REPUBLIC OF SOUTH AFRICA

Oceans Lab – Offshore Oil and Gas Exploration A1 Workstream:

Phased Gas Pipeline Network

Strategic Environmental Assessment

Focus Groups and Public Meetings

1-13 November 2017, Neville Ephraim & Thabani Dlamini

Gas Transmission Pipelines

Gas Act

• Pressure >15 bar	Transmission	Main trunk line
• 2 bar < Pressure = or < 15 bar	Distribution	Branch Lines to industrial areas & reticulation offtake points
• Pressure = or < 2 bar	Reticulation	To homes and small industry

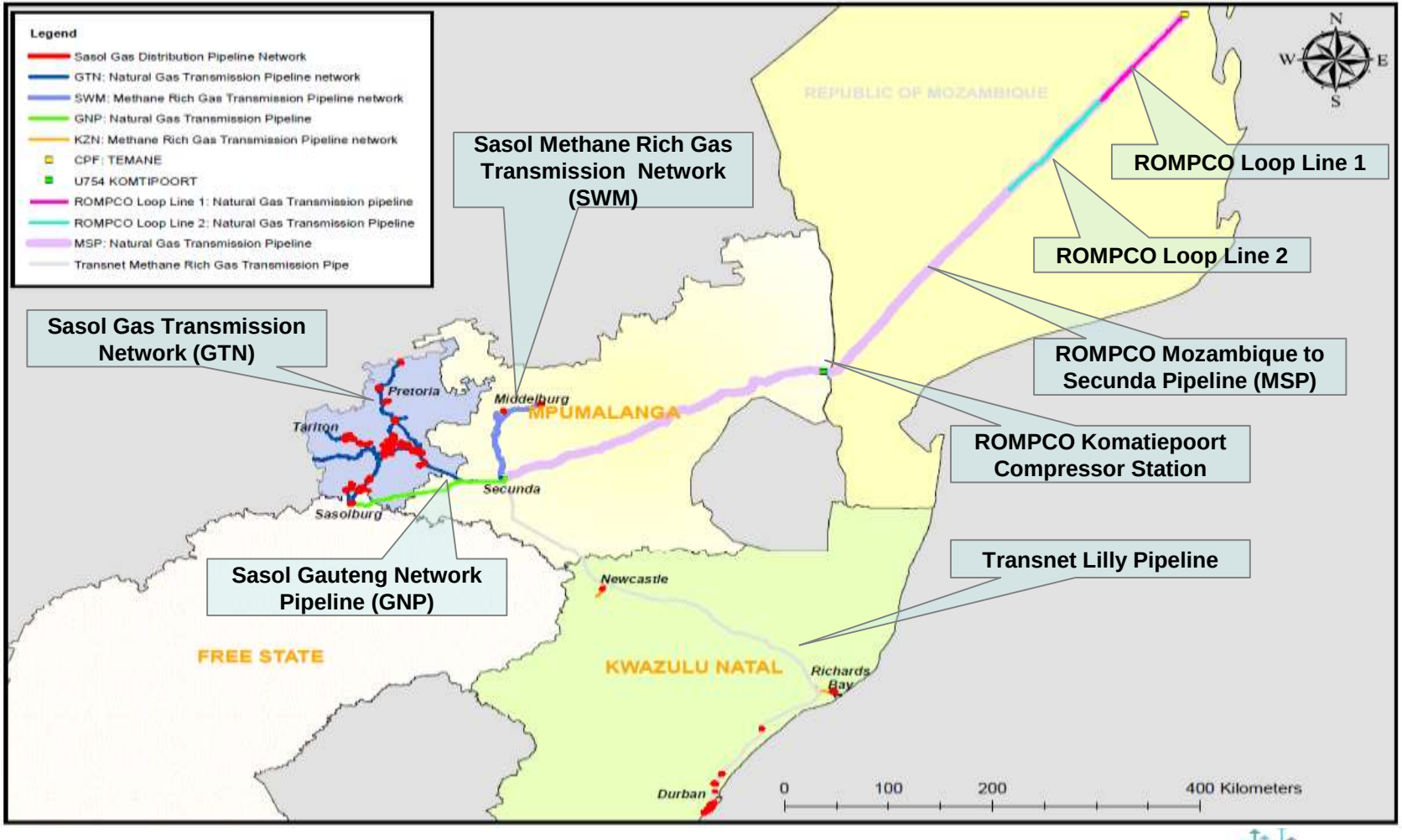
Pressures compared to a full LPG Tank at room temperature (27ºC)

- LPG pressures depend on the ratio or mixture of Propane to Butane
- 100% Propane 7.0 bar
- 50/50 Propane/Butane 3.9 bar
- 100% Butane 0.8 bar

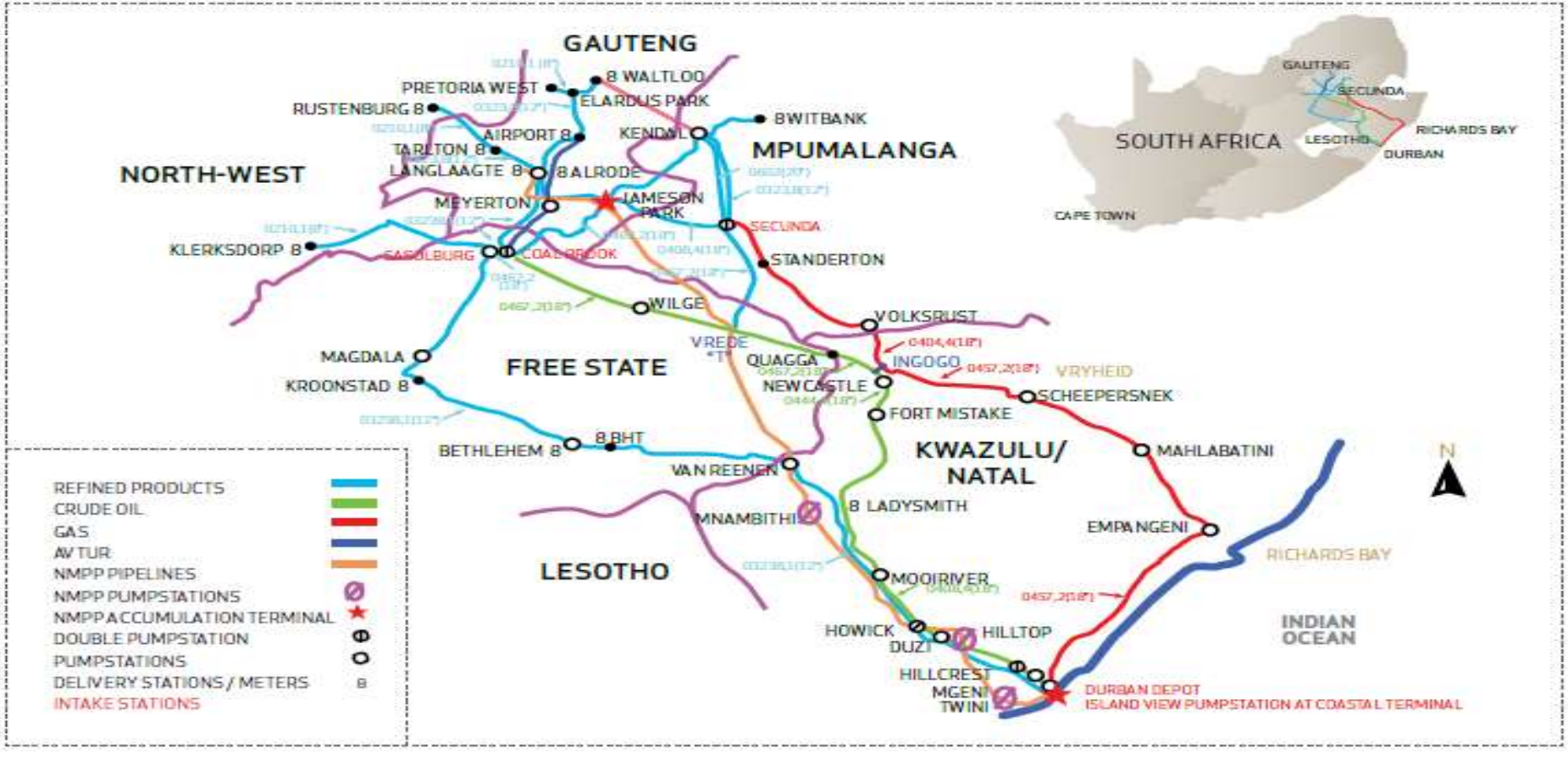
Typical Dimensions e.g. Rompco Mozambique to Secunda (MSP)

- Length 865 km
- Diameter 26” 660 mm
- Wall Thickness 10 – 17 mm depending on proximity to human settlements

Existing Gas Pipelines in South Africa



Existing Transnet Liquid Pipelines Network in South Africa



- Also, Chevron crude oil pipeline from Saldanha to Milnerton

Pipelines Industry

- Existing, well established industry in South Africa
- 1000’s of kilometres of both oil and gas pipelines in South Africa
- North America, Europe and Asia have 10’s of 1000’s of kilometres of pipelines
- South America and Australia are building their networks
- Most economical mode of transport overland
  - “Virtual pipelines” may start with trucking or rail
  - Then expand to pipelines as the market grows and volumes increases

- All pipelines are buried, except where they come above ground at Pigging Stations
- Top of pipe is typically 1m below the ground level
- For Rompco these stations are ~130km apart
- New technology may allow that to increase to 250km and possibly 500km

Pipelines Safety Considerations

Regulations:

- Piped Gas Regulations of 2007
- Occupational Safety and Health Act
- National Environmental Management Act, etc

Design and Engineering Best Practices and Standards:

- ASME B31.3 – Process Piping
- ASME B31.4 – Pipeline Transportation Systems for Liquids and Slurries
- ASME B31.8 – Gas Transmission and Distribution Piping Systems
- API Standard 1104 – Pipeline Designs

Welding and Coating Standards – check by AIA

Gas Pipeline Developers/Operators also:

- Have to clearly identify the pipeline in the ground with markers
- Markers are to be visible with clear contact numbers in case of emergencies
- Have programs to educate communities in respecting and handling properly of piped gas and gas infrastructure just like other forms of energy
- Have extensive training of workforce personnel and have monitoring room
- Have maintenance plans which include onsite visual inspections
- Have a well thought Emergency Preparedness Plans and Community alerting systems in case of emergencies

The Phased Gas Pipeline Network emerged as an Infrastructure Requirement from Operation Phakisa's Oceans Lab

South Africa should …

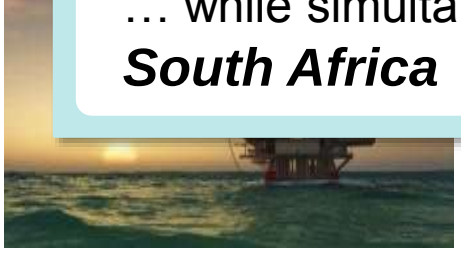
OIL AND GAS LAB VISION

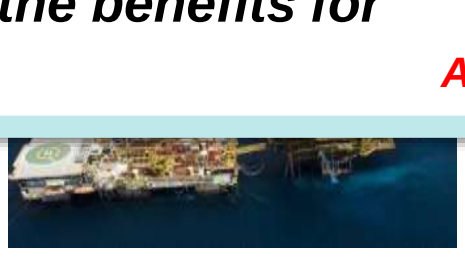
… create an environment that ***promotes exploration*** …

… in order to ***drill 30 exploration wells*** in the next 10 years …

… while simultaneously ***maximising the benefits for South Africa***

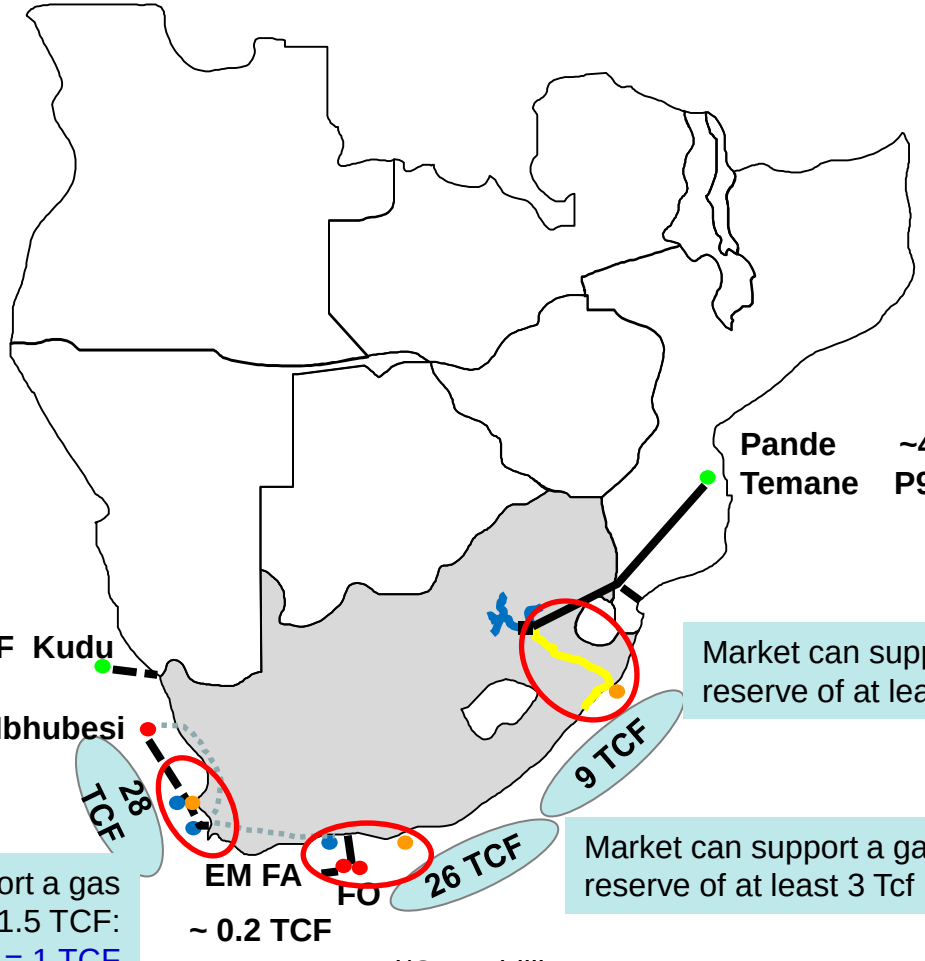
August 2014








State of Gas Exploration, Usage & Planning in South Africa (August 2014)



Market can support a gas reserve of at least 3.1 Tcf

IPP = 1.0 TCF
Avon = 0.6 TCF
Durban & Gauteng = 1.5 TCF

Market can support a gas reserve of at least 3 Tcf

PetroSA GTLR = 1.0 TCF
Gourikwa = 0.7 TCF
Dedisa (IPP) = 0.3 TCF
Baseload IPP = 1.0 TCF

Market can support a gas reserve of at least 1.5 TCF:
Ankerlig = 1 TCF
IPP = 0.5 TCF

Changing Economic Environment

2014

- Uncertainty around the MPRDA to be addressed by the F1 Workgroup
- $100 / bbl – $110 / bbl brent oil price
- Oil price supported exploration for oil and gas
- Phased Gas Pipeline Network (PGPN) required to take offshore gas to market

2017

- Uncertainty around the MPRDA remains
- $50 / bbl – $60 / bbl oil price *may not* encourage *production* for oil and gas, however does not invalidate advancement of exploration activities
- **Feedback from the Africa Oil Week (23-27 Oct '17)**
  - Indications are that oil price will remain lower for longer
  - Companies are reassessing exploration costs and realising between 20% and 40% efficiencies
  - Proceeding with exploration, possibly production on large finds; marginal fields will remain uneconomical
- PGPN is no longer ***only*** driven by offshore gas discoveries

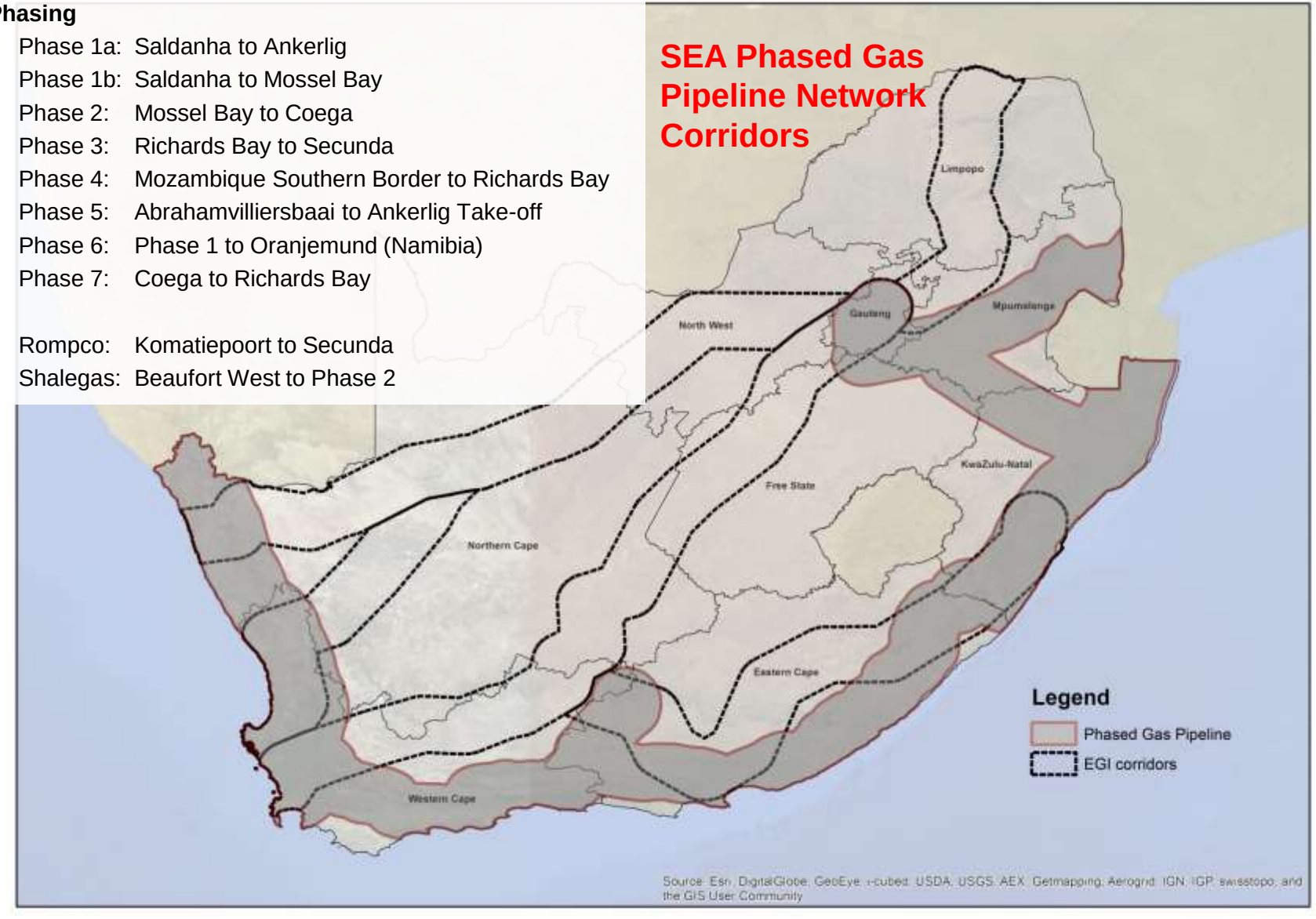
Other Drivers

- PGPN driven by imported LNG (via the LNG to Power Program)
- Shale Gas developments in the Karoo Region
- Imported Gas from Mozambique

Phasing

- Phase 1a: Saldanha to Ankerlig
- Phase 1b: Saldanha to Mossel Bay
- Phase 2: Mossel Bay to Coega
- Phase 3: Richards Bay to Secunda
- Phase 4: Mozambique Southern Border to Richards Bay
- Phase 5: Abrahamvilliersbaai to Ankerlig Take-off
- Phase 6: Phase 1 to Oranjemund (Namibia)
- Phase 7: Coega to Richards Bay

- Rompco: Komatiepoort to Secunda
- Shalegas: Beaufort West to Phase 2



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