

INTERNATIONAL COAL TRANSITIONS AND THEIR RELEVANCE FOR MPUMALANGA

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1 INTRODUCTION

The Mpumalanga region in South Africa, where most coal mines and power plants are located, faces the challenge of transitioning away from the coal upon which it and the country have been dependent for the past century. Several countries have undertaken, or are undertaking, such transitions. Some of these are planned, and others unplanned, and all provide examples from which South Africa can learn as it considers how best to manage the transition process. Germany and Spain are particularly useful in this regard as these two countries have completed some aspects of coal transition including processes supported by labour unions – in South Africa, organised labour is a key stakeholder. This briefing note considers each country in turn, before reflecting on some lessons that can be gleaned for Mpumalanga and South Africa. These include the importance of acceptance, union involvement, addressing subsidies and transition costs, proactive planning, smart diversification, local-level implementation, and the role of renewable energy.

2 INTERNATIONAL CASE STUDIES

The following sections explore two international transition case studies, those of Germany and Spain, which reveal some key components related to the coal transition process. Whilst there are significant contextual differences between these cases and South Africa, both their successes and their failures offer learnings that could be considered for Mpumalanga coal region's 'just energy transition.'

The German case demonstrates two phases of transition, from two types of coal: hard-coal and lignite. The historical phase illustrates the completed regional transition from hard-coal mining and heavy industry in the Ruhr valley to a renewable energy and knowledge-based economy, spanning from 1957 to 2018. This was

an example of an unplanned transition – it took time for the transition to be recognised as such, and for supportive policies to be put in place. Conversely, the current phase of transition is an ongoing national planning process relating primarily to the phase-out of all hard-coal and lignite power stations across Germany.

The Spanish case also involves two phases of transition, although the first began far more recently than that of the Ruhr. Both phases were planned, and both at the national level. The first phase entailed a phase-out of coal production from uneconomical mines from 1990 – 2018 via five successive Plans. The second phase was the final 'Plan del Carbón' of October 2018, which was influenced by the European Union's (EU) policy to prohibit coal subsidies from 2018 onwards.

2.1 GERMANY

Historical phase: The Story of Ruhr

The Ruhr valley in the North Rhine-Westphalia (NRW) state demonstrates regional conversion. Prior to the 'coal crisis' in 1957, the Ruhr accounted for about 80% of coal mining employment in Germany [1], but since then the economy has slowly transformed from one dominated by coal and steel to one focused on knowledge-based services [2]. The drivers for this transformation were initially a combination of cheaper imports of coal and oil along with air pollution concerns. Later however, EU policies relating to emissions, a move toward renewables, and termination of coal subsidies played a role. The last of the Ruhr hard coal mines closed in December 2018. In their place 22 universities have been built [3] with renewable energy (RE) and eco-industry emerging as key fields of competence.



Workers: the slow emergence of adequate planning

In 1957, there were ~473 600 direct employees in coal mining in Ruhr [1]. Initially, the majority moved to jobs in the metal sector, which was in good condition. However, when the steel industry also went into crisis in 1974, other measures were relied on to support worker transition, principally:

1. Redistribution of shifts and forgoing wage increases to avoid layoffs [2].
2. Workers close to retirement were offered full bridging salaries for up to five years before they became eligible for pensions [4]. There was also a strong social security system with unemployment payments. In 2007, a law was passed that further protected every coal worker older than 42 from unemployment [3].
3. The Ruhr Coal Vocational Training Society (RKB) was established within the mining industry to assist in worker placement [4]. RKB worked with regional government and companies to assess the skills demand and labour market prior to providing targeted trade and business training, achieving an 80% placement rate [1]. Personal development centres in the coalfields also gave training until 2018 for alternative employment [1].

Throughout the transition, all decisions were agreed upon with the miners, utilising company processes and with increasing involvement of government.

For a long time, the creation of new sectors was limited by resistance from both coal and steel industries (privately run), exacerbated by a period of reduced economic growth. Consequently, unemployment in Ruhr increased from below 1% in 1960 to 15% in 1987 [3]. While ex-miners were protected, other job seekers suffered.

However, in 1993 the state government, industry and unions signed an agreement to address socially responsible restructuring of the workforce. Negotiations in 2012 between the German Coal Association, trade unions and workers' councils then finalised worker compensation arrangements for all remaining mines that would close by 2018 [4].

Initially there was little done specifically to support communities. However, communities did start to benefit from infrastructure improvements made during the structural policy programmes from the late 1960's, which are discussed in more detail below.

The regional economy: eventual acceptance of transformation

The industrial lock-in and approach of propping-up of the declining coal and steel industries persisted until the mid-1980s when this pattern eventually gave way to diversification, driven through Small and Medium Enterprises, technology transfer and a rising service sector. A major breakthrough came in the 1990's when coal and steel firms finally accepted the transition, reduced obstruction and some companies branched out into environmental technology, plant engineering and control services [1]. In parallel, local authorities promoted 'sunrise industries', and environmental technology emerged as the main player creating new employment for ~100 000 people by the mid-2000s. Interestingly, competence in this field originated in the coal and steel sectors as they had been pressurised through past policies to reduce pollution, dispose of waste and turn to clean technologies [1]. Gelsenkirchen Science Park, built at the site of an old steel plant, evolved from a producer of solar cells in the late 1990s to an innovation hub for urban redesign with RE [5]. The growing number of universities provided the necessary research and development backing. From the late 1960's, investments that expanded transport infrastructure and logistics were prioritised, as the new knowledge-based economy required increased mobility of people [2].

Adapting the plant manufacturing facilities that previously produced components for coal mining, Ruhr has developed a strong wind turbine business – supplying 30% of all gearboxes for wind turbines worldwide [5]. Siemens shifted from constructing coal power plants to biomass generators [1]. RE related enterprises developed rapidly from 2000, and by 2014 there were over 1000 RE companies in Ruhr, and more than 3100 in the NRW state [1]. Ruhr now employs ~16% of the total RE workforce in Germany [5].

'Soft factors' relating to culture, leisure, aesthetics and natural spaces were neglected for a long time. However, in 1980, "Action Program Ruhr" got the ball rolling, followed in 1989 by a ten-year environmental and urban renewal programme called "IBA Emscher Park". This public-private partnership design prioritised a bottom-up approach; over 120 projects suggested by citizens contributed to the reconstruction of 800 km² that had suffered from industrial exploitation. Some



mines, such as Zollverein, were converted to tourist sites [1].

Transition financing: pulling in opposite directions

Financing for the transition mainly came from the national budget and the EU, however this was dwarfed in size by ongoing coal production subsidies, a factor which confounded the transition progress. Between 1968 and 2018, Germany had subsidies for domestic coal sales alone totalling ~€165 Bn, whereas social policies for workers (e.g. retraining, work placement, early retirement etc) only received ~€18 Bn. The implementation of ten structural programmes, such as IBA Emscher Park, over the same period cost ~€41.9 Bn [3]. It was only in 2007 that a deal was concluded for the termination of subsidies for hard coal.

2018 onwards: German Coal Commission and the Coal Exit Law

The Commission on Growth, Structural Change and Employment, known as the ‘Coal Commission’, was a multi-stakeholder negotiation process started in June 2018 to map the phase-out of all remaining coal-fired power stations distributed across Germany by 2038. By the end of 2019, total coal power generating capacity was 43.9 GW [6] and total direct coal sector employment was ~25 000 [7].

Strengths of the process were the balanced composition of the Commission members to cover relevant constituencies and the rigorous mix of expert input, debate and working groups. The recommendations from the Commission covered i) a capacity reduction pathway, ii) support for mining regions, iii) modernising the power system, iv) ‘just transition’ measures for workers and v) monitoring and revision [8].

In January 2020, a draft ‘Coal Exit Law’ based on the Commission’s suggestions was adopted by cabinet and will undergo parliamentary review. The Law allocates €49.35 Bn for regional, business and worker support mechanisms [9], but there is provision for the consideration of additional compensation to cover power price changes and emission trading certificates [8].

While the Commission and Law were largely welcomed by the public, there has also been criticism. Notably, the emission profile of the 2038 timeline is insufficient to meet Germany’s Paris Agreement commitments [8]

and plans for how to deal with the remaining lignite mines, mainly in the East, have been neglected. The recommendations on monitoring and revision should allow for improvements, which may become easier as the transition gains momentum.

2.2 SPAIN

Transition by five national plans

From 1990 to 2018, Spain undertook a co-ordinated phase-out of coal production via five successive government plans, which were developed with unions. The drivers were economic: the majority of Spanish mines became uncompetitive with imported coal, and price support for domestic coal was also subject to EU regulations. More recently, investment in renewables led to excessive overcapacity in electricity generation by 2015 and further decreased the need for coal [10].

Each plan covered 4 to 9 years and included coal price support mechanisms; but to qualify, mining companies (one state owned and the rest private) had to meet reduction targets for coal production and employment numbers. While these targets were successfully met, support measures for workers were fairly limited in scope and were often in the form of short-term focussed solutions – relying mainly on financial compensation for job losses [10]. In 2018, when all uncompetitive coal mines had to cease operations, a final agreement was bartered with unions covering all the remaining workers in the mines slated for closure.

Workers: a focus on short-term compensation-based solutions

There were ~45 000 workers in the Spanish coal mining sector in 1990, which steadily reduced to less than 2000 by 2018. Workers’ concerns were included to varying degrees in all of the restructuring plans, which were developed with unions, including:

1. Support for early retirement as the main mechanism – workers could receive a salary through the mining company of 2 to 3 times the minimum wage until retirement age [11].
2. Compensation for voluntary termination of jobs.
3. Additional compensation of €24 000 from 2013 for workers suffering from silicosis [10].
4. Worker training and placement support [10].



The overarching issue in the earlier plans was the inadequate creation of alternative industries and consequently there were limited employment opportunities, regardless of vocational and skills programmes.

As with the Ruhr case, although initiatives to address industrial decline were not specifically aimed at communities, they did benefit from upgrades to infrastructure and restoration of degraded areas.

The mining sector leads the transition to renewables

While an objective of the plans was to close uncompetitive mines, those mines that were economically viable without state subsidies were allowed to continue operating. Because supporting new businesses was also an important component of the plan, grants were made available for new businesses, including those that supported the mine industry to increase their operational efficiencies and reduce their environmental liabilities [11]. Existing companies also played to their strengths. For example, Hunosa (the only state-owned mining company) branched out into mining consulting services, converted mines to museums and expanded into geothermal and biomass [12]. The government plans also allowed for restructuring assistance to coal value chain companies.

As the uptake of renewables increased, some mining businesses got involved. For example, Sociedad Anonima Minera Catalano-Aragonesa (SAMCA) was a main coal producer in Teruel and has diversified its portfolio to include RE [13]. Electric utility, Endesa, has been making a major shift toward RE: in 2016, the utility bought renewable assets worth €1.2 Bn rather than modernising their Andorra coal plant [13]. In 2019, it petitioned Spanish authorities to close a coal power station in Galicia and proposed the development of wind power instead [14]; and in Teruel, Endesa plans to replace their coal plant with a 1 GW solar farm [15].

From the late 1990s, most infrastructure developments were aimed at transport and communication systems, with some provision made for health, education, water supply, farming and tourism [10]. From 2006 to 2012 a wider set of projects (including leisure, industrial services and innovation-related ventures) were run at local level supported by a range of finance options: seed capital, microloans and venture capital funds.

Transition budgets favour compensation over alternative opportunities

The costs for the five plans covered by the Spanish budget are shown in the table below and include i) coal price support to mining companies, ii) worker compensation and iii) regional reactivation.

Plan	Total Cost (€ Bn)
1 (1990-1993)	4.7
2 (1994-1997)	4.3
3 (1998-2005)	9.2
4 (2006-2012)	5
5 (2013-2018)	>2.1

Sources: First four plans [16], fifth plan [17].

In all plans the budget focused on coal price support and compensating workers. The creation of alternative opportunities was significantly underfunded. For example, the second plan only had an annual allocation for regional reactivation of ~€11.5 M/yr, which was increased to €390-440 M/yr in the third and fourth plans. This regional reactivation budget was split, in the first three plans, across infrastructure (77%), training (8%) and business projects (15%). Across all plans, infrastructure [10] has dominated the regional reactivation budget, whilst training has consistently been allocated less than 10%.

Unsurprisingly therefore, the first four plans did not adequately create alternative industries, and so the fifth plan (2013-2018) included further financial incentives (including grants) for job creation and retention. Grants of €100,000 were made available for projects creating at least three jobs, and at least €30,000 for projects creating at least one job or maintaining at least three existing jobs [10]. Mine rehabilitation was also supported, with the fifth plan specifically allocating €15 M per year towards this.

Final 2018 deal with unions – the Plan del Carbón

In October 2018, after a long process that included strikes in 2012, Spanish mining unions secured a deal with benefits for workers and communities associated with the closure of all mines that were no longer economical – the €250 million Plan del Carbón. A key driver for this deal was the hard EU policy deadline for the end of coal subsidies in 2018 [18]. The Plan covers 1677 affected workers: two-thirds employed at the



state-owned mining company Hunosa and the rest at 7 private companies [11] [19]. The Plan has two important features: i) it replaces coal industry subsidies with a sustainable development plan and ii) unions were not only involved in its development, but have praised it as a possible ‘just transition’ model [19].

Under the Plan, the government will fund the transition activities expected to take place mainly between 2019 and 2023. The agreement is detailed and covers miners over age 48 (or 25 years’ service) via early retirement and younger miners with redundancy payments, social aid and retraining. There is an additional allocation of €26 000 for each miner with asbestosis. There are funds allocated for mine regeneration (and job priority for ex-miners), while communities will benefit from upgrades to: water treatment, waste management, recycling facilities, utilities infrastructure, pollution control and forest restoration. Action plans are to be created for each community including ways to develop new industries, particularly those involved in energy efficiency and renewable energy [19] [20] [21].

3 LEARNINGS FOR MPUMALANGA

The two case studies above are from the global north, there has yet to be an example of an energy transition in the global south. Whilst this is clearly a significant contextual difference, both cases nevertheless offer learnings from both their successes and their failures that can be considered for Mpumalanga’s ‘just energy transition’. Four points in particular are discussed below:

1. Acceptance – and its implications for transition budgeting

International examples repeatedly demonstrate the importance of accepting that a transition is necessary and possible. In Rhur, the incumbent coal and steel industries resisted change for a long time, which constrained other employment prospects and increased total costs. In both Germany and Spain, the subsidies to prop up the coal sector were significantly higher than costs to transition, so delays in accepting the need to shift from coal ultimately put more strain on national budgets [23]. Following on from this, we see how Spain is now redirecting these fossil fuel subsidies to fund a social compensation and environmental restoration plan. Only when the EU prohibited coal subsidies from 2018 were the second

phase, coal-terminating, transitions able to be implemented.

2. Involve unions, plan clearly and create alternatives

Stakeholder engagement is critical, and should be a first step in ‘just transition’ planning. In the Rhur and Spanish cases, workers and labour unions were involved in developing the plans. The German Coal Commission had a balanced membership across a variety of constituencies. Following consultation, planning should be proactive rather than reactive – the sequential Spanish plans had defined targets and short-term timelines leading up to the longer-term objective. Similarly, the German Coal Exit Law provides a capacity reduction schedule for coal power stations.

For workers, a managed transformation of the workforce includes a variety of measures, as seen in both Rhur and Spain. A caution from the Rhur case was that efforts to protect ex-miners meant that other jobseekers in the area suffered, emphasising the importance of generating alternative economic opportunities. In Spain, support extended to restructuring the whole coal value chain.

Lessons from the Spanish case warn against insufficient resources being dedicated to retraining, and that an overreliance on early retirement planning reduced the pressure to create alternative industries, a very important part of building economic resilience. The Rhur region eventually achieved this through related and smart diversification: the region leveraged existing competencies and applied them to new sectors that emerged as suitable long-term replacements for coal and steel.

3. The role of renewable energy and environmental restoration

In both case studies, renewable energy and environmental restoration played a role. This is not to say all coal jobs can be replaced by ones in these sectors, but that they are part of the solution. In the Rhur area, manufacturers switched from mining machinery to wind turbine components. In Spain, Endesa plans to replace a coal power plant with solar and utilize the existing electrical distribution infrastructure.

4. Involving local communities

In the Ruhr case, successful implementation often relied on local agents (such as the RKB for worker



placement) who were in tune with local needs, but supported by government funding. Infrastructure upgrades such as the urban renewable through “IBA Emscher Park” in the Rhur were based on community’s ideas, funded by the federal state.

Mpumalanga, like the Rhur, needs a regional conversion from coal dependence, but the circumstances (economic, geography, population etc) are entirely different. The drivers are also different: in Germany and Spain, the drivers were initially mainly economic, with climate change commitments only coming in later. For South Africa, climate change consideration will be part of the planning from the beginning, and there is no EU to provide an external political solution to the coal subsidy issue. Nonetheless, the underlying principles of the above examples have great value, including acceptance, addressing subsidies and costs, union involvement, proactive planning, smart diversification, local level implementation, and the role of renewable energy.

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