



Western Cape
Government

FOR YOU

Department of Economic Development and Tourism:
A Trikam

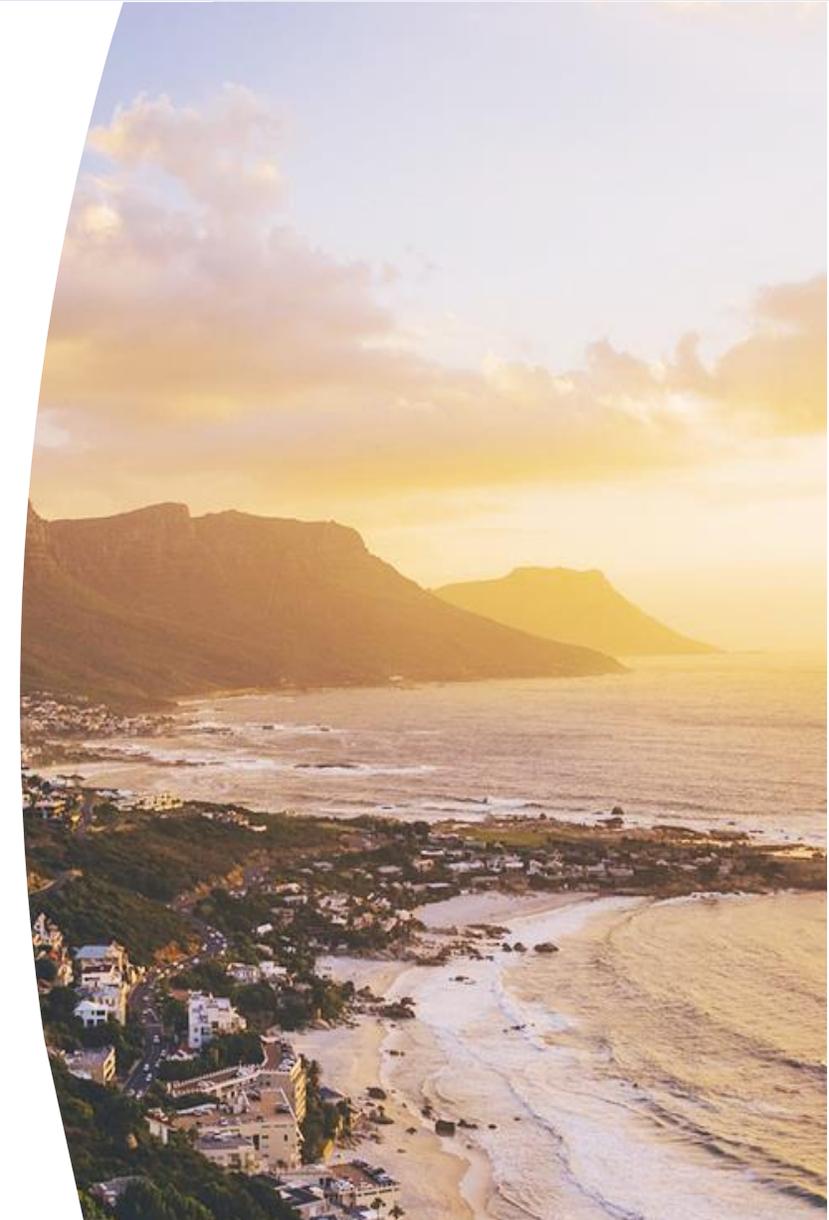
Western Cape Government Energy Workshop

Liquified Natural Gas (LNG)

LNG project 2012-2020

The Western Cape Government was actively promoting the importation of natural gas into the West Coast of the Western Cape. This is because:

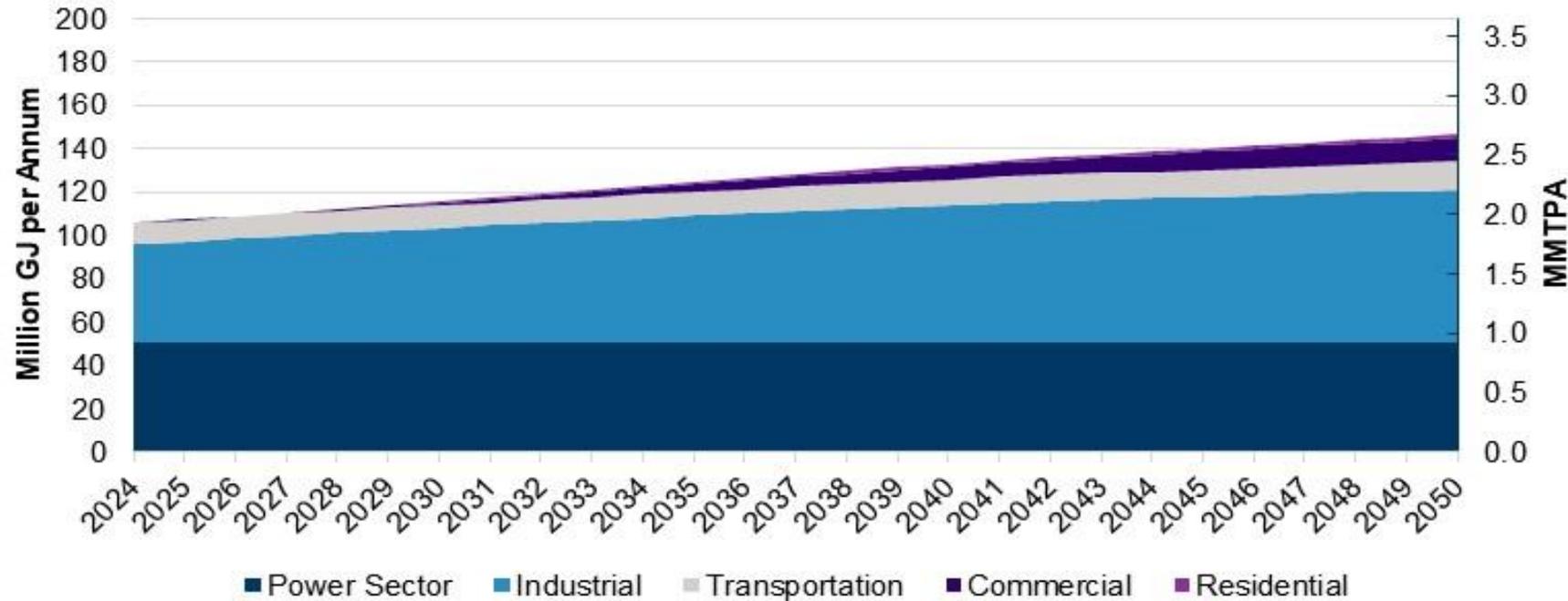
1. Socio-economic benefit from gas-based industrialisation
2. Industries will be able to switch from dirtier fuels (coal, heavy fuel oils and diesel) to natural gas, thus reducing the Western Cape's carbon footprint.
3. Natural gas will help achieve goals of a low-carbon, energy-secure future.
4. Gas-to-power works well with solar and wind energy, as it provides flexible dispatch.



List of studies completed

1. Pre-Feasibility report for the importation of natural gas into the Western Cape with specific focus on the Saldanha Bay-Cape Town Corridor, March 2013. (H Visagie)
2. Environmental Screening and Safety Study for the proposed LNG terminal at Saldanha and associated pipeline infrastructures to Atlantis and Cape Town, August 2014. (CSIR)
3. Preliminary assessment of the marine environmental conditions for LNG shipment and transfer operations for an area within the Port of Saldanha, September 2014. (CSIR)
4. Preliminary assessment of the marine environmental conditions for LNG shipment and transfer operations for an area within the West Coast of South Africa, September 2014. (CSIR)
5. The socio-economic impact of importing LNG into the West Coast of the Western Cape, February 2015. (Deloitte)
6. Liquefied Natural Gas (LNG) importation: Evaluating the risks, June 2016. (PwC)
7. Feasibility study for the Western Cape LNG importation and gas-to-power project, 2019 (Delphos International)
8. Techno-economic analysis of energy in the Western Cape Transport sector, 2019 (eScience)

Findings of 2019 feasibility: Gas demand analysis



- Base case gas demand profile: 1.9 MT/a in 2024; rising to 2.7 MT/a in 2050
- This is 20% higher than pre-feasibility
- Supported by surveys and reviews of potential diverse off-take prospects.
- Including interviews with potential major industry users along the West Coast corridor (including all major Saldanha industries).

Findings of 2019 feasibility: Perspectives of gas demand

1. Power generation remains critical anchor off-take prospect

Based on Ankerlig conversion, but could also be IPP in either Saldanha or Atlantis

All dependent on **agreed capacity factor i.e Combined Cycle and not Open Cycle**

2. Overtaken by growing industry demand within 10 years

Some “chunky” investment prospects – **However AMSB has since shut down**

3. Land-based transport usage small (except, possibly for long-haul freight)

Passenger transport only for captive fleets (**current investigations are looking to leapfrog gas in favour of Green Hydrogen**)

4. Marine bunkering could be significant

All dependent on how SA positions itself re MARPOL in 2020. **World bank undertaking a Marine bunkering pre-feasibility for green hydrogen (Saldanha Identified as one of the ports.)**

DEMAND SENSITIVITIES

Rank	Variable
1	Ankerlig NGCC Capacity factor
2	GDP growth rate
3	Technical Substitution rate
4	Energy intensity of use
5	% Vessels requiring LNG bunkering

Findings of 2019 feasibility: Contractual models of development

Domestic sale of gas through GasCo	Gas supply and power generation all bundled so various industrial users will have to purchase LNG from an international supplier
	Avoiding gas price regulation but price of the electricity subject to price regulation
The gas project is a self-standing project, with Eskom being one of GasCo's customers (the anchor customer)	
Allows for a situation in which the gas aggregator (GasCo) and the electricity generator (PowerCo) are independent of one another	GasCo and PowerCo are a single integrated company
Reduces the concern over Eskom's conflict of interest as a vertically-integrated company involved in the generation of electricity	Potentially easier as IPP procurement aspect is less complex - involves only the appointment of one IPP to generate electricity from one gas source

Findings of 2019 feasibility: Risks

LIKELIHOOD	High	C11-LNG price indexation F1-Currency		
	Medium	C28-Eskom default under Tolling PCA F3-Interest rate E1-Opposition by effected parties E6-Carbon tax adoption	T2-Marine terminal siting C12-LNG take-or-pay terms C24-Eskom default under Anchor GSA F4-Inflation E4-Marine terminal siting	
	Low	T1-Dredge material disposal T3-Seabed preparation C14-LNG regasification failure/delay C16-PowerCo electricity non-delivery C27-Seller default & termination of GSA IA C29-GoRSA default & termination of Tolling PCA E2-Capital dredging E3-Cooling water & brine dispersion E7-Fresh water for Anchor	T7-Right-of-way acquisition C3-COD delay due to GasCo C4-COD delay due to TNPA C5-COD delay due to PowerCo C6-Cost over-runs C7-Input supply failure/shortage C8-Infrastructure defects C9-Integration failure C10-COD due to FM C15-GasCo breach to take LNG C17-Gas buyers failure to take gas C18-Operating failure due to FM C19-Regional upstream gas development C20-Political FM C21-TNPA default & termination C22-GasCo default & termination of TNPA PCA C23-GasCo default & termination of Anchor GSA C26-GasCo default & termination of GSA IA C30-Change in law C31-Expropriation	
			T8-Pipeline routing F2-Credit T4-Submerged transfer pipeline rupture T5-Seismic activity T6-Foundation failure T9-Failure of LNG storage tank C1-Project site access C2-Site condition C13-LNG non-supply/delivery delay C25-GoRSA default & termination of GSA IA C32-Eskom collapse E5-Fossil fuel restrictions	
		Low	Medium	High
		IMPACT		

- LNG price identified as a high risk (Given the Ukraine-Russia War the impact is likely to be higher due to volatile gas pricing).
- Currency risk – gas buyer would be exposed to currency risk as gas is traded on international markets.
- Pipeline routing may be sensitive due to environmental and social sensitivities.
- Credit – with Eskom as anchor – credit rating may be a challenge given debt burden.
- Credit - Global banks are divesting away from fossil fuels due to climate change commitments.

Work undertaken 2019-20

1. Memorandum of collaboration with Transnet for LNG development in Western Cape – to leverage lessons learned from Transnet on Richards bay development
2. Memorandum of understanding with Eskom developed for LNG development in the Western Cape – not signed as Eskom were undertaking RFIs for new gas sales agreement and for balance of plant conversion to convert Ankerlig and Gourikwa from Diesel to Gas.
3. Secured USTDA funding for a feasibility study into small scale gas to seed the market and stimulate market demand – not taken up due to resource constraints.

Recent studies/presentations on role of gas in SA

DMRE Gas masterplan (Dec 2021)

- “A challenge in developing the gas sector is to bring gas demand and supply on stream at the same time and spread geographically to stimulate broader localised demand through South Africa. Without such localised gas demand, it is difficult to develop distributed gas supply and without such distributed gas supply it is difficult to develop localised gas demand.

- “One way of breaking this impasse is to create significant “anchor” gas demand through the development of a gas-to-power programme. In pursuit of adding generating capacity, lowering carbon emissions, enhancing energy security and supporting industrial development, South Africa has taken the first steps in a gas-to-power programme to be executed under the Integrated Resource Plan 2019, aiming to increase the national energy mix natural gas contribution from 2.6% to 15.7% by 2030.”

Eskom CEO (keynote Enlit – June 2022)

Eskom anticipates an investment in 3 to 6GW of gas-fired generation to achieve system stability, however there are commercial risks associated with gas.

Standard Bank Presentation (July 2022)

- 2025 - Gas engines at Eskom sites
- 2026-27 – Early production at Luipard and Brulpadda with fuel switching of Gourikwa
- 2028-29 – Full field development of Luipard and Brulpadda i.e. 3GW
- Recent significant discoveries made in Namibia (Graff & Venus) along the maritime border between Namibia and South Africa has led to increased planned exploration activity in South African waters of the Orange basin.
- The proximity to a key demand hub in the Western Cape provides a compelling opportunity. Landing a pipeline in the existing Saldanha harbour, and onward connection to Cape Town, provides multiple demand hubs, including conversion of Ankerlig OCGT from diesel to gas-fed CCGT, as well as new CCGT generation capacity.

Recent studies/presentations on role of gas in SA

IISD: Gas Pressure: Exploring the case for gas-fired power in South Africa (March 2022)

Since gas supply is not necessary until 2035 in the power sector (if the system is optimally developed from now) it is logical to avoid unnecessary lock-in to another high-carbon fuel. Therefore, wait until 2030 to assess if any post-2035 role for gas exists.

Given the increasing risks of gas, improving alternatives, and the narrow window before gas would need to be phased out to reach net-zero by 2050 (or is outcompeted by green fuels), it is not rational to rush into building an extensive fleet of CCGTs that the government seem to be planning.

Meridian Economics: Hot air about gas: An economic analysis of the scope and role for gas-fired power generation in South Africa (June 2022)

“Gas in a peaking role could yield annual savings of R6.1 billion compared to large-scale gas use. Contrarily, large-scale gas use would push electricity prices up 40%. After 2030, considering carbon tax hikes, the premium on electricity costs would be above 60%. High electricity prices may even force some businesses to close, which will impact GDP”

We need between 25 to 40 PJ of gas by 2030 – the equivalent of 8 to 15 LNG deliveries a year – if we solely switch to gas to provide peaking power

National Business Initiative – Boston Consulting Group (June 2020)

The switch: from Gas to Green Hydrogen

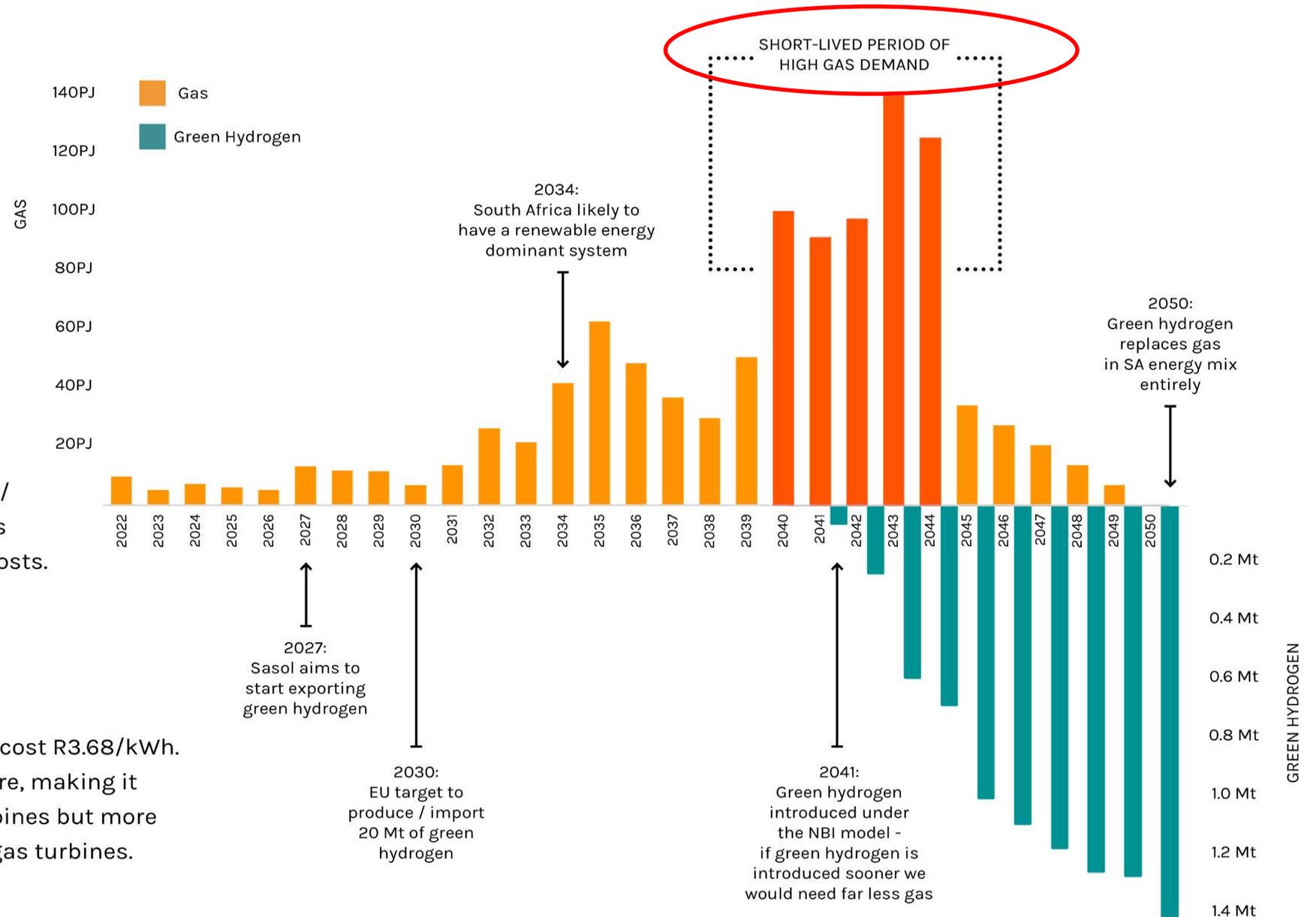
Before 2039, we need very little gas - between 5 and 62 PJ a year. That number will likely go up - potentially reaching a peak of 139 PJ in 2043 in NBI's model. But if green hydrogen is available sooner at an affordable price, the case for gas begins to evaporate.

What will Green Hydrogen cost?

Currently, green hydrogen costs around \$2.62/kg in countries like Qatar and Australia. That's around R1.24/kWh, excluding infrastructure costs.

- R1.72/kWh (gas CCGT)
- R3.68/kWh (green hydrogen)
- R5.68/kWh (gas OCGT)

The NBI model estimates green hydrogen will cost R3.68/kWh. This includes capex and opex for infrastructure, making it cheaper than gas burnt in open cycle gas turbines but more expensive than gas burnt in combined cycle gas turbines.



Market movements

- DMRE minister Mantashe budget speech (May 2022) - gas will be a “game-changer” for the economy. “If we are going to fully develop we cannot kill the prospects of oil and gas before it has even begun,”
- Transport Minister Fikile Mbalula (January 2022) - the Strategic Fuel Fund would build a \$1.5-billion (R24-billion) onshore regasification plant in Coega in the Eastern Cape. However, his department later said he was still considering their application for port access rights.
- In South Africa, Arcelor-Mittal recently announced that it will likely leapfrog gas and move straight to green hydrogen as a feedstock for its Saldanha steel plant.
- Sasol will no longer consider gas supply from a planned pipeline stretching from fields in northern Mozambique to its South African operations because it doesn't want to get stuck with the infrastructure as the world shifts away from fossil fuels. “Gas in the long term is also a fossil fuel and we said we want to get to net zero,” Sasol CEO Fleetwood Grobler “You need to bridge 10 or 15 years and then you need to go out.”

Questions

1. Eskom have yet to release of RFP for gas sales agreement and for balance of plant (BOP) conversion from diesel to gas for Ankerlig. If combined cycle gas required (i.e. large volumes) to ensure feasibility of gas importation infrastructure, will there still be an opportunity after BOP conversion given age of Ankerlig, gas prices and the acceleration towards green hydrogen?
2. IRP 2019 reduced role of gas from 12GW to 3 GW. There is no GasIPP programme yet despite being first announced in 2012 (10 years ago), however given recent presidential address on energy plan this is now imminent (~October 2022) after battery procurement process (September 2022). Will this go ahead, and if so which port will be identified given 3 ports of Richards Bay (Transnet favoured), Coega (DMRE favoured) and Saldanha Bay (only suitable port in the Western Cape) and/or will it allow Namibian gas to power projects?
3. What should Western Cape Government's role be in upstream oil and gas given that PetroSA Mossgas is major employer in Mossel Bay and Total Energies is committed to development of Brulpadda and Luipard?
4. What should Western Cape Government's role be for gas to power and gas for industrial use, given pressure on exports due to carbon border adjustments and WCG commitments (DEA&DP) to the under 2 coalition (i.e. net zero by 2050?)

Thank you