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Just Energy Transition: How disused coal mines could become sites of job creation

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By leveraging closed and abandoned coal mines as assets rather than liabilities, it may be possible to generate employment and support economic diversification without displacing local communities.

Introduction

The Just Energy Transition (JET) focuses on transforming South Africa's energy sector as the country shifts away from coal, while compensating where possible for the job losses or other negative impacts on affected communities. The underlying intent is that unemployment and poverty should not be exacerbated by the energy transition.

Mine closures, while reducing emissions, are a challenge for a just transition. Moving away from coal poses [employment risks for an already vulnerable population](#) group. In 2019, the coal mining sector employed between 76 000 and 108 000 people (about 0.5% of total employment and 19% of employment in the mining sector).[i] Approximately 87% of these jobs (about 66 000) are in Mpumalanga, where 46 000 households rely on coal-related income.

Half of South Africa's coal-fired power plants are scheduled to close by 2040, meaning employment solutions for communities reliant on coal mining are urgent. The rehabilitation and repurposing of closed and abandoned coal mines may represent opportunities for the creation of employment. In meeting JET criteria, could they access the associated funding and support? This question will be explored drawing on my research on high-employment and low-carbon growth.[ii]

Contextualising closed and abandoned mines

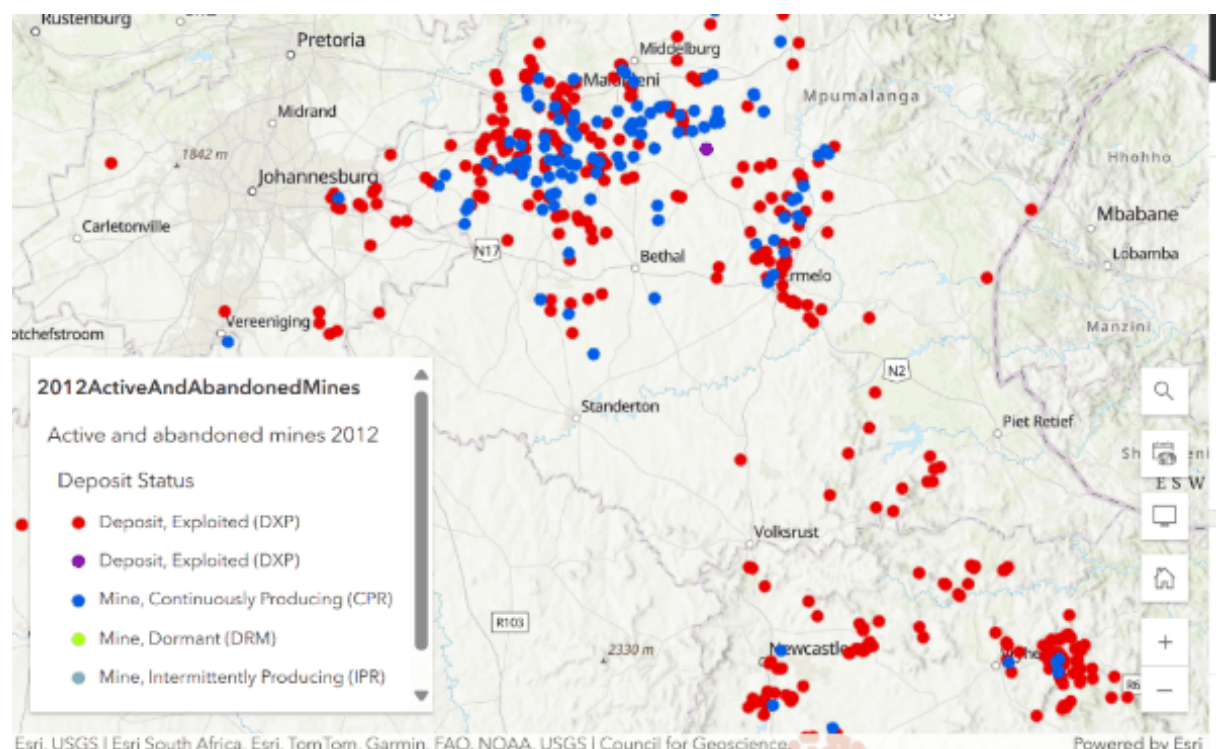
Historically, South African legislation placed little focus on mine rehabilitation.[iii] Key challenges include weak enforcement, difficulty monitoring the growing number of small "junior" mines, and a lack of stakeholder engagement. Mining companies also encounter difficulties obtaining government mine-closure certificates and securing adequate rehabilitation funds, and so there have been cases where companies sell off their mining assets just before planned closures, or place mines on maintenance and care to avoid

closure processes. Lastly, there have been issues around illegal miners re-opening disused mines.[iv] However, even if these issues were to be solved overnight, rehabilitation is a very costly and lengthy process.

The result? Government is liable for 6 000 abandoned mines, including about 379 coal mines.[v] The environmental impacts include acid mine drainage, water pollution, land degradation, greenhouse gas emissions due to spontaneous combustion (notably when reopened by illegal miners), and safety concerns.[vi]

While information on the recent closure of established coal mines is available, this is not the case for abandoned mines. Available data is not up-to-date and gives no specific locations. Figure 1 illustrates the extent of the problem in Mpumalanga and northern KwaZulu-Natal (abandoned coal mines in red).

Figure 1: Active and abandoned mines - 2012



Source: Council for Geoscience. (2012). National database SAMINDABA (South African Mineral Deposits Database). BGIS_Projects/2012ActiveAndAbandonedMines (MapServer). BGIS Projects, ArcGIS REST Services Directory.

Deficient rehabilitation and restoration of closed and abandoned coal mines presents risks, but also opportunities to create jobs. Supporting job creation and community resilience is very much in line with the JET.

Which sectors can support new jobs?

My analysis highlights sectors that support high-employment and low-carbon growth, summarised in figure 2 (with industry codes in brackets). Agriculture, environmental monitoring and other services, and industries linked to renewable energy exhibit strong employment benefits. These align with the Mpumalanga Green Economy Development Plan, which aims to transition the province's economy toward renewable energy (including biomass), sustainable agriculture, and tourism by 2030.

Figure 2: Carbon-intensity and employment-intensity by sector

Low carbon intensity	C. Coal mining (21); Finance & insurance (81, 82); Post & telecommunication (75); Manufacturing n.e.c, recycling (392, 393, 395); Other transport equipment (384-387); Other private services (92, 94-96); Health (med, dent, vet) & social work (93)	A. Other producers/activities (99); Clothing (313, 314, 315); Catering and accommodation (64); Forestry (12); Furniture (391); Leather (316); Wood and wood products (321, 322); Wholesale and retail trade (61, 62, 63); Footwear (317); Food (301-304); Motor vehicles, parts & accessories (381-383); Machinery & equipment (356-359); Printing, publishing & recorded media (324-326); Business Services (83, 85, 87); Beverages (305); Tobacco (306); Professional & scientific equipment (374-376); TV, radio & communication equipment (371-373); General government (91)
High carbon intensity	D. Gas sector (natural) (2211); Gas (412); Electricity (411); Collection, purification & distribution of water (42); Coke & refined petroleum products inc. nuclear fuel (331-333); Mining of metal ores (24); Other mining & quarrying (221, 25); Basic precious & non-ferrous metals (352); Basic chemicals (334); Basic iron & steel (351, 353); Transport & storage (71-74); Plastic products (338); Other chemicals & man-made fibres (335, 336); Non-metallic minerals (342); Gold mining (23); Glass & glass products (341); Rubber products (337); Electrical machinery & apparatus (24)	B. Textiles (311, 312); Agriculture(11); Fishing (13); Building construction (502); Metal products excluding machinery (354, 355); Civil engineering & other construction (501, 503-505); Business services (84, 86, 88); Paper & paper products (323)
	Low employment	High employment

Mining contamination in Mpumalanga has posed a major challenge for crop cultivation,[vii] but innovative rehabilitation techniques are proving land can be restored for sustainable agriculture – an outcome once thought impossible.[viii] The Mafube water reuse project (2017–2020 with phase 2 beginning this year) demonstrated that irrigating virgin land with mine water produced high-quality maize with yields (14.5 t/ha) nearly doubling those of dryland crops (8t/ha). Similarly, the Wonderfontein winter wheat project (2021) showed that mine-affected land and water improved crop performance, yielding higher outputs than virgin soil while meeting necessary safety standards.[ix] Mpumalanga has also partnered with Coaltech and the Mpumalanga Green Cluster Agency to repurpose mining land for biofuels, industrial hemp, and renewable energy.[x]

These projects relied on collaboration between the private sector, government, and local communities. They also demonstrate how the challenges of converting coal mines into productive land can be overcome using actionable solutions - continually being built on by local research institutes such as Coaltech and Mintek.[xi] However, limited pilots mean policy must proactively support the necessary regulation, skills development, and finance requirements.

What should be done?

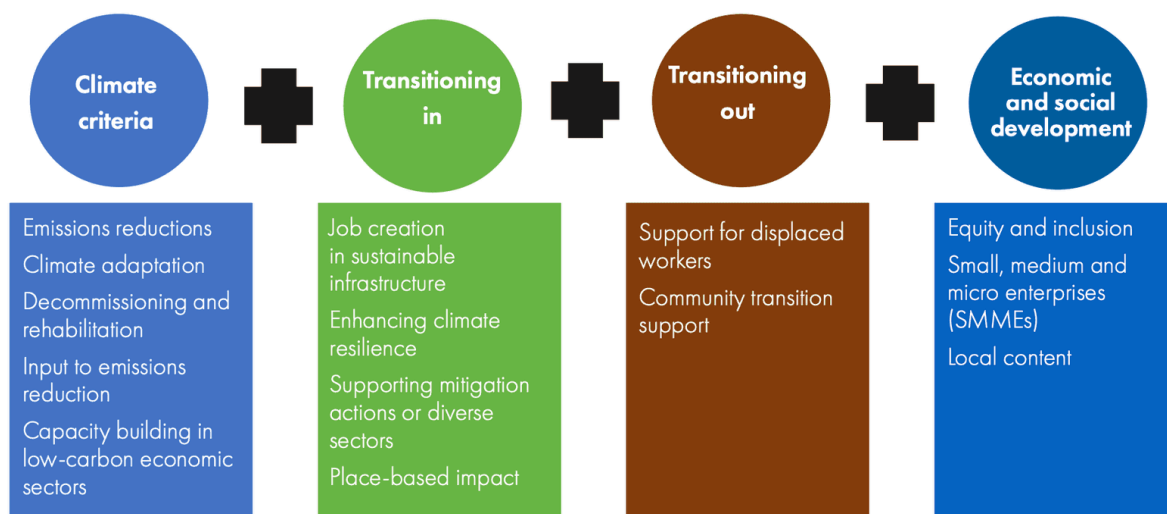
Regulation: About 55 abandoned mines have been rehabilitated by government, which prioritises asbestos mines and focuses on safety and restoring land to its natural state. Legislation requires that rehabilitated land should resemble its pre-mining condition, but a more effective approach would be making land economically viable for local communities.[xii] Notably, the ongoing greenhouse gas emissions associated with these sites are not included in legislation. Research suggests that "abandoned mine methane (AMM)" continues to be released into the atmosphere decades after mine closure.[xiii] This is important to consider in the context of commitments to the Paris Climate Agreement.

Skills: Many communities affected by mine closures lack skills and opportunities to adapt to an energy transition. Workers in these mines are mostly semi-skilled, with around 40% in craft and related trades and 35% in plant and machine operations. Reskilling can assist in

the transition from mining work to mine rehabilitation efforts, or even farming, but community buy-in is also critical.

Finance: The government allocated R181.9 million to mine rehabilitation in 2024/25.[xiv] But as mentioned, coal mines are not the priority, and accessing mining closure certificates and rehabilitation funds from government is notoriously elusive. So, would rehabilitation and restoration projects meet the criteria for funding under the "(JET) Investment Programme"? Based on the JET project assessment guidelines, summarised in figure 3, the answer is yes.

Figure 3: JET project assessment guidelines



Source: Just Energy Transition. (2025). JET Funding Platform. South Africa: The Presidency, Republic of South Africa.

Granted that JET funds are dwindling, could meeting its criteria unlock alternative financing mechanisms? There is an argument that this would foster "investor confidence". If funders have visibility on how money is allocated and the tangible outcomes of projects (as being a JET project would ensure), this could enhance transparency and accountability, making initiatives attractive. Thereafter, successfully financed projects would pave the way for larger investments.

Conclusion

A just transition in South Africa's coal-mining communities hinges on pro-active policy interventions, strategic financing mechanisms, and collaboration between government, industry, and local communities. The challenge is to turn mining's destructive environmental past into an economic asset. Key policy considerations include the following:

Regulatory measures:

- Ensure stronger compliance with mines closure rules, notably "junior" mines that are often overlooked
- Strengthen government capacity to oversee mine closures and access to rehabilitation funds

- Monitoring and oversight of emissions reduction

Skills development:

- Collaboration with communities to engage in transition training
- Upskills and reskilling through vocational training in targeted sectors
- Support training for community-led cooperatives

Finance:

- Leverage JET criteria to unlock alternative finance, public and private
 - Employment-focused incentives, such as tax incentives for companies investing in rehabilitation/repurposing
 - Public-private partnerships with mining companies co-investing in training alongside government support.
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