

Decarbonising South Africa's Mining as well as Petrochemicals and Chemicals sector

Johannesburg, October 21, 2021

Reports on the decarbonisation pathways for South Africa's Mining as well as Petrochemicals and Chemicals sector were released today. This work by the [National Business Initiative \(NBI\)](#), [Business Unity South Africa \(BUSA\)](#) and the [Boston Consulting Group \(BCG\)](#) shows that it is possible to decarbonise key economic sectors. It will also unlock opportunities for the country in the mining, green fuels and chemicals space.

DECARBONISING THE MINING SECTOR

South Africa's mining sector is a key socio-economic contributor. To remain competitive globally, it will need to decarbonise, respond to shifting value pools, and adapt to local climate change impacts - while ensuring a Just Transition. This is the central finding of the *Decarbonising South Africa's Mining Sector - towards a Green Technology-driven Mining Ecosystem* report. The report shows that South Africa can decarbonise its mining sector and promote socio-economic development via enabling cross-sector green-tech opportunities.

The biggest mining sector decarbonisation lever is a cleaner electricity supply, eliminating ~75% of Scope 1 and 2 emissions, while electrification of mobility and stationery machinery would eliminate ~15% of Scope 1 and 2 emissions. A coal phase out would remove the majority of fugitive emissions, gases and vapours.

Meeting the Department of Mineral Resources and Energy (DMRE) target of 4-5% of global exploration expenditure (~ZAR8 billion per annum) by 2026 is key as it would drive the exploration of green tech commodities in South Africa. In addition, establishing the policy environment and infrastructure to enable increased local beneficiation is key.

Overcoming structural issues, establishing an enabling policy environment, and setting a clear path towards decarbonised operations and production of clean tech commodities would allow South Africa's mining sector to be a prime destination for global long-term investments in the context of a Just Transition to net-zero in South Africa.

DECARBONISING THE PETROCHEMICALS & CHEMICALS SECTOR

The *Decarbonising South Africa's Petrochemicals and Chemicals Sector* report confirms the petrochemicals and chemicals sector as a key contributor to South Africa's energy security, and as a significant role-player in a decarbonised economy in the long-term.

The sector currently drives 13% of the country's gross emissions and will experience key challenges in a net-zero emissions scenario. In the long-term, demand for conventional liquid fuels will decrease through decarbonisation, particularly in the transport sector. In the mid-term, South Africa will be challenged by a decline in local refining capacity and an increasing need for fuel imports. If, however, South Africa can unlock disruptive technology, specifically green H₂ and sustainable sources of carbon, it can decarbonise its petrochemicals and chemicals sector, and unlock the opportunity of becoming a producer of green fuels and chemicals for local demand and export.

This is based on a competitive advantage in the cost-competitive production of green H₂ and expertise in the production of synthetic fuels. South Africa has some of the best solar and wind resources on the planet, sufficient land and access to seawater for desalination. The country also has unique Fischer-Tropsch technology for the beneficiation of H₂ into hydrocarbons, such as e-methanol and Sustainable Aviation Fuel (SAF).

WHY DECARBONISING KEY SECTORS IN LINE WITH A JUST TRANSITION IS IMPORTANT

While the decarbonisation of these sectors enables local industrialisation and realisation of new export opportunities, helping improve South Africa's balance of payments, it will be critical to manage socio-economic risks in the mid-term and particularly the displacement of workers in the coal, refinery and related value chains incorporating ~ 140,000 jobs today. In addition, increased reliance on liquid fuel imports is also a risk for energy security. To mitigate these risks will require accelerating decarbonisation across sectors from 2030 onwards.

Given its vulnerability to the impacts of climate change, South Africa understands the need to transition its economy and to decarbonise its coal intensive sectors, as well as to build resilience to the impacts of climate change.

The case for change is also driven by trade risk as key trading partners implement low-carbon commitments, with some, like the European Union planning to introduce carbon border tax adjustments. This will create mounting pressure for South Africa, especially in key economic export sectors like mining, manufacturing and agriculture.

Navigating the transition will be complex and will require a high degree of collaboration across industries and amongst government, private sector, civil society and the public.

The NBI, in partnership with BUSA and BCG, have worked with leaders in business, government, civil society, and academia to identify decarbonisation pathways for key economic sectors aligned to achieving net-zero emissions by 2050. These reports also consider how to achieve a just transition that is economically and environmentally sustainable and which leaves no one behind.

Both these reports form part of the broader NBI Just Transition and Climate Pathways project. This series ultimately aims to develop zero carbon pathways for all the sectors of the South African economy, as well as understand what the socio-economic implications will be in order to mitigate the negative impacts and address inequality, poverty and employment.

A copy of the mining sector as well as petrochemicals and chemicals report can be downloaded from the [NBI's website](#). Reports for each sector will be released as they are completed.

— ENDS —

PRESS CONTACT:

Steve Nicholls

Head of Environment at the National Business Initiative

Telephone: 083 786 5058

Email: SteveN@nbi.org.za

National Business Initiative (NBI)
PO Box 294, Auckland Park,
Johannesburg 2006, South Africa
0861 123 624 (0861 123 NBI)
www.nbi.org.za

KEY FINDINGS FROM THE MINING REPORT:

Making this transition, particularly in the predominantly coal reliant and PGMs mining sector, will be complex. The report identified 8 key findings around the future of the mining sector, green opportunities and decarbonisation, in South Africa:

1. If the South African mining sector drives decarbonisation along the value chain and adapts to the global shift in mining commodity value pools, it can remain internationally competitive and promote socio-economic development in South Africa via enabling cross-sector green opportunities.
2. In the context of climate change, the South African mining sector faces three key challenges: **value pools are shifting away from South Africa's key mining commodities towards green tech commodities; the pressure to decarbonise from stakeholders is mounting; and the need to adapt mining operations to local climate change is increasing.**
3. South Africa's key mining commodities will be impacted by local and global climate action - thermal coal will be phased out and overall Platinum Group Metals (PGMs) demand could decrease towards 2050. **South Africa should strive to meet the Department of Mineral Resources and Energy (DMRE) targets of 4-5% of global exploration expenditure (~ZAR8 billion per annum (bn/a) by 2026),** in order to drive exploration in South Africa of green tech commodities, which will be increasing in global demand.
4. Decarbonisation of the mining sector will be driven by cleaner electricity supply, eliminating ~75% of Scope 1 and 2 emissions, while electrification of mobility and stationery machinery would eliminate ~15% of Scope 1 and 2 emissions. Furthermore, the phase out of coal would remove the majority of fugitive emissions.
 - a. A hybrid self-generation and grid electricity supply concept is the most cost-effective decarbonisation option for the mining sector's electricity supply, requiring ~16 GW of self-generated renewable energy. This represents ~50 times the currently distributed renewable energy capacity in South Africa, and a ~ZAR290 Billion investment over 30 years.
 - b. The decarbonisation of mining vehicle fleets will require a ~ZAR90 Billion investment over 30 years and will produce cost savings post-2024 as a result of reduced vehicle fuelling cost - provided that technical challenges faced by mining zero emissions vehicles are overcome through mining and original equipment manufacturer (OEM) collaboration.
 - c. As coal phases out, scope 3 emissions in mining will mainly be driven by iron ore usage in steel production and, to a lesser extent, metal processing; eliminating those emissions requires a transition towards green steel production and decarbonised energy supplies.
5. Increasing temperatures, changing rainfall patterns and more frequent extreme weather events will impact mining operations in South Africa significantly, and will require mining companies to develop adaptation pathways that account for risk thresholds along the value chain.
6. The phase-out of coal is inevitable given the need to decarbonise energy supplies to maintain South Africa's ability to export. While developing a clear Just Transition plan to protect the livelihoods of coal miners and coal value chain workers is critical, this segment only represents ~20% of current employment and ~26% of current revenue in the mining sector, highlighting that significant opportunity will remain in the sector - provided that emissions intensities are reduced.
7. Enabling the sector's transition requires public-private sector coordination along a common strategy, a conducive policy environment, and cheap finance for enabling exploration, and decarbonisation and adaptation along the value chain.
8. If the existing structural issues are overcome, an enabling policy environment developed, and a clear path towards decarbonised operations and production of clean tech commodities created, South Africa's mining sector could become a prime destination for global long-term investments and contribute to a Just Transition to net-zero in South Africa.

Unlocking South Africa's vision of a just transition against this backdrop, at national and sectoral levels, hinges on key building blocks being in place:

- An enabling policy framework to support reindustrialisation and the creation of new industries;
- Job creation;
- Social and ecological welfare;
- Managing geographic and cultural dislocation of communities;
- Education, capacitation and reskilling;
- Economic inclusion and participation (especially of the youth and black women);
- More distributed ownership;
- Improved quality of work;
- Infrastructure planning and rollout;
- Policy and governance; and
- Funding.

KEY FINDINGS FROM THE PETROCHEMICALS AND CHEMICALS REPORT:

Ten key findings of the petrochemicals and chemicals sector analysis:

1. If South Africa can unlock disruptive technology, in particular green hydrogen (H₂) and sustainable sources of carbon, **it can fully decarbonise its petrochemicals and chemicals sector**, which today drives 13% of the country's emissions, and **become a leading producer of green fuels and chemicals for local demand and export**.
2. **South Africa will be faced with different challenges in the petrochemicals and chemicals sector across timelines:** in the 2030s, South Africa could be facing the risk of weakened energy security, given a potential decline in domestic refinery capacity, due to decreasing competitiveness against imports, and regulatory compliance and feedstock supply risks. In the long-term, the sector will need to adapt to a changing demand landscape: Depending on the transport sector decarbonisation scenario, conventional liquid fuels demand could decrease by 50-100%, while conventional chemicals would eventually be substituted by decarbonised alternatives – also as a result of carbon border adjustment mechanisms – globally and in South Africa.
3. **While in the mid-term energy security needs to be maintained and the socio-economic risks associated with declining domestic refinery capacity and a potentially resulting negative balance of payment change managed, the changing demand landscape creates an opportunity for South Africa in the long-term:** South Africa could become a leading producer of green synthetic fuels and green chemicals, particularly e-ammonia and sustainable aviation fuel (SAF), for local demand and export, enabled by decarbonisation and conversion of South Africa's synfuels sector.
4. **South Africa's opportunity in the production of green fuels and chemicals is based on the competitive advantage in the production of green H₂ and synthetic fuels:** first, South Africa has some of the best solar and wind resources on the planet; second; it has sufficient land and access to seawater for desalination, which can also serve a dual purpose of improving water security; and third, it has unique Fischer-Tropsch technology for beneficiation of H₂ into hydrocarbons, such as e-methanol and SAF.
5. **Decarbonising South Africa's synfuels production will not just support the transition to the production of green fuels and chemicals, it will also be critical to reduce South Africa's overall emissions footprint and the carbon-intensity** of locally produced chemicals – given that today's coal-based synfuels sector drives ~90% of the petrochemicals and chemicals sector's emissions and constitutes a key supplier of feedstock for local downstream chemicals production.
6. **The ability to decarbonise the petrochemicals and chemicals sector will depend on access to key technologies and feedstocks:** full decarbonisation of the existing synfuels production requires access to green H₂ at scale below a price of US\$2/kg and sustainable carbon feedstocks, supplied via, for example biomass and – potentially in the long-term – Direct Air Carbon Capture (DACC). For gas to support the decarbonisation as a transition feedstock, gas prices would need to be secured at an economically viable level.
7. **Depending on the timing of availability and affordability of disruptive technology and lower emissions feedstock, such as Carbon Capture Utilisation and Storage (CCUS), DACC, green H₂, biomass and gas, different pathways towards net-zero synfuels production exist;** whereby cumulative emissions range between 0.6-1.2 Gt CO₂e, but

socio-economic trade-offs differ significantly across pathways with regards to, for example, timing and scale of investment requirements, impact on production cost, job impact across the sector's, and adjacent value chains and the speed at which green production can be achieved.

8. **Two per cent of the sector's direct emissions are linked to the downstream chemicals production;** removing those emissions will require process, energy and material efficiency improvements, fuel switching, access to sustainable feedstock and negative emission technology, such as CCUS.
9. **While the decarbonisation of the petrochemicals and chemicals sector enable local industrialisation and realisation of new export opportunities** which help improve South Africa's balance of payment, it will be critical to manage socio-economic risks in the midterm, in particular the displacement of workers in the coal, refinery and adjacent value chains, which together make up ~140 000 direct jobs today, and the risk of increasing reliance on liquid fuels imports, which would decrease energy security and negatively impact South Africa's balance of payment in the 2030s - accelerating decarbonisation across sectors will be key to mitigate those risks.
10. **It will be critical to establish cross-sectoral and international partnerships and pilot projects to drive research and development, off-take agreements to secure cheap financing at an early stage, and a conducive local policy environment** to unlock the key technologies and feedstock needed to drive decarbonisation and the establishment of green fuels and chemicals production in South Africa - if this cannot be achieved, the sector is at risk of losing its competitiveness and will eventually come to a demise.

PRESS CONTACT:

Steve Nicholls

Head of Environment at the National Business Initiative

Telephone: 083 786 5058

Email: SteveN@nbi.org.za

National Business Initiative (NBI)
PO Box 294, Auckland Park,
Johannesburg 2006, South Africa
0861 123 624 (0861 123 NBI)
www.nbi.org.za

ABOUT THE AUTHORS:



ABOUT THE NATIONAL BUSINESS INITIATIVE

At the National Business Initiative (NBI), we believe in collective action and collaboration to effect change; building a South African society and economy that is inclusive, resilient, sustainable and based on trust. We are an independent, business movement of around 80 of South Africa's largest companies and institutions committed to the vision of a thriving country and society. The NBI works with our members to enhance their capacity for change, leverage the power of our collective, build trust in the role of business in society, enable action by business to transform society and create investment opportunities.

nbi.org.za



ABOUT BUSINESS UNITY SOUTH AFRICA

BUSA, formed in October 2003, is the first representative and unified organisation for business in South Africa. Through its extensive membership base, BUSA represents the private sector being the largest federation of business organisations in terms of GDP and employment contribution. BUSA's work is largely focused around influencing policy and legislative development for an enabling environment for inclusive growth and employment.

busa.org.za



ABOUT BOSTON CONSULTING GROUP

BCG partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG, the pioneer in business strategy when it was founded in 1963, today works closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organisations to grow, build sustainable competitive advantage, and drive positive societal impact. Our diverse, global teams are passionate about unlocking potential and making change happen and delivering integrated solutions.

www.bcg.com

PRESS CONTACT:

Steve Nicholls

Head of Environment at the National Business Initiative

Telephone: 083 786 5058

Email: SteveN@nbi.org.za

National Business Initiative (NBI)

PO Box 294, Auckland Park,

Johannesburg 2006, South Africa

0861 123 624 (0861 123 NBI)

www.nbi.org.za

