Ministry of Mines & Energy

"promoting Namibia's mineral, geological and energy resources"

21 August 2024

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Update on the Namibian Oil and Gas Strategy: *Where are we now……*

MAGGY SHINO
PETROLEUM COMMISSIONER
MINISTRY OF MINES & ENERGY
REPUBLIC OF NAMIBIA

Ministry of Mines & Energy

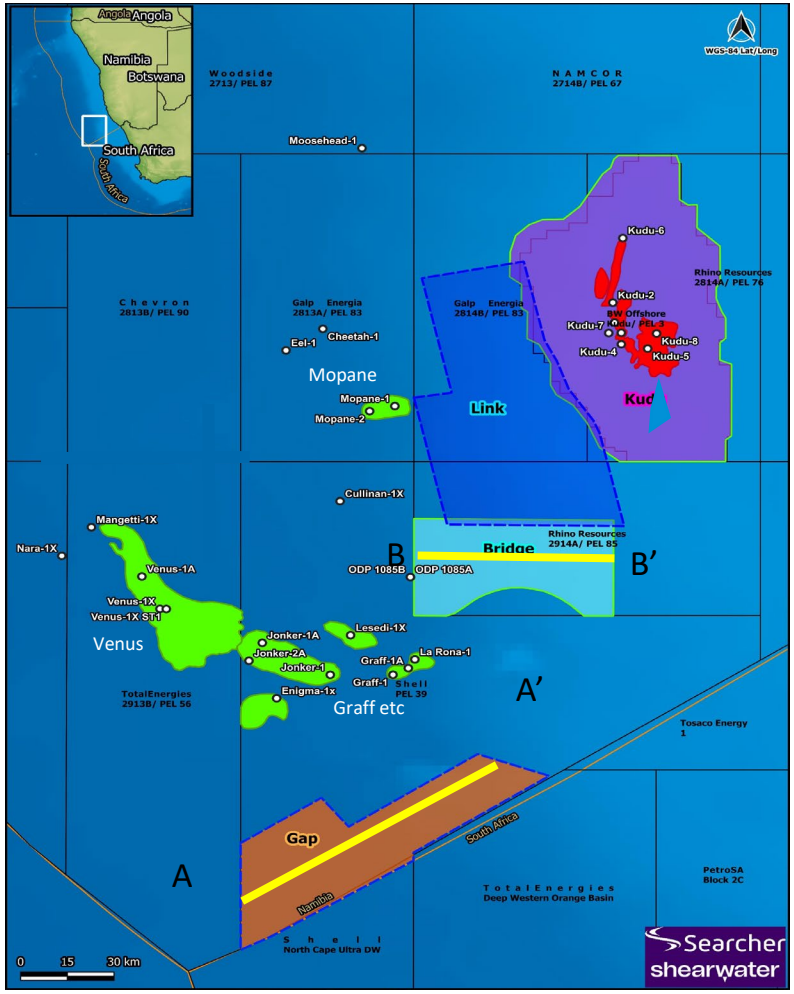
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Offerings

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- Stability: economy, industry alignment, conducive environment and sanctity of contract
- Vow to deliver the most sustainable barrels on the continent
- Larger basins available for exploration



Three Hydrocarbon Systems Domains of Orange Basin

Basin Floor Fans: Venus and Mangetti

- Source: Aptian Source rock sits on Oceanic crust
- Reservoir: Aptian basin floor fans sit on top (and within) Source Rock
- Trap: Stratigraphic Pinch out to North and East

Slope Channels: Graff, La Rona, Lesedi, Enigma, Jonker

- Source: Aptian Source rock sits on Oceanic crust/ transitional crust charging overlying slope channel.
- Reservoir: Albian to Cenomanian Sands in channels linking back to the shelf
- Trap: Stratigraphic bypass, structural trapping from gravity driven thrusts.

Inner Basin: Mopane, Kudu

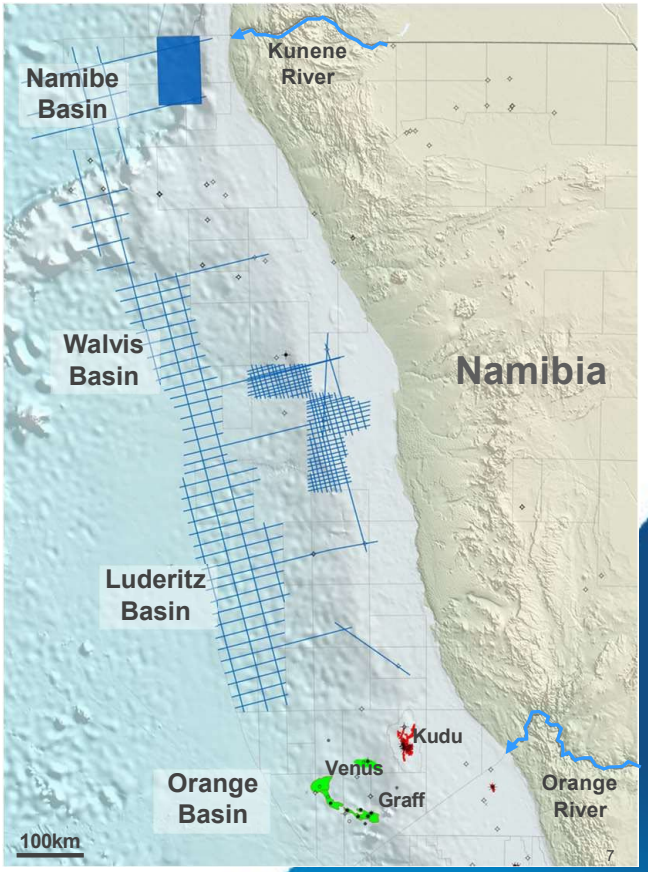
- Source: Aptian Source rock over syn-rift volcanic of Inner Basin. Possible Early Cretaceous source rock in Syn-rift.
- Reservoir: Albian to Cenomanian Sands in channels linking back to the shelf
- Trap: Counter regional dip against outer high, Stratigraphic trapping and bypass up dip, structural trapping from gravity driven thrusts. Traps in the Gravity driven fold and thrust belt.

Additional offshore potential

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- Orange Basin has recently experienced great success, uncovering large hydrocarbon accumulations.
- Comparable reservoir and source rock elements are extensive and have been identified in deep-water Luderitz, Walvis and Namibe Basins, which are underexplored.
- Aptian source rock has been derisked using wells, seismic and maturity models
- Deep-water Namibe Basin depositional system is akin to Orange Basin given the proto river influence.

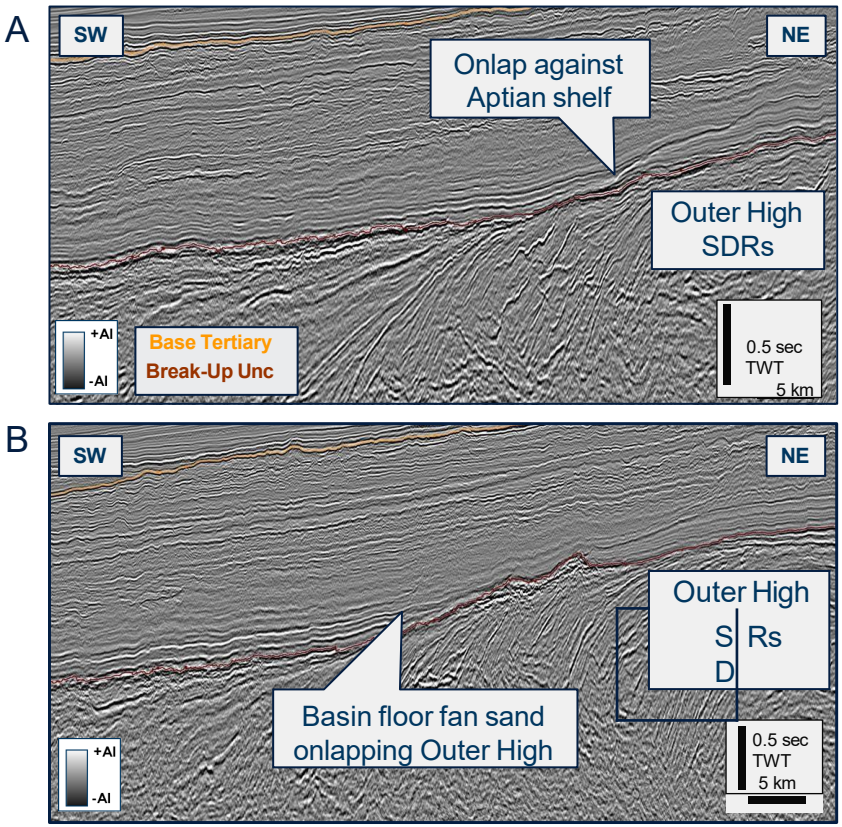


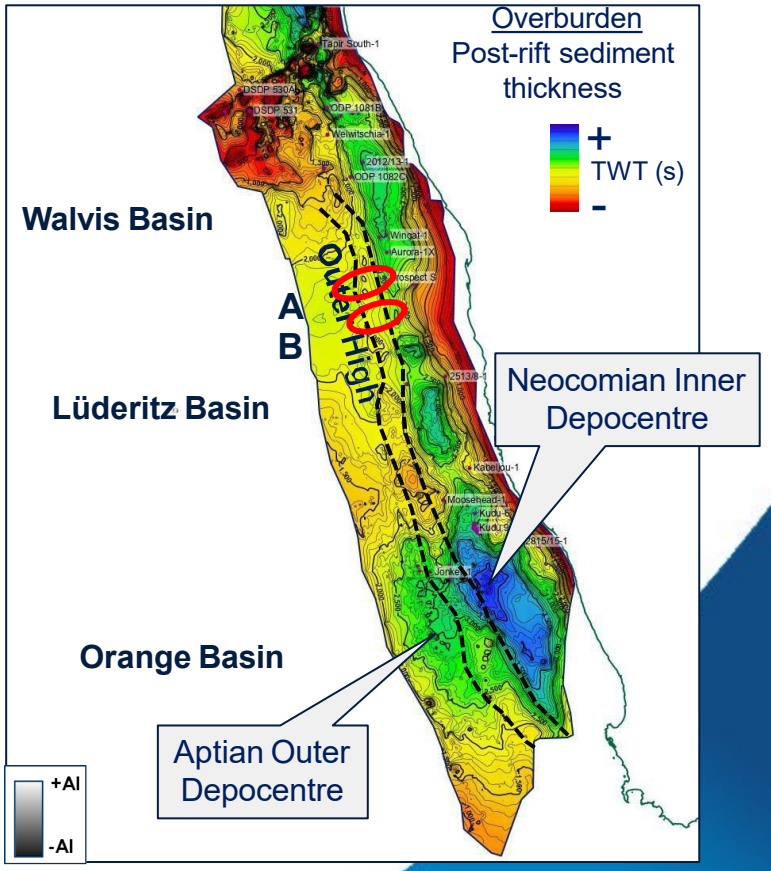
Ultra deepwater Basin Floor Fan Play (Walvis/Lüderitz)

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NAMCOR TGS





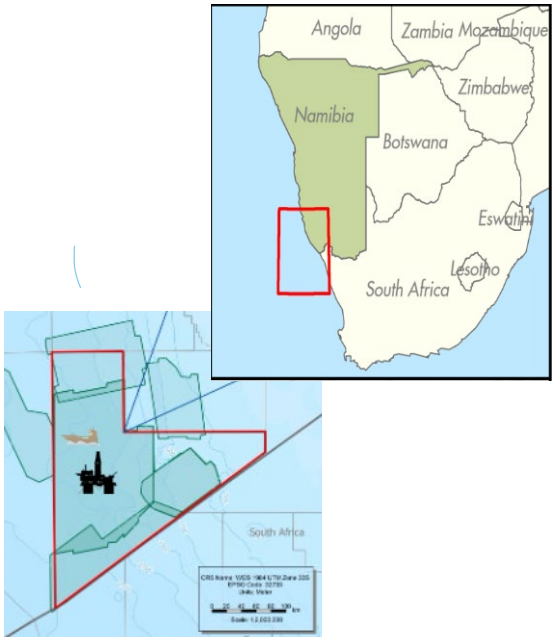
Deepwater frontier exploration in Namibia - PEL0039

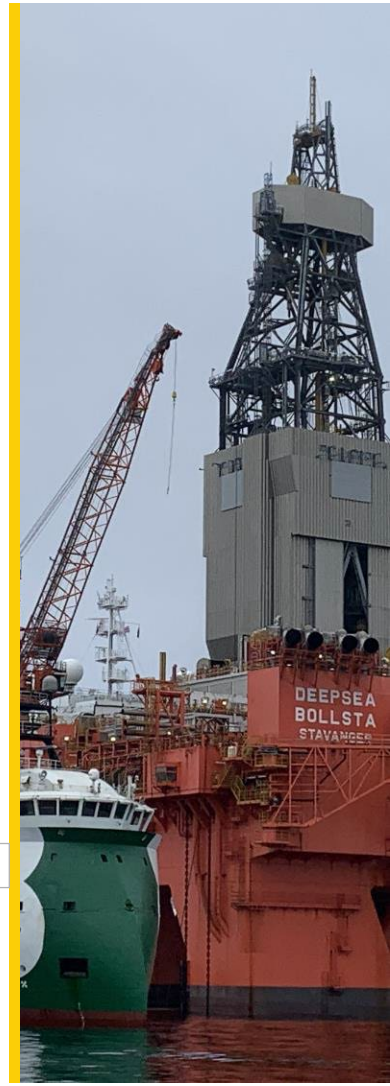


Moving to polarise at pace

Multi-well campaign to determine commerciality

- Together with Joint Venture partners QatarEnergy and NAMCOR, Shell is working at an unprecedented pace and scale to understand the PEL0039 license – both volumes in place and commercial potential.
- Since discovering hydrocarbons in the Graff 1-X well in early 2022, the Venture has drilled 5 further exploration wells, 3 appraisal wells and completed 2 flow tests.



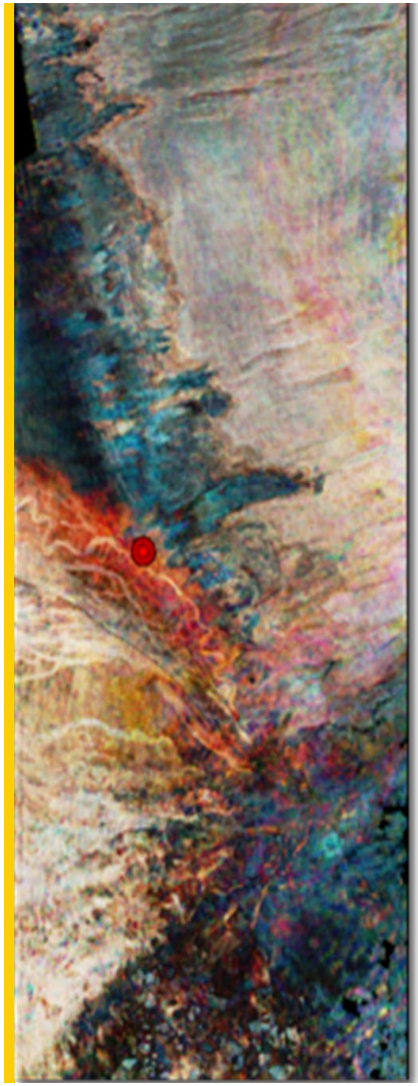


Q4	2022 Q1	Q2	Q3	Q4	2023 Q1	Q2	Q3	Q4	2024 Q1	Q2
Graff-1X	La Rona-1X			Jonker-1X		Graff-1A ST1	Lesedi-1X Cullinan-1X	Jonker-1A	Jonker-2A	Enigma 1-X

PEL0039 Exploration & Appraisal

Much has been accomplished.

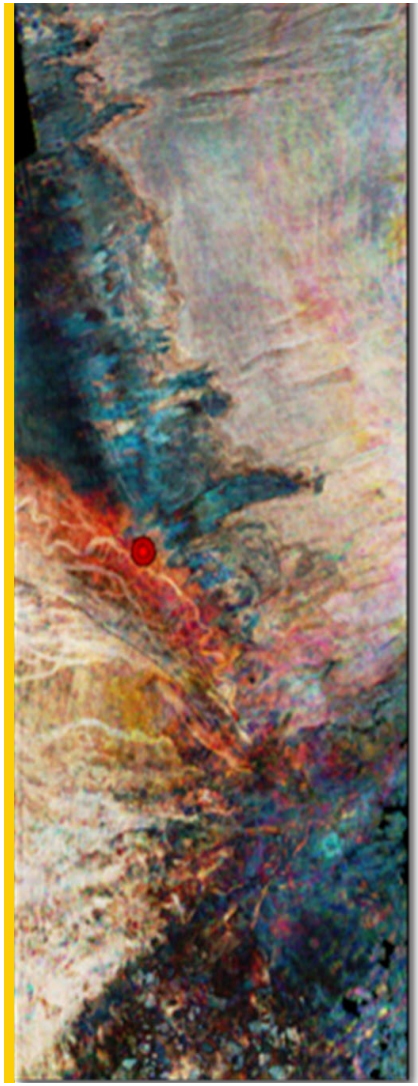
- Beginning with the Graff exploration well in Dec. 2021, Shell has drilled a total of 6 exploration wells within 2.5 years, exploring the viability of 3 distinct petroleum plays.
- Completed safe scope execution on the Deepsea Bollsta and across the onshore/marine/air operations. Delivered the full scope with 508 Goal Zero days.
- Bollsta rig released on 30th April 2024; Executing end-of-campaign lookback, with an extensive review of supplier performance and feedback.
- In December 2023, Shell acquired further 3D data to fully characterize additional opportunities, along with completing Environmental Baseline and Metocean data acquisition.



The journey continues

There remains much to be done.

- Attention now focused fully on analysing the vast amount of data collected in ~2 years including rock & fluid samples, logging data, well testing data, and newly acquired seismic surveys covering majority of license to further expand our subsurface understanding.
- Results from this work will inform next steps, including future decisions on possible further exploration and appraisal activities.
- Concept evaluation for potential additional appraisal and/or development of discovered resources continues, with focus on delineating positive pathways to commercial development.
- Leverage the acquired learnings to look beyond PEL0039 to identify growth opportunities offshore Namibia.
- Ongoing commitment to accelerating oil and gas industry in Namibia through greater collaboration.
- Continued investment in local content development and social investment.



A COMPREHENSIVE AND INDEPENDENT OIL & GAS INDUSTRIAL BASELINE SURVEY (IBS)

In light of recent offshore O&G discoveries, the objective of the IBS project was to gain a comprehensive understanding of the Namibian ecosystem and identify potential local content opportunities for the short, medium and long term

How was the survey realized?



Extensive desk research: *LC policy & regulations, socio-economic landscape, labor market, etc.*



Communications: *large-scale communication campaign involving local newspapers and radios, webinars and social networks*



Stakeholder mapping & engagement: *online surveys, interviews and site visits to understand local challenges and expectations*



In-depth analysis of Supply Chain (SC) & Workforce (WF): *assessment of local SC & WF and project demand estimation to quantify and qualify SC & WF gaps*



Economic impact analysis & Identification of potential next steps: *valuation of LC economic impact on Namibian GDP and next steps for Oil & Gas Sector*

Key findings

Challenges

- Lack of knowledge of sector
- Lack of anticipation of economic upset (risk of "Dutch Disease")

Expectations

- Positive contribution to GDP
- Maximum contribution from Namibian suppliers
- Meaningful skill transfers and training
- Transparent legal and political environment

Supply Chain Assessment

- 80% of suppliers showed clear interest
- 45% of Supply Chain's (SC) can be ramped up without major investment
- Significant need for investment in HSSE

Workforce Assessment

- Some critical qualifications for technical jobs were identified as insufficient in terms of volume
- Specific O&G qualifications do not exist in-country

LC Impact Assessment

1 FPSO:

- Construction phase: +1% of GDP growth and drive to increase the Gross Operating Surplus (GOS).
- Production phase: 5.8% GDP growth and 7k jobs created in the Production phase

Potential next steps

Increase awareness of the oil & Gas industry requirements, incl. project timeline, demand scale, standards of HSSE, ethics & compliance, etc.

Define competitive LC policies and incentives,
e.g.,: Incentives for investment, skill development, and partnerships

Create more favourable financing conditions
e.g.,: Facilitate access to lending, de-risk investments in capability building, Improve working capital conditions

Prioritise infrastructure development
e.g.,: Developing maritime/onshore logistics base

Establish National Talent Register and Workforce enablement system
e.g.,: Online Talent Portal, Set-up of O&G specific modules within the curriculum for engineering and TVETs, workforce certifications

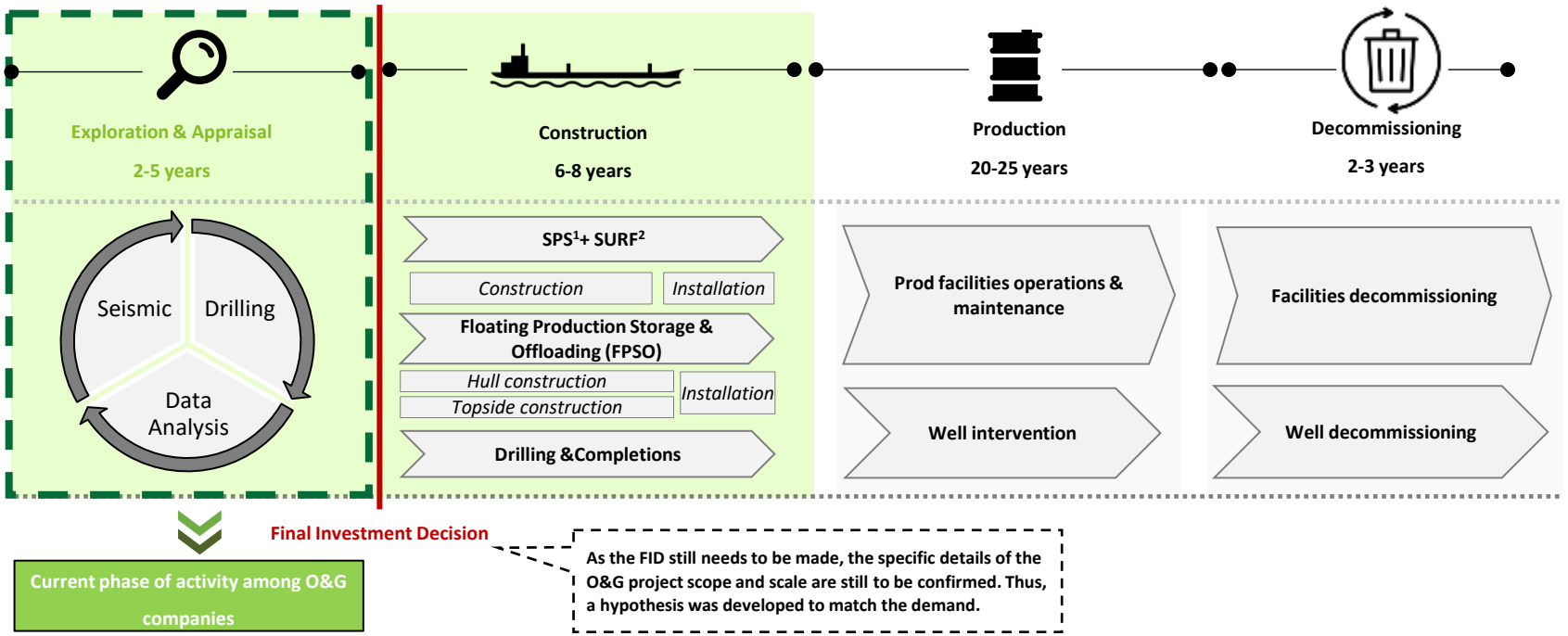
Establish National Supplier database and Supplier Development Centre
e.g., Supplier Portal, Support development of the local supplier ecosystem

Prioritise Supply Chains for development
e.g.: Priorities investments on quick wins supply chains, focus investments on supply chains with limited demand-supply gaps

Launched by TotalEnergies, Shell *Under the Championship of* NAMCOR, PETROFUND *Led by Namibian entities* Deloitte., Monasa Advisory & Associates, SURVEY WAREHOUSE

The Namibian Oil and Gas projects are still in the pre-Final Investment Decision (FID) phase of a project lifecycle that could span 30+ years…

Indicative, Non-exhaustive



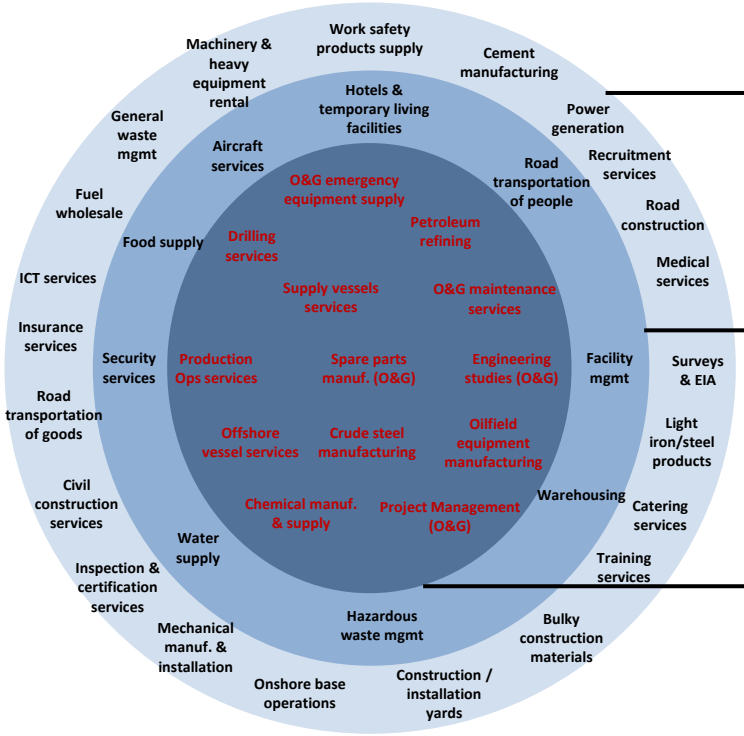
Legend:

Current pre-FID phase of activity among O&G companies in Orange Basin

Phases financed 100% at risk by Oil & Gas companies with no revenue untill production phase

Notes: 1.SPS: Subsea production system 2. SURF: Subsea umbilicals, risers and flowlines.

A total of 22 supply chains offer O&G companies short-term potential, although 9 supply chains would require certain investment and effort to better meet O&G upstream project requirements



Short-term priorities »» **22 supply chains**

Medium-term priorities »» **9 supply chains**

Long-term priorities »» **13 supply chains**

X No presence in Namibia

Local Content

Shaping the Namibian economy

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REPUBLIC OF NAMIBIA

PETROLEUM AGREEMENT

BETWEEN

THE GOVERNMENT OF THE REPUBLIC OF NAMIBIA

AND

(Insert Company name)

On ...../...../.....20...

UNITY LIBERTY JUSTICE



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Current Local content requirements

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LOCAL CONTENT IS A MUST

Clause 22

Employment and training

- 22.1 In carrying out Petroleum Operations the Company shall, to the maximum extent possible, employ Namibian citizens having appropriate qualifications.

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Clause 23

Namibian goods and services

23.1 The Company shall-

(a) use and purchase goods supplied, produced and manufactured in Namibia whenever such goods can be obtained at prices in Namibia which are competitive in international terms and are, in all substantive respects, of a quality comparable with the quality of goods from outside Namibia. The Company shall give preference to such supplier, producer or manufacturer, unless it is able to show good cause to the satisfaction of the Minister why such preference should not be given;

(b) make maximum use of contractors in Namibia where services of comparable standards with those obtained elsewhere are available from such contractors at competitive prices and on competitive terms;

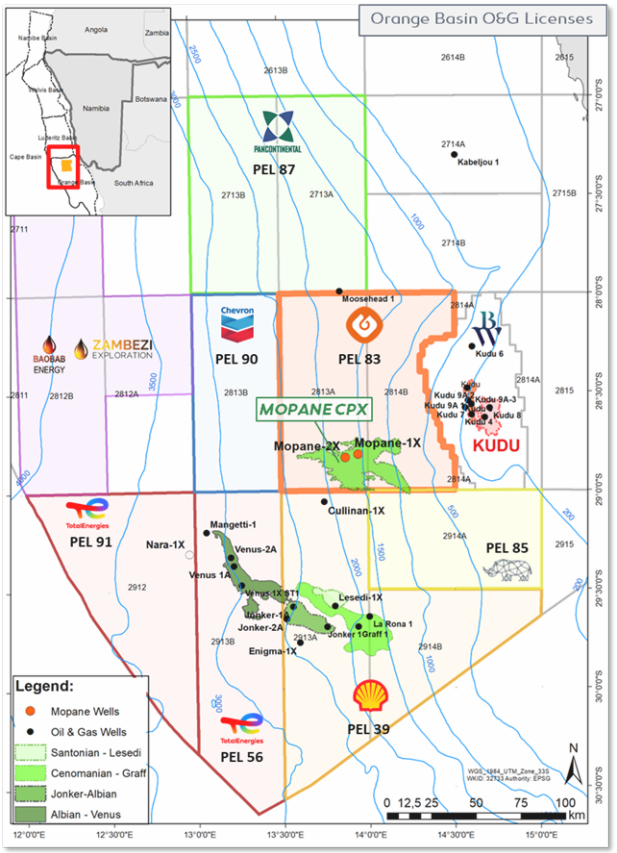
(c) when it is necessary to import vehicles, machinery, plant or equipment and any such vehicles, machinery, plant or equipment are not purchased directly from a manufacturer, effect the purchase of the items through traders operating in Namibia at competitive prices;

(d) co-operate with companies in Namibia to enable them to develop skills and technology to service the petroleum industry.

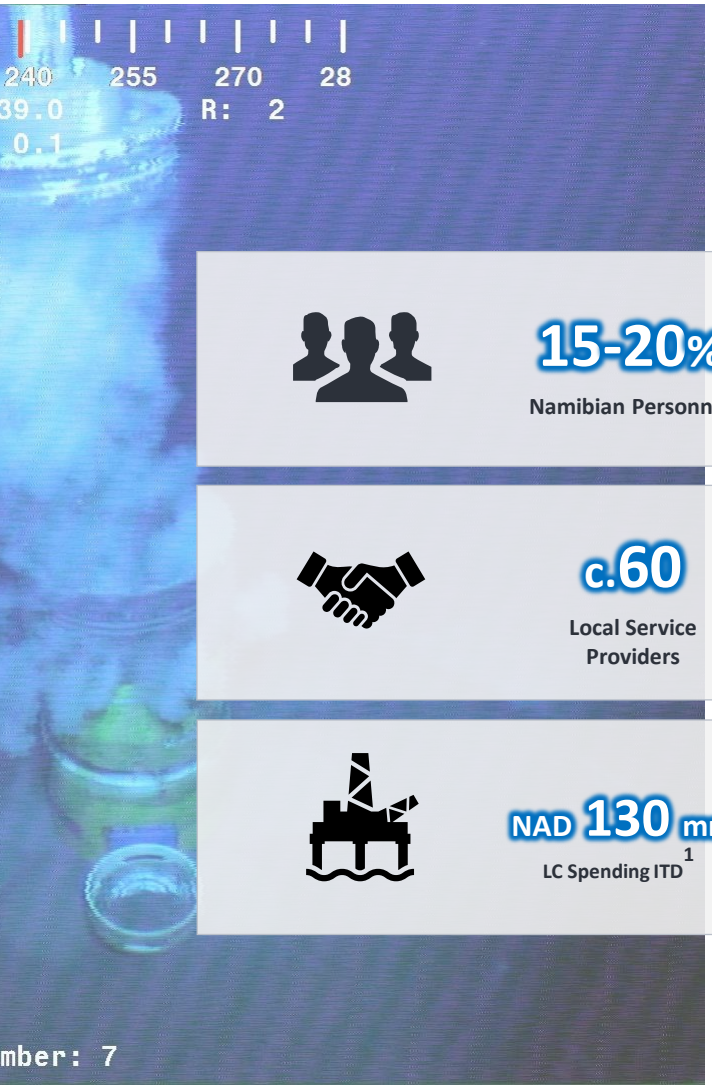
23.2 The Company shall ensure that a term similar to this clause is contained in its contracts with contractors.


galp
PEL 83:
NAMCOR
CUSTOS ENERGY

Proving presence of a material light oil / gas-condensate Mopane Complex discovery



- Accelerated initial deepwater exploration campaign conducted safely and on budget between Nov'23 and April '24
- Back-to-back drilling of two exploration wells (Mopane-1X & 2X) including 1 drill-stem test
- Discovered three material hydrocarbon bearing reservoir levels with excellent reservoir properties, high flow potential and significant HC columns > 140 m
- Preparing for spud of fast follow-up appraisal and exploration campaign before year end '24 (up to 4 wells until end '25)



Mopane Drilling Operations

Involving Namibian citizens and companies

15-20%
Namibian Personnel

Significant number of Namibia personnel involved (> 40 of a total of 230 persons), supporting specialized development of Local People for future deepwater projects.

25% of Namibians employed were females.

c.60
Local Service Providers

Top quartile services provided by Local Service Providers.

NAD 130 mn
LC Spending ITD[1]

Local Content spending amounted to ca. NAD 130 mln.

[1] Since November 2023

Mopane next steps

Proceeding with appraisal drilling campaign to de-risk Mopane creates robustness for future field development.

Early production system could deliver first oil still within this decade.

Key objectives

- **Drilling campaign to de-risk reservoir extension and connectivity**
- **Screen and assess the technical and economic feasibility of production concepts to guide future development strategies.**

Key workstreams 2024-25

up to 4 wells E&A

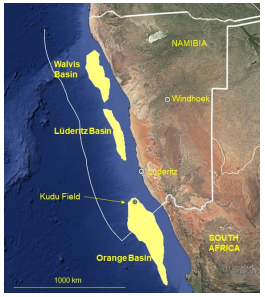
Proprietary 3D Seismic

Metocean & Bathymetry Studies

Assess production concepts Pre-Feasibility Studies



Kudu Project Overview



Kudu Field

- Production Licence 003
- BW Energy & NAMCOR
- c. 600 Bcf
- ≈ 800 MW x 20 years
- 3 Wells



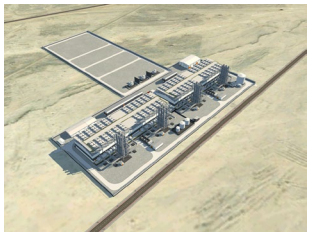
FPS

- West Leo (already purchased)
- BW Offshore/ BW Energy



Pipeline(s)

- c. 200 km subsea
- c. 40 km onshore
- 12”



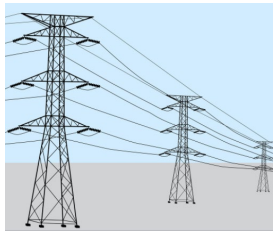
Power Station

Phase 1

- c. 420 MW
- 24 x 18 MW engines

Phase 2

- up to 400 MW



Transmission Line

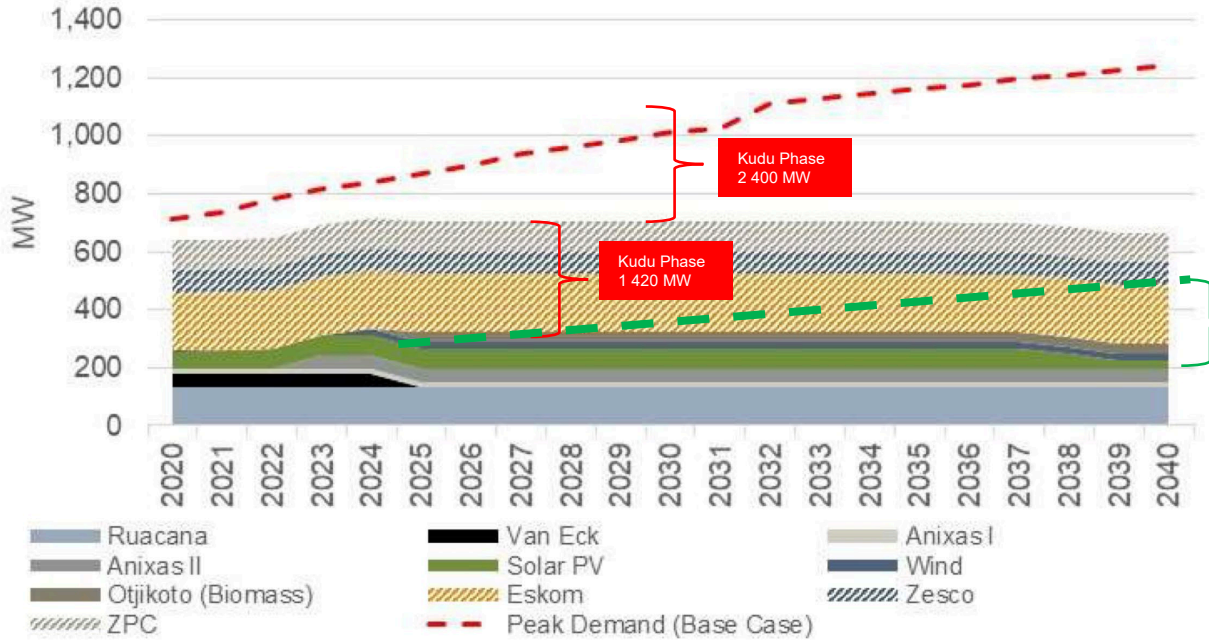
- c. 180 km at 400 kV

Other Markets

- LNG
- Natural Gas

Namibian Electricity Demand & Supply

Kudu Gas-to-Power can be phased to meet demand growth, to improve system reliability, reduce reliance on imported base-load electricity & promote RE expansion in Namibia



Source: NIRP 2022

Kudu - Renewables Complementation:

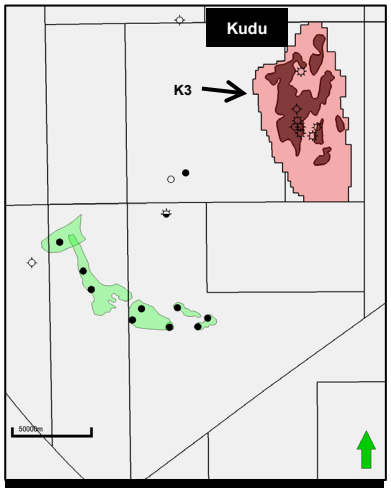
Given its dispatchability, Kudu Gas-to-Power will initially operate as base load and then start to also complement incremental renewable power generation on the Namibian power system

Net Result:

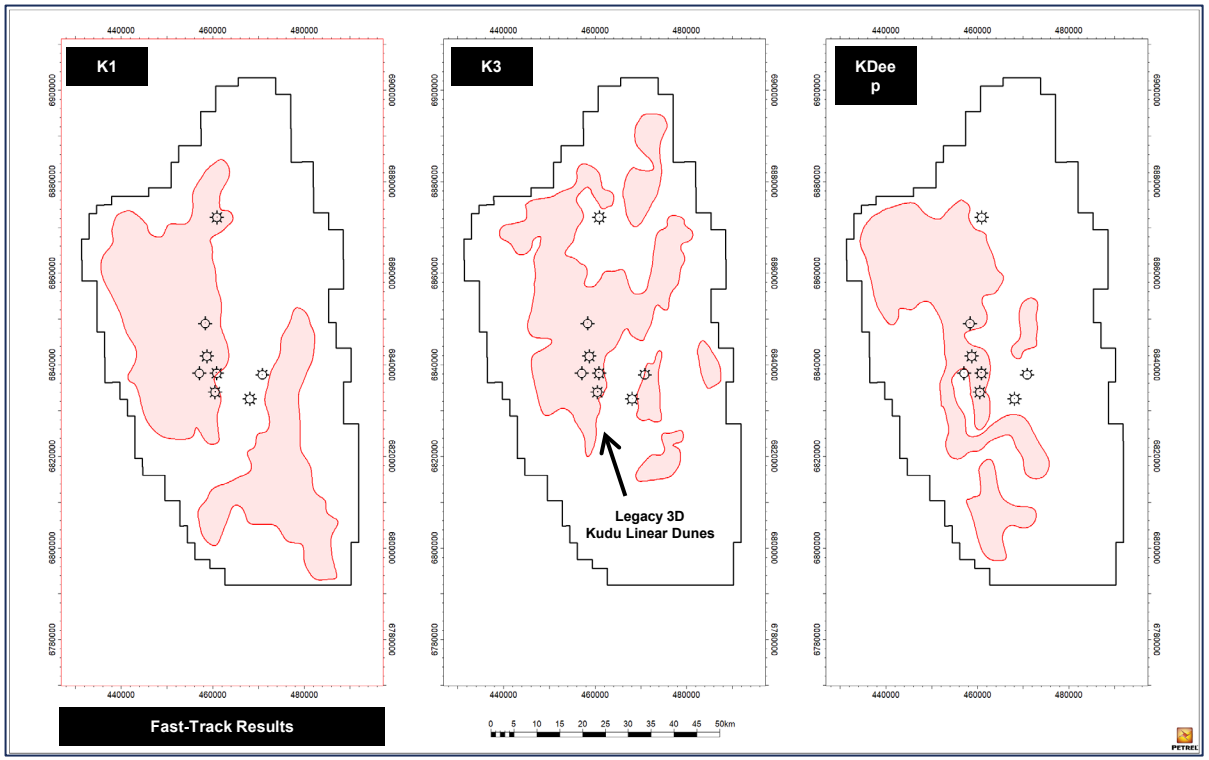
- Reliable cost-effective supply
- Sensible reliance on import & export of electricity
- Allows for steady economic growth strategy
- Lowest carbon footprint for the power sector

Kudu Updated Amplitude Footprint

The key penetrated gas reservoir intervals show extended amplitude footprint
Final PSDM to be used to calibrate amplitude response to reservoir thickness sweet spots



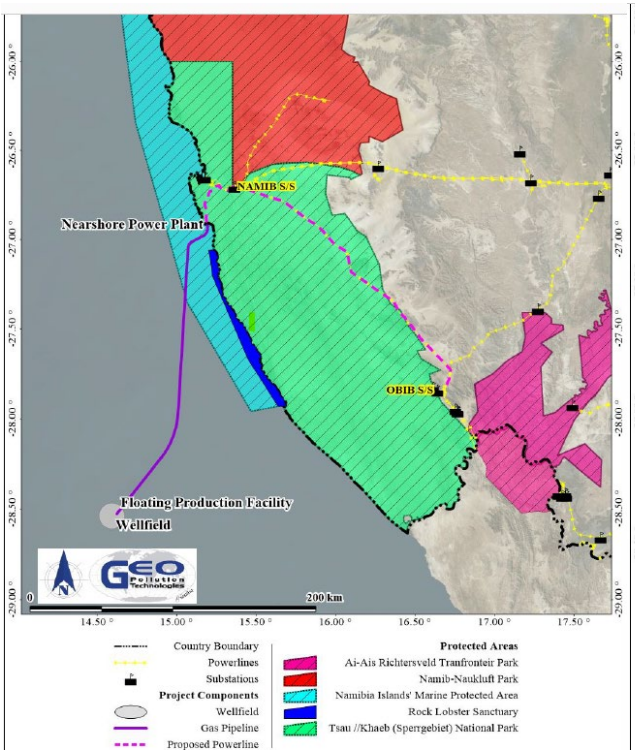
Regional Map Orange Basin Discoveries and Kudu K3 Footprint



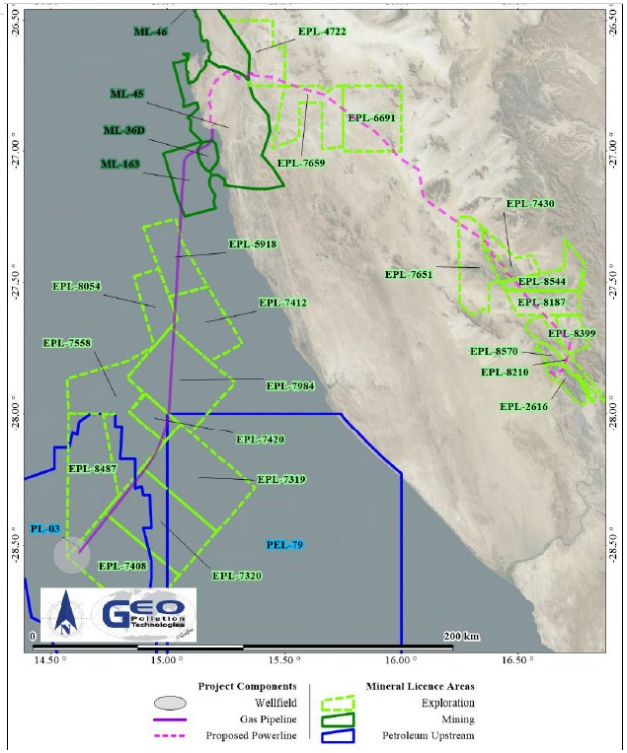
Pre-FEED / Concept Study Work

- **SURF**
  - Flow assurance study
  - Flexible pipe high temp suitability studies
  - Pipeline, flowline and umbilical sizing
  - Subsea layout and riser pull-in / clashing studies
- **Floating Production Facility (FPF)**
  - West Leo Conversion Scope of Work and Specification
  - Mooring Design and Hull Stability Analyses
  - Process simulation based on existing PVT data to develop PFD and primary equipment sizing
  - Conceptual layouts / 3D models of the topside facilities module
- **Export Pipeline and Shore Crossing**
  - Pipeline sizing and route installation feasibility studies
  - Preliminary design of shore crossing, pipeline pull-in and approach jetty at Elizabeth Bay.
  - Nearshore Metocean Study
- **Onshore Pipeline**
  - LIDAR topographical survey of pipeline route from Elizabeth Bay to power plant.
  - Pipeline sizing and design of onshore gas receiving equipment
- **Onshore Power Plant and Substation**
  - Selected gas engine generators
  - Conceptual equipment layout including power generation and balance of plant equipment
  - Conceptual layout of the Substation equipment, including GSU transformers, GIS and reactive compensation requirements
- **Overhead Transmission Line & Grid Tie-in**
  - Conductor sizing and proposed routing of new 400Kv overhead transmission line to Obib substation
  - Electrical Grid study with Nampower
  - Preliminary equipment list and layout of grid tie-in at Obib

Environmental & Social Due Diligence



Conservation & Marine Resource Areas



Mineral License Areas

- Completed a high-level environmental and social screening (ESS) study
- Study focus was an assessment of the Kudu project gas supply pipeline's and 400kV transmission line's impact on the environment with respect geomorphology, conservation and marine resource areas, heritage, tourism, existing infrastructure, mineral license areas and socio-economic issues, inclusive of identifying key risk avoidance approaches
- Key finding is none of the identified environmental / socio-economic risks would prevent the project from proceeding

Project Value Add for Namibia

Multi-Faceted Value Proposition for Namibia and Southern Africa

Reliable, Lower Carbon Supply of Electricity

- Improve self reliance in energy/electricity for Namibia
- Will replace high carbon intensive coal-based electricity from South Africa.
- Cost-effective, flexible (i.e., dispatchable) base load power generation.
- Natural gas/small-scale LNG can substitute more expensive and imported diesel & heavy fuel oil usage in transport, industrial, mining and commercial sectors.

Complement Higher Penetration of Renewable Power

- As a complement to renewable energy Kudu will enable further increase in local renewable power generation and lower carbon footprint for the nation's power sector.
- Natural gas can be supplemented hydrogen. Therefore, if co-located within regions which will also host hydrogen developments, as in the Karas region, Kudu could also be a catalyst for hydrogen energy developments in the country.

Local Employment & Skills Development

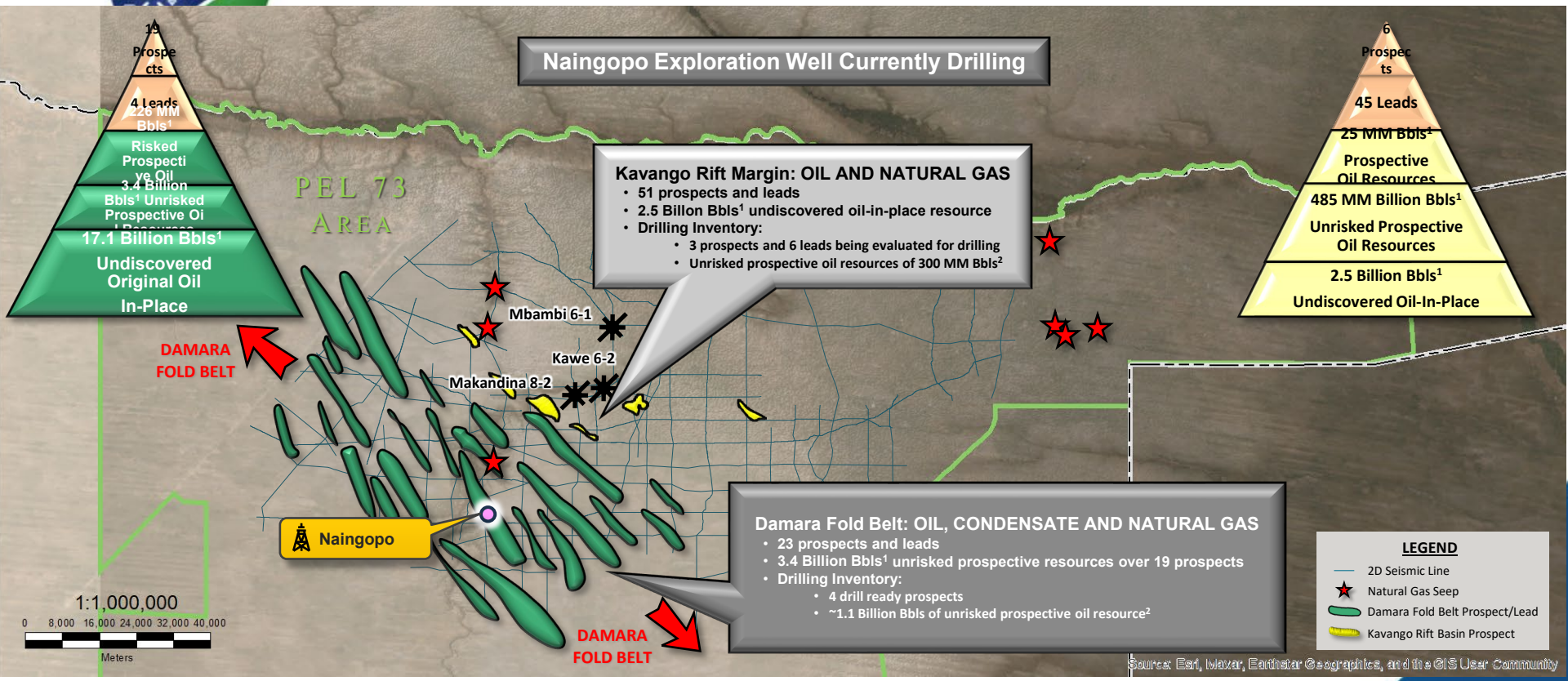
- Large-scale local employment during the construction phases of the projects, skills development and employment during operational phase.

Local Capital Markets

- Certain project components within the overall Kudu project will be ideal for local capital market participation.

PEL 73 Resource Inventory | Damara Fold Belt and Rift Margin

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1. The NSAI Report. Values represent sum of prospective oil resources for prospects on a 100% working interest basis.
2. Drilling inventory locations includes prospects (noted as locations 6,7,63,68 and L,M, I, and O-P) in the Damara Fold Belt and prospects (17, 30, 47) and leads (2,3,4,24A,24B, 50) in the Kavango Rift Basin

4Q 24 Exploration Drilling Campaign

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RHINO RESOURCES

Rhino and Partners are planning to drill in **November 2024**

Promising prospects have been identified on latest Rhino-Searcher seismic survey and other datasets, **key targets**:

- **Sagittarius**
- **Volans**

Follow on targets could include:

- Capricornus/Carina
- Vela/Alpha Centauri
- Mars/Rooikat

Rhino advocates for a **diverse spectrum of service providers** operating in Namibia and believes that a healthy O&G industry is driven **by fair-market competition**. Key contracts already signed:

- Drilling – Noble
- Integrated Well Services - Halliburton

Upliftment and opportunity generation for local Namibians is a fundamental part of Rhino's operational focus

Guidance to all Rhino contractors is:

- Inform local Namibians of the project and invite qualified providers to tenders
- Identify/Hire/Train local talent in holistic project management
- Source goods and services from locals when possible





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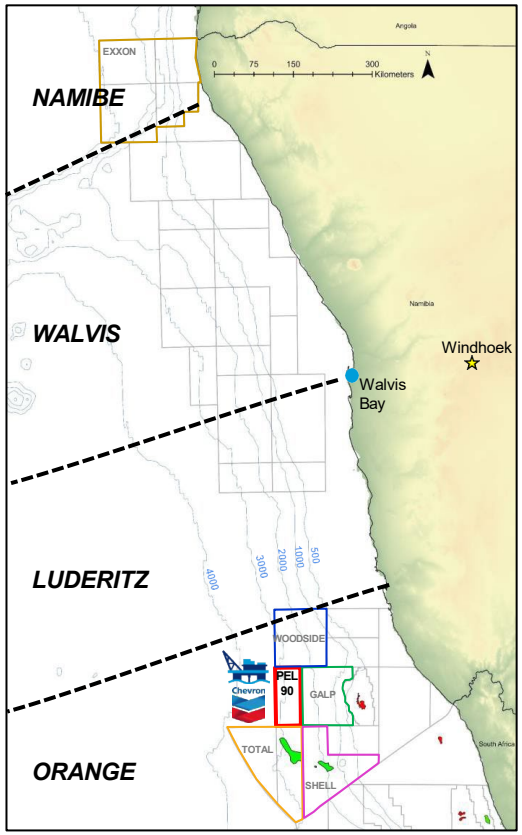
Acquired PEL90 WI in 4Q 2022

Chevron 80%, NOC 10%, Private 10%

Entering Phase 2 in PEL90

Aspire to grow portfolio

Chevron discovered Kudu in 1974



Competed 3D Seismic 1Q 2023

Prospect maturation on going

Internal technical assurance on going

Well planning on going

Advancing key contracts

4Q 24 – 1Q 25 Spud

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POSITIONING TO BE AFRICA ENERGY HUB

Luderitz: Energy Hub to be ready by FID

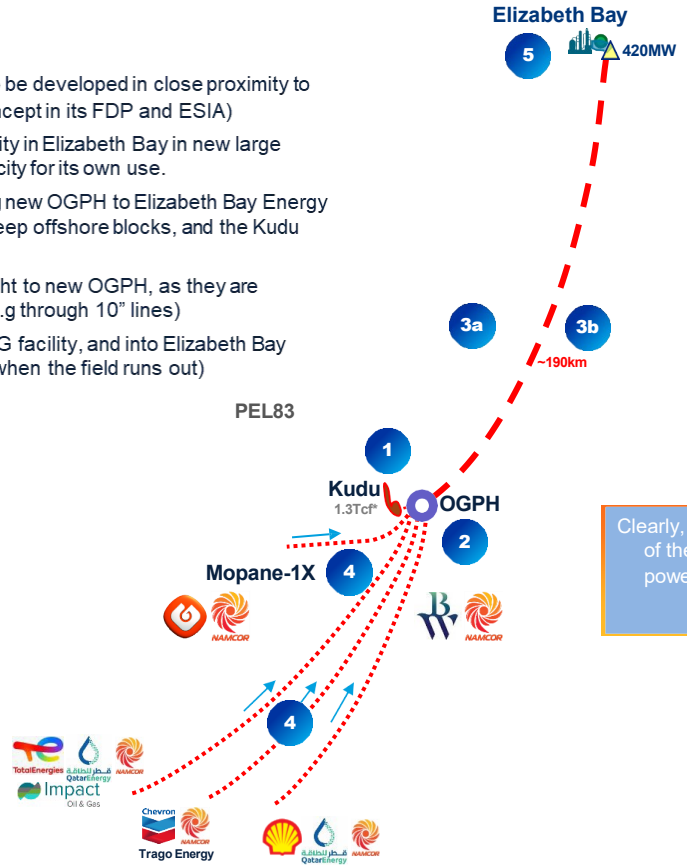


OFFSHORE GAS SCHEMATIC

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1. Kudu gas field development
2. New Offshore Gas Processing Hub ("OGPH") to be developed in close proximity to the Kudu field (e.g. BW Offshore proposes concept in its FDP and ESIA)
3a. Kudu gas brought nearshore into new GTP facility in Elizabeth Bay in new large subsea gas pipeline (e.g. 18"), with sufficient capacity for its own use.
3b. Larger capacity subsea gas pipeline connecting new OGPH to Elizabeth Bay Energy Park. Sufficient capacity for associated gas from deep offshore blocks, and the Kudu gas field.
4. Associated gas from deep offshore blocks brought to new OGPH, as they are brought online post-reinjection of initial volumes (e.g through 10" lines)
5. Gas received from OGPH, into new onshore LNG facility, and into Elizabeth Bay Energy Park, and long-term replacing Kudu Gas (when the field runs out)



- Elizabeth Bay Energy Park ("EBEP") to accommodate LNG, Domgas Projects, GTP, O&G Services, Supplies etc
- Kudu GTP to start with 420 MW capacity, and scalable to 840MW (2 x 420MW) and beyond
- With Kudu gas being brought nearshore (3a), a fit-for-purpose pipeline, is required.
- Should the deep offshore associated gas be brought onshore, it can be brought onshore via a shared, larger capacity pipeline ,

Clearly, as Namibia grows rapidly from oil, it is key to ensure growth of the power sector is maintained, with adequate mid-merit and base load power needed.

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EXPECTATIONS

- Accelerated development and fast pace to production
- Alignment with the Namibian society
- Responsibility to develop local economy
- Delivery of profitable barrels through efficiency
- Technology and innovations
- A diversity of industry players