



MOZAMBIQUE OIL & GAS **EXPLORATION OPPORTUNITIES**

Lagos, Nigeria 13-15 February 2024





MINISTRY OF ENERGY & MINERAL RESOURCES - MIREME

- Defines strategies, action plans and policies;
- Responsible for gas allocation.



STATE SHARES MANAGEMENT AGENCY

- Coordinates and controls state holdings in the business sector;
- ensure good management practices and the necessary technical assistance;



REGULATORY AUTHORITY

- Manages Mozambique's oil resources;
- Ensures oil operations to be carried out in compliance with laws and regulations;
- Manage resource optimization with an emphasis on international best practices.



COMMERCIAL ARM

- Exclusive representation of the Government in the Upstream;
- Participates in all concession areas;
- Gas field in production since 2004;
- Gas manager for the domestic market.

WHO ARE WE

ENH - Confidential Information



Commercial
Hand of the
GoM in
Hydrocarbon
sector



Dom Gas
aggregator
Quote of
25% of the
projects



Pionier in
networking
gas
distribution

STRATEGIC OBJECTIVES:



Increase gas
incomes and
portifolio



Increment of
the teczical
capabilities



Become an
operator
In a mid-long
term

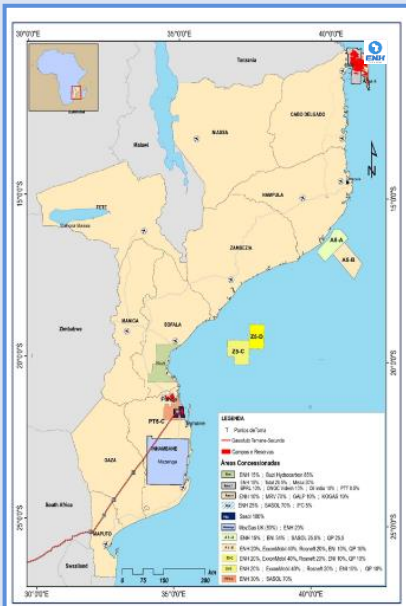
ENH BUSINESS PORTFOLIO

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UPSTREAM

EXPLORATION

P&T
A1
A4
A5-A
A5-B
BUZI
PT-5C
MAZENGA



DEVELOPMENT

53 PJ/a

13.12 MTPA + 18 MTPA

CTT 450MW

LPG (Cooking Gas) 30'000 t/a

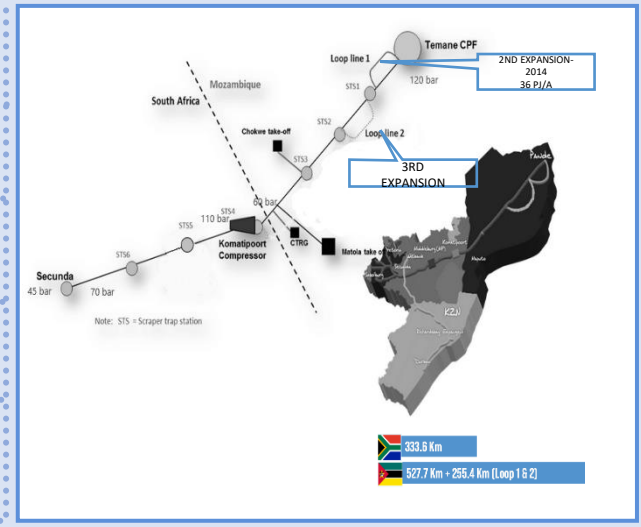
MIDSTREAM

PRODUCTION

197 PJ/a

3.4 MTPA

- CTM 100MW**
- 120MW**
- 175MW**
- 40MW**
- autogas**
- Industrias**



DOWNSTREAM

TRANSMISSION

DISTRIBUTION

KOGAS

GAS DISTRIBUTION NETWORK

Piped Gas
Maputo/Marracuene
Norte de Inhambane

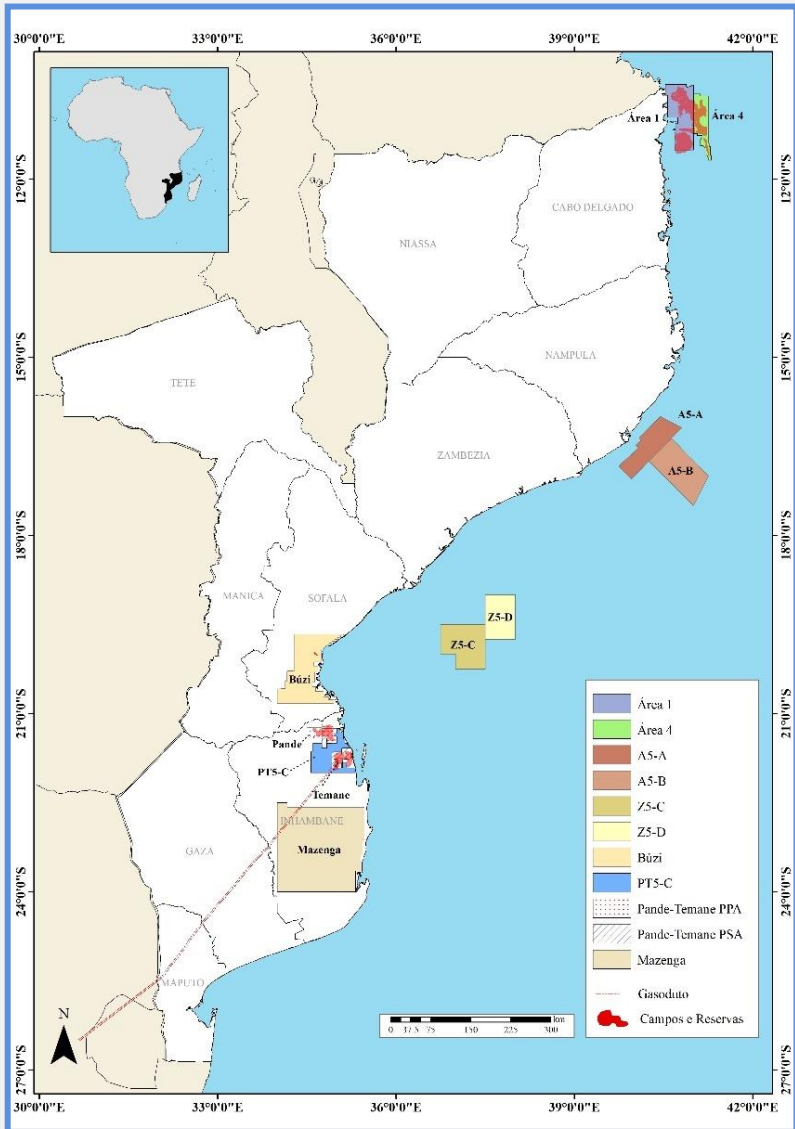
2500 Residential Clients

SERVIÇOS DE APOIO

-
-
-
- ENGINEERING SERVICES**
- INSTALLATION SERVICES & MAINTENANCE**

ACTIVE AREAS VS. OPEN ACREAGE

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EXPLORATION

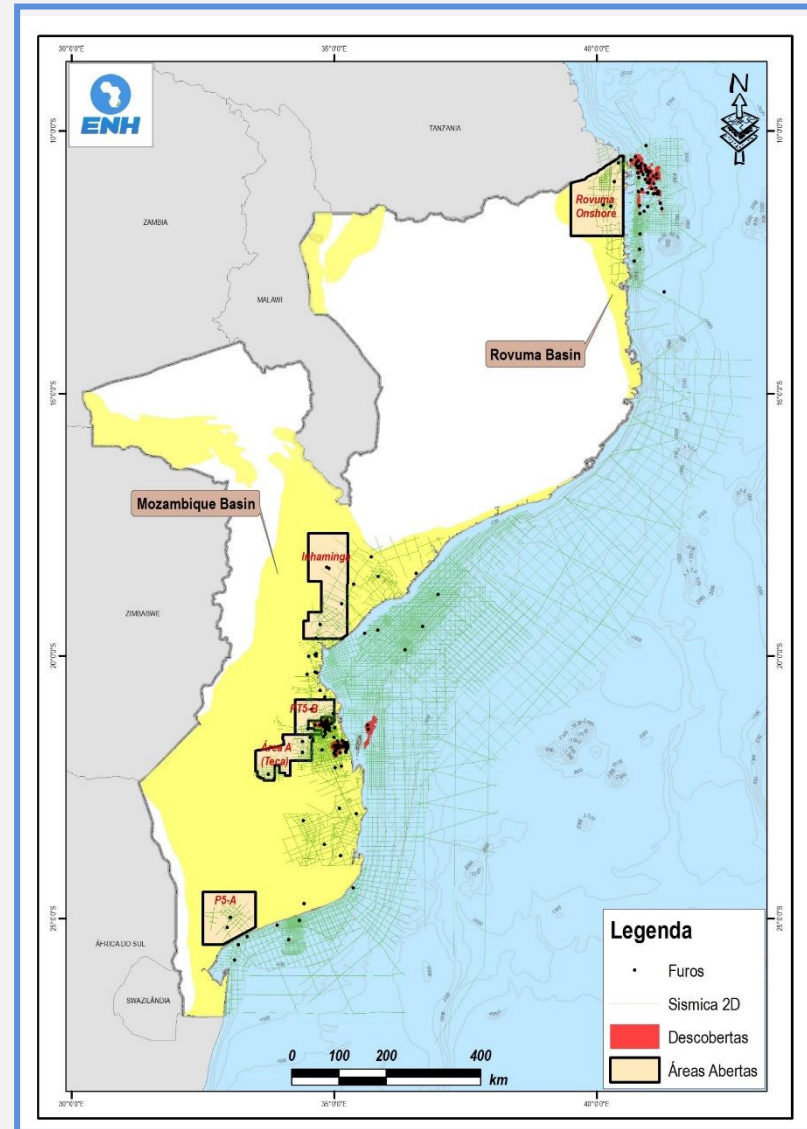
BUZI	ENH 25%	
MAZENGA	ENH 20%	
Blocos do 5º concurso	ÁNGOCHE A5-A	ENH 15%
	ÁNGOCHE A5-B	
	ZAMBEZI Z5-C	ENH 20%
	ZAMBEZI Z5-D	
	PT5-C	ENH 30%

DEVELOPMENT

ÁREA 1	MOZAMBIQUE OIL & GAS	ENH 15%
ÁREA 4	CORAL FLNG	ENH 10%
PSA	ENH Evoluir é natural	

PRODUCTION

PPA	ENH Evoluir é natural	ENH 25%
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CURRENT ENH UPSTREAM PARTNERS

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CORAL SOUTH FLNG

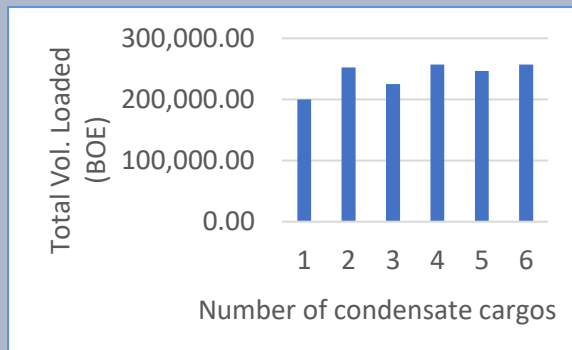
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Coral Sul FLNG

Design: FLNG
 Capacity: ~3.5 MTPA
 Reservoir: Coral Eocene 441
 Location: Offshore Afungi
 Operator: Eni

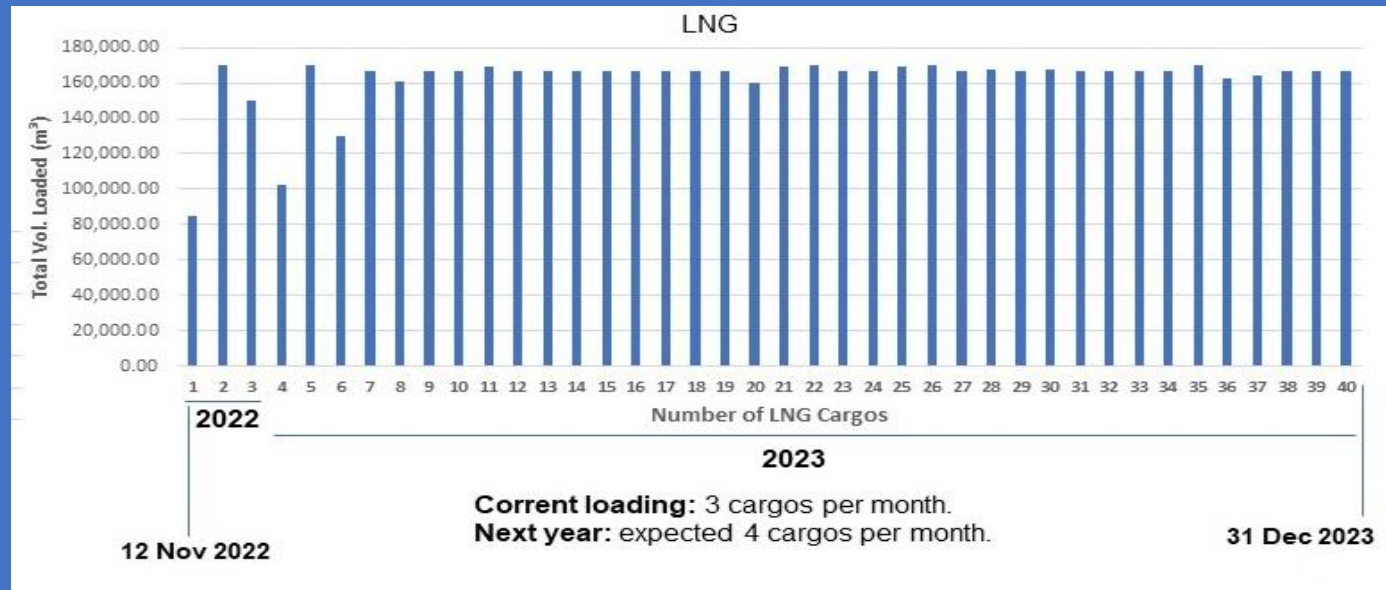
Condensate



MRV (70%) 	ENH (10%) 	GALP (10%) 	KOGAS (10%)
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Jun 2017 – FID / Main Contract Award	2018 - 2021 – Construction FLNG and Drilling 6 wells	18 Jun 2022 – Production start-up	2 Oct 2022 – First LNG Drop
12 Nov 2022 – 1st LNG cargo		30 Nov 2022 – 1st Condensate cargo	28 May to 15 Jun 2023 – Shutdown for Provisional Acceptance Certificate (PAC)

Plant achieved 95% of production capacity



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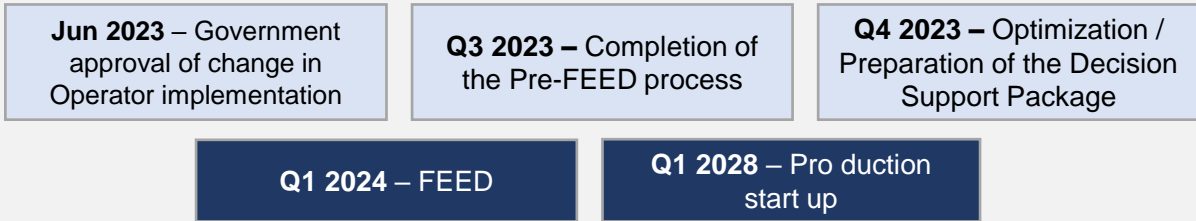
Imagen apenas ilustrativa

Rovuma LNG Phase 1

Design: Onshore modular eLNG
Capacity: 18.0 MTPA
Reservoir: Mamba straddling EU397 e OUS361&2
Location: Afungi
Operator: ExxonMobil (EM)

MRV (70%)	ENH (10%)	GALP (10%)	KOGAS (10%)
 ExxonMobil	 ENH Energía e natural		

- ❖ The state of Force Majeure (FM) prevails - suspension is expected in coordination with Area-1;
- ❖ Resettlement (Area-1) restarted in March 2023;
- ❖ Pre-FEED for onshore eLNG is in the final stage. Request for Expression of Interest (EOI) for FEED made on March 17, 2023, to which 20 entities responded, of which 7 were qualified.
- ❖ FEED is expected to start at the beginning of 2024;
- ❖ The Government's decision is awaited on the request for division of leadership in the Projects (ExxonMobil as Operator of Transzonal reservoirs and Eni as Operator of non-Transzonal reservoirs).

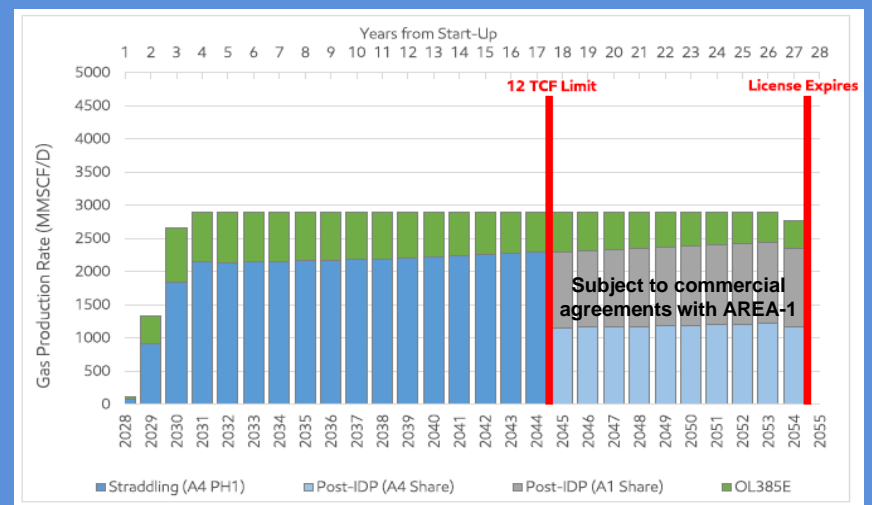


- **Wells:** 26 (11 EU297 + 7 OUS361&2 + 8 OL385E)
- **Gas Rate:** 2,900 MMscfd
- **End of concession:** 2054

Subject to commercial agreements with AREA-1

Area -1

- **Wells:** 14
- Production start-up: 3 years later Area-4
- **Capacity:** 10.0 MTPA



MOZAMBIQUE LNG

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Mz LNG

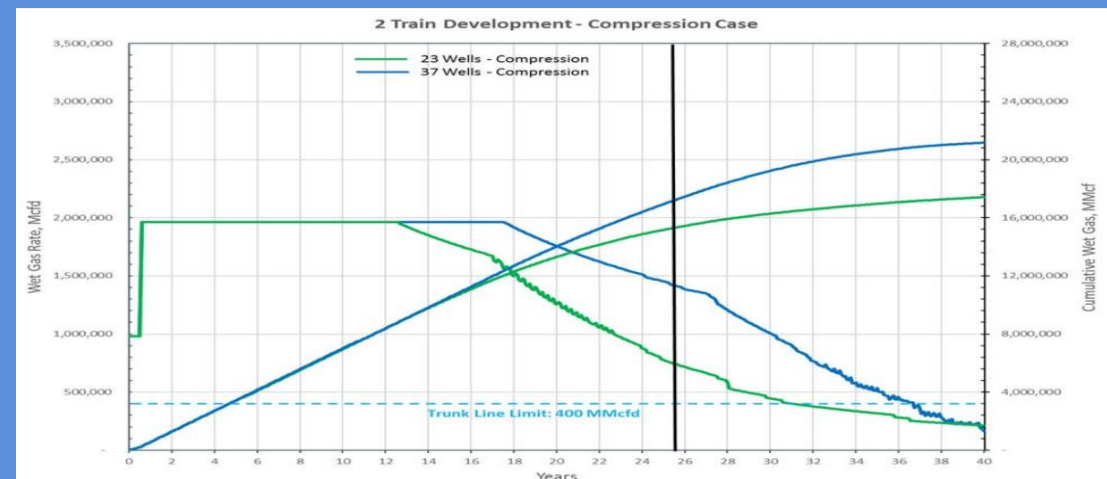
Design: Trains Onshore
Capacity: 12.88 MTPA
Reservoir: Golfinho-Atum
Location: Afungi
Operator: TotalEnergies

Other Discoveries:
 Prosperidade (Pre-development): 45 TCF
 Orca (Appraisal): 12,2 TCF
 Tubarão (Appraisal): 2,87 TCF
 Tubarão-Tigre (Appraisal): 1 TCF

TOTAL (26.5%) 	ENH (15%) 	OVL (10%) 	MITSUI (20%)
PTTEPL (8.5%) 	BEAS (15%) 	BHARAT (10%) 	

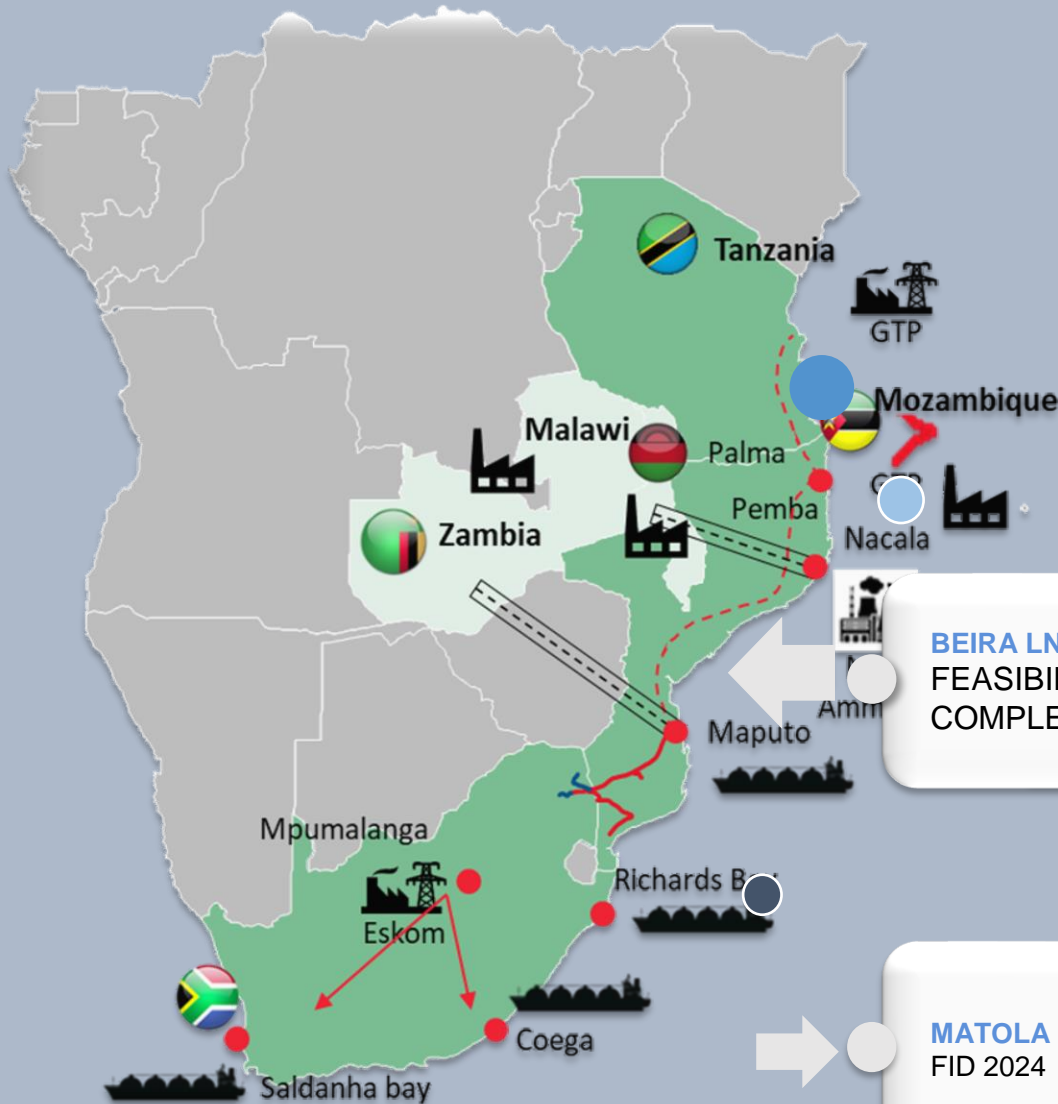
- ❖ FM (Force Majeure) status prevails;
- ❖ Resettlement (Area-1) restarted in March 2023;
- ❖ FM is expected to be suspended between July 2023 and January 2024;
- ❖ Negotiations to extend the suspension period of the contract with CCSJV were finalized, from June to December 2023;
- ❖ Negotiations are underway with shipbuilders and manufacturers to preserve contracts and secure extensions.

2018 – PoD	2019 – FID	2020 – spud construction phase	Q1 2021 – declared FM
Q3 2023 – Q1 2024 – expected re-start	Q2-Q3 2028 – Production Start up	<ul style="list-style-type: none"> • Wells: 18 (23 no PoD) • Production index: 2 Bscf/d • Capacity: 13.12 MTPA (2 Trains) 	



ENH DOMESTIC GAS MONETIZATION OPPORTUNITIES

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400+500 MMSCFD
DOMESTIC GAS COMMITMENT

NORTH SOUTH PIPELINE | 2,600 KM
FEASIBILITY STUDY

PRODUCTION OF METHANOL/FERTILIZERS
FEASIBILITY STUDY

BEIRA LNG TERMINAL
FEASIBILITY STUDY
COMPLETED

MATOLA LNG TERMINAL
FID 2024

CABOTAGEM

- ssLNGC
- FSU/ FSRU

PORTO

- Cais Existente
- Cais Dedicado
- CBM (Conventional Buoy Mooring)

TERRA (ONSHORE)



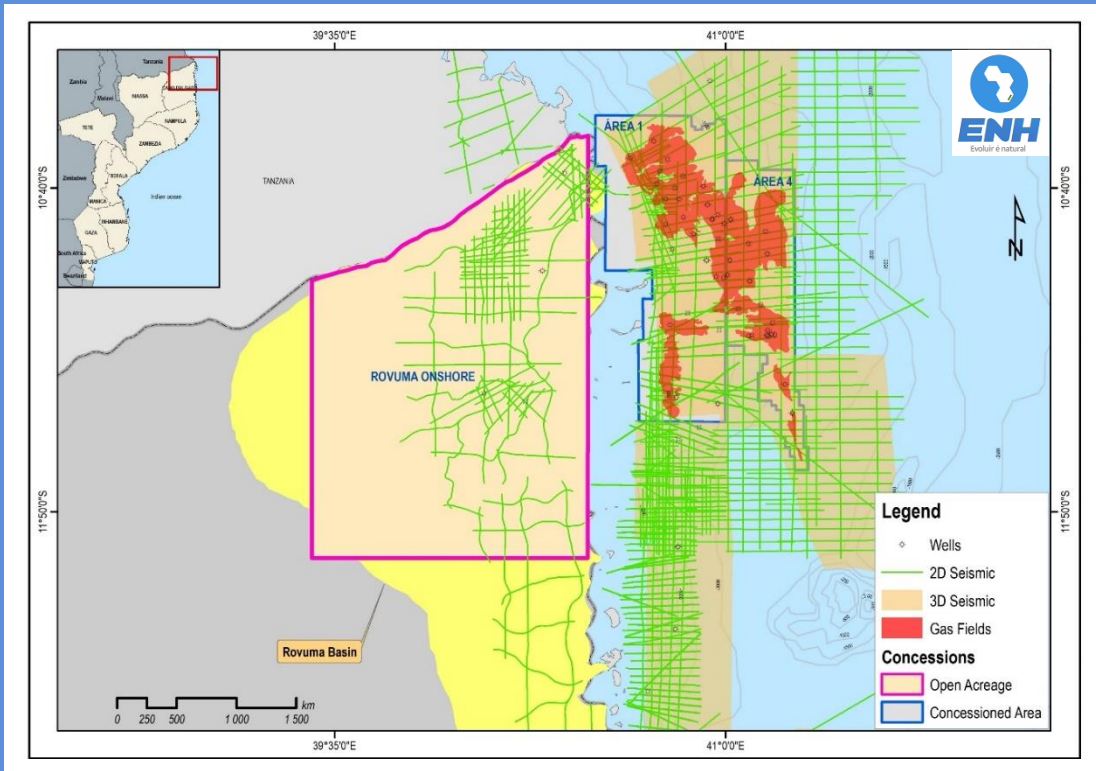
POTENTIAL OPEN AREAS

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- ❑ Six (6) onshore blocks (open acreages).
- ❑ One (1) Located in Rovuma Basin (Northern Mozambique) and five (5) in Mozambique Basin (Central and south Mozambique)
- ❑ All with high geological potential for clastic reservoir with oil and gas.

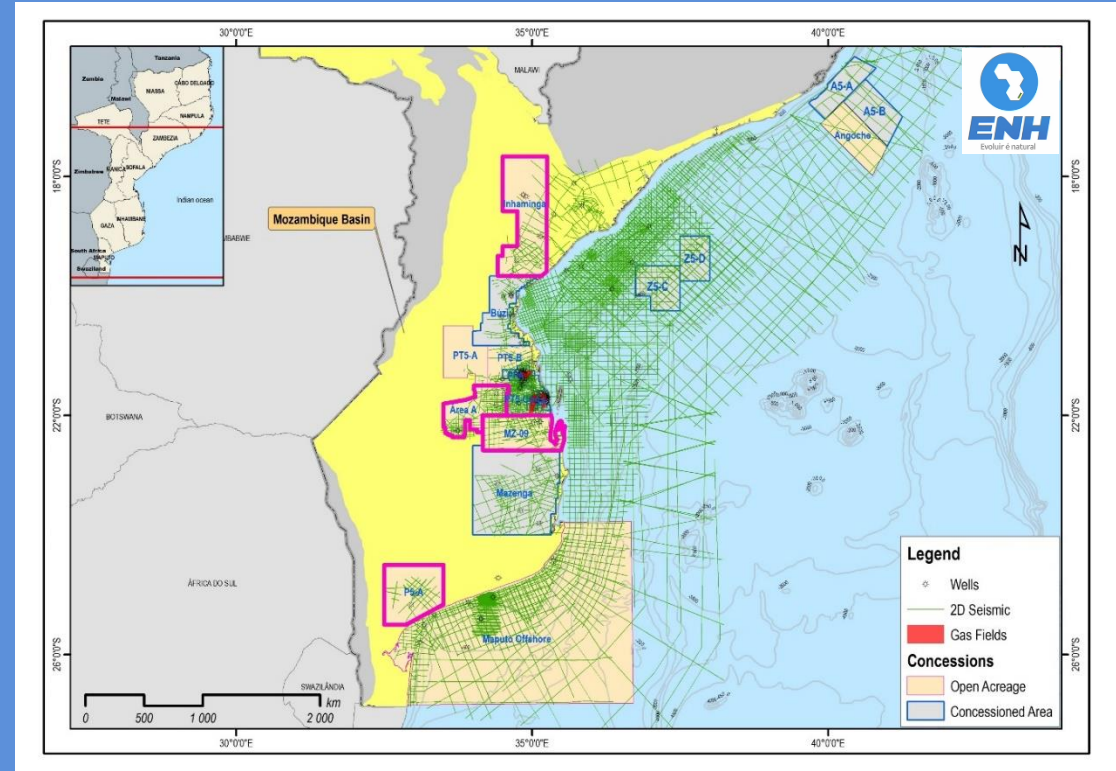
ROVUMA BASIN (NORTHERN MOZAMBIQUE)

Rovuma Onshore Block



MOZAMBIQUE BASIN (CENTRAL & SOUTH MOZAMBIQUE)

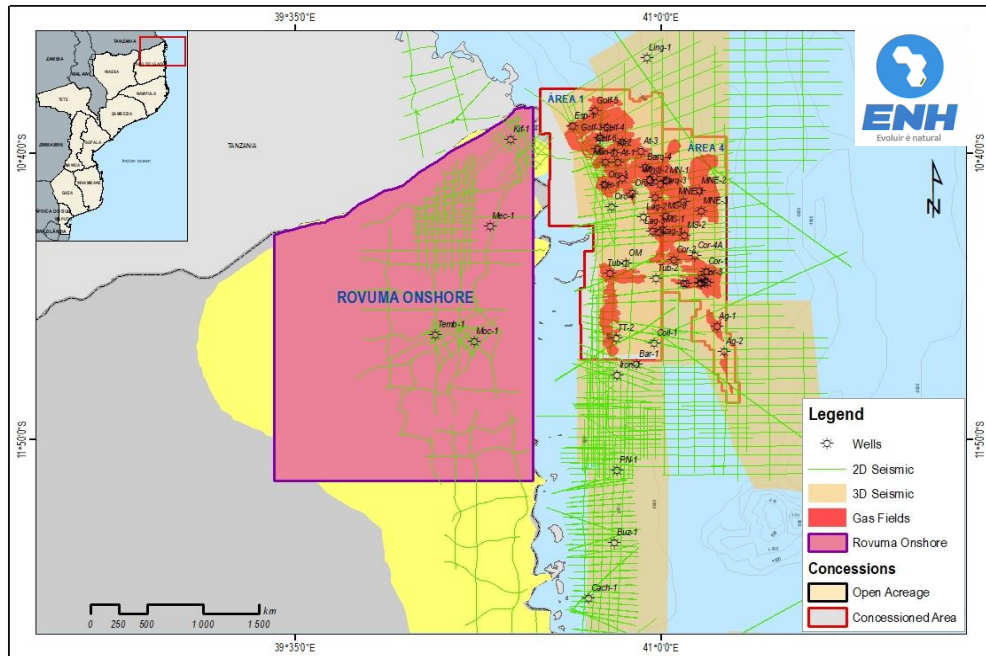
PT5-B; Teca; Inhaminga; MZ-09; Palmeiras; P5-A



ROVUMA ONSHORE BLOCK

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Seismic Data



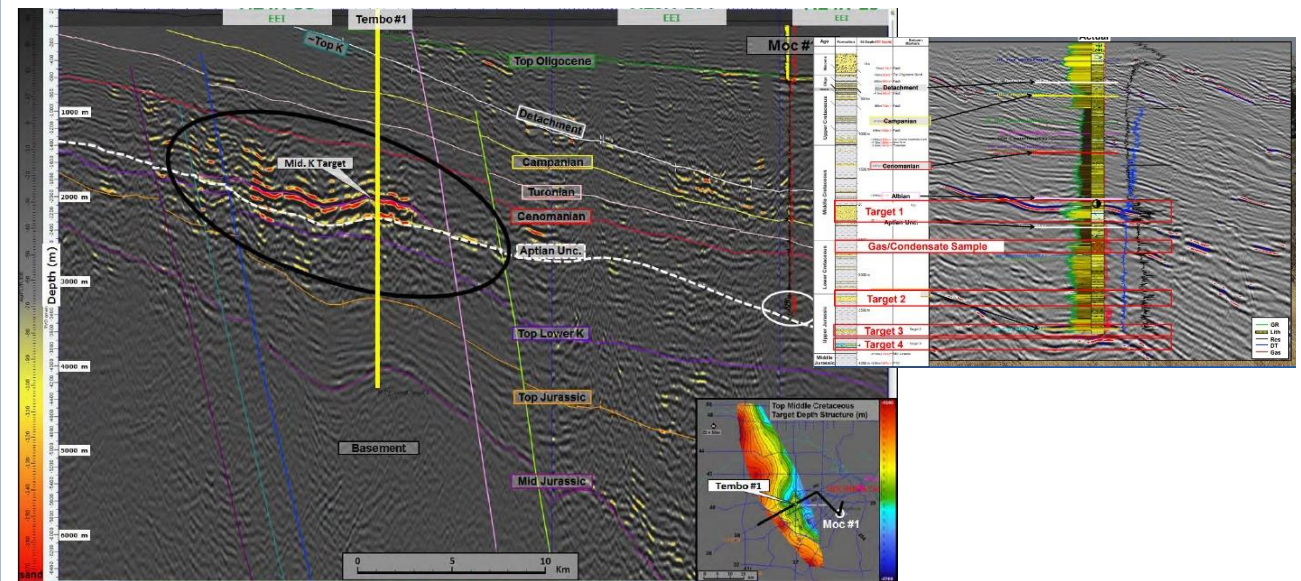
Background

- ❑ Covers an area of 15,000 km²;
- ❑ The is covered by 3951 Km of 2D seismic data;
- ❑ Hydrocarbon occurrence (non commercial gas and multiple oil traces);
- ❑ Shallow targets with good amplitude response.

Well Information

Wells	Year	TD (mTDVss)	Target Interval	Drilling Results
Mocimboa-1	1986	3494	Oligocene Roll-over anticlines (tertiary) and Albian submarine fans (Cretaceous)	P & A, with gas show and oil traces
Mecupa-1	2009	2898	Oligocene-Miocene structural-stratigraphic traps	P & A, gas shows in Oligocene-Miocene sandstone
Tembo-1	2014	4500	Cretaceous and Jurassic strutral-stratigraphic traps	P & A, gas discoveries in 3 m sands from Albian aged reservoir (with recoverable resources < 2 BCM)
Kifar-1	2015	3100	Oligocene-Miocene structural-stratigraphic traps	Dry hole

HC Potential



- ❑ Middle Cretaceous units (Albian) - Mixed limestone and sands with 11 m of net sand where gas shows were reported.

PT5-B BLOCK

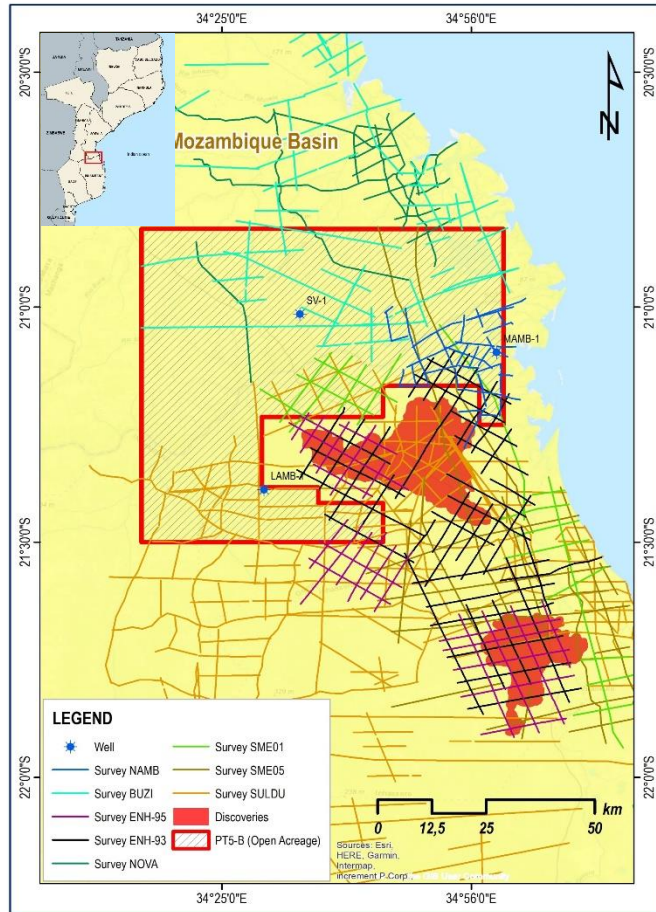
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Well Information

Wells	Year	TD (mTDVss)	Target Interval	Drilling Results
Lambo-1	1967	1664	L. Grudja	Dry
Mambone-1	1957	3611	Lupata	Gas Show
North Save-1	2010	2025	L. Grudja	Dry

Seismic & Wells

- Covered by about 1460 km of 2D seismic data;
- Six(6) different surveys cover the Block;
- Three (3) wells drilled in the Area: Lambo-1(1957), Mambone-1(1967) & North Save-1(2010).

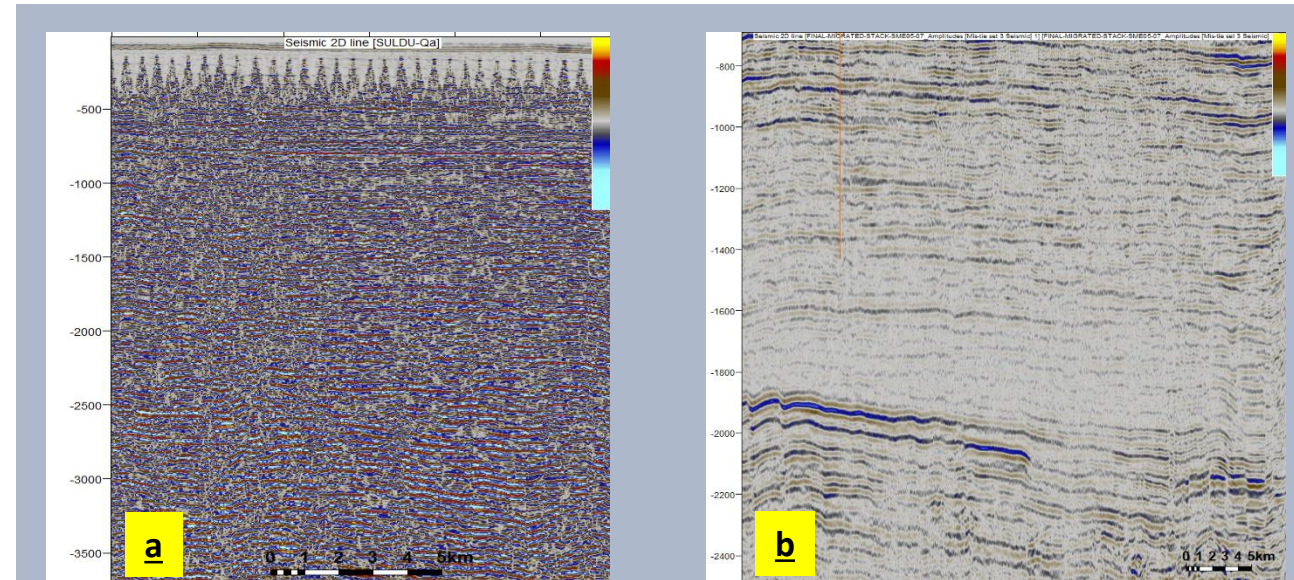


- Location: *Continental Onshore. Central of the Mozambique Basin*

bordered South-East: Pande (gas field) & PT5-C (gas discovery) and North: Buzi Block (gas discovery and under evaluation)

- Area: 4.356 sqm
- Past Operating Company
✓ Sasol
- Logistic Infrastructures
✓ Nearest Airports: Beira & Vilanculos
✓ Nearest Seaports: Beira

Seismic Data Quality



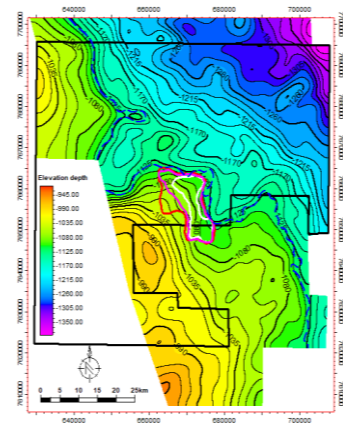
Data Quality

- Surveys: Suldu(1960), Nova(1961), Búzi(1966), Namb(1968) – worse quality;
- Campaign SME-01, SME-05 & ENH-95: - moderate quality;
- Sparse data & West part no data acquired.

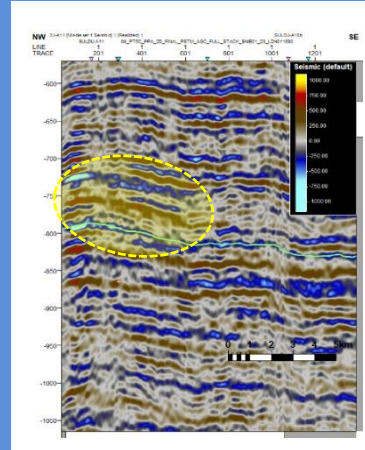
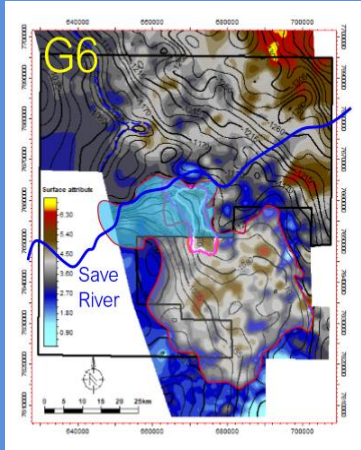
PT5-B BLOCK: SEISMIC INTERPRETATION AND PROSPECTIVITY

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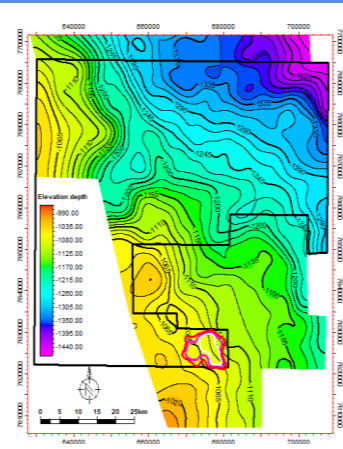
Top G-6: Depth Structural Map (C.I = 15 ms)



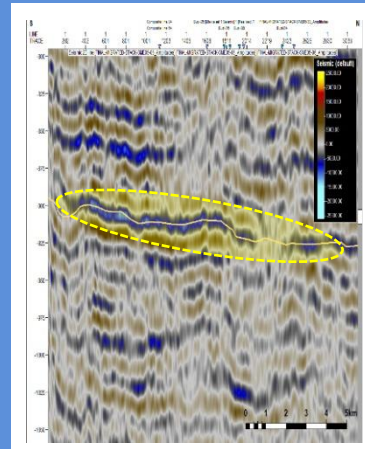
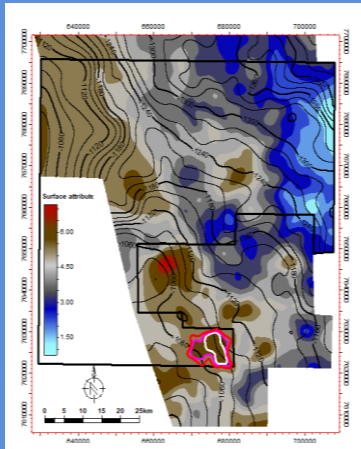
G-6: RMS Seismic Attribute (+/- 5 ms)



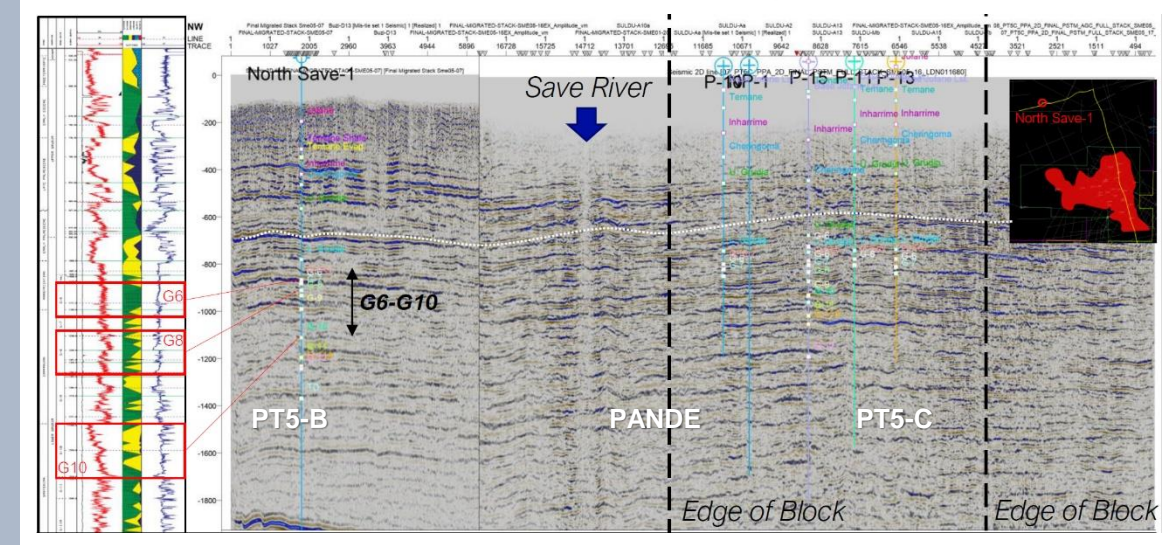
Top G-8: Depth Structural Map (C.I= 15 m)



G-8: RMS Seismic Attribute (+/- 5 ms)



The main targets



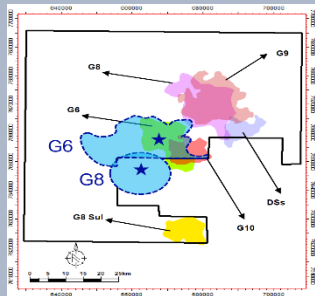
EXTERNAL STUDIES

Resources estimated (ENH) at G6 Level

Parâmetros Considerados - G6					interpretation
Sw (%)	Øe (%)	BG	NTG	GWC	
60	24	0.01	0.44	1121	
Estimativas - G6					
Reservatório	Area (10 ⁶ m ²)	GRV (10 ⁶ m ³)	HCPV (10 ⁶ m ³)	GIIP (Bcfs)	
High	161.2	6045.90	244.74	864.28	X2?
Best	121.2	3962.50	160.40	566.46	X2?
Low	74.5	2260.50	91.50	323.15	

G-6 level, volumes could be double 1,tcfs GIIP (Best Case)

Possible G6 extension



Leads/Prospectos

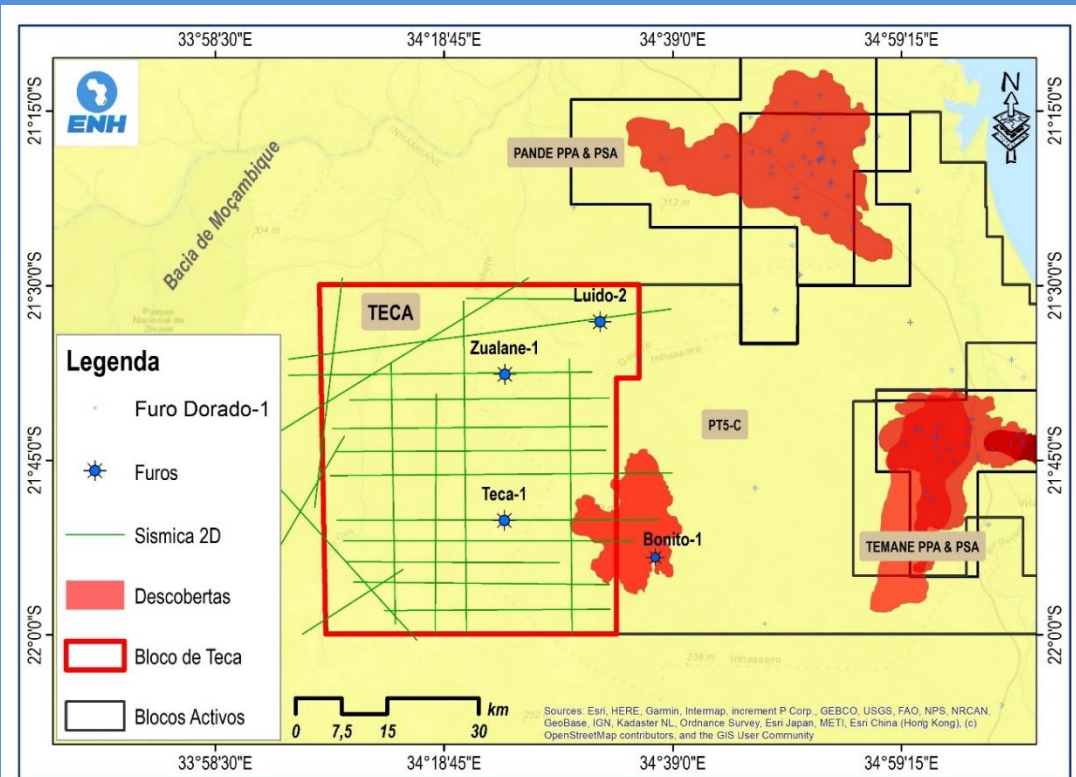
Leads/Prospects	Low Scenario	Best Scenario	High Scenario
G6	323.15	566.46	864.28
G8	171.37	3181	520.28
G8 Sul	46.28	195.31	310.11
G10	129.55	144.15	372.13
Domo Sandstone	122.42	241.41	364.93
Total	792.78	1565.43	2431.73

- 2D Arbitrary line PT5-C, Pande Field & PT5-B target L. Grudja Fm to understand Sand fairway and reservoir presence;
- G6 GWC – 1221 m TVDSs from Pande Field showing amplitude conformance with structure;
- Reservoirs: G-8, G-10 & G-11A, show good sand development in the North Save-1 well;
- P-25 Well GWC @ G10 used for G10 in PT5-B;
- TD in G12 level, above Domo Formation.

TECA BLOCK

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Seismic Data



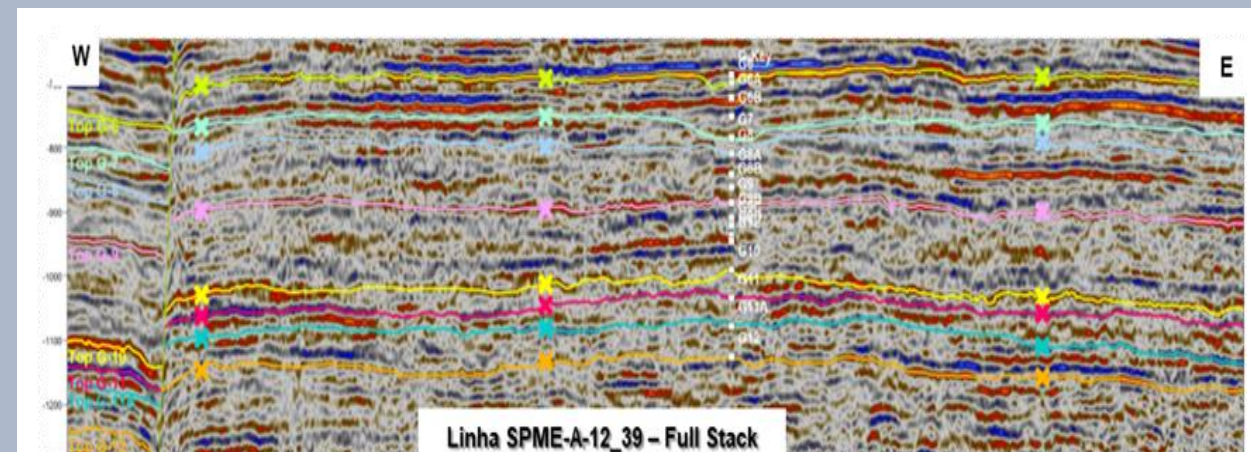
Background

- Covers an area of 6,695.3 km²;
- 5 Exploration wells drilled between 1956 and 1967, 1 well drilled by Sasol in 2017;
- 2,247 km of 2D seismic data acquired in 2012/13;
- Lower Grudja reservoirs are the main targets.

Well Information

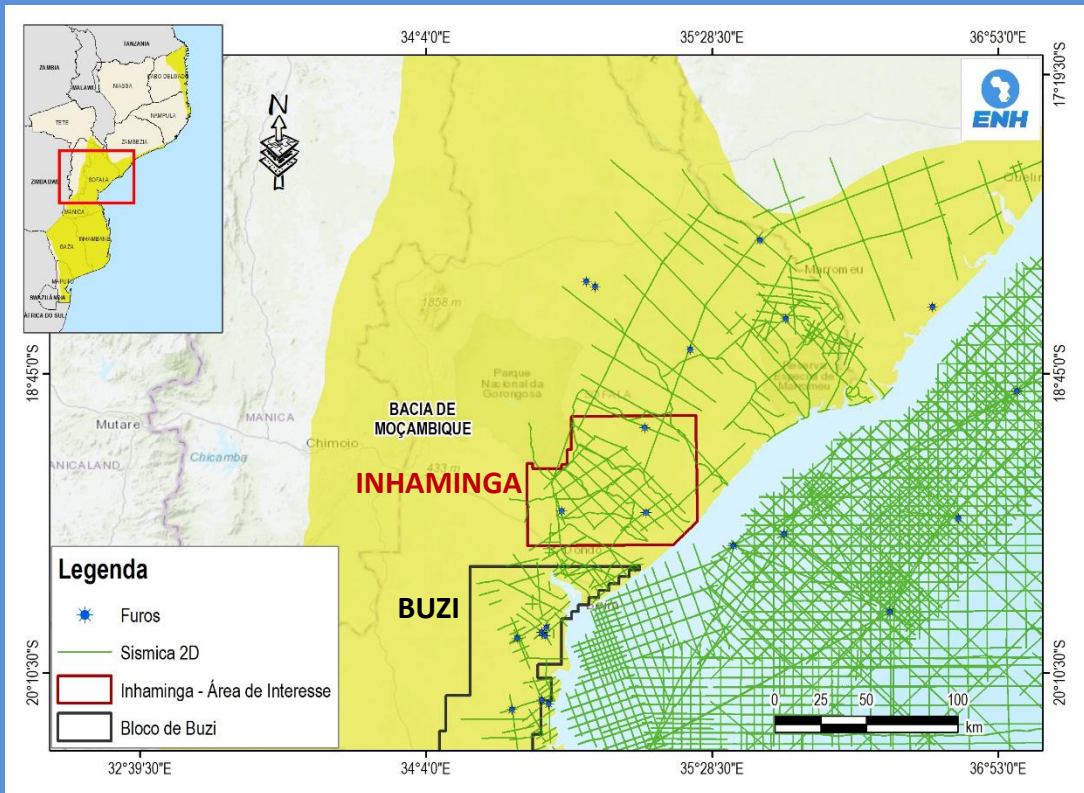
Wells	Year	TD (mTDVss)	Target Interval	Drilling Results
Teca-1	1962	3196	Lower Grudja (Cretaceous)	dry hole with four (4) gas shows
Luido-2	1967	1779	Lower Grudja (Cretaceous)	Dry hole
Zualane-1	1967	1678	Lower Grudja G-11A (Cretaceous)	P & A, max. Gas show

HC Potential



- Gas High potential on shallow (**Lower Grudja** level) and deeper targets (**Domo Sandstone** and **Sena** formations);
- Upper Cretaceous Maastrichtian G-6 and G-8 sands show strong amplitude anomalies

Seismic Data



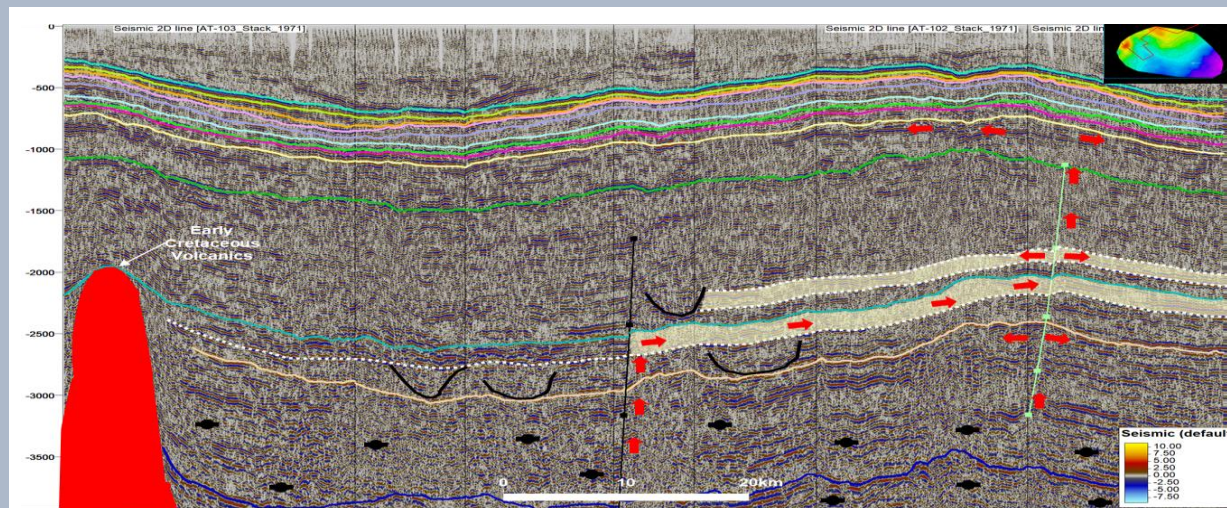
Background

- ❑ Is an onshore block located in the northern of the Mozambique basin, north of Buzi gasfield;
- ❑ Covers an area of approximately 5,300 km²;
- ❑ Partly covered by seismic data (~2222 km).

Well Information

Wells	Year	TD (mTDVss)	Target Interval	Drilling Results
Corone-1	2004	2180	Lower Grudja G-9 (Cretaceous)	P & A, with shows
Savane-1	2004	1962	Lower Grudja G-11 (Cretaceous)	P & A, with shows
Chipondene-1	2008	750	N/A	Result unreported
Chipondene-1ST	2008	1710	N/A	Dry hole
Sangussi-1A	2008	2250	Lower Grudja G-9 & G-10 (Cretaceous)	P & A, with gas shows
Chite-1	2010	3500	N/A	P & A, Dry hole
Inhaminga High-1	2011	3600	Lower Grudja G-6, G-10 and Domo sandstone (Cretaceous)	Dry hole

HC Potential

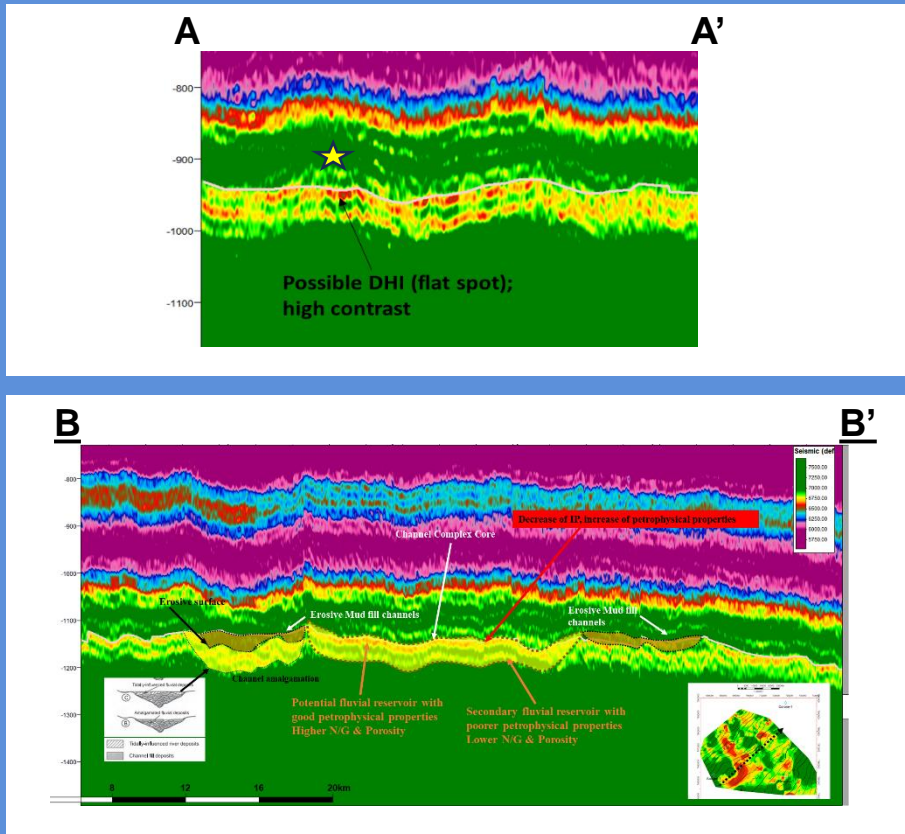


- ❑ Gas shows in Lower Grudja Fm. (Sangussi-1 well);
- ❑ Rio Condue gas seep, located in north of the this block has the same gas composition as the Temane gasfield;
- ❑ Gas shows in 2 shallow wells from the 1930s.

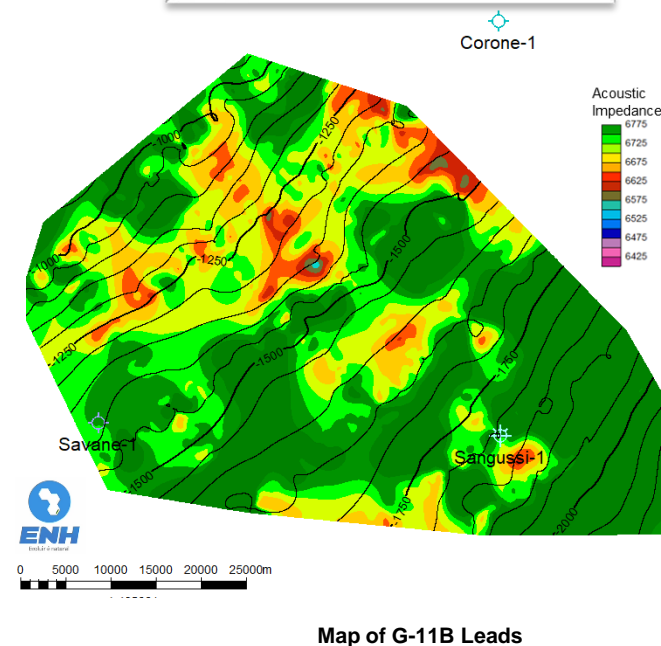
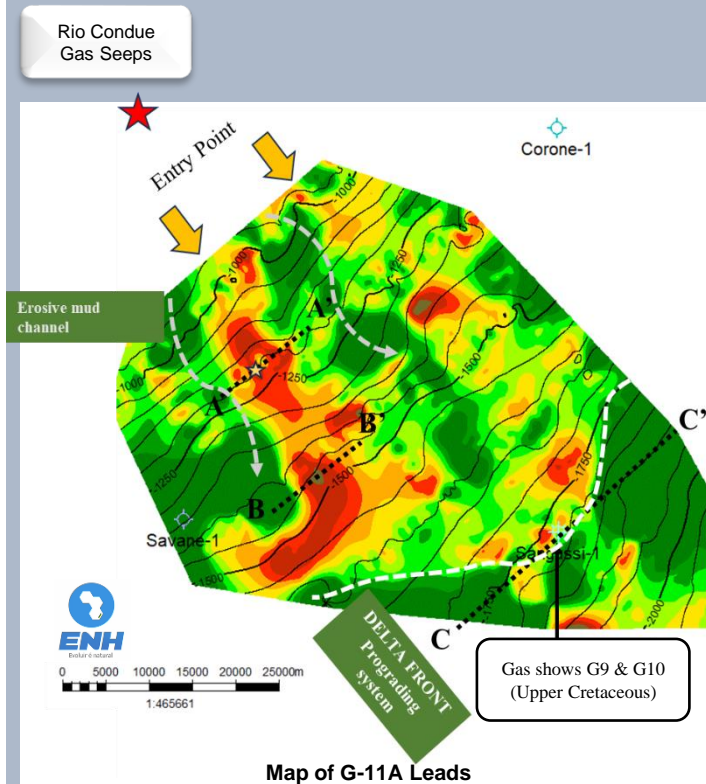
INHAMINGA BLOCK

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Seismic Inversion Data & Interpretation



PROSPECTIVITY



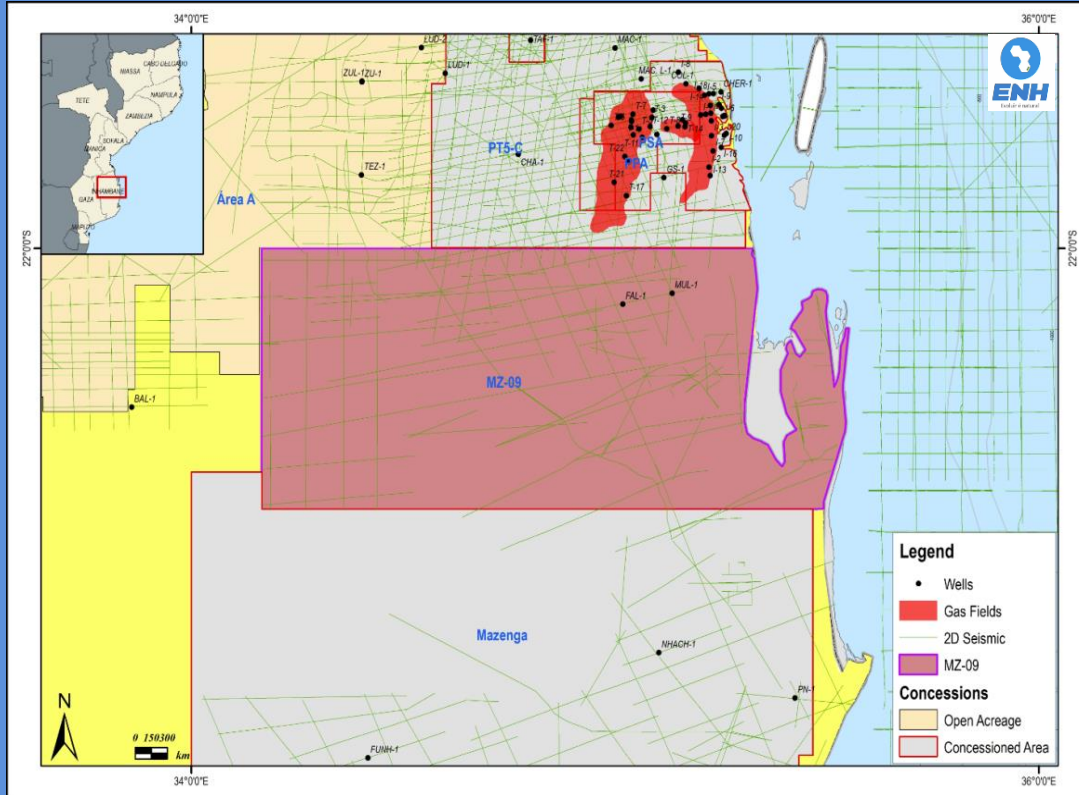
GIIP (Bcf)	Low	Best	High
G11A-Oeste	559(S) – 717(N)	870	1248
G11A-Este	229	351	492
G11B-Central	187	231	869
G11B-Oeste	158	408	475
G11B-Sul	59	92	152
Total	1,192(S) – 1,350 (N)	1,952	3,236

- Updated G&G study performed in southern area of the Inhaminga block – Seismic Inversion & Interpretation
- Higher HC prospectivity in Southern area;
- Five (5) Leads identified in the Lower Grudja sequence in G-11A eq. & G-11B eq. targets;
- Estimated GIIP resources over 1.5 Tcfs for the G-11A eq and up to 1.5 Tcfs for G-11B eq.

MZ09 BLOCK

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Seismic Data



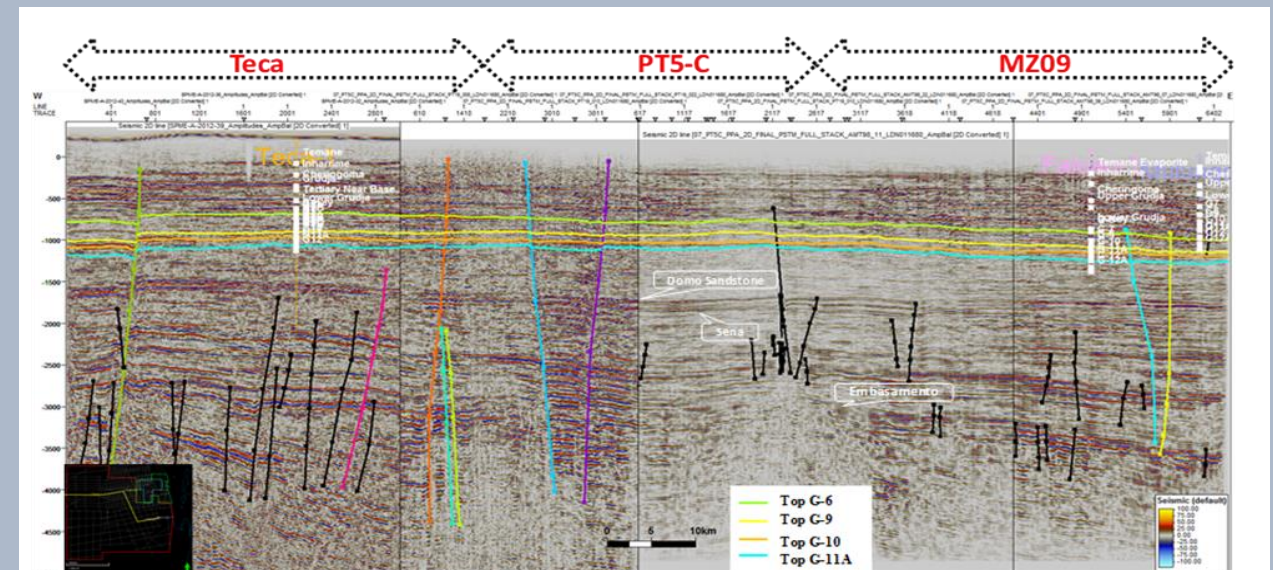
Background

- The Block covers approximately 8,526 square kms;
- Potential targets are Lower Grudja paralic sand bodies vertically stacked;
- High grade prospects were mapped based on 2D seismic data recently reprocessed;
- The wells Falcão-1 and Mulungo-1 were drilled off structure, downdip of the regional N-S trending structural High visible on seismic sections.

Well Information

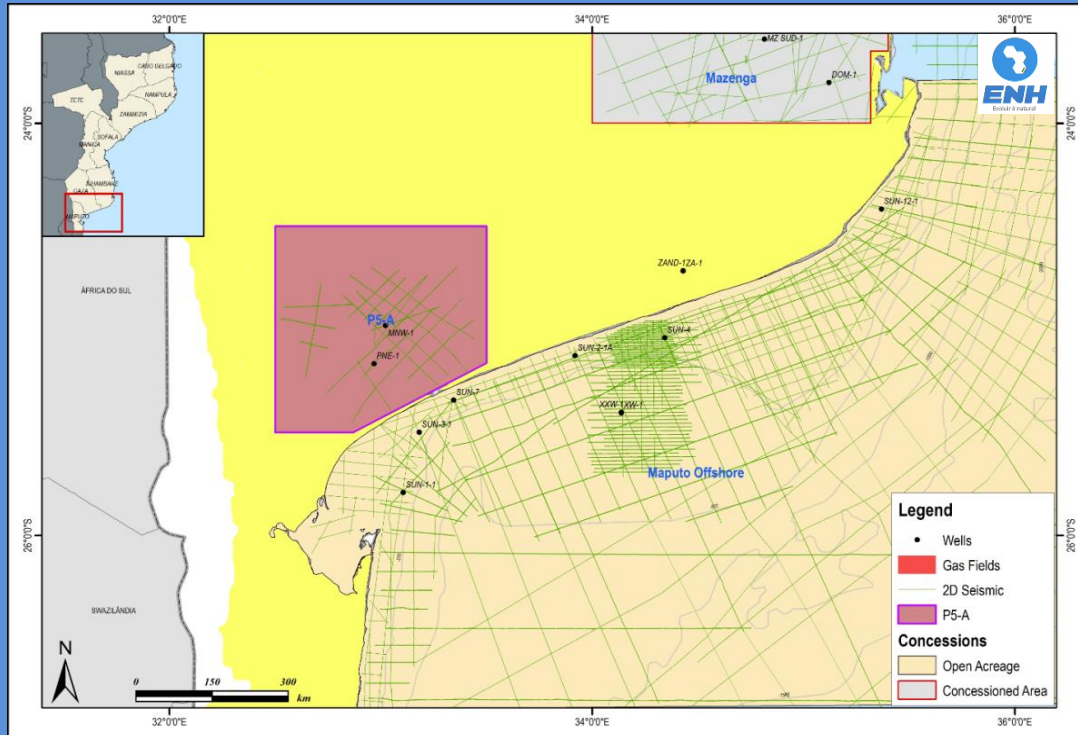
Wells	Year	TD (mTDVss)	Target Interval	Drilling Results
Mulungo-1	2004	2003	Cretaceous Sandstone	Dry hole with gas show in G-12
Falcão-1	2010	2007	Cretaceous Sandstone	Dry hole

HC Potential



- Undrilled prospects, vertically stacked located in the central are of this concession.

Seismic Data



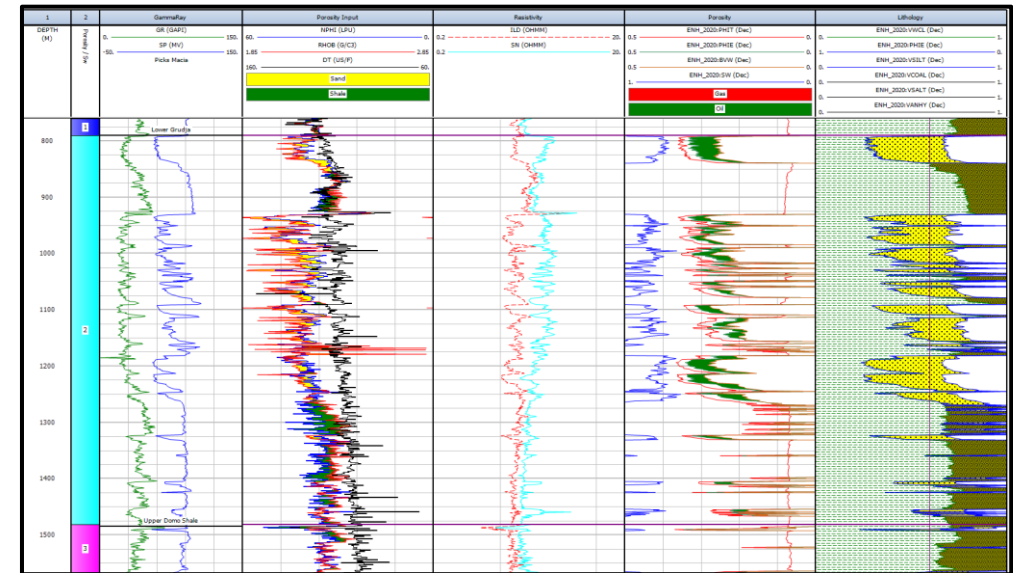
Background

- The Palmeira block covers an area of 9,997 km²;
- The block is covered by 900 kms of legacy 2D seismic data acquired in 1970 (low quality data);
- Target interval comprises Cretaceous aged reservoirs deposited under Deltaic and shallow marine environments (same as Lower Grudja Fm in Pande-Temane-Inhassoro fields).

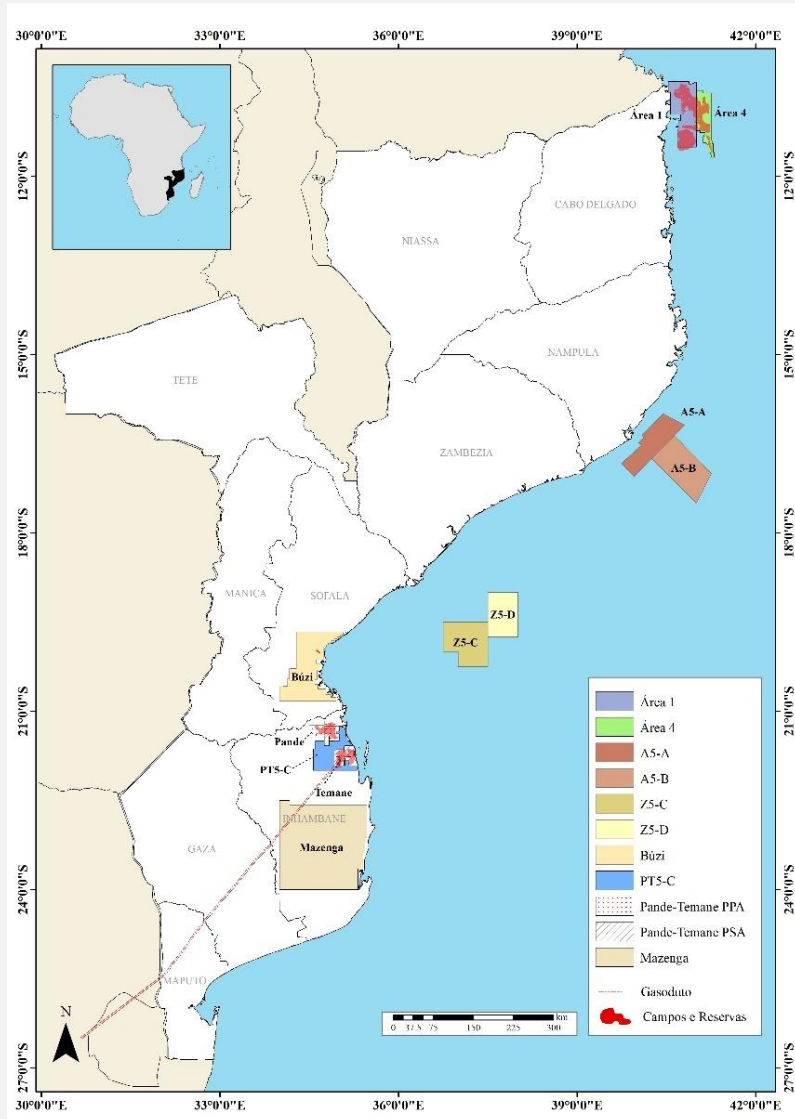
Well Information

Wells	Year	TD (mTDVss)	Target Interval	Drilling Results
Palmeira NE-1	1971	4470	Cretaceous Sandstone	Dry with possible oil show in Lower Domo Shale Fm.
Macia NW-1	1971	2338	Cretaceous Sandstone	Dry well

HC Potential



- Good quality reservoirs are present in the upper section of the Lower Grudja Formation (CPI from the Macia NW-1 well).



Onshore Mozambique Basin

- Vertical wells total depth ~1600 to 2100 m;
- Horizontal wells total depth ~1800 to 2600 m (~1000 m horizontal section)

Drilling Contractor

Drilling Rig Services Provider

- Onshore Drilling rigs
- Drilling Bits
- Solids Control Services
- Drilling Fluids
- Mud Loss Circulation Solution
- Onsite Nitrogen generating and pumping

Drilling Auxiliar Services

Providing Directional Drilling, Measurements

- Directional Drilling
- Measurement While Drilling
- Logging While Drilling
- Borehole Survey
- Wireline Logging Services
- Fishing and Downhole tools

Providing Production & Well services solutions

- Well Interventions
- Completion Services
- Pumping and Cementing
- Coiled Tubing & Slickline
- Well Stimulations
- Gravel pack & Pumping
- Well Testing, Drill Stem Test
- Drilling Fluids and Completions Fluids

Sourcing of local services

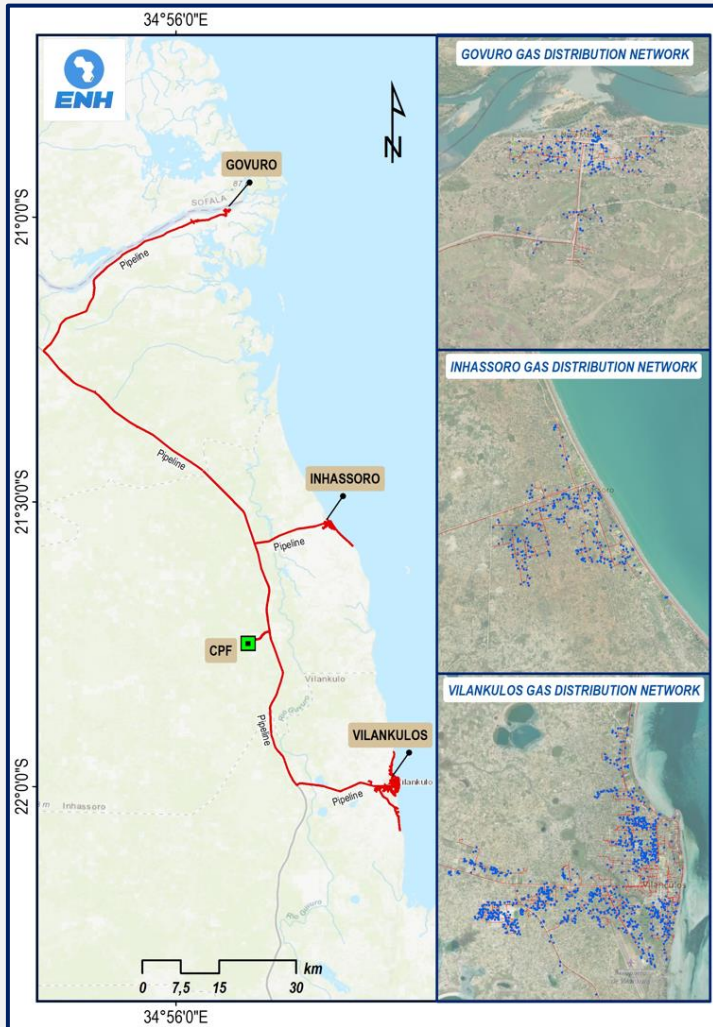
- Demining and Debushing
- Civil works (Site preparation, well pads construction, conductor installation, road access)
- Logistic base (provision of an area and its preparation for support to operation)
- Logistic base Management
- Chartering of local vessels if required
- Local transportation of materials (trucking)
- Supply of local consumables (Procurement)
- Fuel/Gasoline/Diesel, water, food (procurement)
- Drivers & Cars (Transportation services) opportunities
- Crew change (visa, transport, local flights, hotel, etc.)
- Agency Services, Custom Clearance, Meet & Greet
- Visas
- Housing and Accommodation (Hotels, Apartments)
- Catering service
- Offices
- Provision / Supply of Office equipment
- Health & (Safety/ SHE) Security services
- Medical Services (Clinic, Lab, ambulatory/ evacuation service, etc.)
- Security services (provision of Guard services)
- Telecommunications and IT services
- Waste management
- Drilling Water wells borehole / Supply potable water

Seismic Acquisition & Processing

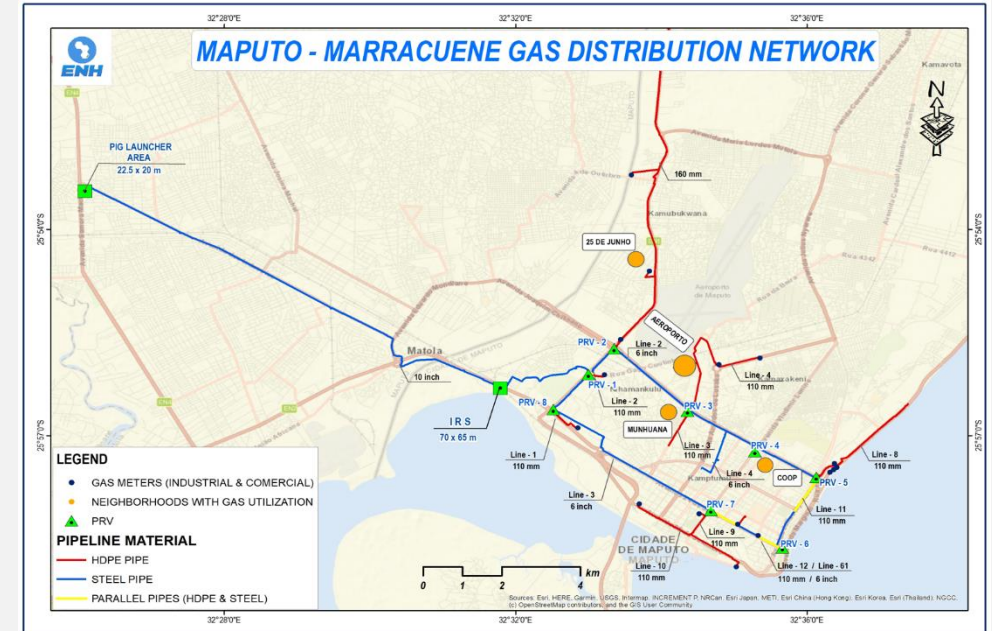
EXISTING GAS NETWORK

ENH - Confidential Information

North of Inhambane Province



Maputo - Marracuene



ENH Supplies Natural in Southern Mozambique

Pigging Launcher and Metering



IRS (Intermediate Regulation Station) and Pigging Receiver



Residential Clients



Commercial and Industrial Clients

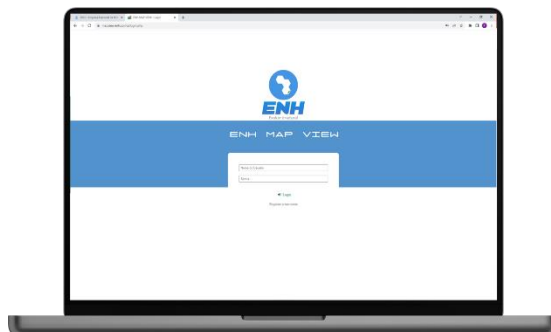
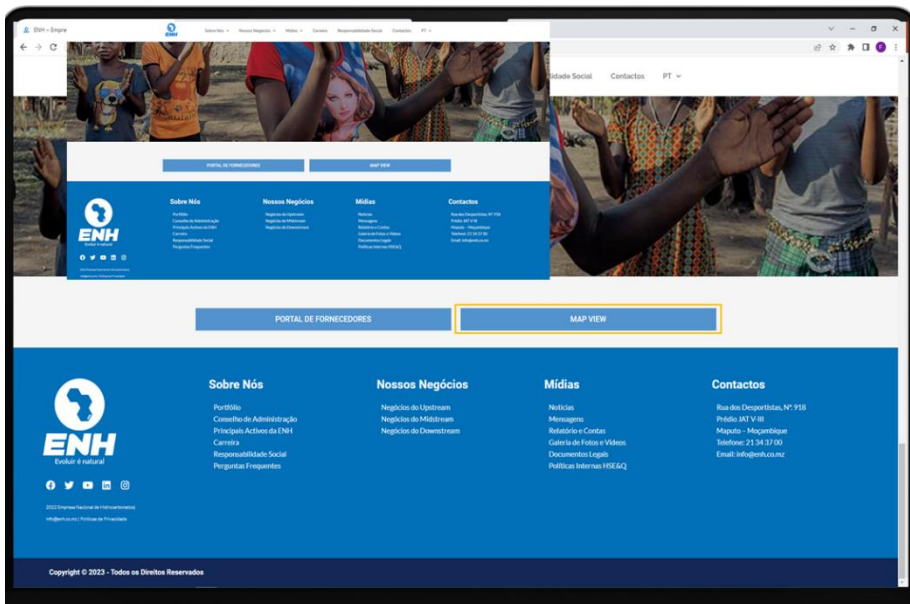


Natural Gas Vehicles Refuelling Stations

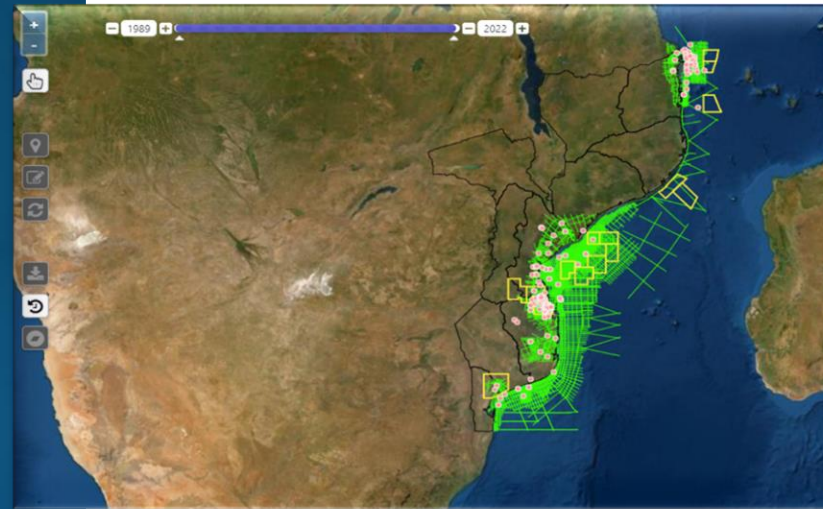


- 🔥 Around 2200 domestic customers in Northern Inhambane;
- 🔥 300+ domestic customers in Maputo City;
- 🔥 Utilization: cooking, heating
- 🔥 Mostly are conventional houses.
- 🔥 27 industrial and commercial customers, including NGV Refuelling Stations;

VISUALIZATION OF TECHNICAL DATA AND CREATION OF MAPS



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ENH

Evoluir é natural

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