LEADERSHIP GROUP FOR INDUSTRY TRANSITION

South Africa's green steel opportunity: navigating challenges, seizing the future

On 18 April 2023, in Johannesburg, the Trade & Industrial Policy Strategies (TIPS) research institute and the Leadership Group for Industry Transition (LeadIT) hosted a workshop on developing a roadmap for decarbonizing South Africa's steel and iron value chain. The event was organized at the request of South Africa's Department of Trade, Industry, and Competition (DTIC). This brief summarizes the key points from the workshop.

Aaron Maltais / October 2023

Key takeaways from the steel decarbonization roadmap workshop

South Africa's potential competitive edge in green steel

- Because South Africa is a top producer of iron ore, with rich renewable energy resources, it is in a prime position to be a leader in the green steel transition.
- Export market opportunities could help build the know-how, infrastructure, and market conditions for a successful transition in national and regional markets.

A global level playing field to accelerate action

- Rapid action is imperative to remain competitive and take advantage of new possibilities amid evolving global climate and trade policies, including the EU's carbon border adjustment mechanism (CBAM).
- Shifts towards green industrial policy in major economies may obstruct countries with weaker financial resources from realizing their competitive advantages.
- International cooperation across countries and industrial sectors, including through financing, is essential to ensure a level playing field.

Sustainable power generation

- South Africa's unstable power grid is a challenge to low-carbon steel production, necessitating urgent policies and cross-sector collaboration to decarbonize the power sector, including exploring off-grid renewable solutions for industrial electrification.
- A key challenge is to bolster grid reliability for the entire population, while also supporting the green steel transition.

Workshop insights and identified priorities

South Africa is Africa´s second-largest steel producer (World Steel Association, n.d.) and steel is vital to the country's economy, anchoring multiple sectors like construction, transport, and energy. Historically, steel production in the country has been carbon-intensive with higher CO2 emissions per metric ton than the global average as of 2019 (Monaisa, 2021). Approximately 60% of South Africa's steel is produced using the blast furnace method (BF-BOF), with the remaining using the electric arc furnace (EAF) process (South African Iron and Steel Institute, 2022). To address climate goals, including South Africa's net-zero ambitions, a swift transition to sustainable technologies is critical.

Realising South Africa's competitive edge

- Embrace innovative technologies such as Hydrogen Direct Reduced Iron (H-DRI) and recycling methods, capitalizing on South Africa's rich solar, wind, and iron ore resources.

One of the main themes of the workshop was South Africa's unique opportunity to take a leading position in the global transition to green steel. LeadIT's Green Steel Tracker tool shows that the steel industry is clearly moving towards implementing new low-emissions solutions. This shift, driven by environmental imperatives, can also offer a significant competitive advantage for South Africa, especially for its export markets.

Innovations like green hydrogen direct reduced iron (GH-DRI) are set to revolutionize steelmaking. Coupled with recycling, such technologies can drastically cut down the steel industry's carbon footprint.

South Africa's position as a top iron ore producer, combined with its abundant solar and wind energy resources and strong industrial foundation makes it a potential powerhouse for producing and exporting green iron and other sustainable steel products. As demand for low-emissions steel accelerates, there is clear potential for new market opportunities for South Africa.

This rising opportunity is in line with the government of South Africa's climate ambitions. The recommendation in South Africa's Steel Master Plan is clear: the industry should target carbon neutrality by 2050. This vision was re-iterated by government and private sector representatives in the workshop and is in line with global initiatives like LeadIT, which South Africa became a part of in 2022.

Trade, finance, and just transitions

- Proactively adapt to international regulations, such as the EU's carbon border adjustment mechanism (CBAM), ensuring South Africa's steel remains competitive.
- Address concerns, alongside partner countries, around the fairness of trade measures to emerging and developing countries.
- Ensure equitable access to international climate finance that can support both the broader public's climate transition needs and specific industries that need to transition to net-zero.
- Emphasize broad engagement and dialogue with all stakeholders, and pay special attention to concerns around equity and just transitions.

South Africa has had limited time to adapt to the EU's newly adopted CBAM, and sector experts in the workshop argued that South Africa must expedite its efforts in producing decarbonized steel to tap into burgeoning demand. However, some participants argued that the EU's CBAM and public financial incentives that support green industrial investments in high-income countries will unfairly affect trade conditions for South Africa.

Workshop participants said that international climate finance, such as funds announced at COP26 (the 2021 UN climate conference in Glasgow) for South Africa's Just Energy Transition Partnership (JETP), supported by the EU, France, Germany, the UK, and the US, was critical for making industrial transitions viable and fairer.

One of the three priority sectors of the JETP is green hydrogen, including for use in industrial production of steel. However, a question raised at the event was whether this funding would be better spent on improvements to the power sector that are spread widely among the population as opposed to being directed towards corporate actors in industrial production.

Although only one example, this discussion highlights how considerations of fairness and just transitions at international and national levels mean different things to different stakeholders. An important takeaway is the need for wide stakeholder engagement in the transition.

Power generation

- Address under-investment, which leads to an unstable grid. Ensure that power sector investment and decarbonization align with both the green steel transition and the broader needs of South Africans.

Green steel transitions are tightly linked to the power sector and many of the key technologies involve direct or indirect electrification of production processes. South Africa has faced difficulties in the power sector that have worsened in recent years. Frequent load shedding is now a significant economic and social challenge for the country. There is a clear need for policies and investments that accelerate the decarbonization of power in South Africa in ways that both increase the reliability and total production of electricity for the entire population, as well as making possible the green steel transition.

Some participants called for the electricity generation market to be opened further to the private sector at scale, to enhance and diversify the energy mix, including off-grid onsite renewable energy generation for industrial production, although limited space in urban areas was identified as an obstacle.

There was a broadly shared view at the workshop that stronger alignment between government, the national power utility, municipalities, and industrial actors is crucial for making the electrification of industrial processes a reality.

Diversified steel sector

- Create incentive structures that are relevant to the different segments of South Africa's steel sector.
- Promote market demand for green steel locally and regionally.

Another key theme from the day was how to deal with the diversified nature of the steel sector in South Africa. The export market is dominated by one large producer, ArcelorMittal South Africa (AMSA), while at the national level there are several smaller actors and value chains that also must be part of the industrial decarbonization pathway.

The workshop exchanges suggest that there is not yet a clear business case for green steel investments in South Africa, even though there are emerging opportunities for the export market. For the domestic market it is much less certain how and when incentives for paying for the "green premium" for low-carbon steel production will emerge.

In the coming years it is a very important task for decision-makers to respond effectively to the different business models and market conditions across the steel sector to create the right incentives for transition. Participants at the workshop highlighted actions that could increase domestic demand for green steel, including partnerships with and between actors in the construction and building sectors, expansion of renewable energy infrastructure, and public procurement.

Skills and technology readiness

- Prioritize investments in skills related to emerging low-carbon steel production methods.
- Foster public-private partnerships to boost technological readiness, facilitate international skill transfer, and support technology transfer.
- Establish a coordinated approach in government and agencies to support industry in managing regulatory issues and incentive programmes, building a "one-stop shop" approach to industry support.

Blast furnaces are the dominant incumbent technology for steelmaking, with skills and capabilities centred around this method. Participants highlighted a pressing need to invest in skills. Participants also emphasized the importance of skill transfers, internationally and throughout value chains, to ensure there is the required capacity at the local level across the sector.

Over the short and medium term there is a need for more public and private partnerships for developing technological readiness for low-carbon production in South Africa. Workshop participants also called for government coordination on the many issues around regulation and incentives that will arise as the sector implements the transition. These include land and environmental permitting, energy markets, infrastructure, piloting and demonstration, and standards. Participants called for a "one-stop shop" that can support industry in managing these issues and address potential goal conflicts. Lessons can be learned from similar government efforts supporting renewable energy projects.

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