TIPS Development Dialogue

Analysis of South Africa’s Petrochemicals in the Energy Transition: Focus on Sasol’s Secunda Facility

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20 February 2025

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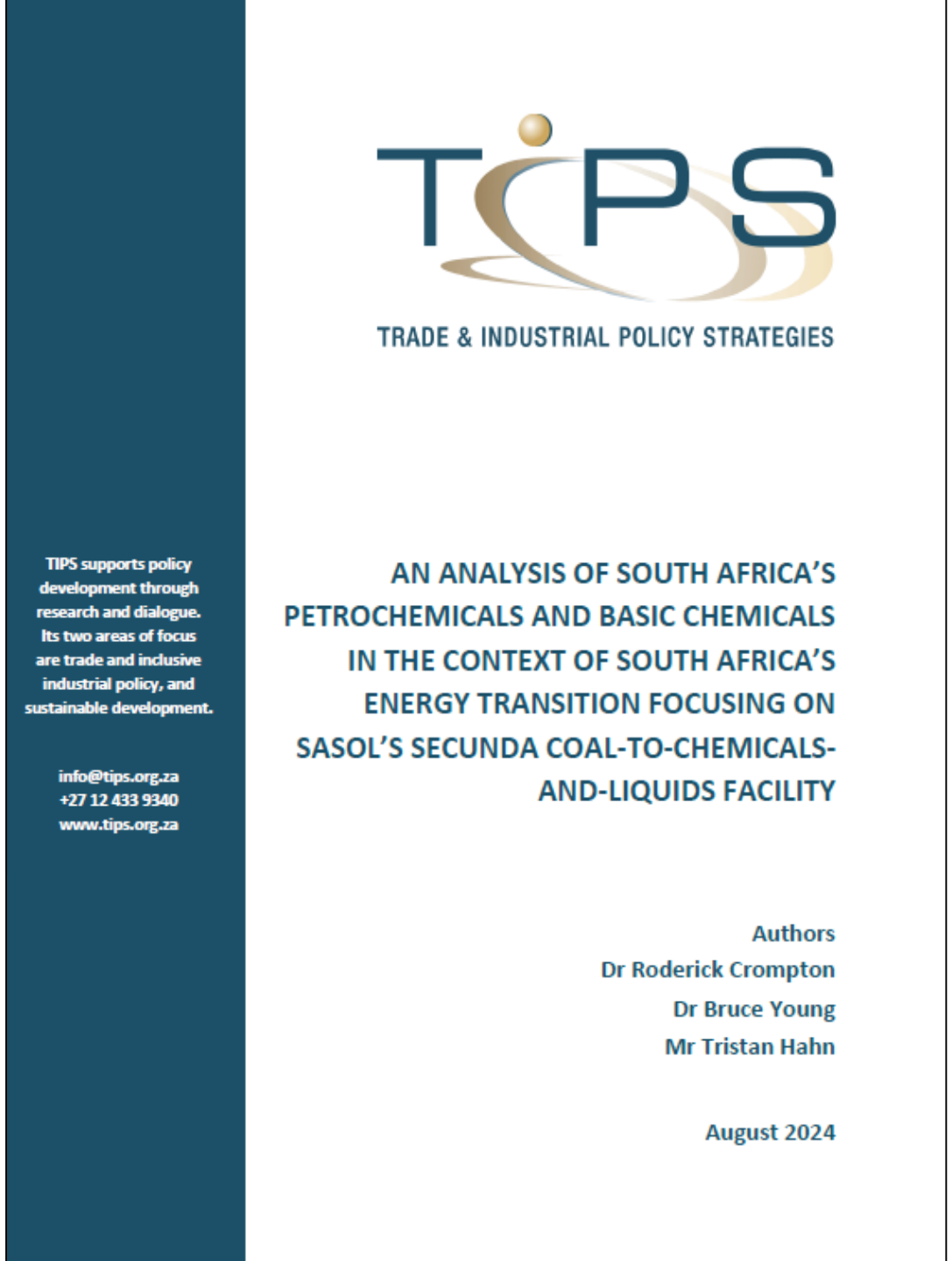


This research report was commissioned by TIPS in April 2023.
The report was published in October 2024
This presentation is a summary of a 120 page report

https://www.tips.org.za/research-archive/trade-and-industry/item/4854-south-africa-s-petrochemicals-and-basic-chemicals-in-the-context-of-south-africa-s-energy-transition-sasol-s-secunda-coal-to-chemicals-and-liquids-facility

Contents

1. Origins & Nature of Sasol Secunda Coal-to-Chemicals-and-Liquids plant

- SASOL 2 & 3 were commissioned in 1980 and 1982 by the state for strategic reasons
- Feedstock was abundantly available low grade coal, energy security, not climate change was the key consideration
- Privatised from 1979 – listed on JSE with guaranteed pricing support for investors
- SASOL's technology is designed for coal and cannot be easily substituted at scale by other feedstocks.
- Natural gas can **supplement** but not replace coal
- Main products are petrol, diesel, jet fuel & chemicals
- Chemical feedstocks are **co-products** with liquid fuels – you can't have one without the other

1. Secunda's contribution to the local economy

- 52% share of local liquid fuels production.
- **The only SA source of petrochemicals for many downstream chemicals, plastics, fertilizers, explosives & other chemicals**
- 2023 chemical sales R70.6 billion.
- Adds immense direct and indirect value to very low-grade coal and a stranded natural gas asset. Sasol's 2021 share of GDP 2.6% and 5.2% all impacts included.
- 2019 Sasol employed 24 000 and paid them R35 bn
- R51 billion contribution to government revenue in 2021
- Sasol level 3 BEE status.
- Contributed R1.4 billion to skills development and R857 million to social investment in 2023.
- Created towns: Sasolburg (from 1954). Secunda town 40 000 inhabitants, 80% work for Sasol directly or indirectly.

Sasol is a major contributor to the South African economy

2. Sasol decarbonisation commitments

Announced in September 2021

- **Net zero by 2050**
- **30% reduction in Scope 1 and 2 by 2030 off 2017 baseline for South African operations**

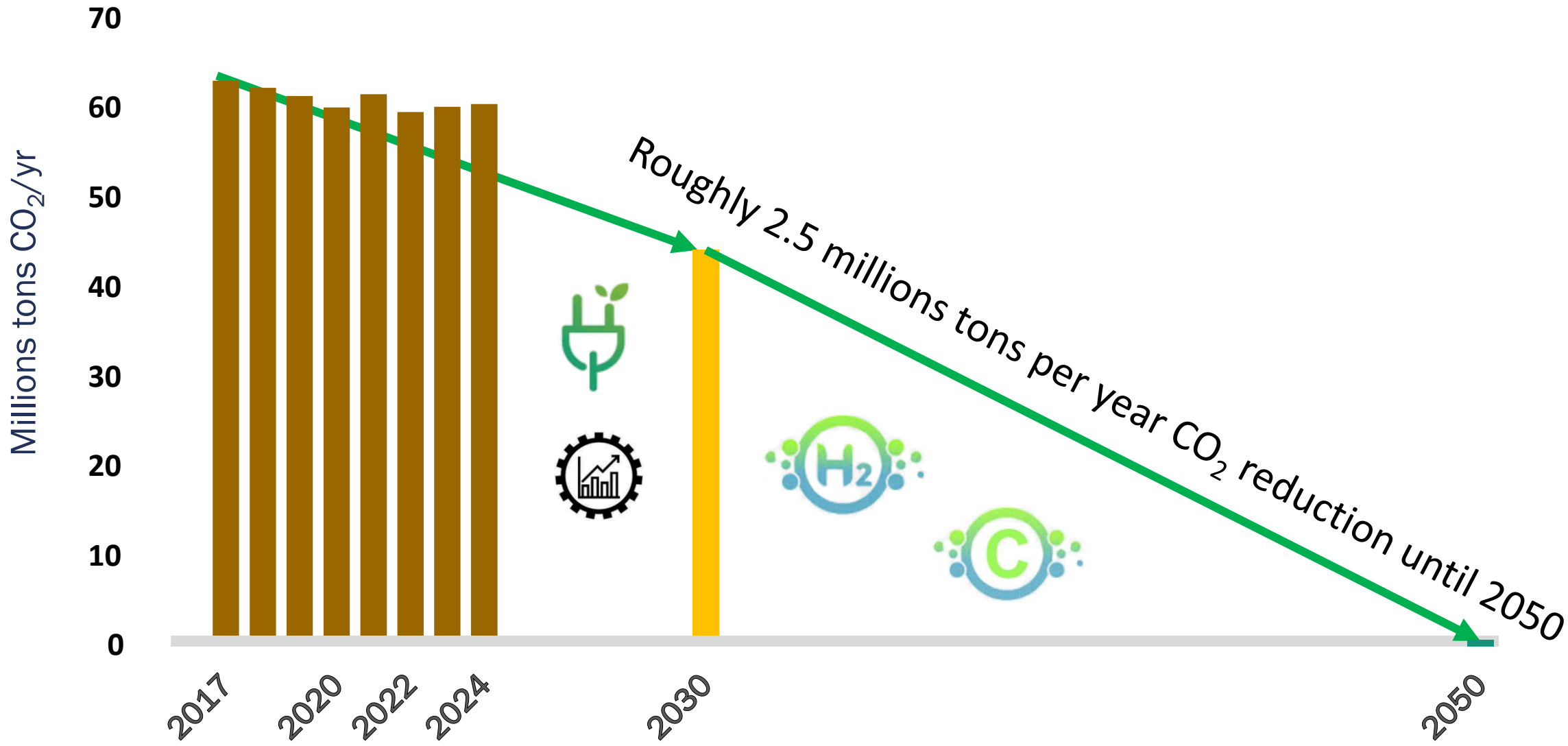
September 2021: Fleetwood Grobler, CEO
"Based on *detailed* assessments and modelling, our 2030 target can be delivered without divestments and offsets, but through the direct decarbonisation of our existing assets"

November 2022: Fleetwood Grobler, CEO
"The starting point is simple. Sasol is committed to our 2030 GHG target and 2050 net zero ambition we announced in 2021. There is no retreat from these goals"

Sasol statement, 3 September 2024
"Sasol remains committed to a sustainable energy transition… includes our GHG emission roadmaps to 2030 and beyond. The group target of a 30% reduction by 2030 remains".

Growing stakeholder pressure results in firmer commitments from Sasol

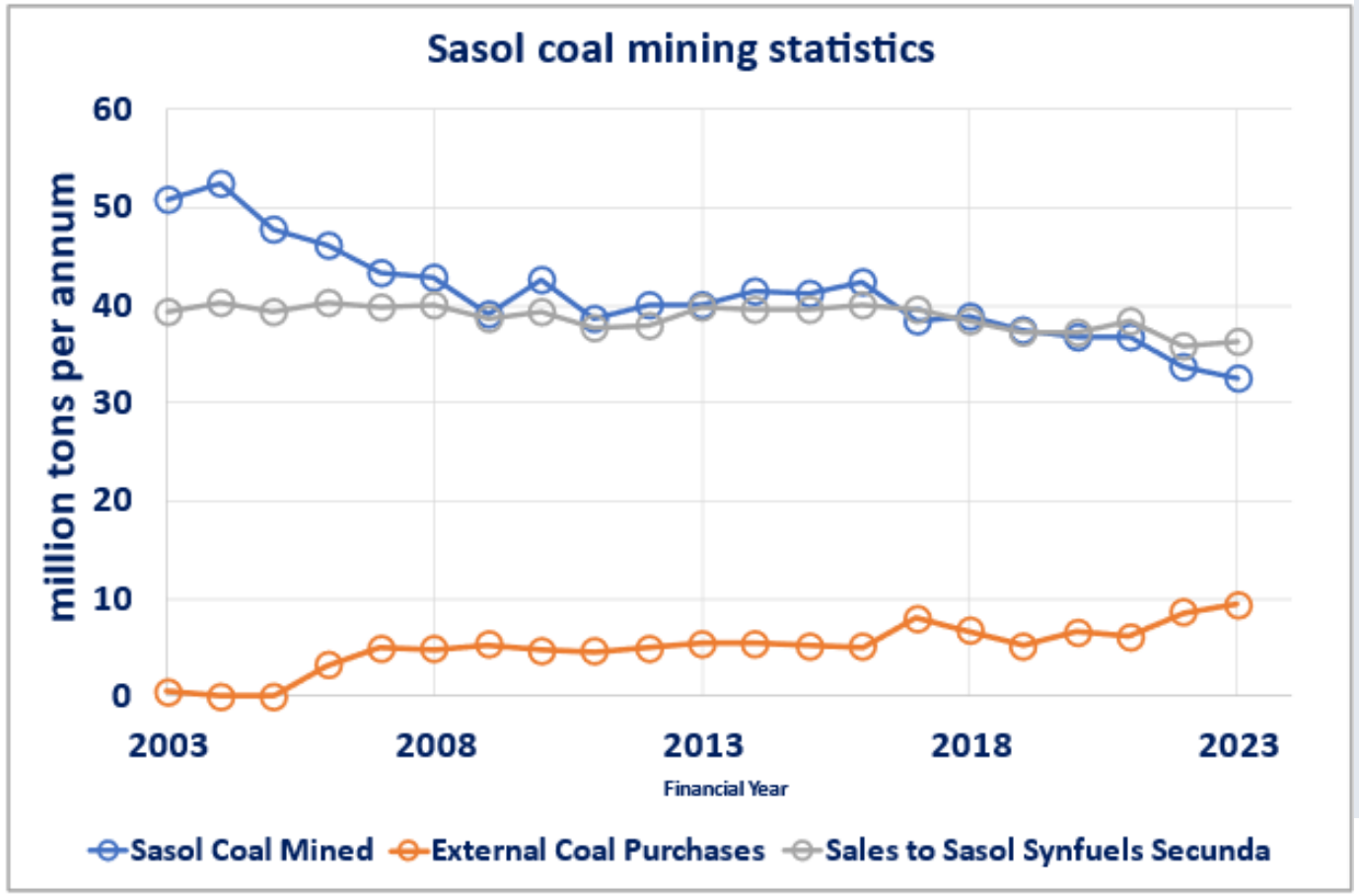
2. Sasol South Africa CO_2 emissions and targets



Slow progress since 2017, tough targets ahead

3. Feedstock challenges: coal

- Secunda built close to coal
- Better-quality coal being mined out

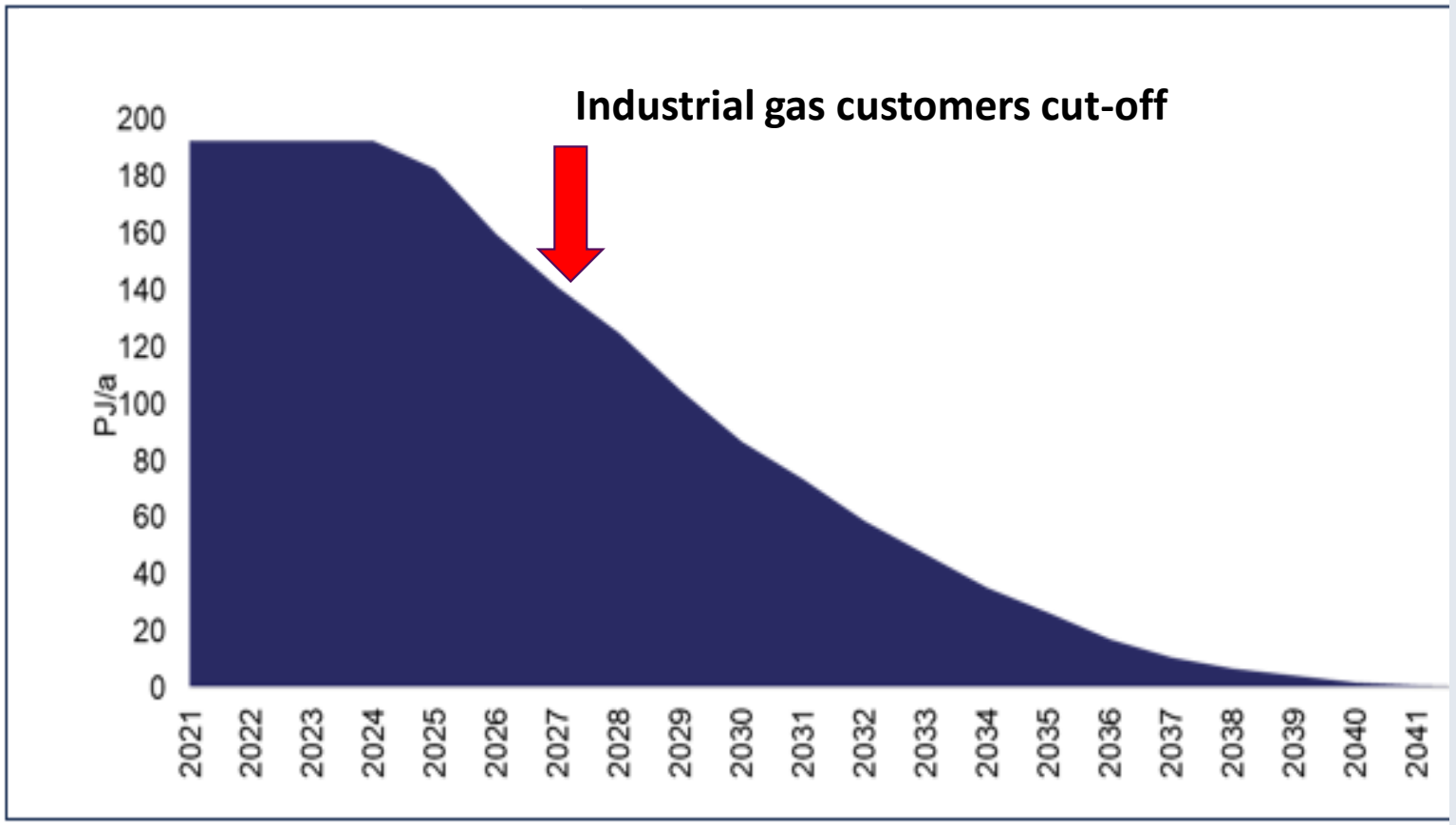


- Coal production:
  - Early 2000's, 50 mtpa
  - 2023 : 33 mtpa
- Coal quality has been declining.
- Destoning project is underway to improve quality
- External purchases of coal from further afield will need to increase

Coal costs are increasing, reducing the margins and profitability of Secunda

3. Feedstock challenges : The gas cliff

- **Mozambican gas reserves depleting rapidly**
- **Sasol and the country is facing a gas cliff**

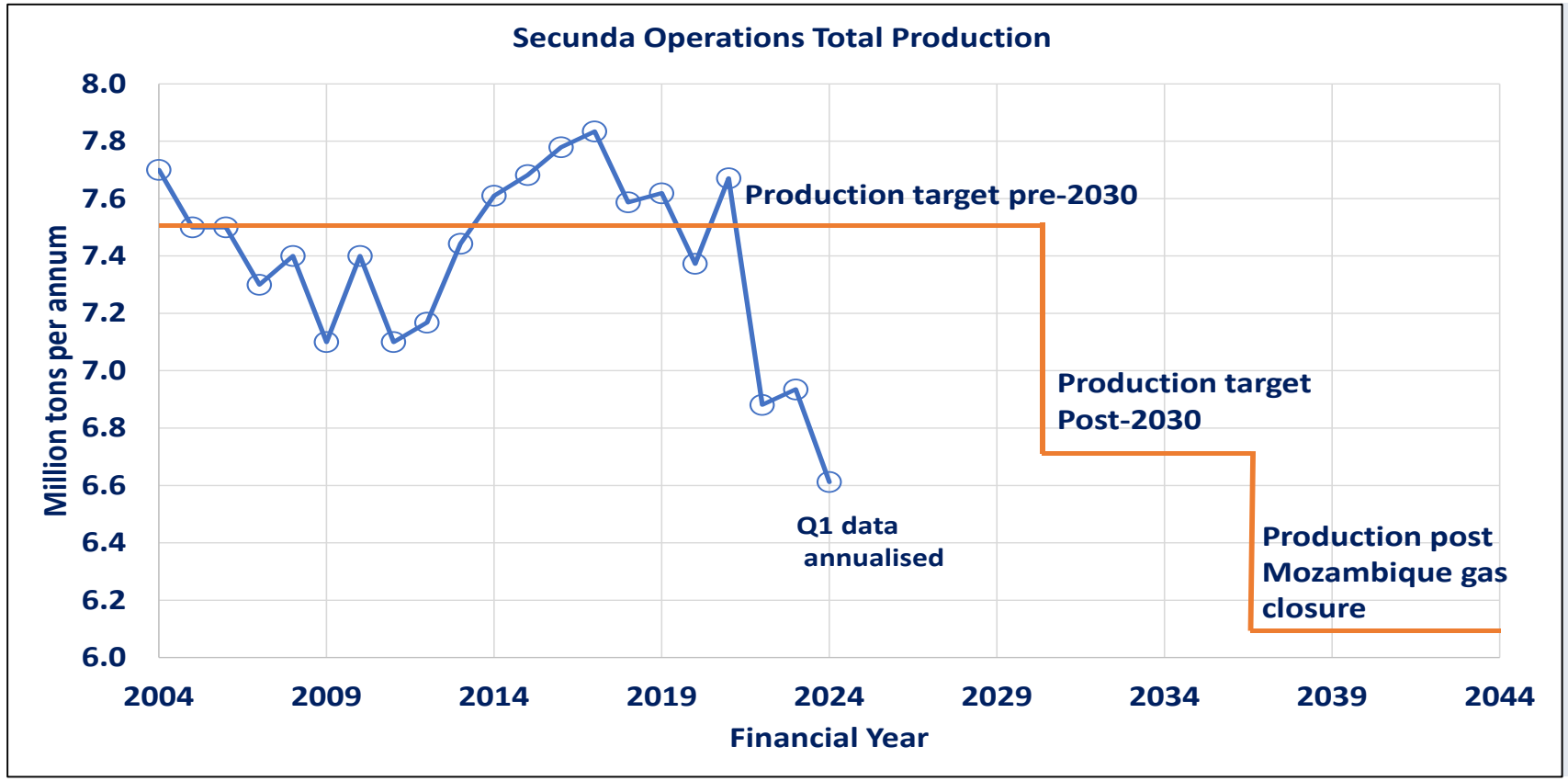


- Mozambican gas anchors Sasolburg and supplements Secunda (10%).
- Sasol is the largest industrial gas consumer.
- LNG imports are under study, but Sasol can't afford it.
- An LNG terminal's viability is uncertain without Sasol – gas to power projects are essential for LNG

Natural gas supply to Sasol is declining impacting the viability of both Secunda and Sasolburg

3. Feedstock challenges: Production outlook

Secunda faces production declines post 2030 to meet emission reduction targets and then a further decline as gas supply runs out in the mid 2030's

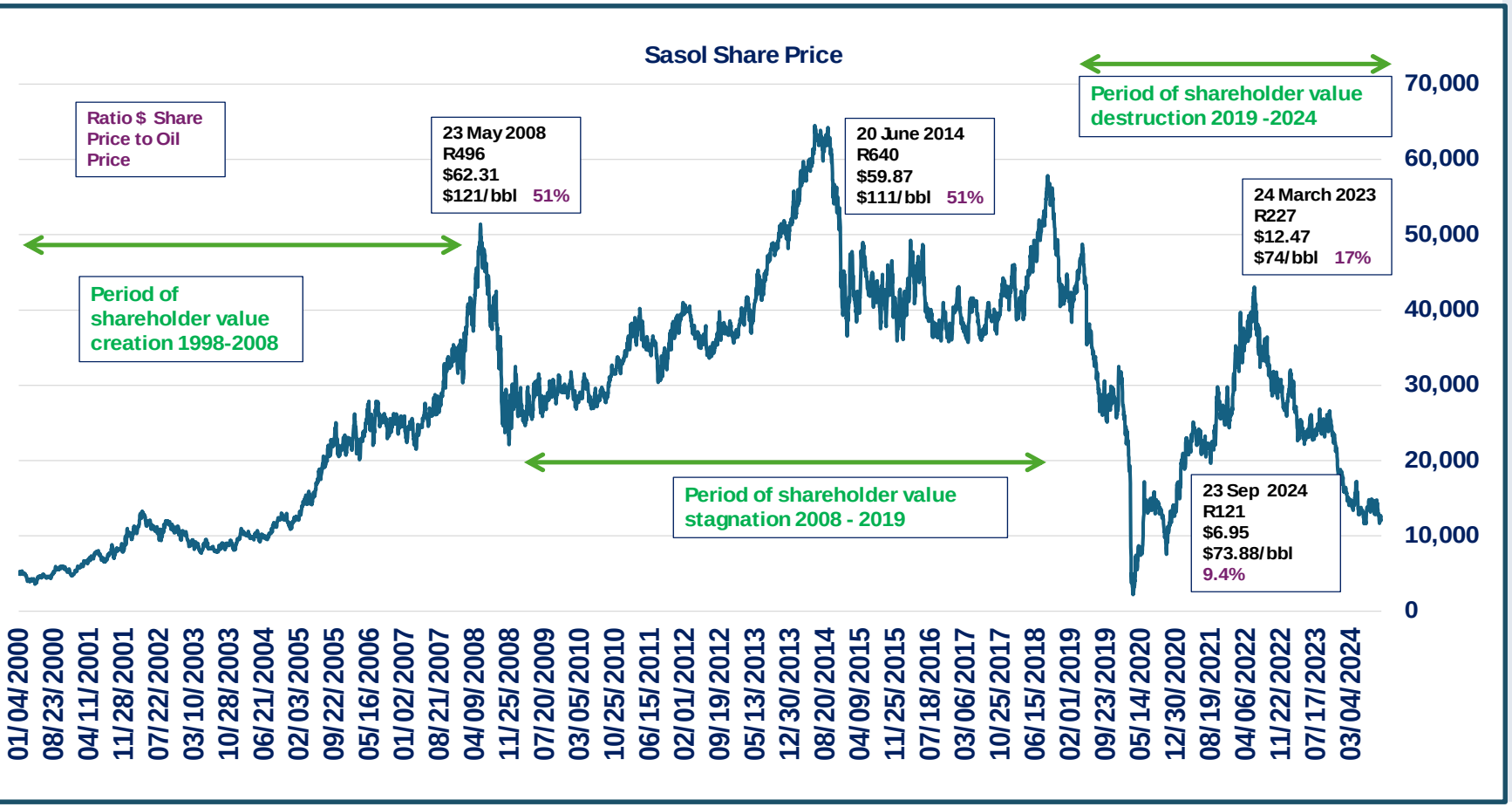


- Production forecast to drop from 7.5 to 6.1 mtpa by the mid-2030s.
- Lower production hurts margins due to fixed costs.

The future of Secunda and Sasolburg face significant headwinds in the coming decade

4. Shareholder value and financial position

A company's share price reflects its **overall health**.
Sasol's share price dropped from R640 ($59.87) in 2014 to under R90 ($4.84) by Feb 2025, losing 92% of its value.



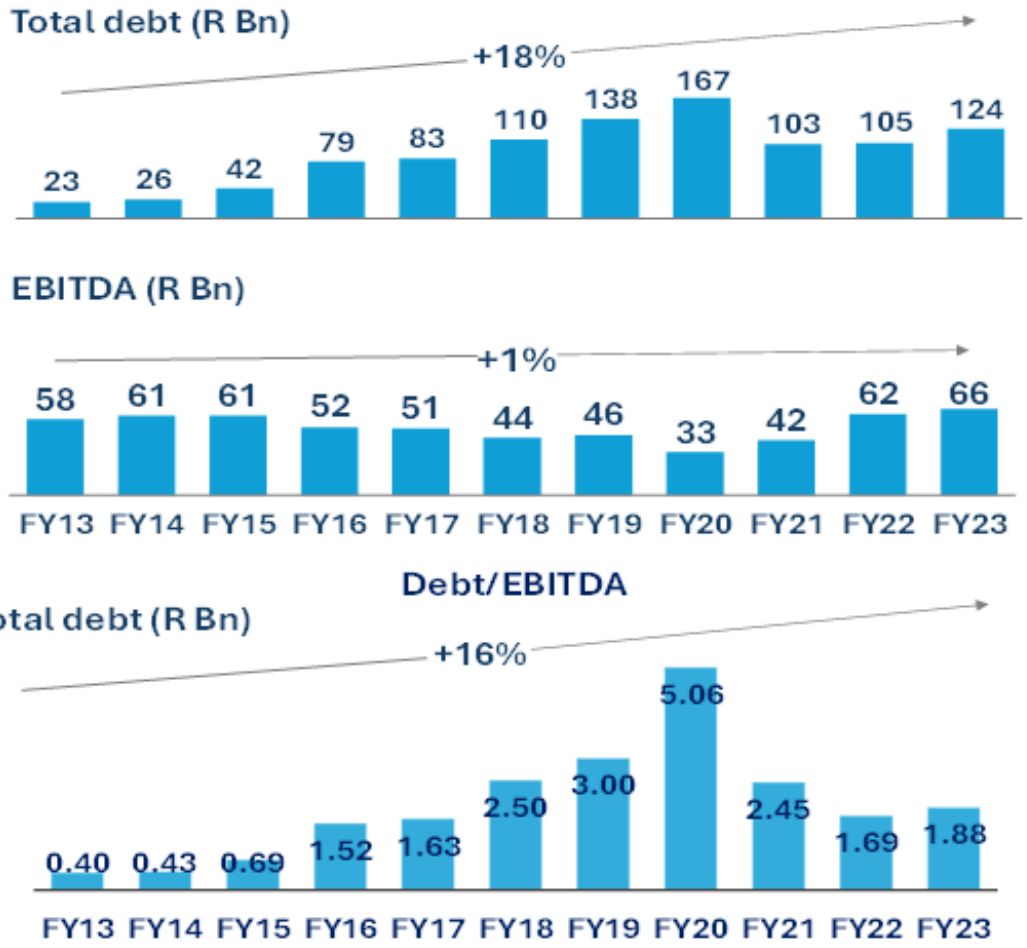
- **2000-2008:** Share price surged from R30 to R500 (16x growth).
- **2008-2018:** Share price stagnated, but dividends were paid.
- **2018-2025:** Share price decline.

LCCP cost overruns ($8.1B → $12.9B) led to debt, Covid struggles, and forced asset sales.

Sasol's market valuation has a concerning trajectory with an uncertain future.

4. Shareholder value and financial position

Sasol's earnings have been declining and debt increasing over the last 10 years



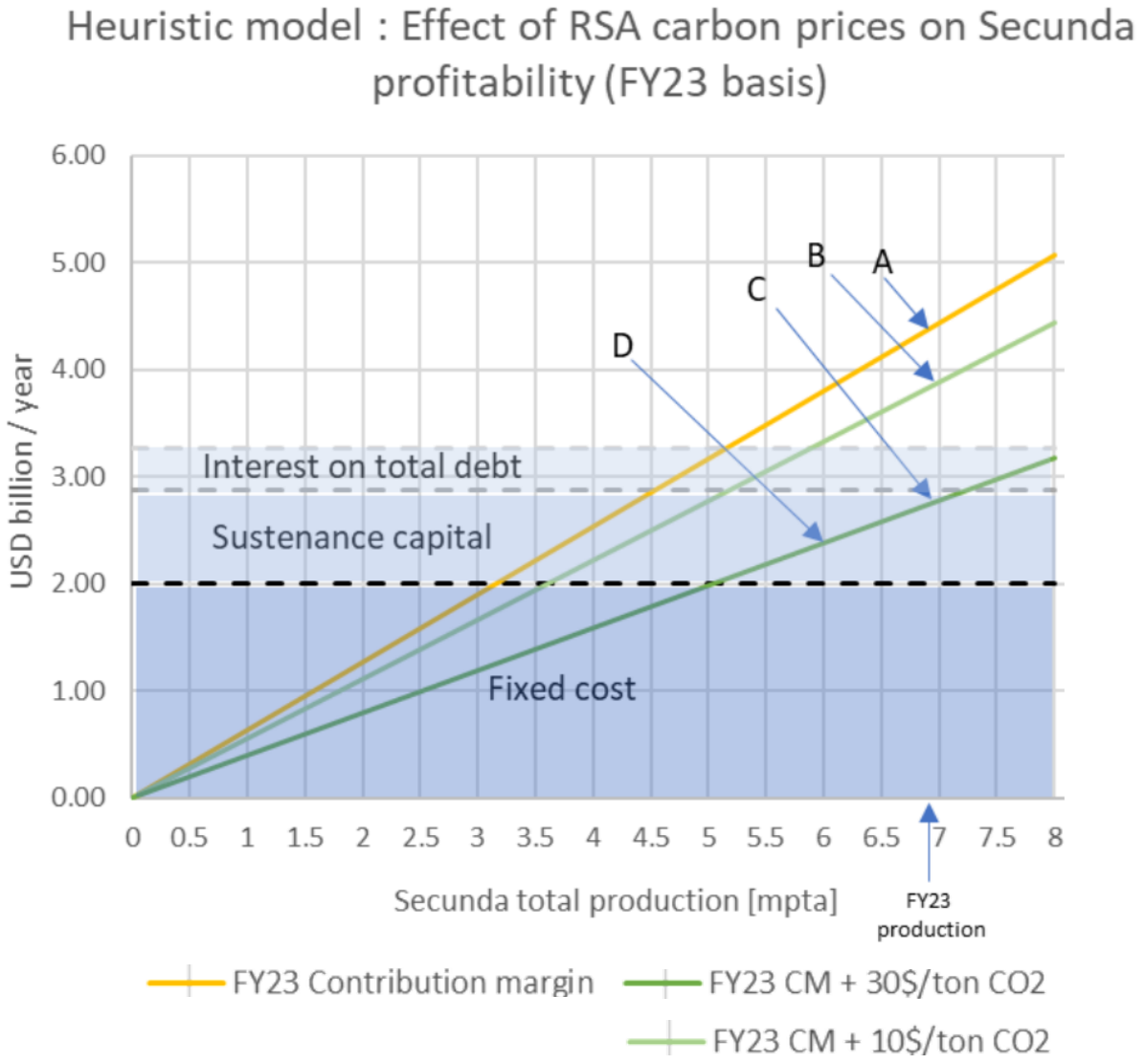
- Sasol's low debt in 2013 surged, triggering a 2020 crisis (debt/EBITDA >5), forcing asset sales.
- Over 10 years, dollar earnings fell 5.5% annually, while debt rose 10.4%.
- Cost-cutting and restructuring remain ongoing.
- Financial decline explains shareholder value loss.

Sasol appears to be a company in financial distress making decarbonization more challenging

5. Economic modelling indicates Secunda vulnerable to carbon tax

- Economic modelling used to reduce very complex puzzle to something manageable
- Secunda is a very carbon intensive at around 8 tons CO_2 / ton product
- Tax base case is a fully exposed 30$/ton CO_2

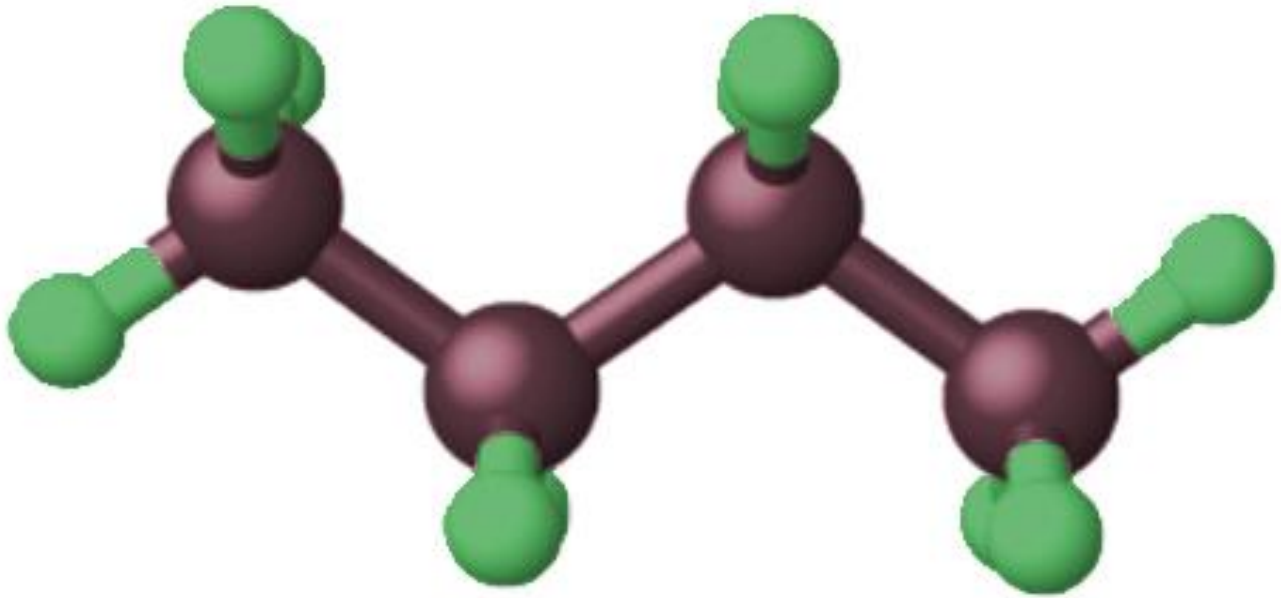
- 30$/ton CO_2 is much less than EU ETS today
- Economic health is also very sensitive to oil prices and to production declines



An effective CO_2 cost of 30 $/ton is a heavy burden

6. Greening Secunda's products

- Secunda makes hydrocarbons (chains of -CH_2-)
- Two separate processes are required to green the "C" and "H" in the products
- Step 1 (costly) : Green the "H" portion (hydrogen)
- Step 2 (difficult): Green the "C" portion (carbon)



6. STEP 1: Transformation of Secunda to green hydrogen in numbers

- The estimated green hydrogen requirement contained in the products is **2.14 million tpa**
- **18.2GW** of renewable electricity required for this green hydrogen production (70% of current RSA electricity demand)

Capital cost estimate

Green hydrogen	±R360 billion
Renewable Electricity	±R640 billion
Total	**±R1 trillion**

More than US$50 billion (R1 trillion) of capital investment would be required to supply Secunda with 2.14 million tpa of green hydrogen

6. STEP 2: Transformation of Secunda to sustainable carbon

- **Massive land requirement for biomass:** A 1GW power plant requires a wood plantation of 3300 km^2 which is 1.6 times the size of Mauritius.

OR

- **Direct air carbon capture or flue gas recovery:** Considered but not commercially feasible. Converting **23.5 million tpa of CO_2** into feedstock requires **2.14+1.07 million tpa of green hydrogen**, further raising costs.

It is not technically or economically feasible to supply sustainable carbon to Secunda today

7. What does the future hold for the Secunda and Sasolburg operations?

- **Is there a Secunda reinvestment case? Highly unlikely.**
- **Secunda can probably operate to end of its useful life if environmental pressures & oil price allow**

Pressures on Secunda

- Coal based - high carbon intensity
- Feedstock challenges - both coal and gas
- Product price sensitivity
- Increasing production costs
- Environmental pressure both globally and in South Africa

- Declining production
- Declining profitability
- Some shareholder dissatisfaction
- High debt levels

Industrial facilities don't last forever. Secunda and Sasolburg factories are no exception. It's not if, it's when.

7. What does the future hold for the Secunda and Sasolburg operations?

SA regulatory dispensation – Government holds powerful policy and regulatory levers that will strongly influence, if not determine, when Sasol's Secunda and Sasolburg operations close:

- Environmental compliance - DFFE extension for sulphur and particulates to 2030.
- Regulation: excessive gas pricing case. NERSA v Competition Commission jurisdiction case.
- Proposed carbon tax of $30/ton threatens the viability of Secunda

8. Policy recommendations – managing Secunda's sunset and thereafter

Policy makers need to be prepared. Understand the consequences.

- What's the future of SA's petrochemical industry?
- What is the country going to do about it ?
- Develop a plan? Would it be executable?
- Wait to the last minute and then panic?
- Leave it to market forces? Risk of sudden large restructuring events
- Government could possibly help extend Secunda's life. Should it?

What economic activity could substitute? See report.

Nuanced government intervention needed to manage Secunda's twilight years.

Collaboration between Sasol, government, shareholders, funders and NGO's needed for a **managed transition**:

Thank You

Executive summary

Sasol is a very large contributor to the South African economy employing more than 28 000 people directly and up to 450 000 jobs including indirect and induced jobs. In 2021, Sasol output accounted for 2.6% of GDP directly and 5.2% indirectly.

Sasol has recommitted to reducing green house gas emissions (GHG) by 30% by 2030 which Sasol has stated will reduce production from Secunda by 11%. Sasol has further committed to net zero by 2050.

Sasol already faces feedstock challenges in both coal and gas. Coal cost is increasing, and quality has declined. Coal has to be supplied from further away and by external suppliers. Gas reserves in Mozambique are depleting with no viable alternative in sight. Gas depletion implies a further 9% reduction in Secunda production in the mid 2030's

Sasol's share price and market valuation faces a concerning trajectory. Over the last 10 years, Sasol's dollar earnings have declined by an average of 5.5% per year while debt has increased by an average of 10.4% per year. Sasol's net debt is more than $4 billion

Our analysis shows it is not technically or economically feasible to convert Secunda to use green hydrogen and sustainable carbon to replace coal and natural gas

Secunda faces production declines post 2030 to meet emission reduction targets.

Economic modelling based on FY23 shows Secunda has a high fixed cost base (~$2 billion per year) requiring production to exceed 5 million tpa to break even. Sustained low oil prices (<70$/bbl) or increases in carbon tax to $30/ton will severely impact profitability. Debt repayment adds to financial distress.

As Secunda faces its sunset phase government holds powerful policy and regulatory levers that will strongly influence, if not determine, when Sasol's Secunda and Sasolburg operations close