coal phase-out • Reduces worker transition costs	• As closures rise, redeployment options shrink • Shifts unemployment to others, creating long-term job shortages • Redeploying to other coal mines can be counterproductive • May reduce current workforce productivity