

An Overview of South Africa's Oil & Gas landscape



David van der Spuy
WECP 31 October 2016

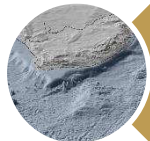
OUTLINE



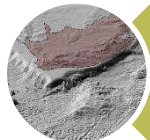
Mandate, vision and mission and the role of PASA



History and current situation



Offshore exploration activities



Onshore exploration activities

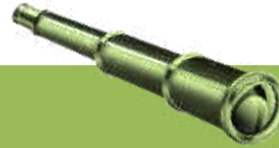


Way forward and conclusions



MANDATE

Mineral and
Petroleum Resources
Development Act
(2002)



VISION

A viable,
sustainable and
responsible
upstream industry
in South Africa.



MISSION

To promote,
facilitate and
regulate exploration
and sustainable
development of oil
and gas in South
Africa.

REGULATORY FRAMEWORK: Role of PASA

**Promotion and
Adding Value
to G&G Data**

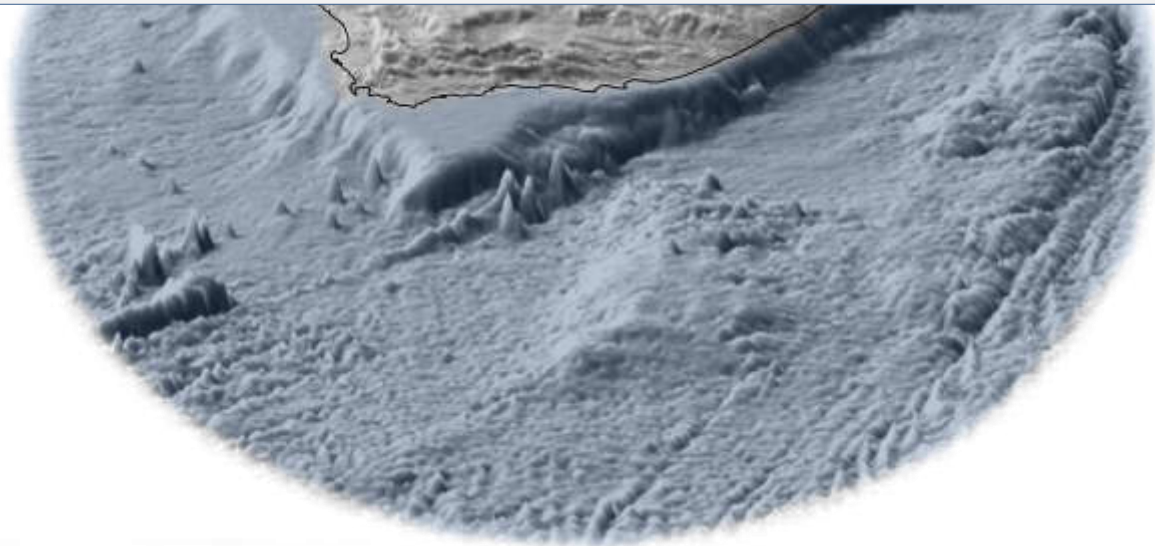
Chapter 6 of the MPRDA

**Regulation of
oil and gas
exploration and
production**

**Archiving all
Petroleum
Related data**



HISTORY OF OIL AND GAS EXPLORATION AND CURRENT STATUS



HISTORY OF EXPLORATION & PRODUCTION IN SA

First organised search for hydrocarbons

Geological Survey of South Africa

1940's

Mining Rights Act - 1967

Offshore concessions granted to number of international explorers

1960's

Soekor (with Rand Mines) extend to offshore

Sole explorer due to political sanctions

1970-1980

Petroleum Agency SA 1999 and PetroSA 2001 (Merger of Soekor and Mossgas)

1990

2000

Soekor (Formed by government) in 1965- onshore Karoo, Algoa and Zululand Basins

First offshore well in Pletmos basin - 1969 by Superior - Discovery of gas and condensate

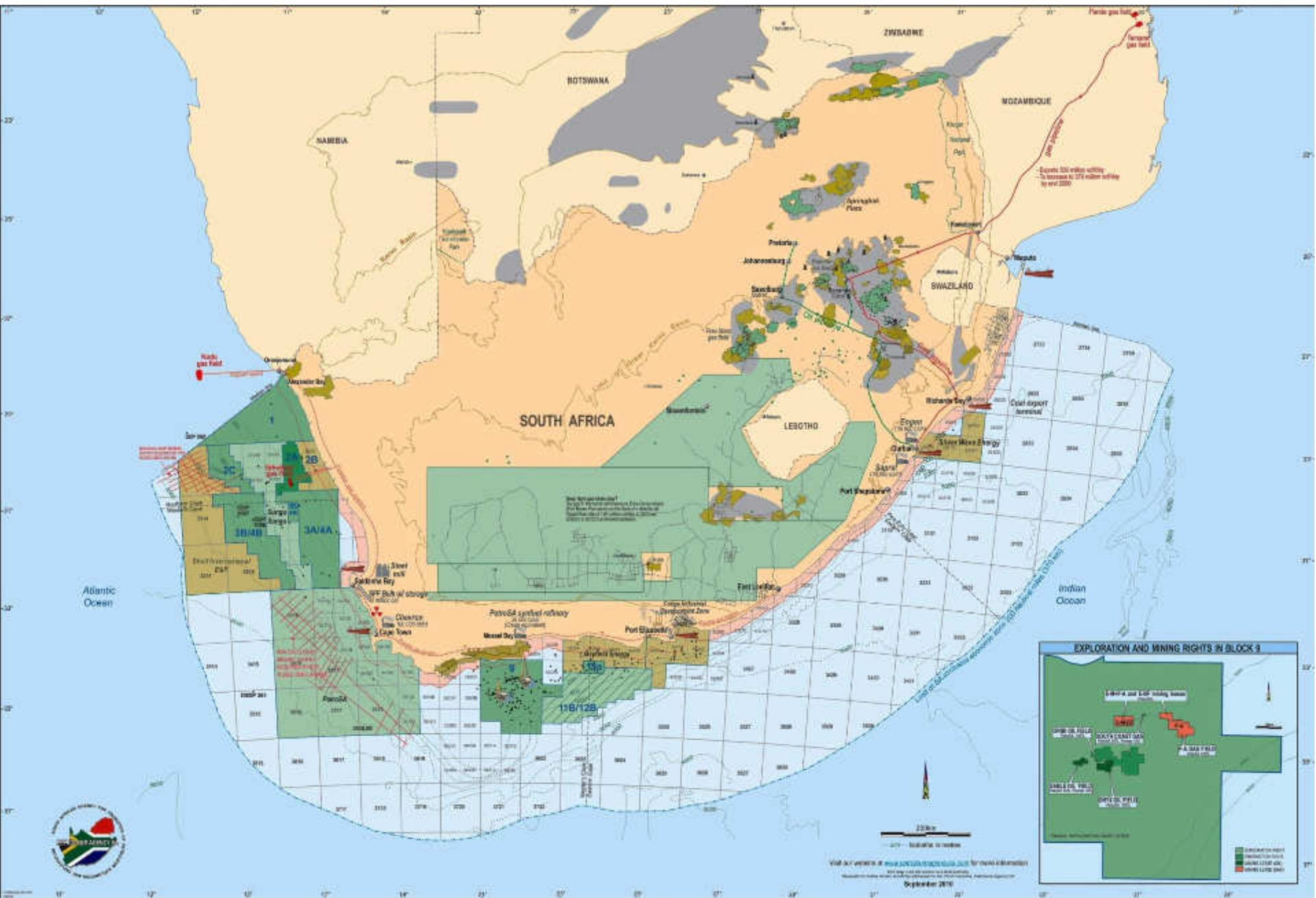
Licensing Round held in 1994- Offshore areas open to international investors

Mineral and Petroleum Resources Development Act passed- 2002 operational 2004

Exploration drilling was most active from 1981 to 1991 during which some 181 exploration wells were drilled. The Bredasdorp Basin has been the focus of most seismic and drilling activity since 1980.

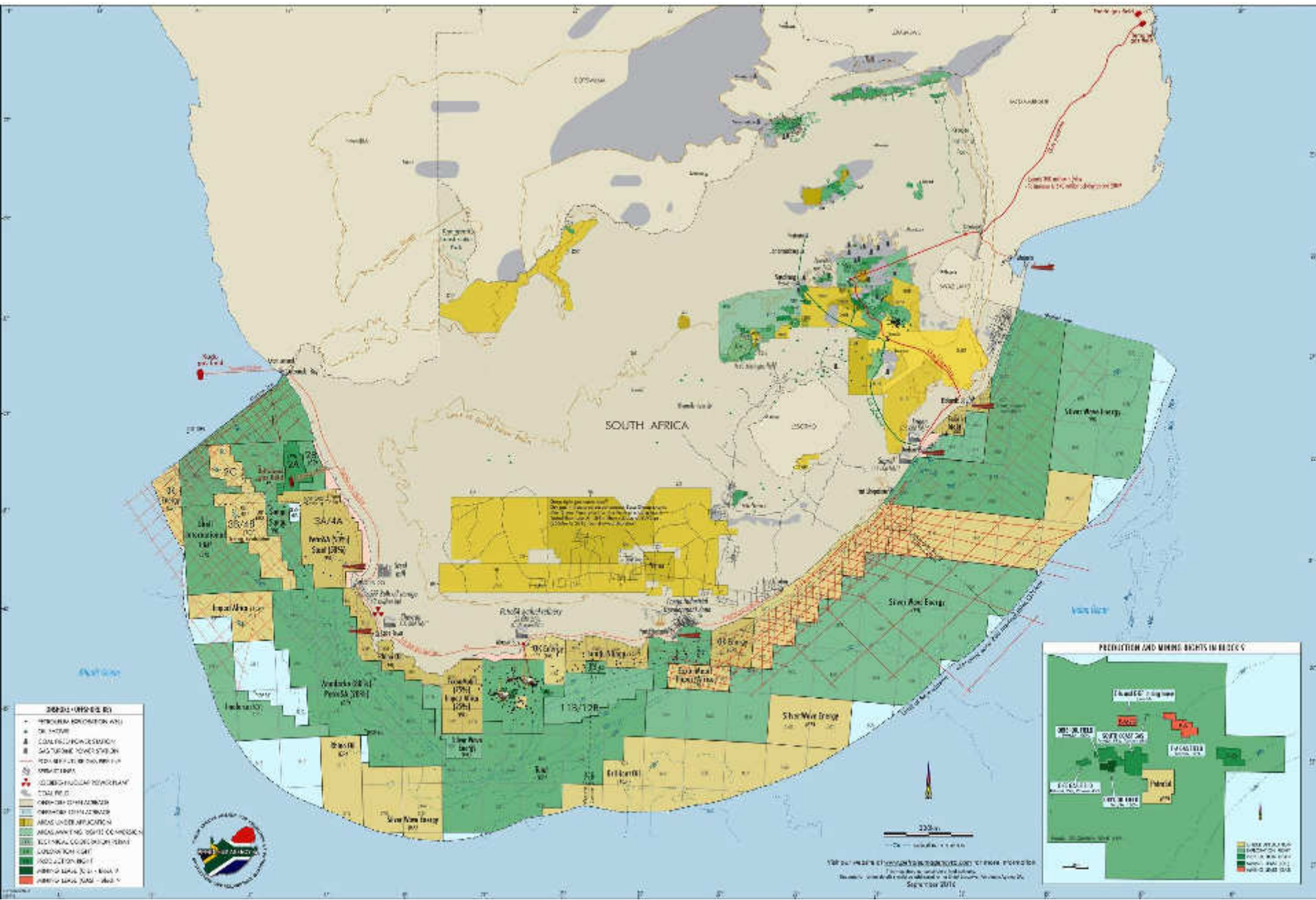


EXPLORATION MAP 6 YEARS AGO



Visit our website at www.sasol.com for more information.
 SASOL is a registered company in South Africa.
 September 2010

EXPLORATION MAP CURRENTLY



THE SOUTH AFRICAN GEOLOGICAL SURVEY
 FORMERLY THE GEOLOGICAL SURVEY OF SOUTH AFRICA
 PRESENTS THIS MAP AS A SERVICE TO THE MINING INDUSTRY
 SEPTEMBER 2012



ExxonMobil



TOTAL

PetroSA

CNR International



CROWN ENERGY



SUNBIRD ENERGY LTD



THOMBO petroleum



SASOL reaching new frontiers



Rhino Resources Ltd.



CONSTRAINTS ON INVESTMENT - WILL EXPLORERS LEAVE?

Extended dramatic slump in oil price

Uncertainty - amendments to MPRDA

Hydraulic fracturing – environmental concerns

Is ultra-deep water viable exploration under these circumstances?

BHPBilliton relinquished their block – will others follow?

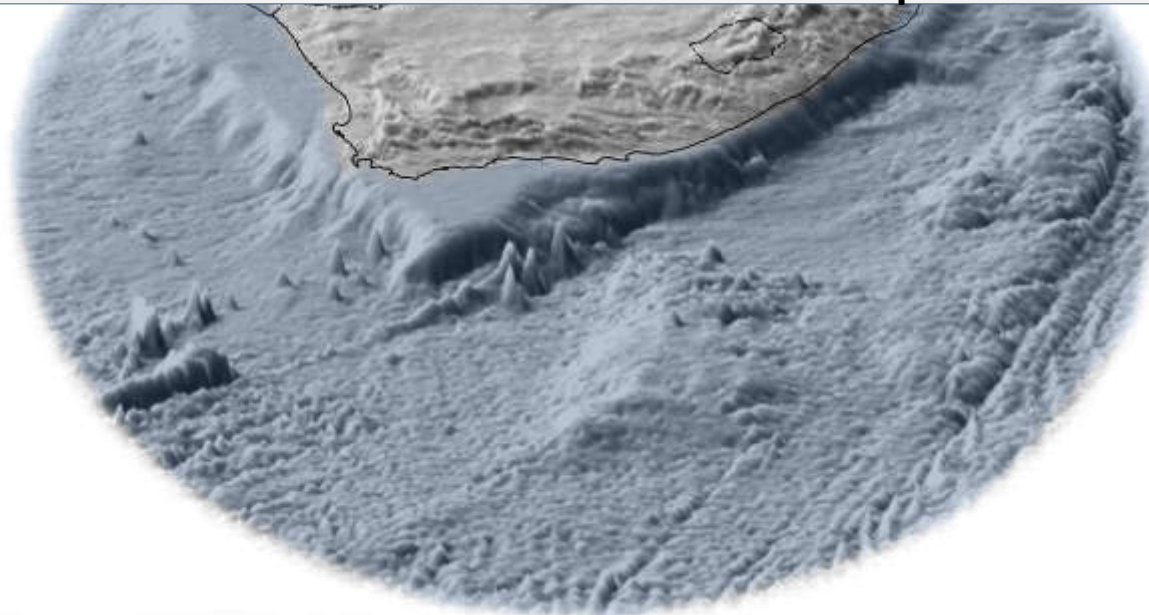
New entrants – West Coast

New applications over BHPB block



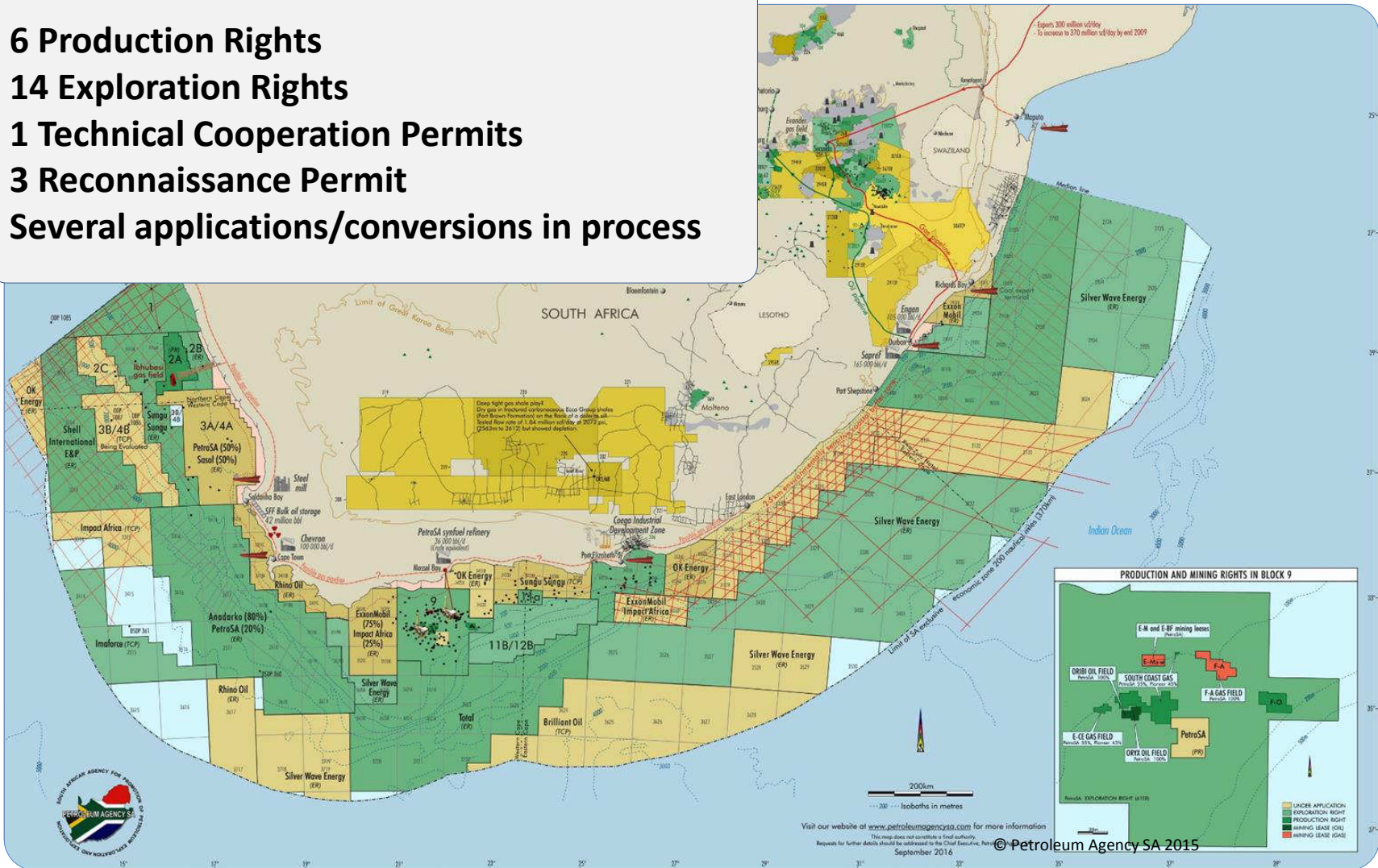
CONVENTIONAL RESOURCES: OFFSHORE

Recent activities and developments



CURRENT OFFSHORE ACTIVITY

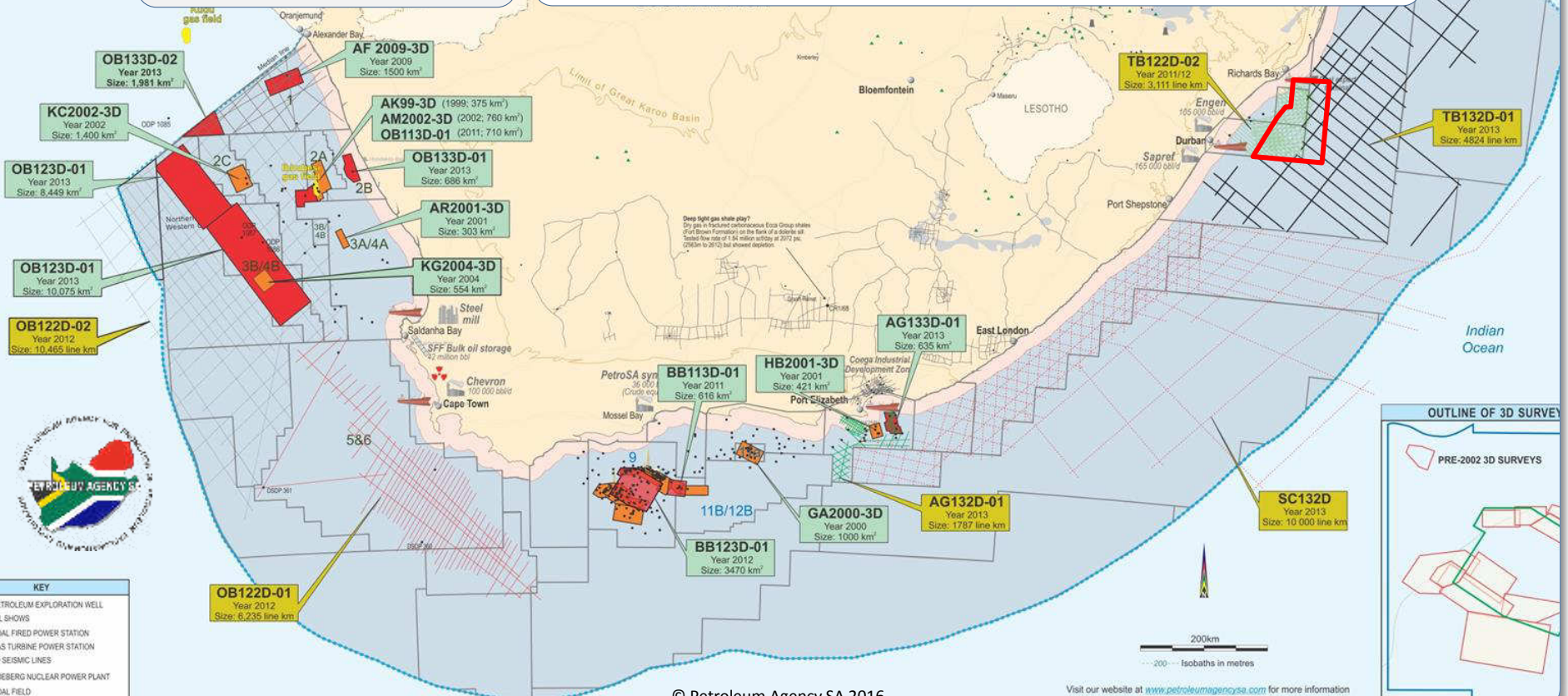
- 6 Production Rights**
- 14 Exploration Rights**
- 1 Technical Cooperation Permits**
- 3 Reconnaissance Permits**
- Several applications/conversions in process**



2013 - 2016 EXPLORATION ACTIVITY

3D SURVEYS
>25 000 km²

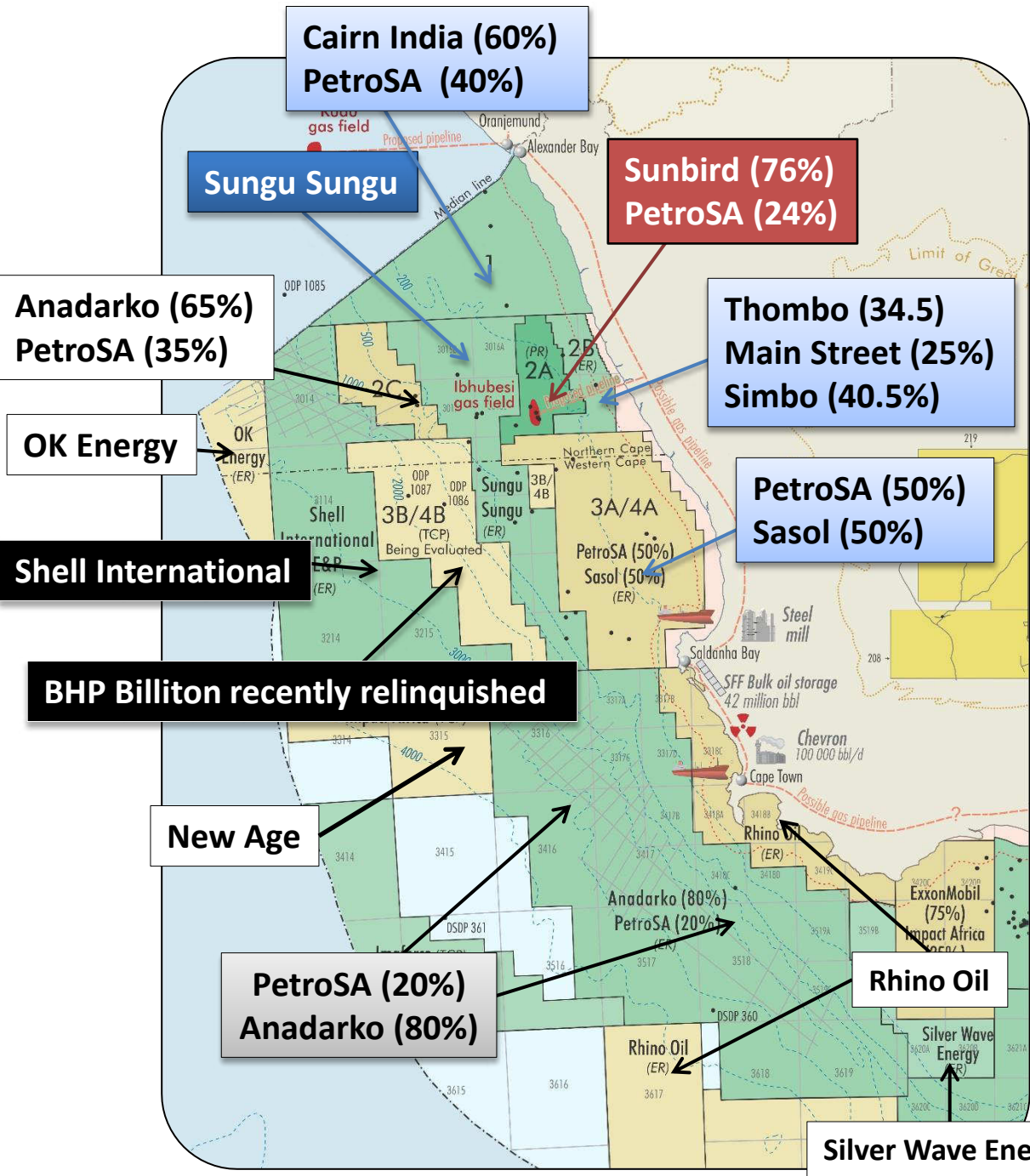
2D SURVEYS
>50 600 km



WEST COAST

Rights and major operators

- **Shallow-water** – Cairn India, PetroSA, Thombo, Simbo, High Street, Sasol
- Sunbird - **Production right** around Ibhubesi
- **Mid-Basin** – Sungu Sungu
- **Deep-water** – Shell
- **Southern basin** – Anadarko and PetroSA



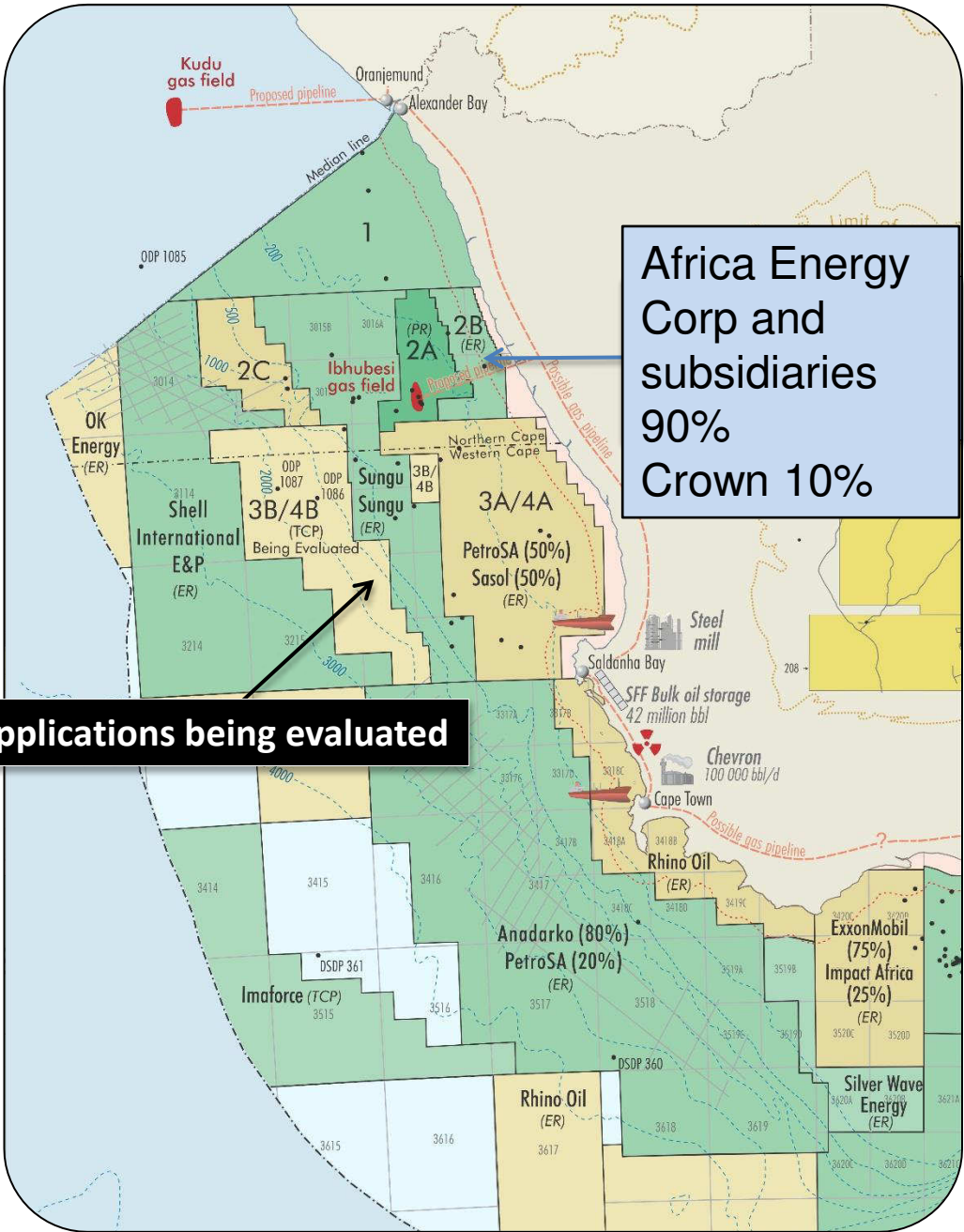
WEST COAST

Recent changes

- AEC takes over block 2B
- BHPBilliton relinquish deep water block, but Agency immediately received new TCP applications

New applications being evaluated

Africa Energy Corp and subsidiaries
90%
Crown 10%



IBHUBESI GAS PROJECT

 SUNBIRD ENERGY = 76%

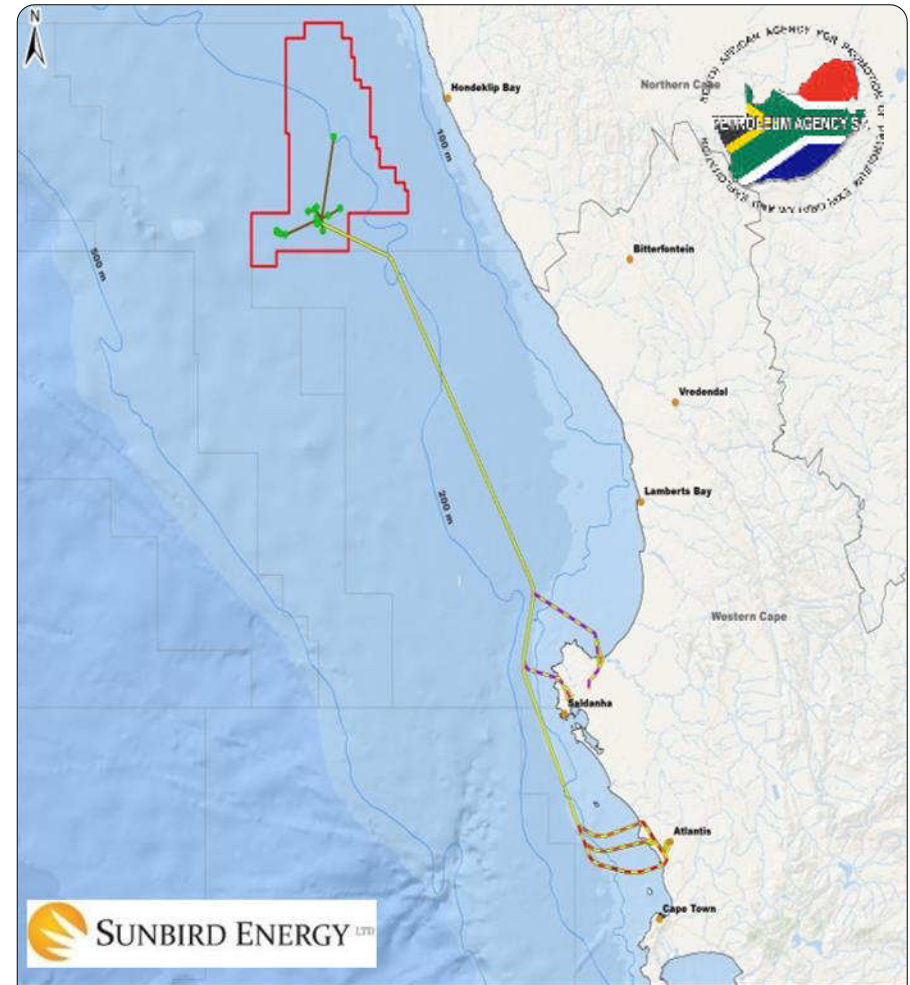
 24%

License Summary:

- Production right (Sunbird & PetroSA)
- ±5 000 km² in extent, 60 km offshore
- Water depth 200m - 250m
- ±400 km north of Cape Town
- Largest undeveloped field (540 Bcf proven 2P reserves)
- 11 wells drilled, 7 gas discoveries
- Covers ±1770 km² 3D and multiple 2D seismic data

Ankerlig:

- Currently operating on diesel (expensive and inefficient)
- Ankerlig to be converted from diesel to gas operated via the IGP – **currently underway**
- MOU and GSA term sheet signed between Sunbird and Eskom – investigate the feasibility to supply gas from Ibhubesi



IGP DEVELOPMENT PLAN



The plan:

- Sales and delivery point at Ankerlig
- **First gas deliveries 2019**
- 2P reserves → ± 15 year Production Period
- Additional line into Saldanha for power generation and industrial supply

The concept:

- Production drilling - Initial 7 wells plus further 7 wells in phase 2
- Subsea Infrastructure
- Offshore Processing Facility
- Export Pipeline – 400 km offshore and 15 km onshore
- Small onshore gas receiving and metering station

Offshore production facility:

Two options considered for the Production Facility



Floating Production Storage Offload Vessel (FPSO)



Semi-submersible Production Platform



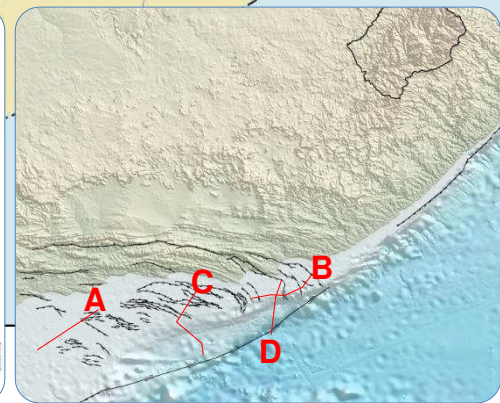
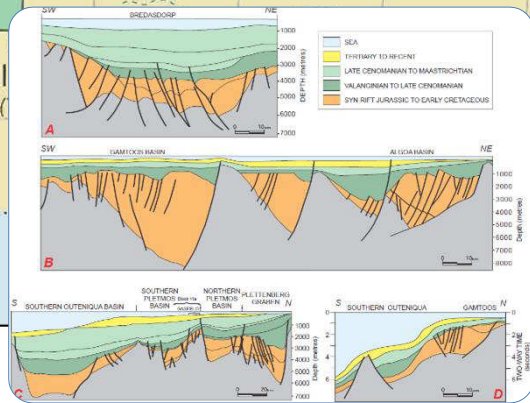
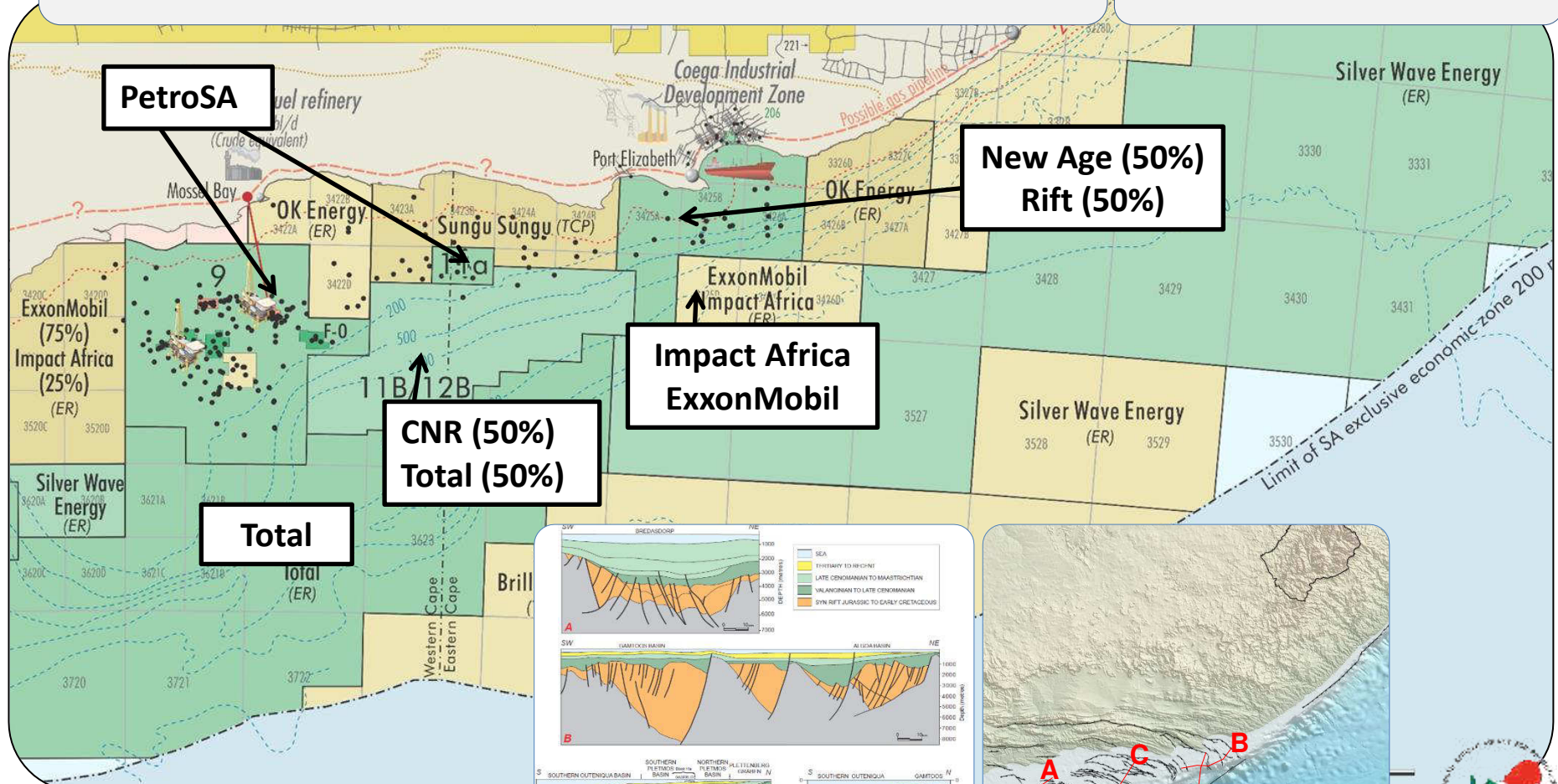
GREATER OUTENIQUA BASIN

Bredasdorp, Pletmos, Gamtoos, Algoa and Southern Outeniqua sub-basins

PetroSA, NewAge with Rift Petroleum, ExxonMobil with Impact, Sungu Sungu and OK Energy in shallower waters.

Total, CNR, Silverwave and Brilliant Oil in the deep water

SOUTH COAST



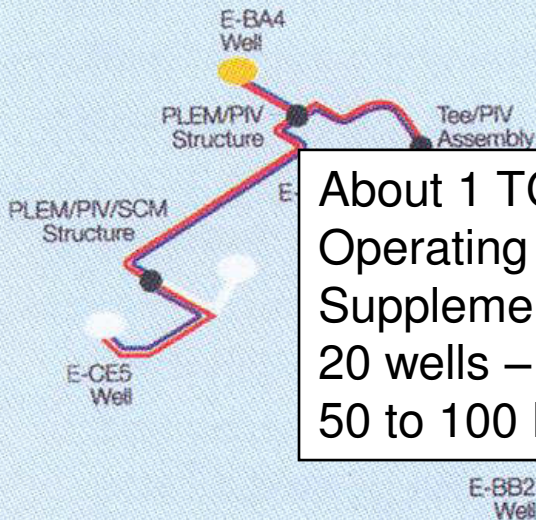
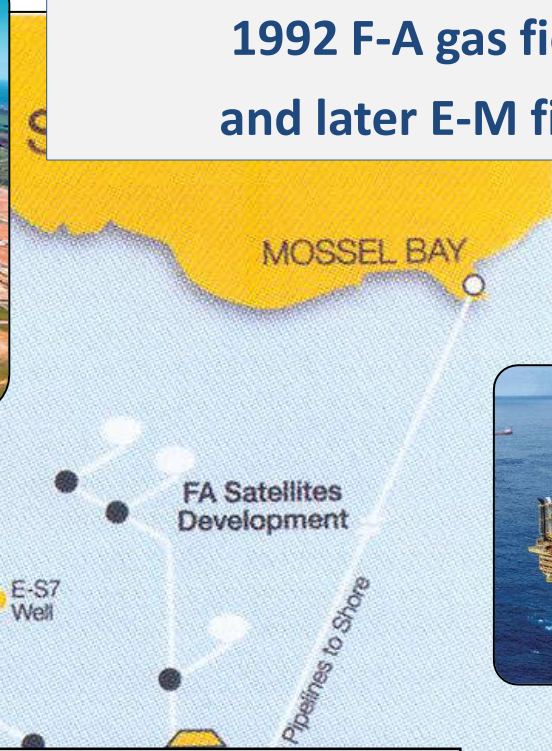
SOUTH COAST GAS PIPED TO GTL PLANT



Petrol
Diesel
Kerosene
LPG
Distillates
Fuel oil



1992 F-A gas field
and later E-M field



About 1 TCF
Operating for over 20 years 195MMscf/day
Supplemented through E-M and South Coast Gas
20 wells – 70MMscf/d single train
50 to 100 Bscf remains

— Production/MEG Pipeline
— Control/Chemical Injection Umbilical



SOUTH COAST OIL PRODUCTION

1997 – Oribi field

2000 – Oryx field

**Sable oil field: 2003 -
2008**

25 000 to 28 000 bbl/d

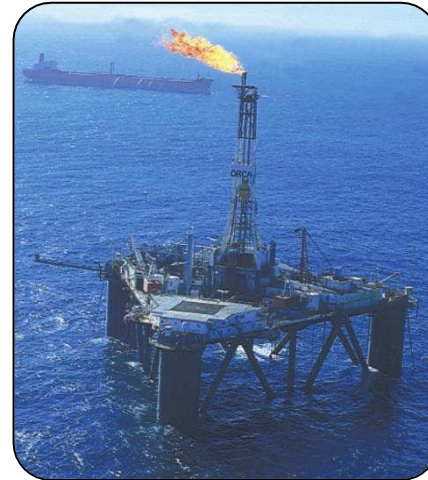
25 million bbl reserves

Original partners in Sable:

PetroSA 55 %

Pioneer 45 %

Now producing gas



SOUTH COAST DEEPWATER DRILLING



Total's Brulpadda-1AX well in Block 11B/12B was spudded on 21 July 2014

The well was drilled to 1835m (~500m below mud line)

Suspended on 27 September

Work programme renegotiated to continue drilling in 2016/17



Block 9 – PetroSA F-O gas field Project Ikhwezi

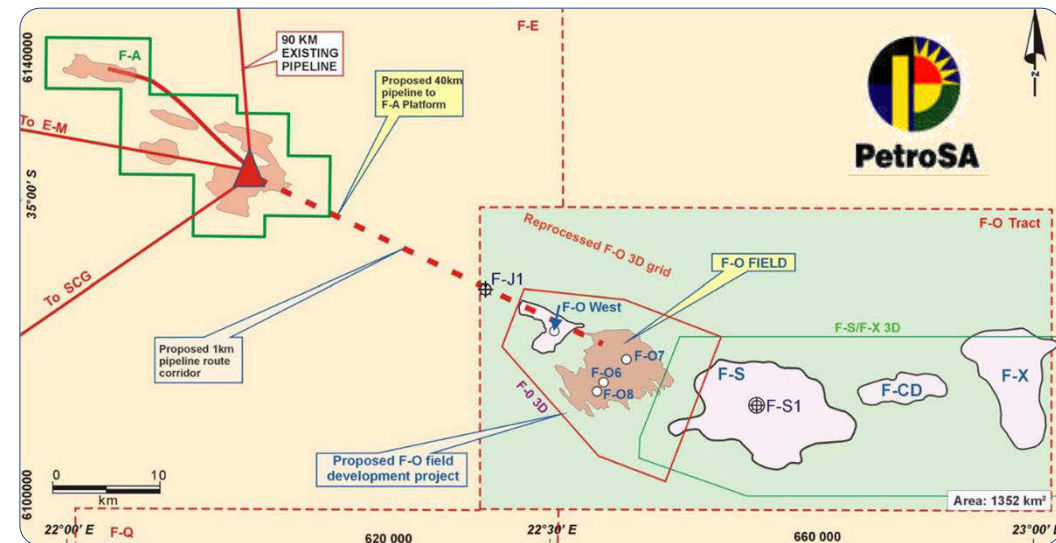
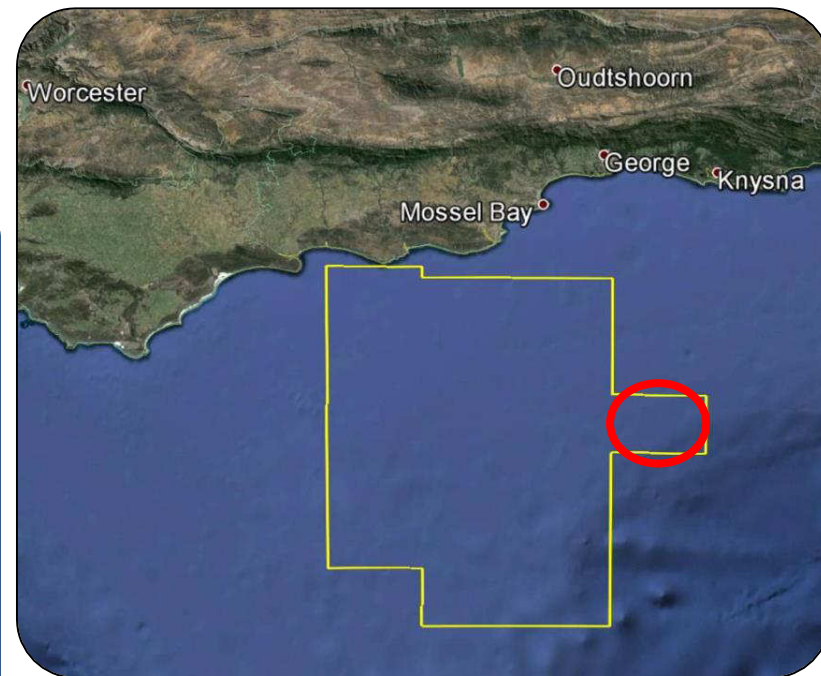
110km offshore, 40 km SE of F-A

**4 wells drilled, 3 tied back and
producing to feed GTL plant**

SOUTH COAST

F-O Gas Field

*Produced 26Bscf to date – remaining
possible from wells 30Bscf
P50 800Bscf GIIP*



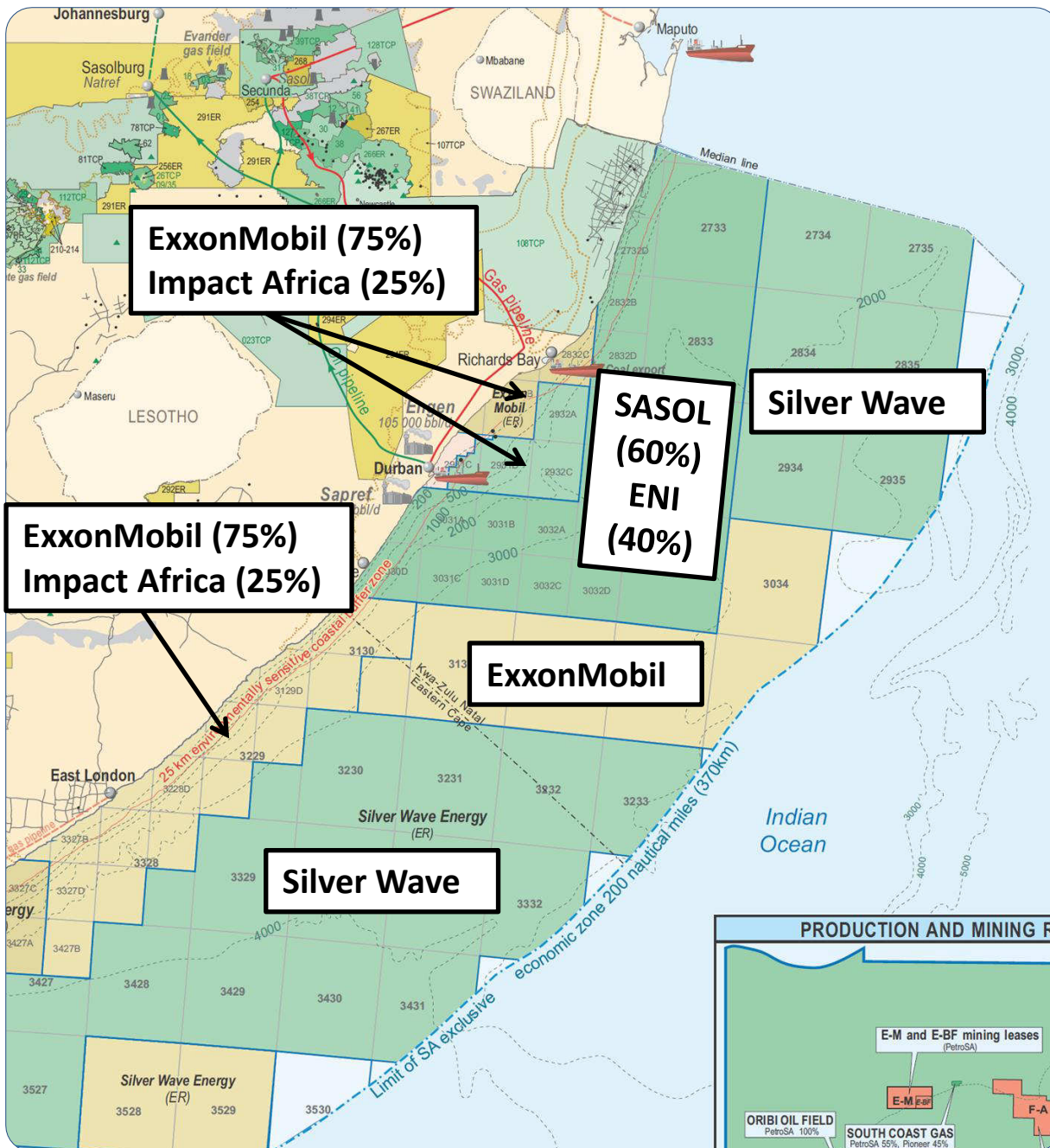
EAST COAST

Rights and major operators

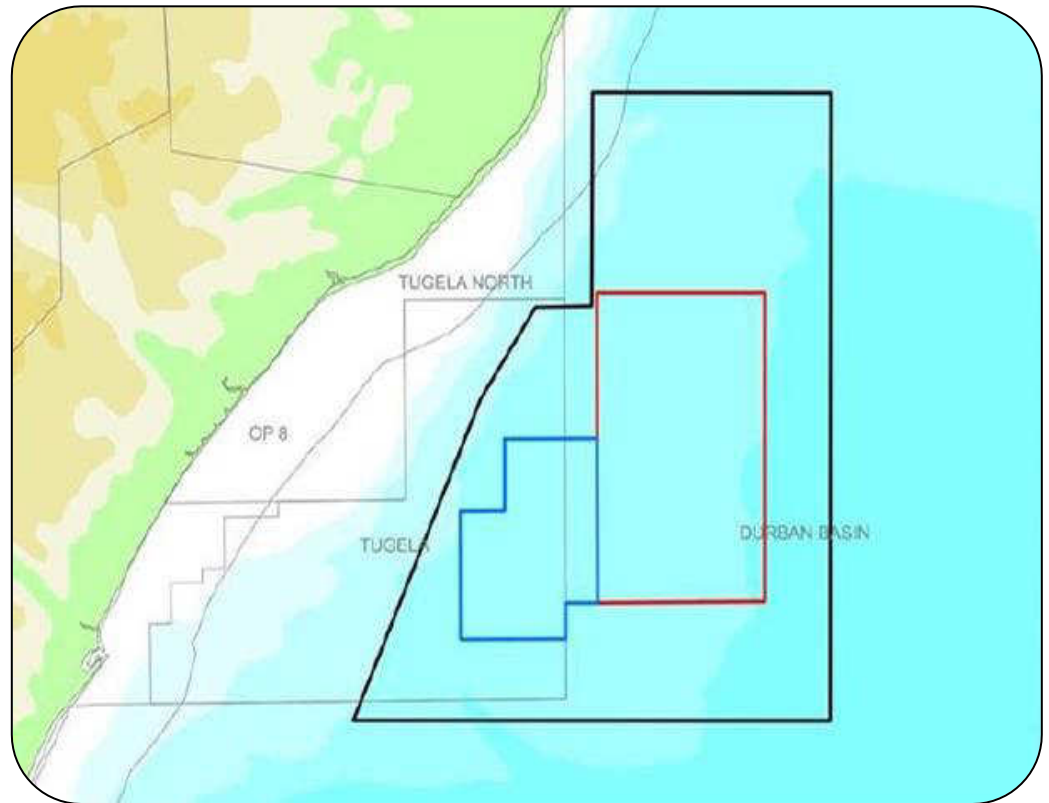
Shallower water –
ExxonMobil and Impact - 2 ERs

Sasol and ENI – ER in **deep water**

Silver Wave and ExxonMobil in the **ultra deep water**

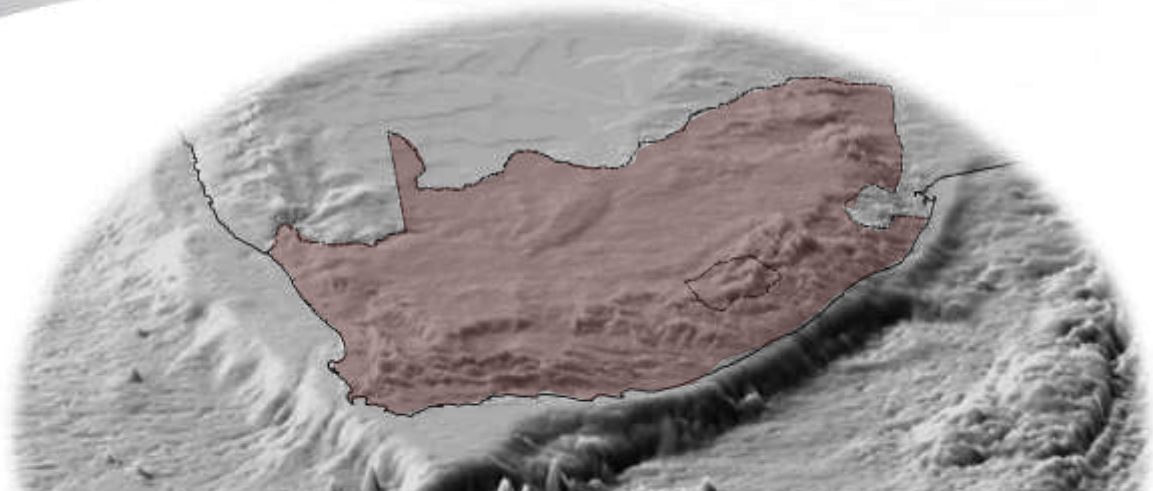


- Schlumberger multi-client 3D survey completed
- mostly over the Eni-Sasol and ExxonMobil blocks
- 4000 km²
- 800 to 2500m depths
- February 2016
- August 2016



WG Magellan





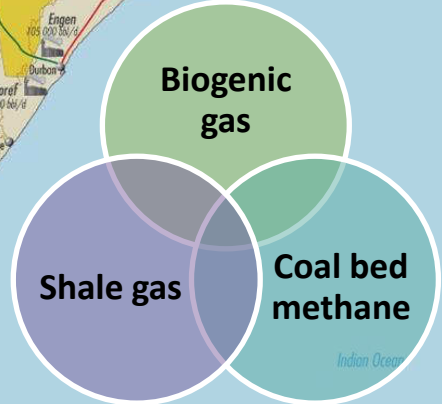
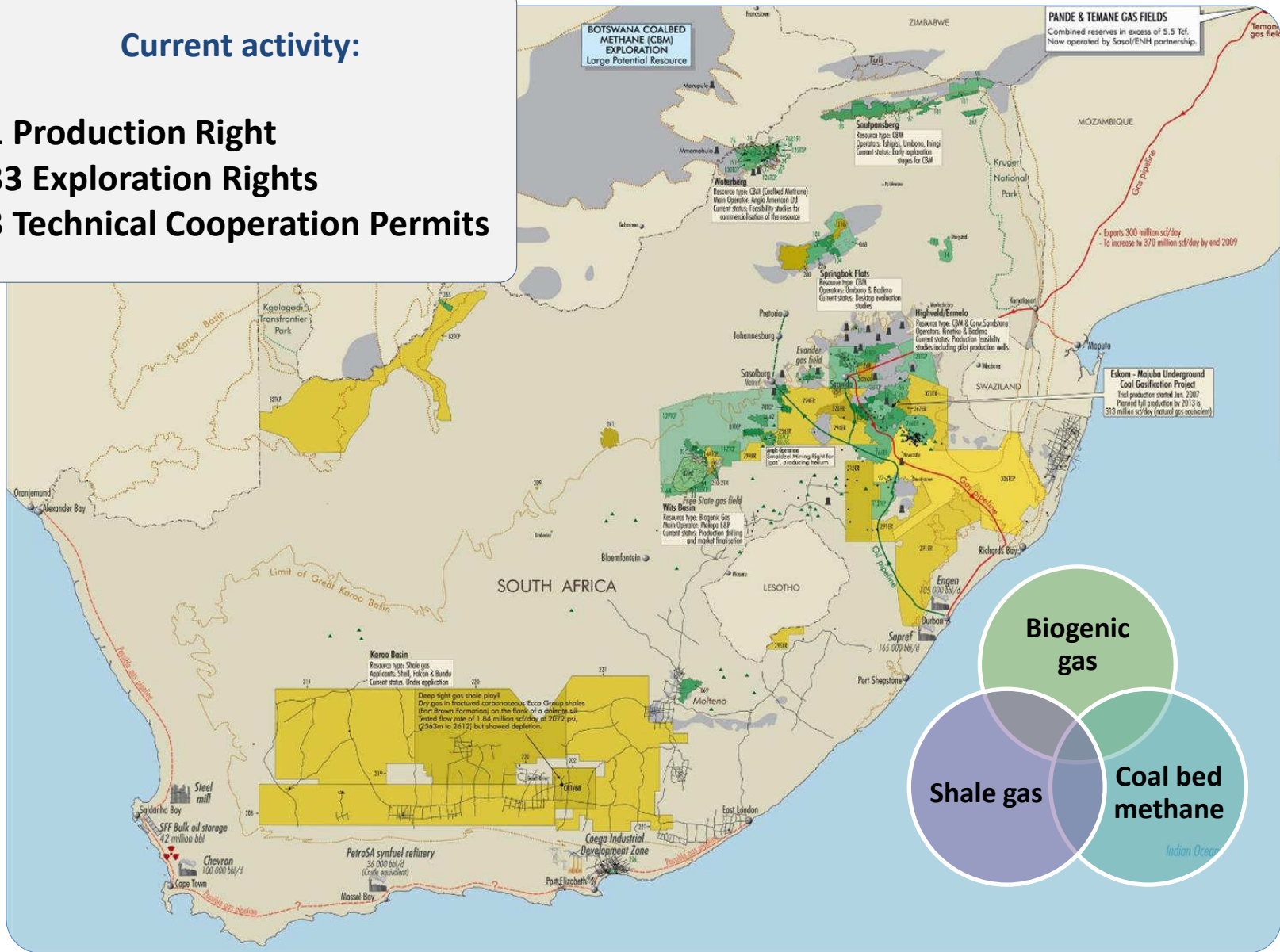
UNCONVENTIONAL RESOURCES: ONSHORE

Recent activities and developments

CURRENT ONSHORE ACTIVITY

Current activity:

- 1 Production Right
- 33 Exploration Rights
- 3 Technical Cooperation Permits

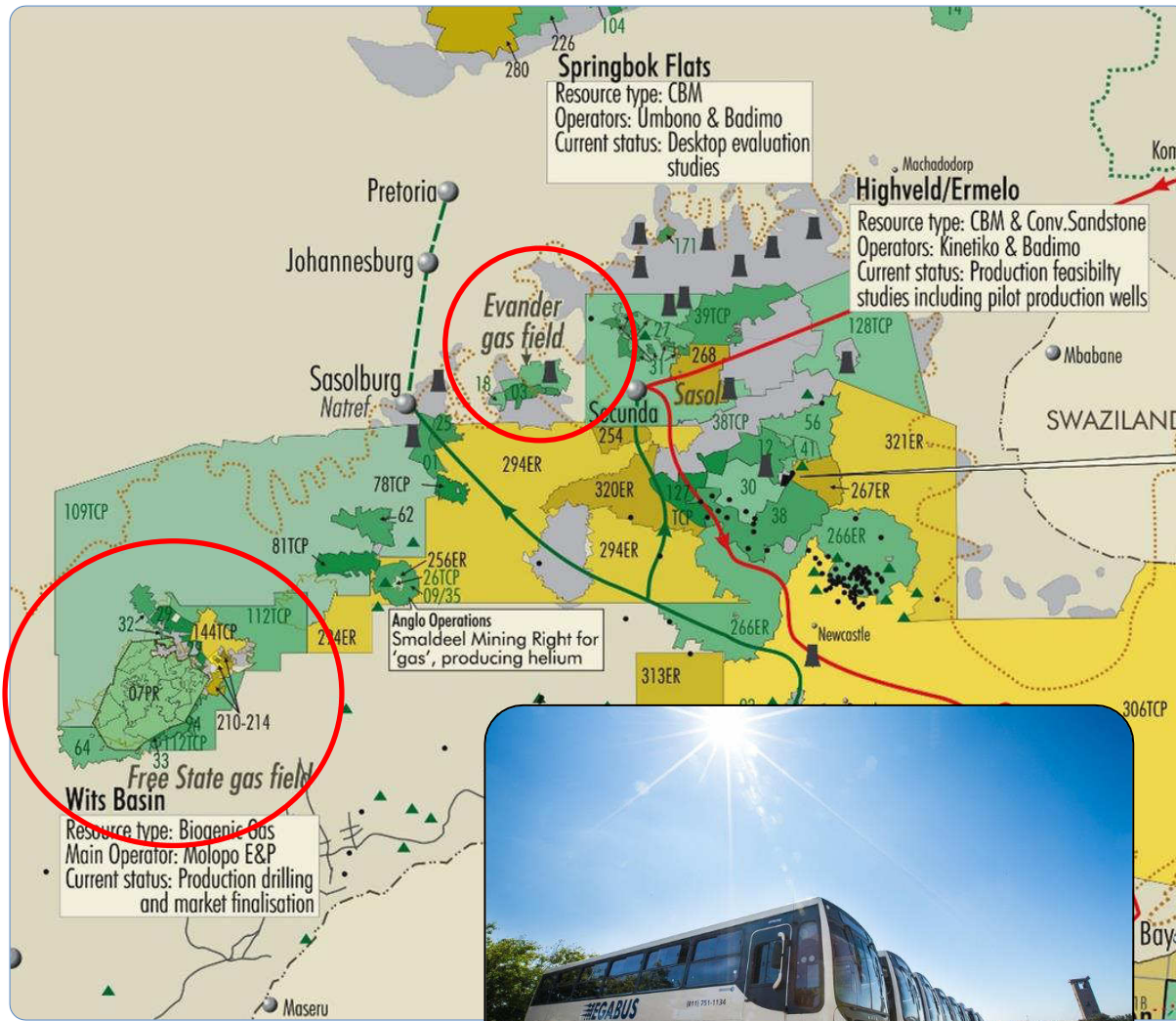


BIOGENIC GAS

RENERGEN



TETRA4



Biogenic gas exploitation –
Renergen's **TETRA4**
Compressed natural gas used
to power Megabus local
service

First onshore natural gas
Production Right awarded in
September 2012

*1 well producing to plant – 11
further wells to be connected*

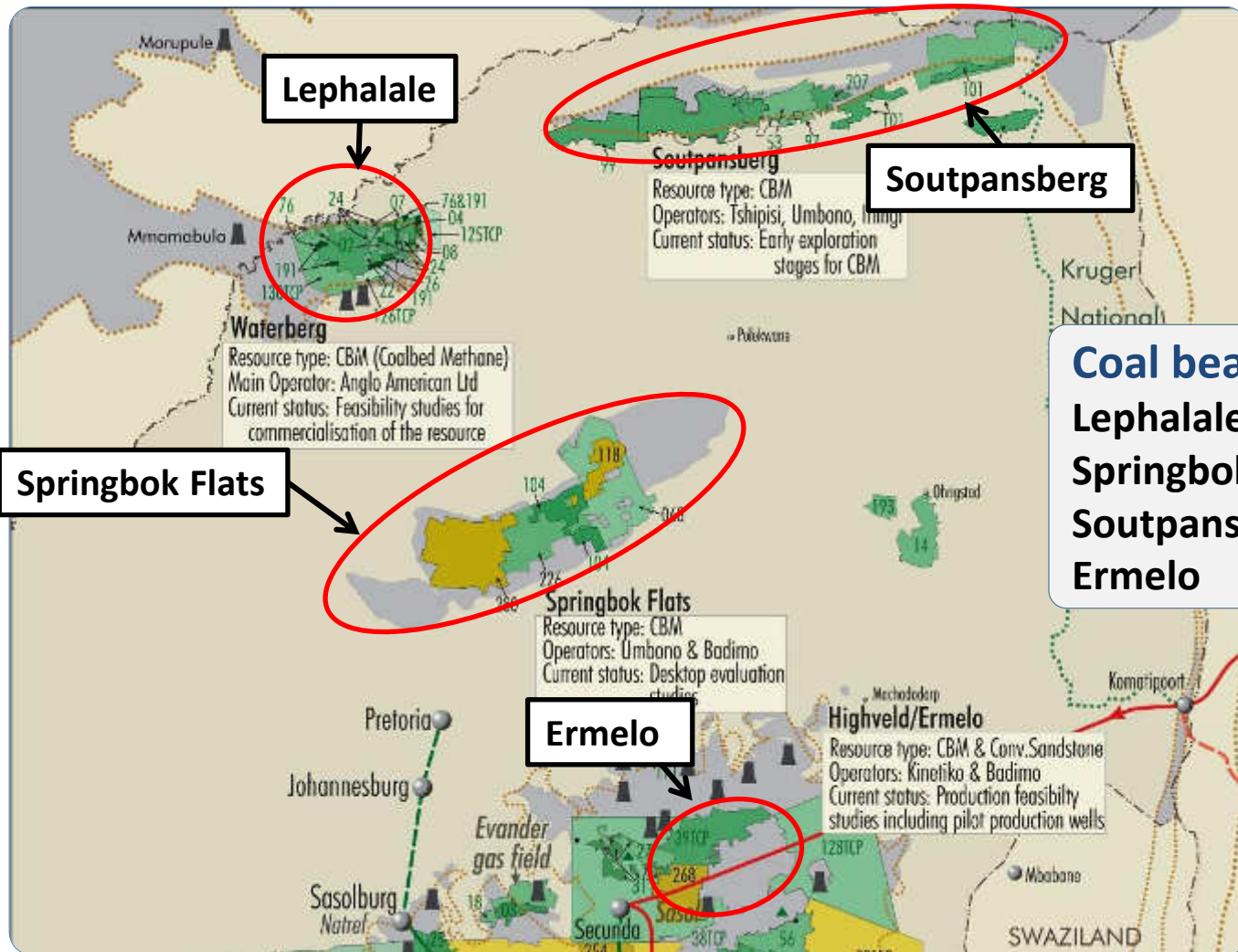
Assets in Virginia in the Free
State and Evander, south east
of JHB.

Virginia 2P 101 Bcf

*Power generation?
Further drilling next year*



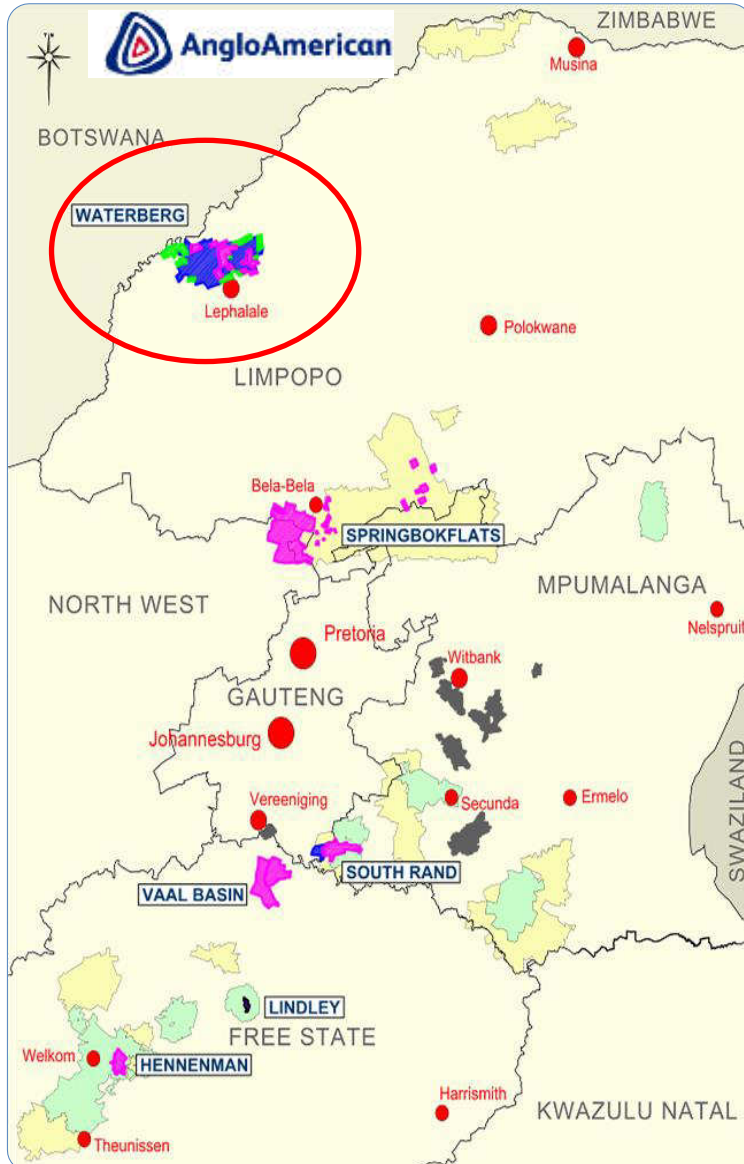
COALBED METHANE



Coal bearing basins
Lephalale
Springbok Flats
Soutpansberg
Ermelo



COALBED METHANE



Lephalale CBM Project

Waterberg Coalfield - Grootvlei

More than 80 core holes drilled

Single 5-spot production test

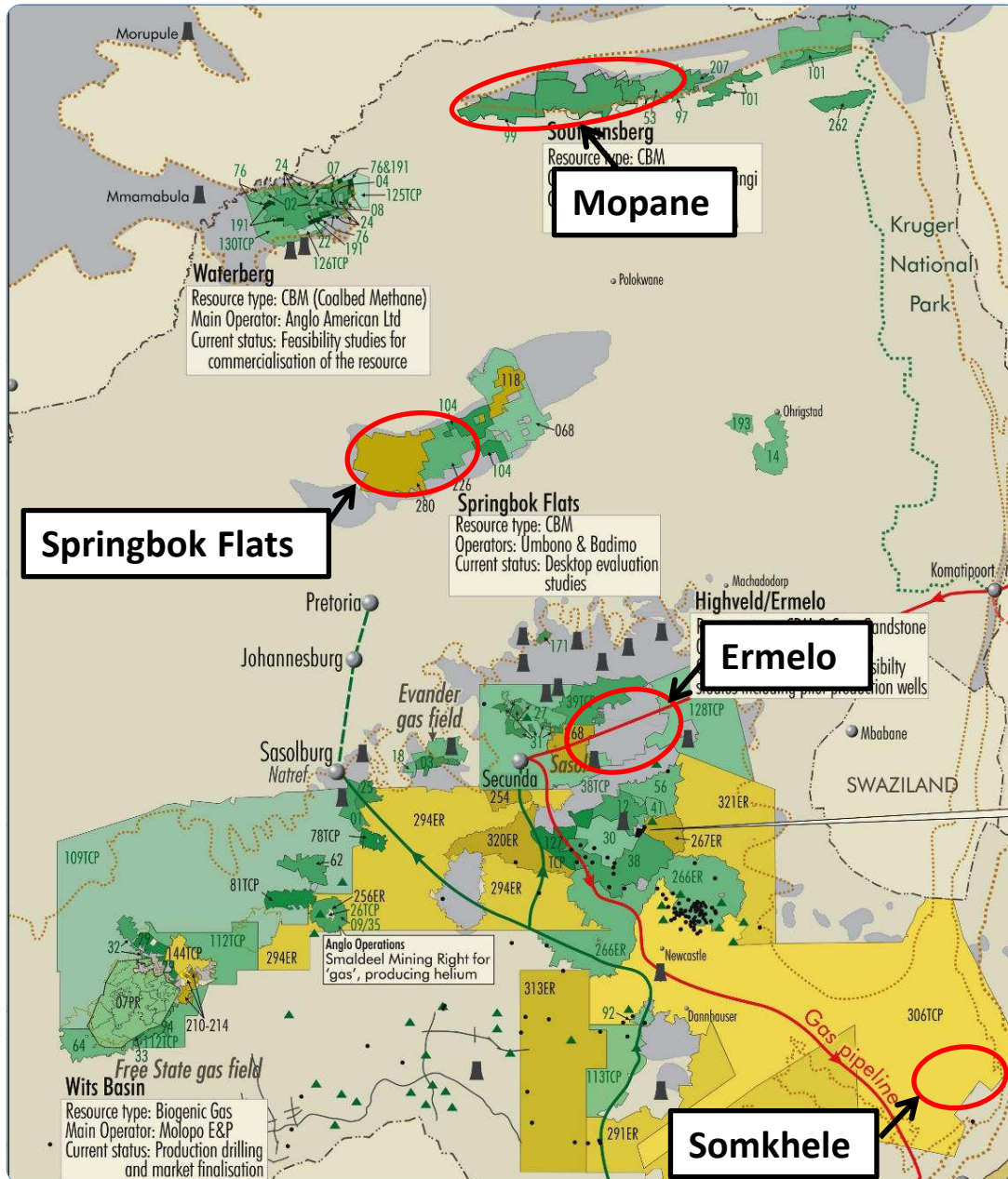
Testing initiated in 2004
and is still flowing gas.

Total Recoverable Reserves
~1 Tcf



COALBED METHANE

UMBONO CAPITAL



JV between *Umbono* and *Sunbird Energy*

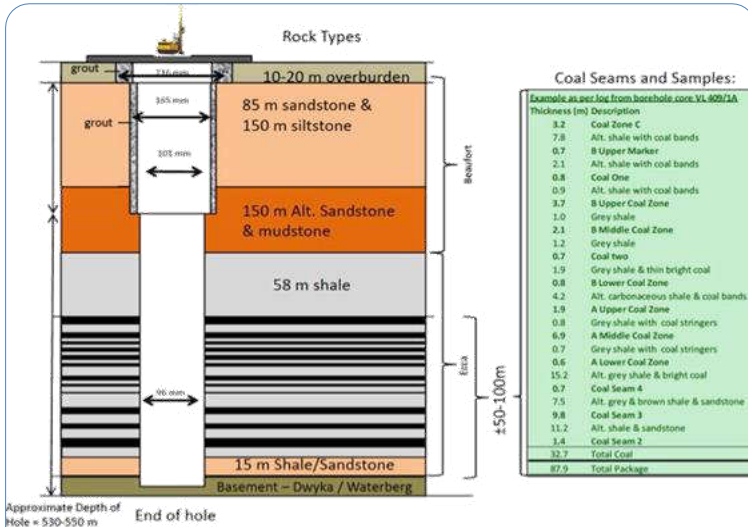
Gas projects:

Mopane, Springbok Flats Coalfields



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COALBED METHANE



The Mopane Project

- 420km NE of Johannesburg covering an area of $\pm 1577\text{km}^2$
- Expanded 8 core hole drilling program underway
- Drilling and logging of 2 core holes completed and now undergoing permeability testing
- 3 core holes piloted to 100+ metres
- 2 rigs operating on site to complete program
- **Best Estimate GIP of 1.9 Tcf**

<http://www.sunbirdenergy.com.au/South-Africa/mopane.html>





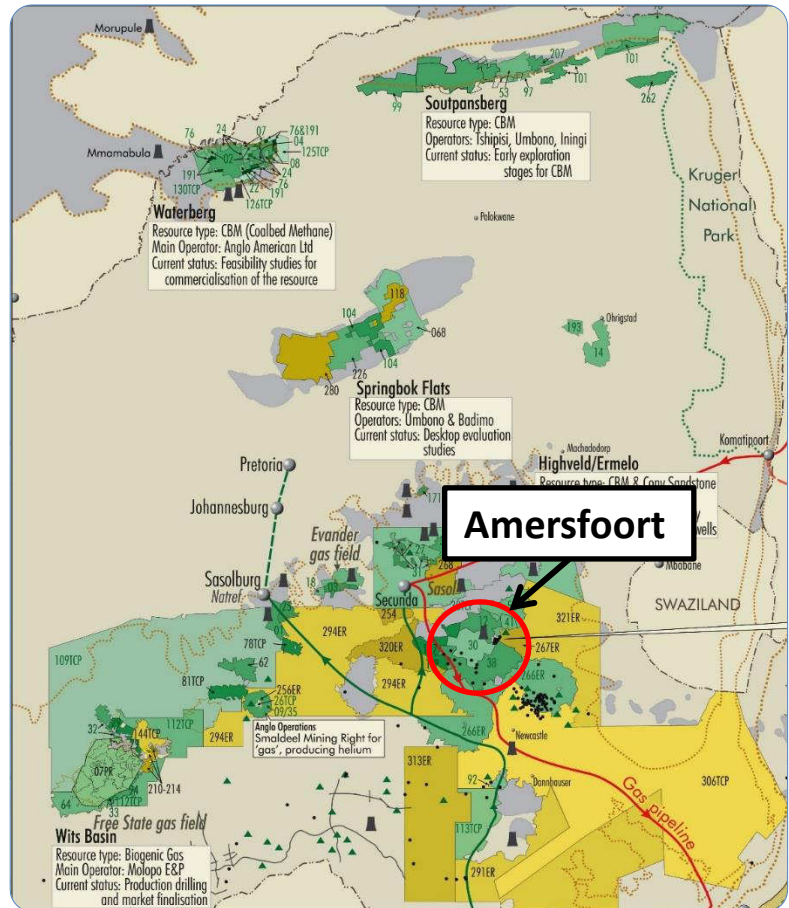
Project Operation photos

The Ermelo Project

- 200 km SE of Johannesburg within the Witbank coal mining region– covers an area of $\pm 1443\text{km}^2$.
- Extensive historic drilling by coal miners provides a detailed understanding of the coal geology.
- Five target coals seams with a range of net coal thickness from 6m to 15m. Individual coal seams are up to 3m thick.
- The Ermelo project provides a combined **Best Estimate GIP of 0.8 Tcf**, with a High Estimate GIP of 3.45 Tcf



COALBED METHANE



- JV between Badimo Gas and Kinetiko Energy - **AfroEnergy**
- The JV covers two exploration rights in Amersfoort Coalfield
- Considered highly prospective for CBM and also gassy sandstones overlying the coal horizons
- Initial drilling complete
- **Contingent resources at P50 level of 2.4Tcf GIIP**

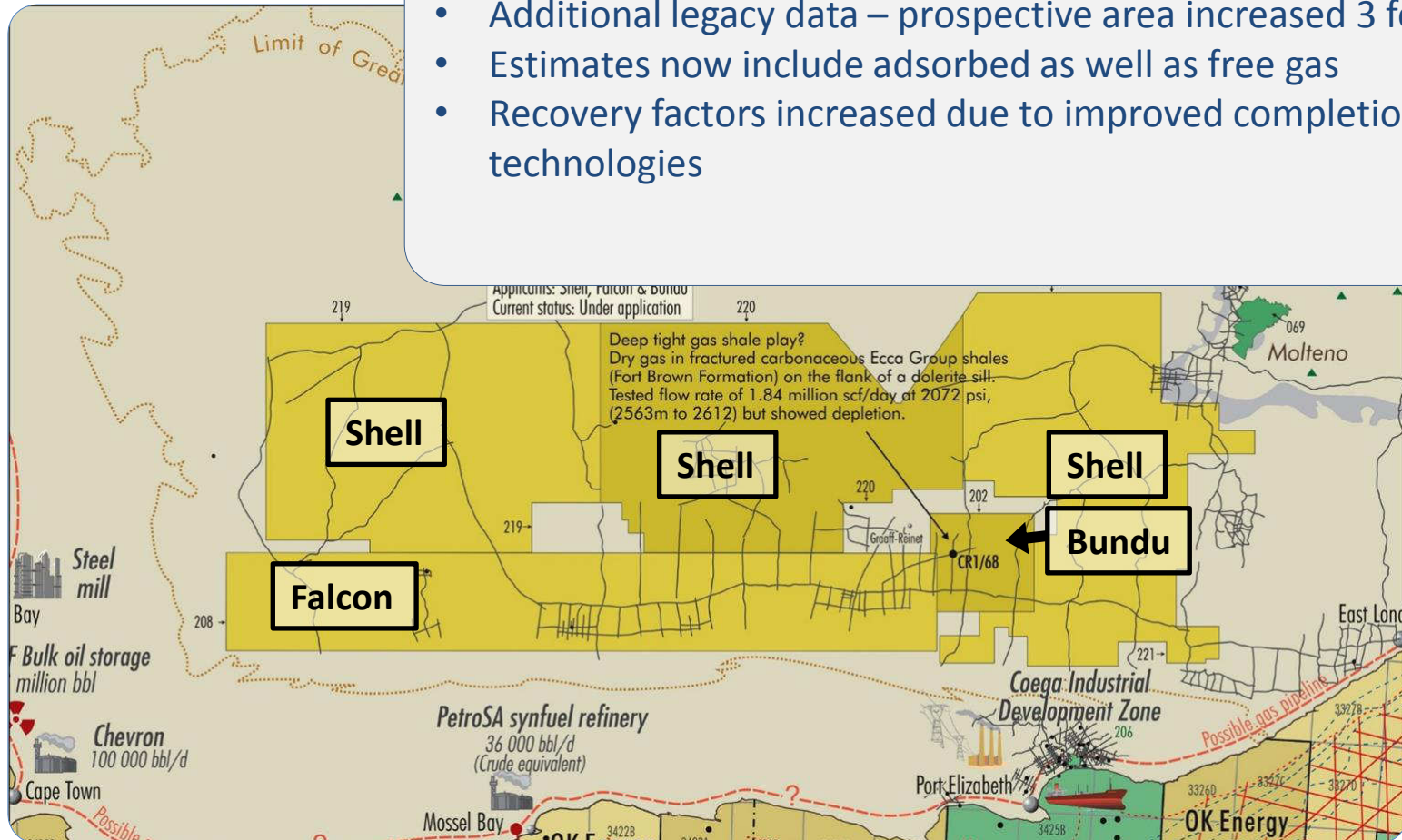


SHALE GAS

Play fairway in southern part of basin
EIA: reporting 390 Tcf (2013)
Petroleum Agency SA's conservative
Previous Best estimate 36 Tcf recoverable

Recently revised to 183 Tcf recoverable

- Additional legacy data – prospective area increased 3 fold
- Estimates now include adsorbed as well as free gas
- Recovery factors increased due to improved completion technologies



GOING FORWARD

Latest on shale gas Exploration

- Existing applications are now being processed – objections through REMDEC, nearing recommendation stage
- Work programmes for first 3 years do not include hydraulic fracturing
- Moratorium on new applications remains

Latest on shale gas Regulations

- Regulations finalised

Latest on MPRDA amendments

- Portfolio Committee has recommended that NA puts Bill to the vote, then refers to NCOP
- A major issue for IOCs



CONCLUSIONS

South Africa has attracted a wide diversity of international and local exploration companies over the past few years.

Majority of acreage under license or under application: acreage is still attractive

A number of new surveys have been conducted offshore in previously underexplored areas.

Active exploration onshore for unconventional resources

MPRDA amendment needs to be finalized to encourage commitment to capital expenditure

Thank you



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