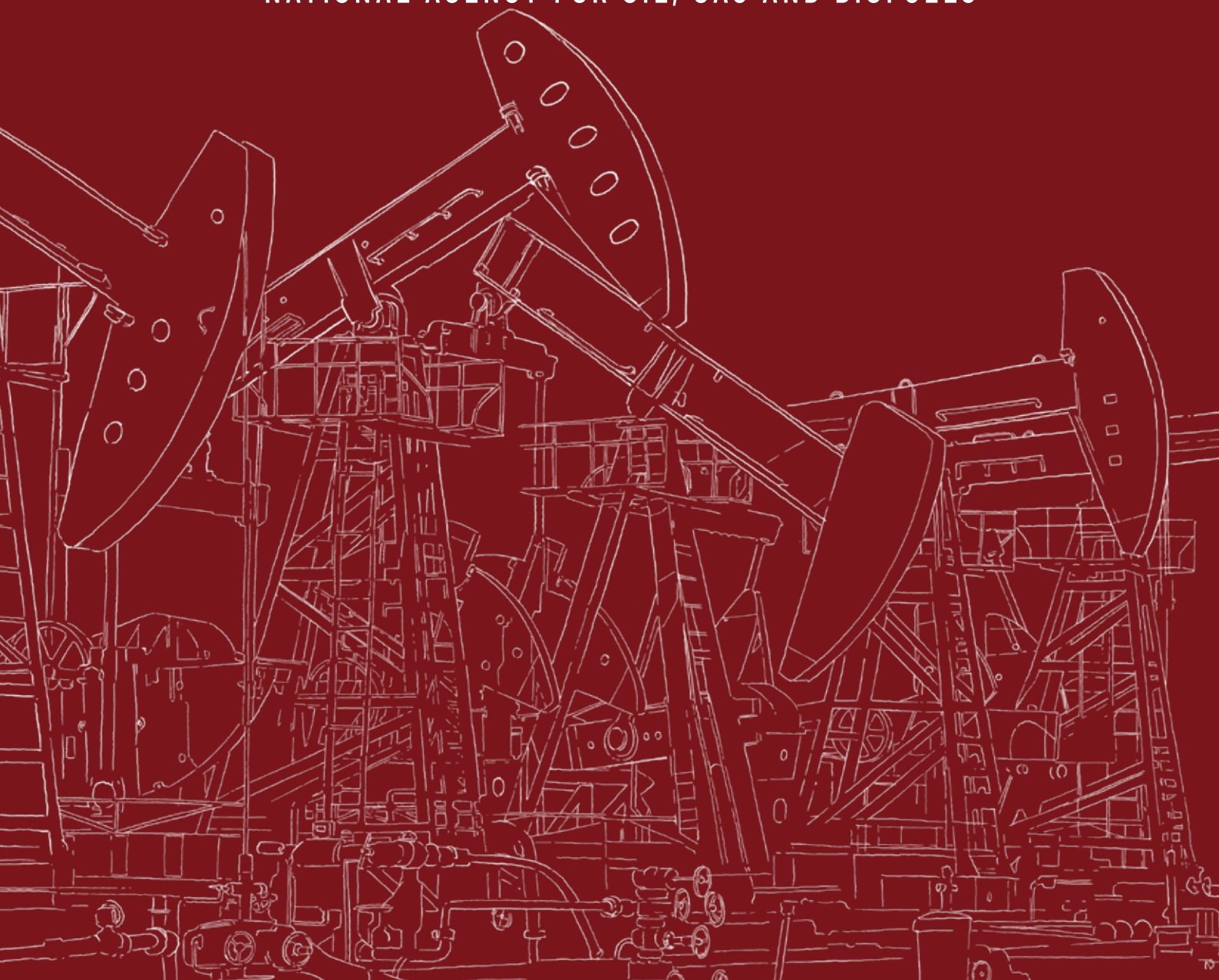
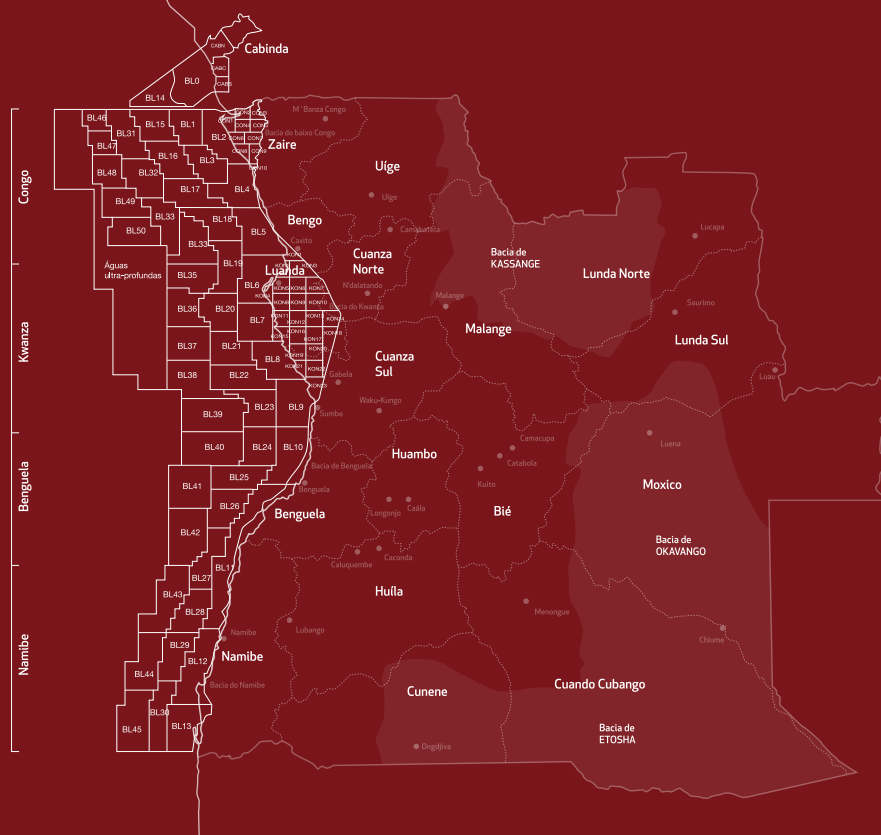
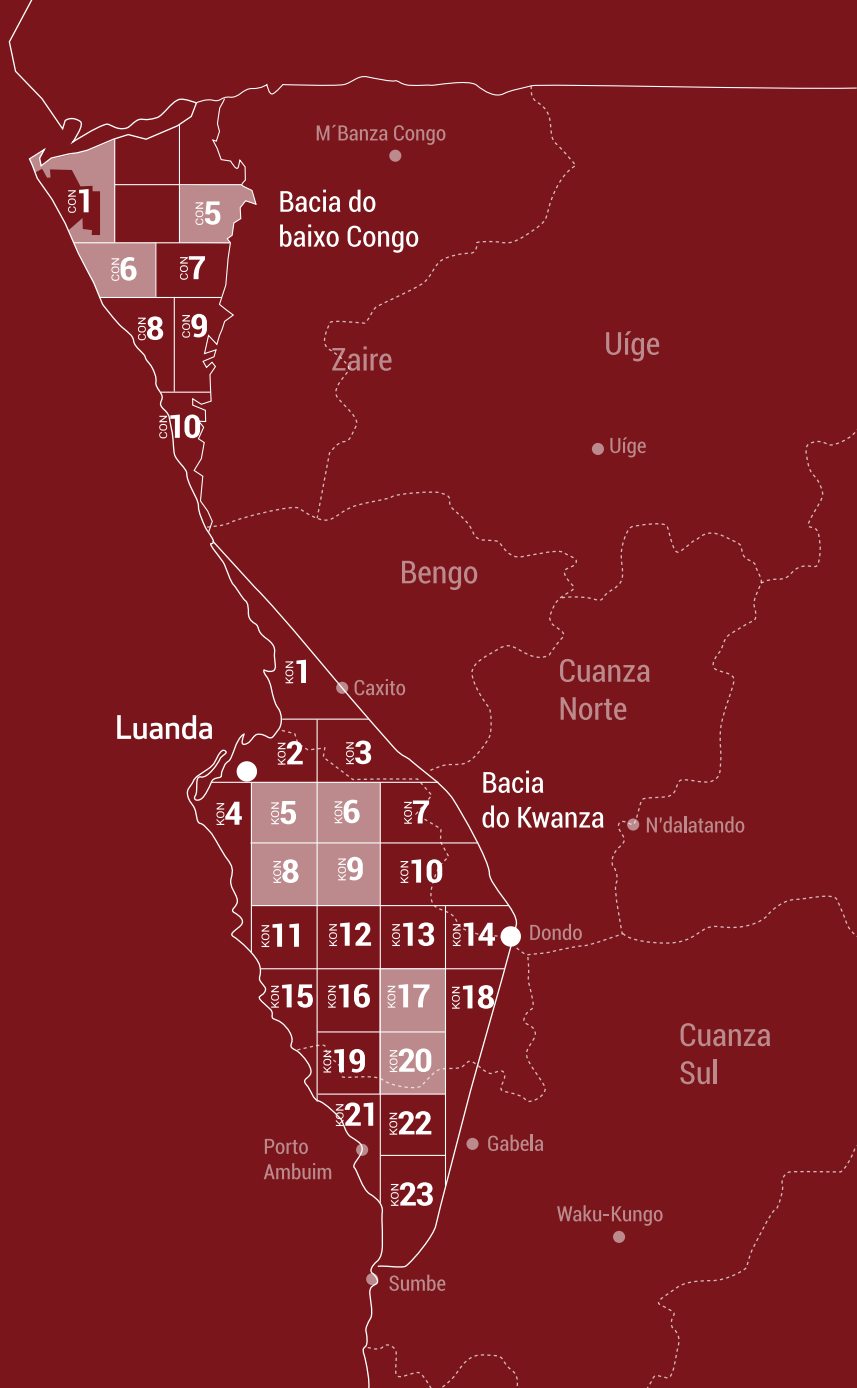




BIDDING OF
OIL CONCESSIONS 2020
REPÚBLICA DE ANGOLA

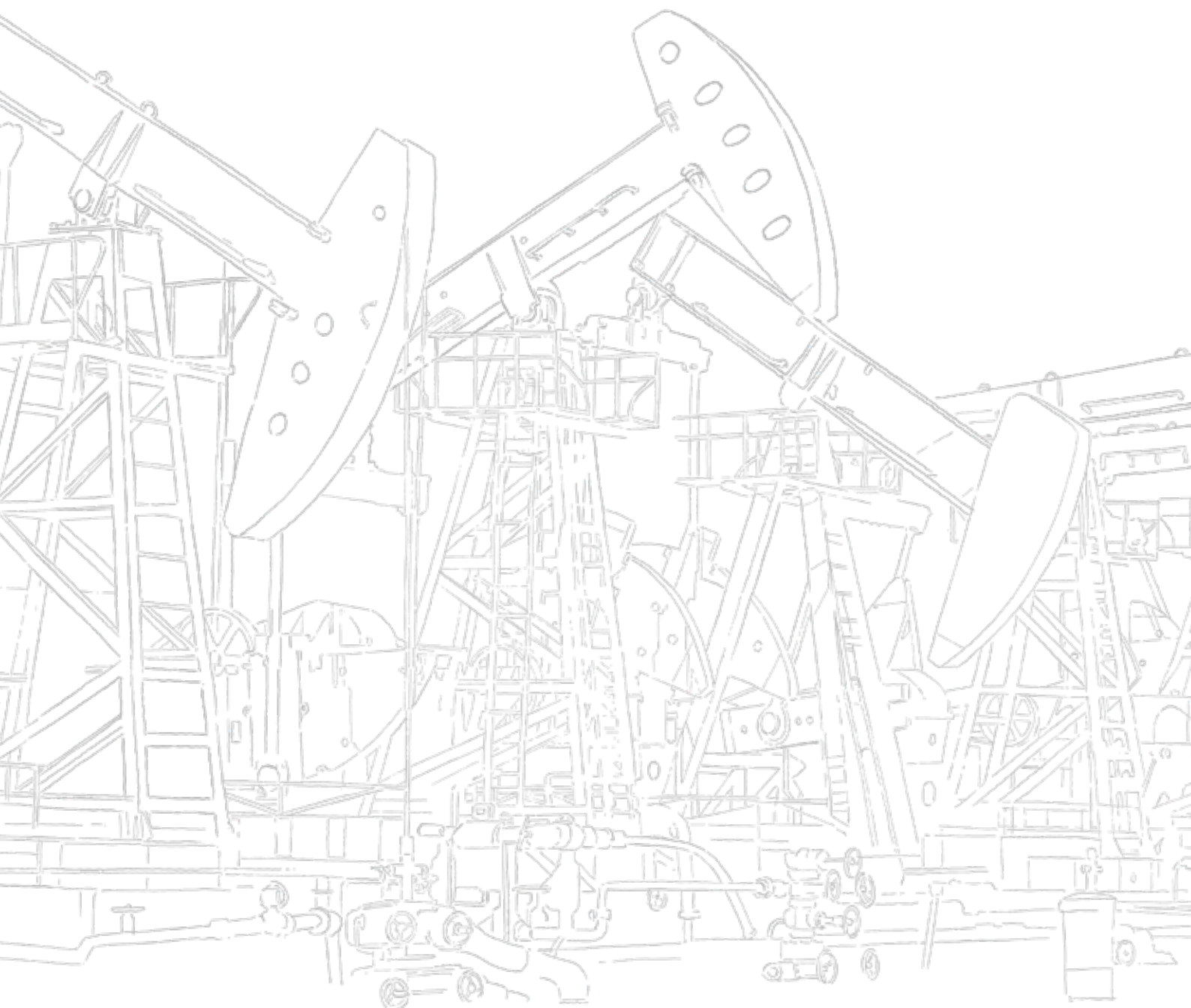
ONSHORE
KWANZA BASINS
NATIONAL AGENCY FOR OIL, GAS AND BIOFUELS

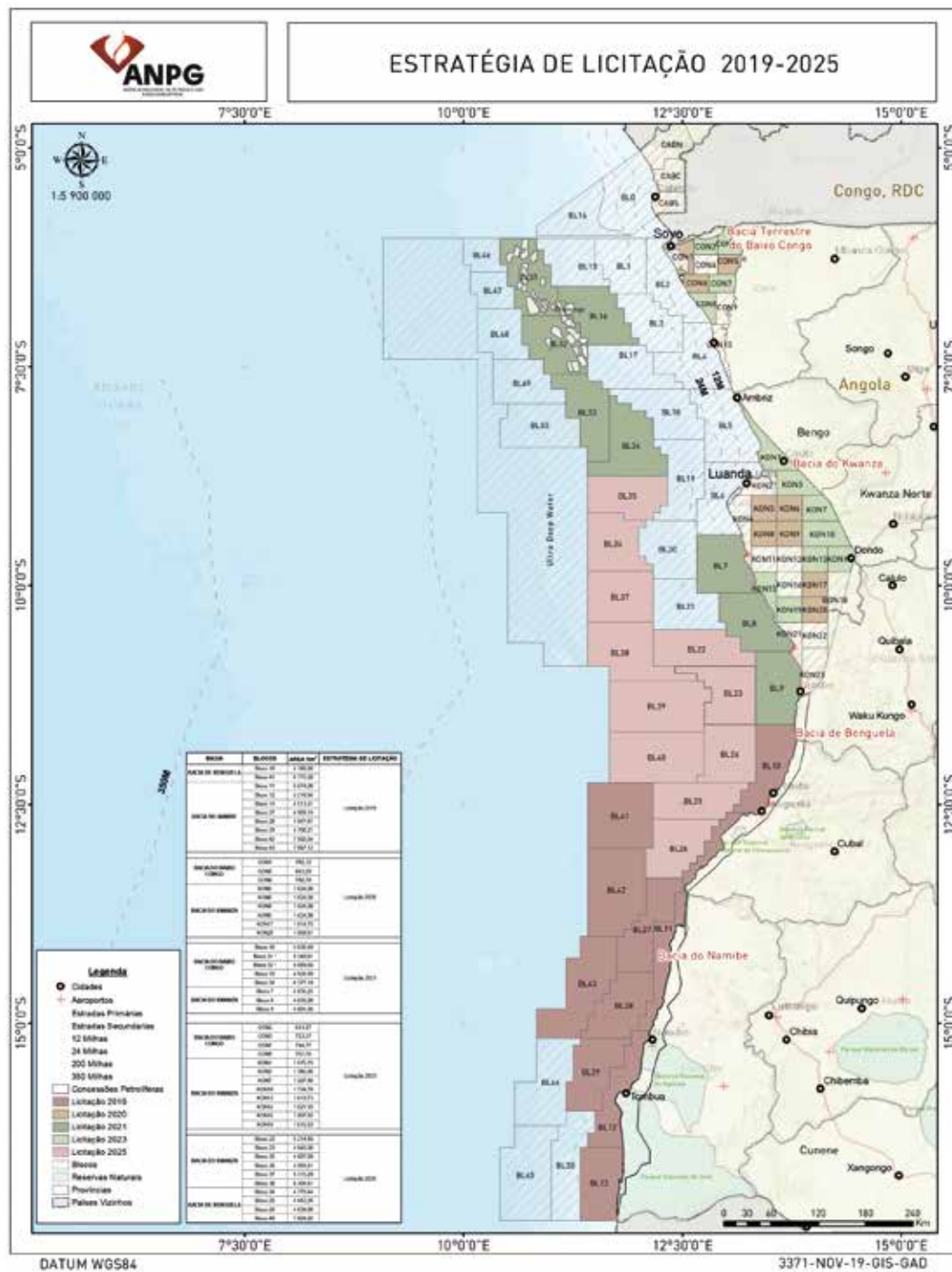






ONSHORE KWANZA BASINS



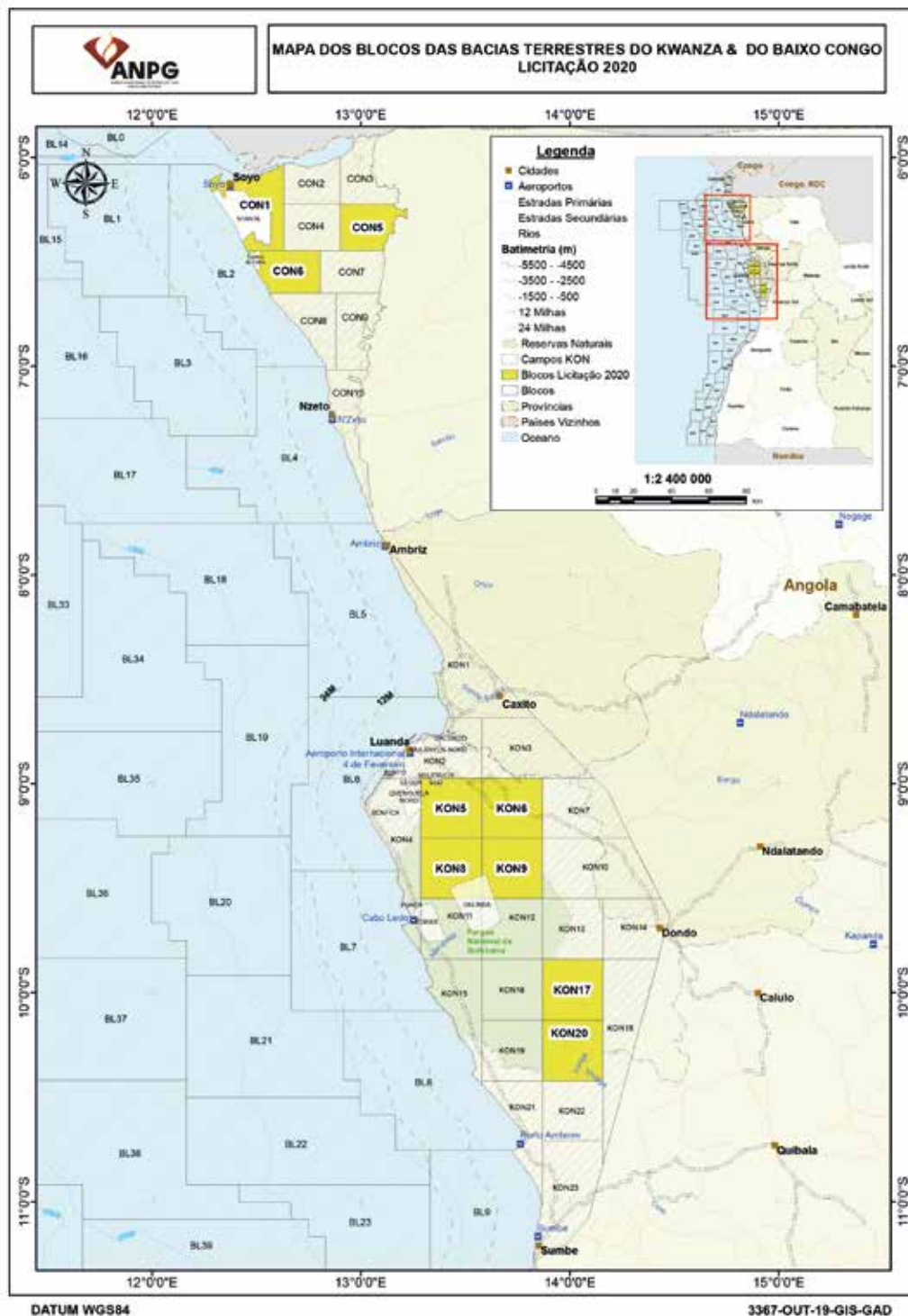


| Bacias | 2019 | 2020 | 2021 | 2023 | 2025 |
|----------|--|--|--|---|--|
| Congo | | Block CON 1 Block CON 5 Block CON 6 | Block 33 Block 34 Block 31* Block 32* | Block CON 2 Block CON 3 Block CON 7 Block CON 8 | |
| Kwanza | | Block KON 5 Block KON 6 Block KON 8 Block KON 9 Block KON 17 Block KON 20 | Block 7 Block 8 Block 9 Block 16 | Block KON 1 Block KON 3 Block KON 7 Block KON 10 Block KON 13 | Block 22 Block 23 Block 35 Block 36 Block 37 Block 38 |
| Benguela | Block 10 | | | | |
| Namibe | Block 11 Block 12 Block 13 Block 27 Block 28 Block 29 Block 41 | | | | |

* Blocks with open areas

ANGOLA 2020 GENERAL STRATEGY BASIS

- Reassesses the oil potential in the Lower Congo and Kwanza Terrestrial Basins; Replacement of reserves;
- Relaunch the exploration and production of hydrocarbons in the onshore areas of the referred basins and promote alternatives for accelerated development;
- Reduce the decline in production by 10% with the increase in the activity of exploring and discovering new resources;
- Stimulate local and foreign investment by small and medium-sized oil companies;
- Promote the incorporation of qualified Angolan labor and promote the dissemination of knowledge, technological innovation and good governance practices.



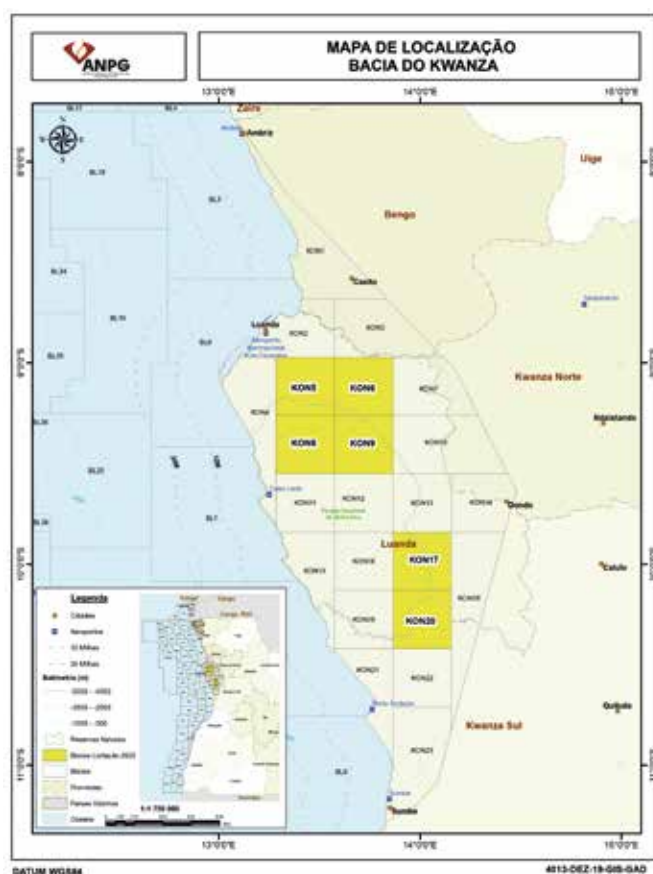
ONSHORE KWANZA BASIN AND LOWER CONGO BASIN

The Lower Congo and Kwanza Onshore Basins are closely linked, from a lithostratigraphic and structural point of view, to the rupture of the supercontinent Gondwana and subsequent formation of the South Atlantic Ocean. These basins are of Meso-Cenozoic age ranging from the Neocomian to the Holocene.

Its sedimentary history is characterized by paleoenvironmental variations between transitional continental and marine environments.

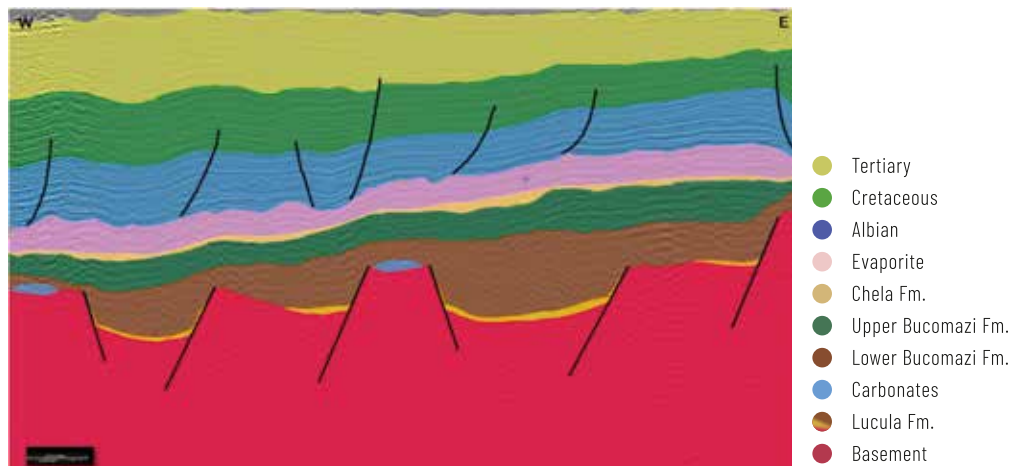
The Onshore Kwanza Basin

located in the central part of the Angolan coast, it is limited in the North by the Ambriz High and bounded in the South by the Benguela Basin. Occupies an area of approximately 25.000 km² and extends for about 300 km along the coast, subdivided in 23 blocks.



ONSHORE KWANZA BASIN AND LOWER CONGO BASIN GEOLOGICAL PROFILES

Onshore Lower Congo Basin Geological Profile



Pre-salt

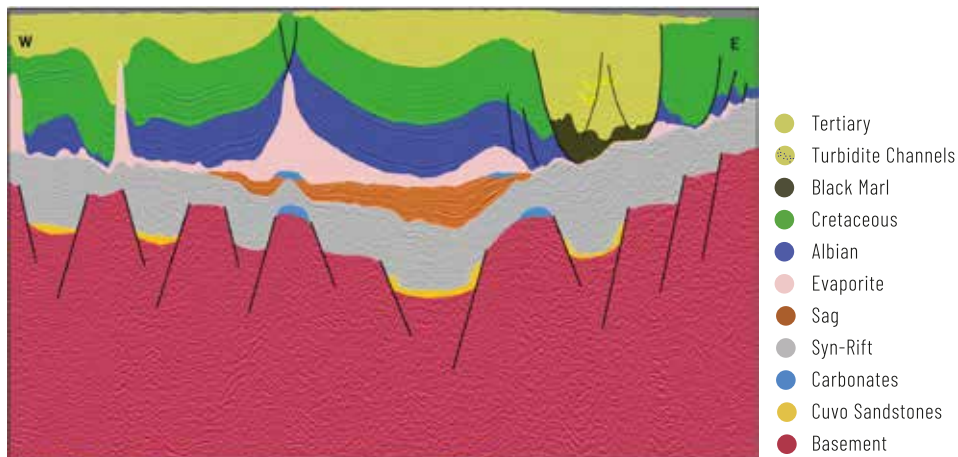
- Horsts and Grabens structures
- Sandstones in the flank of Horsts
- Carbonates on top of horsts and microbiolites at Sag
- Thick Evaporite Sequence that presents an effective pre-salt seal

Post-salt

- Little sequence of the evaporitic sequence as a structuring element
- Occurrence of normal fault in the Albian

ONSHORE KWANZA BASIN AND LOWER CONGO BASIN GEOLOGICAL PROFILES

Onshore Kwanza Basin Geological Profile



Pre-salt

- Horsts and Grabens structures
- Sandstones in the flank of Horsts
- Carbonates on top of horsts and microbiolites at Sag
- Evaporitic sequence representing an effective pre-salt seal

Post-salt

- A strong influence of salt tectonics
- Syn-depositional growth failures with lystric angles.
- Tertiary pits filled with clayey sediments rich in organic matter, with high generation potential interspersed with sands channels with reservoir characteristics.

ONSHORE

KWANZA BASINS



ONSHORE KWANZA BASINS

Block KON 5



Sand limestone, sandstones, conglomerates and fossiliferous limestones Pleistocene Miocene

INTRODUCTION

Location: Northwest of the Onshore Kwanza Basin limited to the North by Block KON 2, to the East by Block KON 6, to the South by Block KON 8 and to the West by Block KON 4.

Area: 1024 km²

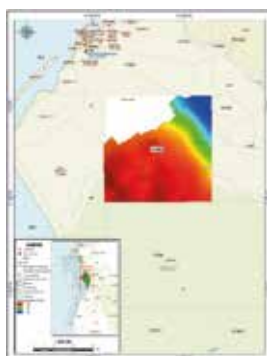
Historic:

- 20 wells drilled (13 Appraisal wells and 7 development wells);
- 2 Production fields discovered (Quenguela South – gas and Mulenvos South – Oil)
- 2D Sismic: 295,45 km (PSTM), during the 70's and 102,03 km (PSTM/PSDM) in 2010

On the surface of Block KON 5, there are outcrops that date back to the Oligocene until the recent age. According to the geological model, in this Block, the pre-salt layer is characterized by normal faults eradicated in the basement that induced the formation of horsts and grabens structures and the syn-rift sequence was deposited on these structures. The sag phase occurs locally as a result of the basin's peneplain. The Post-salt is characterized by saline tectonics, causing the formation of antiforms and tertiary pits associated with normal faults.



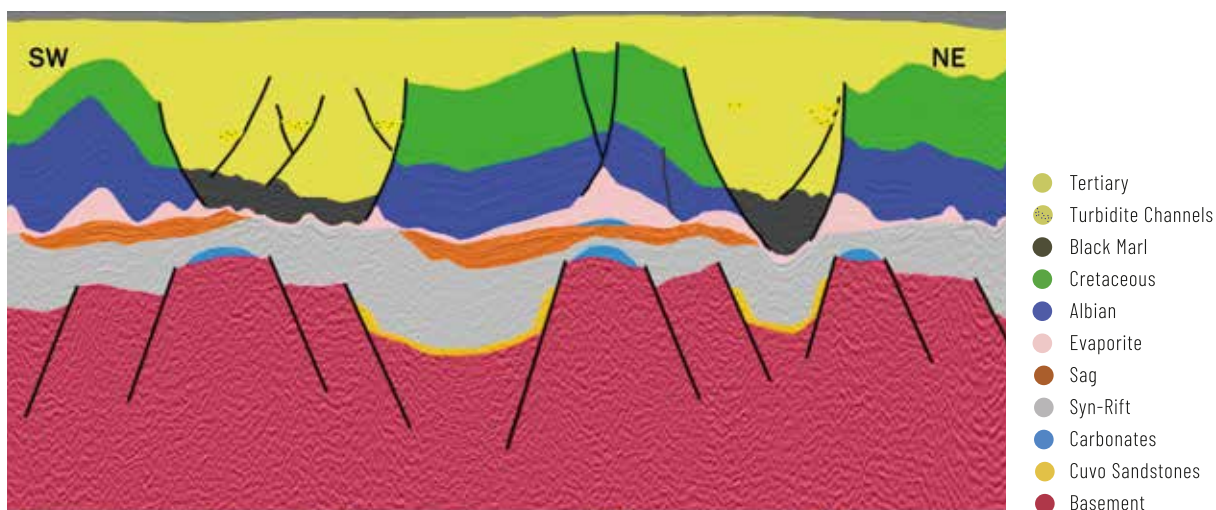
KON 5 Location



Magnetometric Coverage

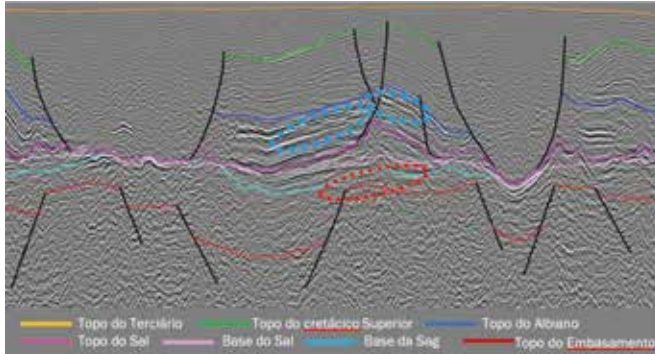


Wells and Seismic Coverage



Geological Model

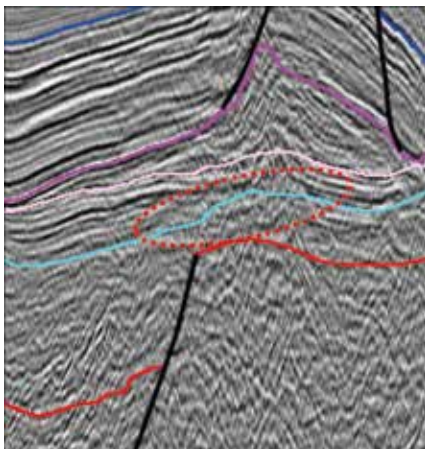
PROSPECTIVITY



Leads have been identified at the following stratigraphic level:

- Pre-salt: Syn-rift, Sag
- Post-salt: Albian, Upper Cretaceous and Tertiary.

Identified Leads:



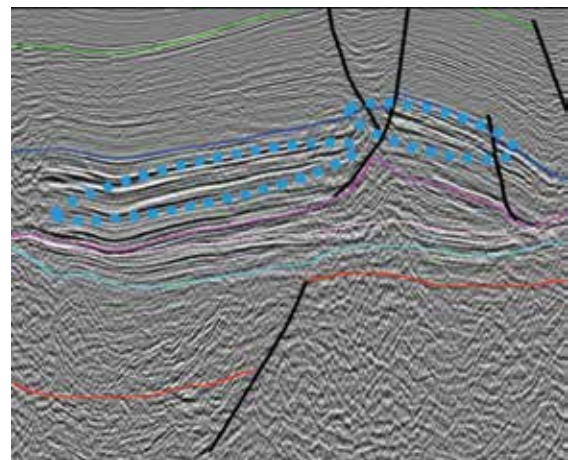
Pre-salt Leads:

multiple targets (syn-rift and sag), reservoirs characterized in the syn-rift by coquina type carbonates from Toca Fm. eq, located in a structural high and in the Sag by microbiolite carbonates and/or by a sandy layer of the Gray Cuvo Fm., confirmed by the wells (MV-5, BJ-1 e ZA-4).

A thick layer of salt and the Gray Cuvo Fm. works as an effective seal.

Source Rock: clays of Red Cuvo Fm., proven by the wells MV-5 and ZA-4, and clays of Gray Cuvo Fm., proven by the wells BJ-1, MV-5.

Trap: A combined type (structural and stratigraphic).

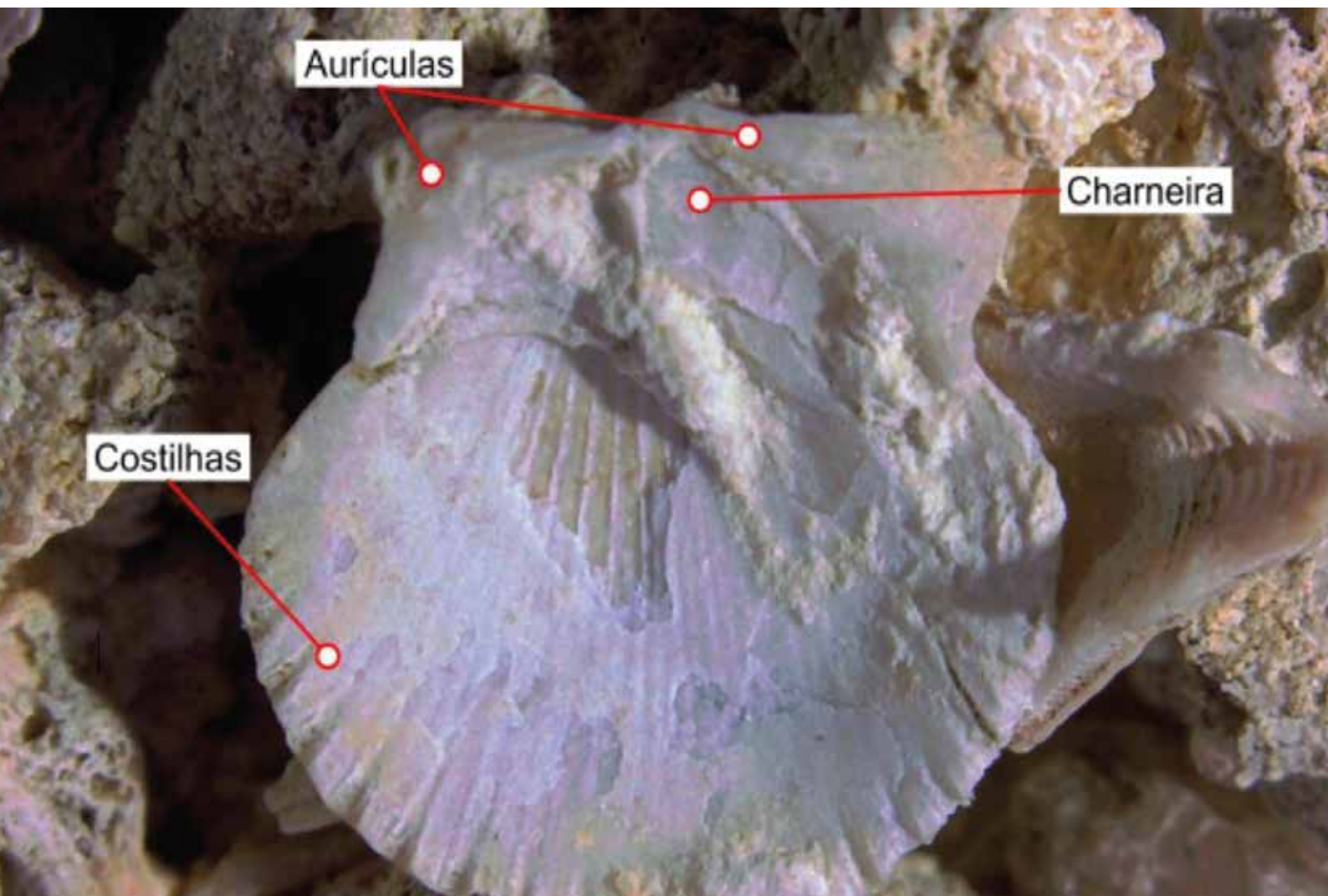


Post-salt Leads (Albian):

reservoirs consisting of carbonates from Catumbela Fm., proven by the wells BJ-1, ZA-4, MV-5, MV-13 and SE-1, with a structural type trap characterized by normal fault growth. The marls of Binga Fm. identified by the well ZA-4 constitute the main source rock at this level. The seal is formed by the intraformational clays from the Upper Cretaceous (Cabo Ledo Fm.).

ONSHORE KWANZA BASINS

Block KON 6



Bivalve Fossile of the Pectinidae Family

INTRODUCTION

Location: North zone of the Onshore Kwanza Basin, limited to the North by the Block KON 3, to the East by Block KON 7, in the South by Block KON 9 and to the West by Block KON 5.

Area: 1.024 km²

Historic:

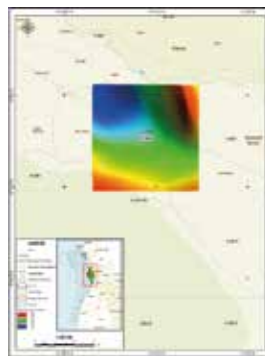
- 4 appraisal wells drilled in the Block.
- 2D Seismic: 613,0 km (PSTM), during the 70's and 103,9 km (PSTM/PSDM) in 2010.

On the surface of Block KON 6, there are outcrops that date from the Paleocene to Holocene. According to the geological model, the basement is characterized by normal faults that induced the formation of horsts and grabens on which the Syn-rift sequence was deposited. The sag phase occurs locally as a result of the basin's peneplaning. Post-salt is determined by normal syndepositional growth faults with lysical tailings. Salt tectonics led to the formation of rafts. Two Tertiary pits occur along KON 6.

Samples of light oil in the pre-salt and post-salt sections (Calomboloca-1 well) suggest that an active generation window is present. Calomboloca-1 proved the existence of a thick package of pre-salt and reservoir rocks of excellent quality in the post-salt level.



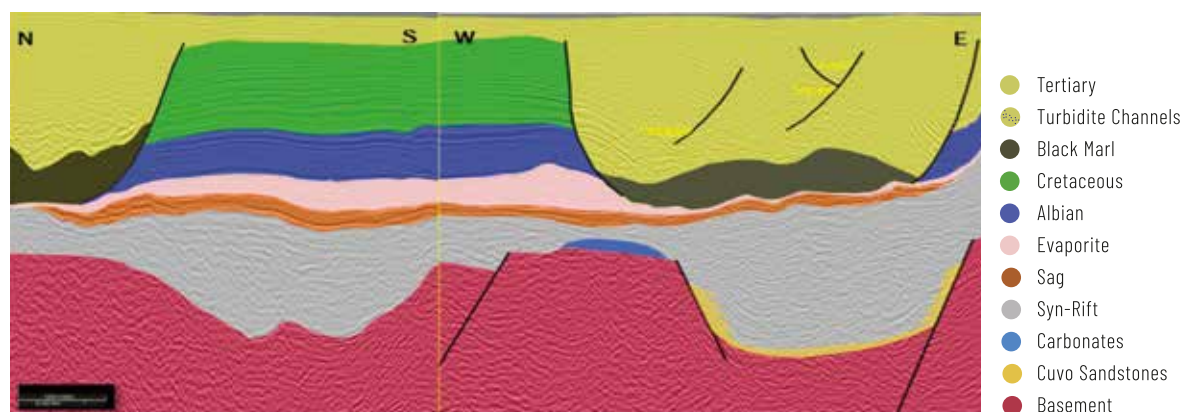
KON 6 Location



Magnetometric Coverage

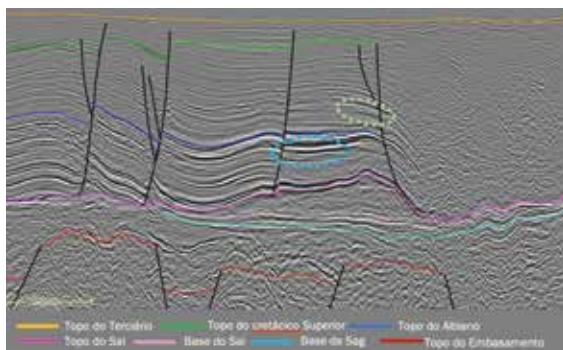


Wells and Seismic Coverage



Geological Model

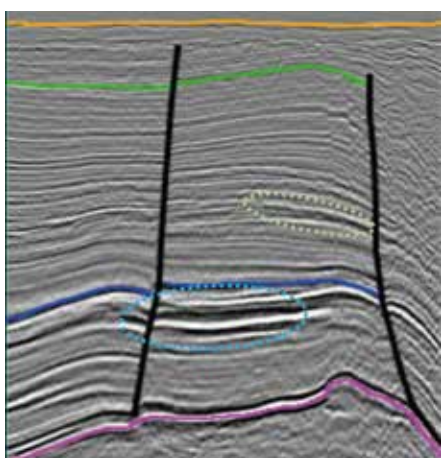
PROSPECTIVITY



Leads have been identified at the following stratigraphic level:

- Pre-salt: Syn-rift, Sag
- Post-salt: Albian, Upper Cretaceous and Tertiary.

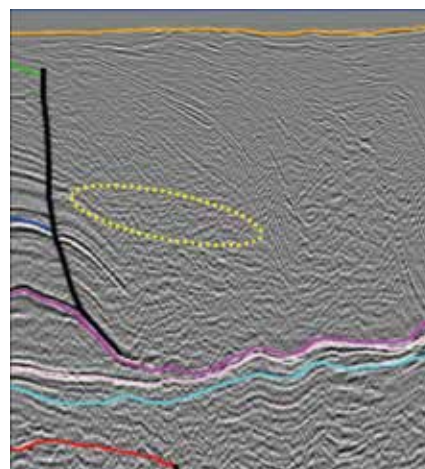
Identified Leads:



Post-salt Leads (Albian and Upper Cretaceous):

carbonates from Binga Fm. constitute the potential reservoir at the Albian level, where clays from the same formation constitute the source rock. The seal is comprised by the Cabo Ledo Fm and with a combined type trap.

Sands of Itombe Fm. constitute the potential reservoir at the level of the Upper Cretaceous, where fossiliferous marls of the Cabo Ledo Fm. constitute the Source Rock that charges this reservoir. The trap is a combined type and the seal is defined by the clays and marls from the Ngolome Fm.

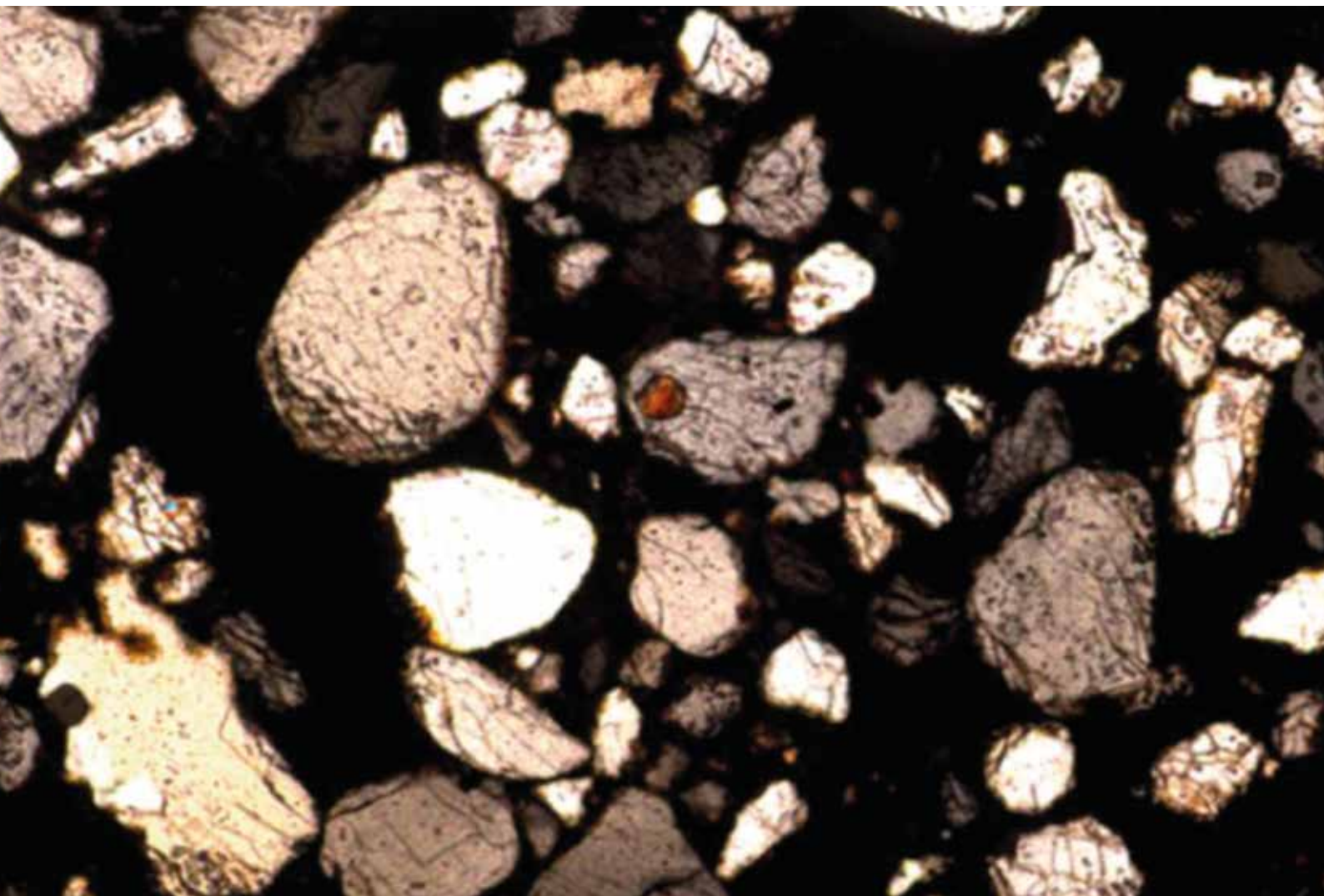


Póst-salt Lead (Tertiary):

characterized by reservoirs of a possible sandy channels in the Tertiary pit, proved by the Calomboloca-1 well. At the base of the pit, black marls rich in organic matter are deposited, constituting excellent source rocks. The trap is of a combined type and the seal is comprised by intraformational clays.

ONSHORE KWANZA BASINS

Block KON 8



Heterometric Quartz Sandstone with a Clay matrix in Crossed Nicols - Quaternary

INTRODUCTION

Location: Northwest in the Onshore Kwanza Basin limited to the North by Block KON 5, to the East by Block KON 9, to the South by Block KON 11 and to the West by Block KON 4.

Area: 1.024 km²

History:

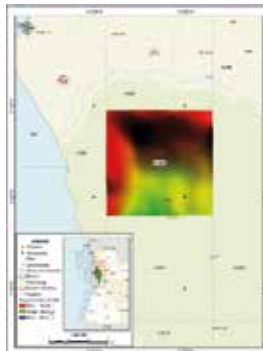
- 4 wells have been drilled in the block
- 2D Seismic: 128.16 km (PSTM), during the 70's and 151,54 km (PSTM/PSDM) in 2010.

According to the geological model, the basement is characterized by normal faults that induced the formation of horsts and grabens on which were deposited the syn-rift sequence. The Post-salt sequence is defined with normal sin-depositional listric thrust faults. The salt tectonics originated the formation of normal faults and antiforms. In the tertiary is visible a structure deposition in large scale (tertiary pits).

The Quenguela-Sul well was drilled in the Northeastern part of the block, where traces of hydrocarbon were found. The Maximende-1 well, found oil in the Aptian carbonates reservoirs of Binga Fm. in the central part of the block. In the neighboring blocks the oil was found in the Eocene and Upper Cretaceous Oligocene reservoirs.



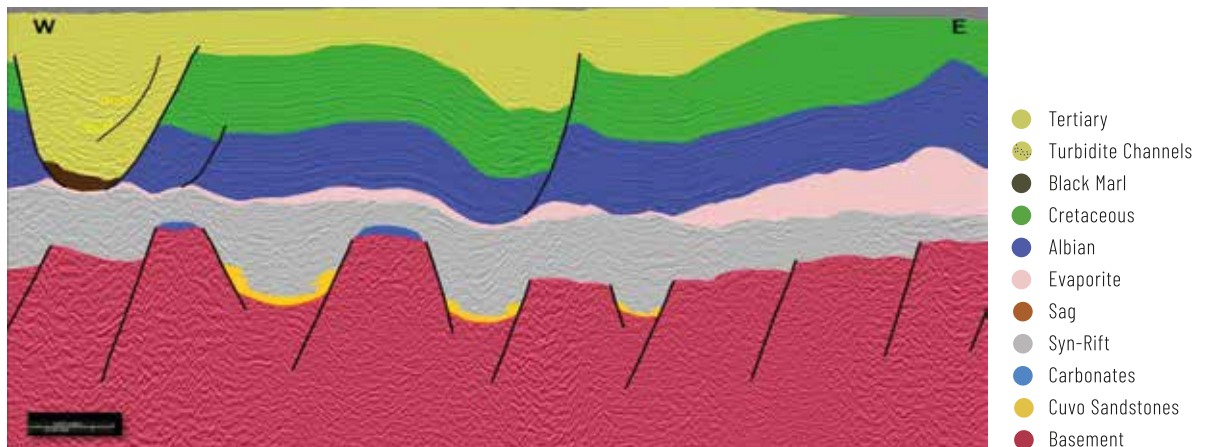
KON 8 Location



Magnetometric Coverage

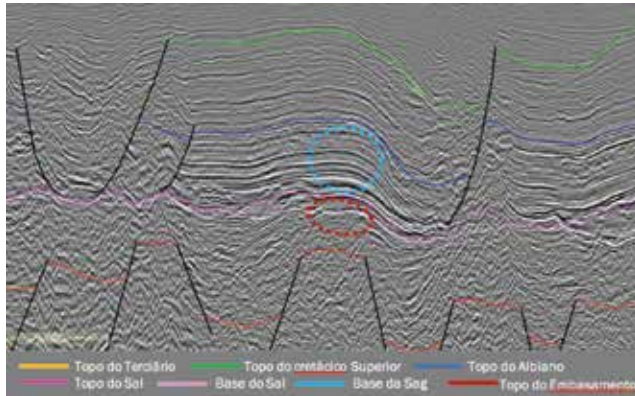


Wells and Seismic Coverage



Geological Model

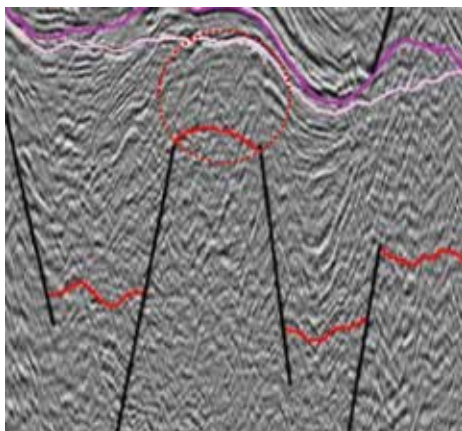
PROSPECTIVITY



Leads have been identified at the following stratigraphic level:

- Pre-salt: Syn-rift, Sag
- Post-salt: Albian, Upper Cretaceous and Tertiary.

Identified Leads:

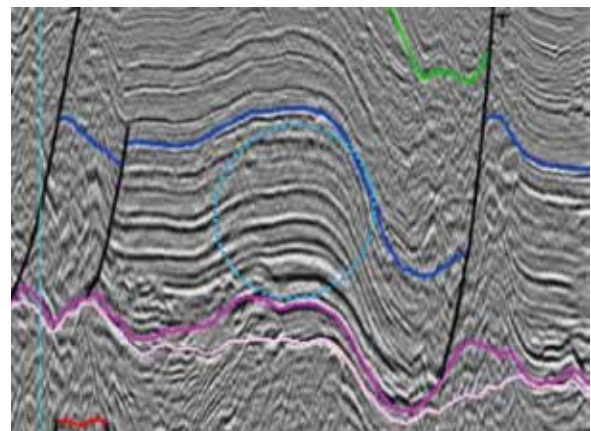


Pre-salt Leads (Syn-rift):

reservoir consisting of coquinas carbonates of the Toca eq. Fm. Located at the structural highs and confirmed by the wells MV-5, BJ-1, and ZA-4. The Clays from Gray Cuvo Fm. Act as a syn-rift seal and the salt layer represents the regional seal for the pre-salt.

Clays from Gray and Red Cuvo Fm., proved by the wells MV-5, ZA-4 and BJ-1 respectively, represent the source rock at the pre-salt level.

The trap is of a combined type.



Post-salt Leads (Albian):

reservoir consisting of carbonates, Catumbela Fm., observed in wells BJ-1, ZA-4, MV-5, MV-13 and SE-1. Typical structural trap types.

The Clays from Binga Fm. Identified by the ZA-4 constitute the main source rock at this level, the seal being the clays of the Upper Cretaceous and Cabo Ledo Fm.

ONSHORE KWANZA BASINS

Block KON 9



Claystone and Sandstone - Pliocene /Pleistocene

INTRODUCTION

Location: Center of the Onshore Kwanza Basin, limited by Block KON 6, to the East by Block KON 10, to the South by Block KON 12 and to the West by Block KON 8.

Area: 1.024 km²

Historic:

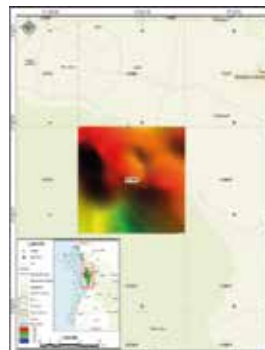
- 4 Appraisal wells were drilled in the block
- 2D Seismic: 227,70 km (PSTM), during the 70's and 106,05 km (PSTM/PSDM) in 2010.

On the surface of Block KON 9, there are outcrops that date back to the Upper Cretaceous until recent age. According to the geological model, the basement is characterized by normal faults that induced the formation of horsts and grabens. The syn-rift sequence was deposited on these structures. The sag phase occurs locally as a result of the basin's planeplaning. The Post salt is thick and defined by anticlines.

The drilled wells reached final depths between 1,225 m to 2,434.6 m, with two of them having signs of hydrocarbons at the level of the Lower and Upper Cretaceous.



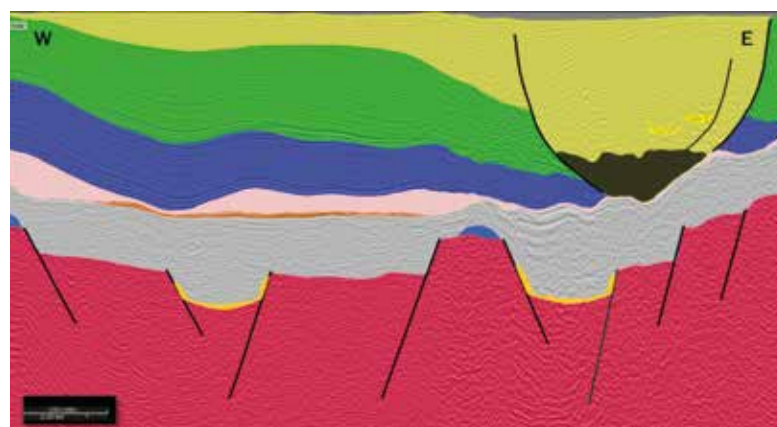
KON 9 Location



Magnetometric Coverage



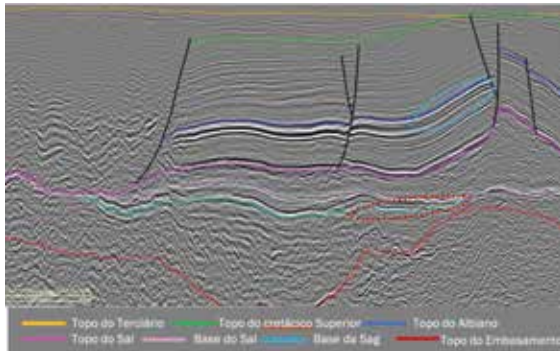
Wells and Seismic Coverage



Geological Model

- Tertiary
- Turbidite Channels
- Black Marl
- Cretaceous
- Albian
- Evaporite
- Sag
- Syn-Rift
- Carbonates
- Cuvo Sandstones
- Basement

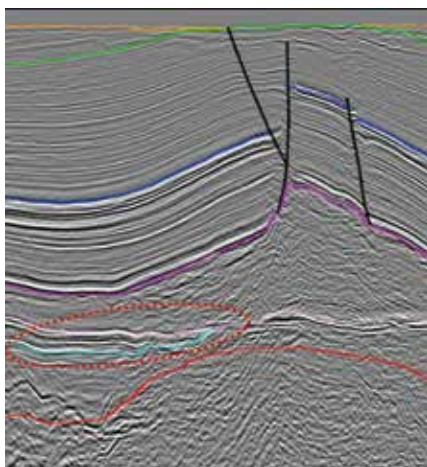
PROSPECTIVITY



Leads have been identified at the following stratigraphic level:

- Pre-salt: Syn-rift, Sag
- Post-salt: Albian, Upper Cretaceous and Tertiary.

Identified Leads:



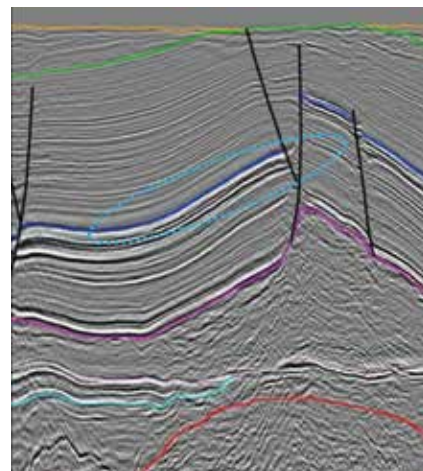
Pre-salt Leads (sag):

pinch out of sediments from sag charged by clays from the Red Cuvo and/or Gray Cuvo Fm., confirmed the existence of a source rock at this level.

The sands of Gray Cuvo Fm. constitute the main reservoirs.

A thick layer of a massive Aptian's salt and intraformational clays from the Gray Cuvo Fm., represents an effective seal.

It presents a trap of a combined style.



Post-salt Leads (Albian):

Dolomitic facies or Oolitic Limestone from the Binga Fm., and probably sandstones from the Tuenza Fm., confirmed by the Cacoba-1 and Cacoba-4 wells constitutes the reservoirs at this level.

This lead is charged by the marls of Binga Fm., as confirmed in the Cacoba-4 well, constituting the main source rock.

The clays from Itombe Fm., work as an effective seal for these levels.

It presents a combined trap type.

ONSHORE KWANZA BASINS

Block KON 17



Siltites - Upper Cretaceous

INTRODUCTION

Location: Southeast part of the Onshore Kwanza Basin is limited to the North by Block KON 13, to the East by Block KON 18, in the South by Block KON 20 and in the West by Block KON 16.

Area: 1,014.75 km²

Historic:

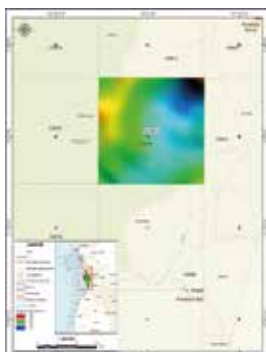
- 2 Appraisal wells drilled
- 2D Sísmica: 147,56 km (PSTM), during the 70's and 159,20 km (PSTM/PSDM) in 2010.

The outcrops found in the Block date back to Upper Cretaceous to recent times. According to the geological model the basement is characterized by normal faults that induced the formation of horsts and grabens on which were deposited the syn-rift sequence. The sag phase occurs locally as a result of the basin's peneplaning. The Post-salt sequence is defined with normal thrust faults and anticline structures. A Tertiary pi tis visible in the Northeastern part of the block.

In the Gunza-1 well, located in the Northwest part of the Block oil traces were identified, while in the Quembeje-1 well located in the Northeast part of the block found traces of Oil and gas.



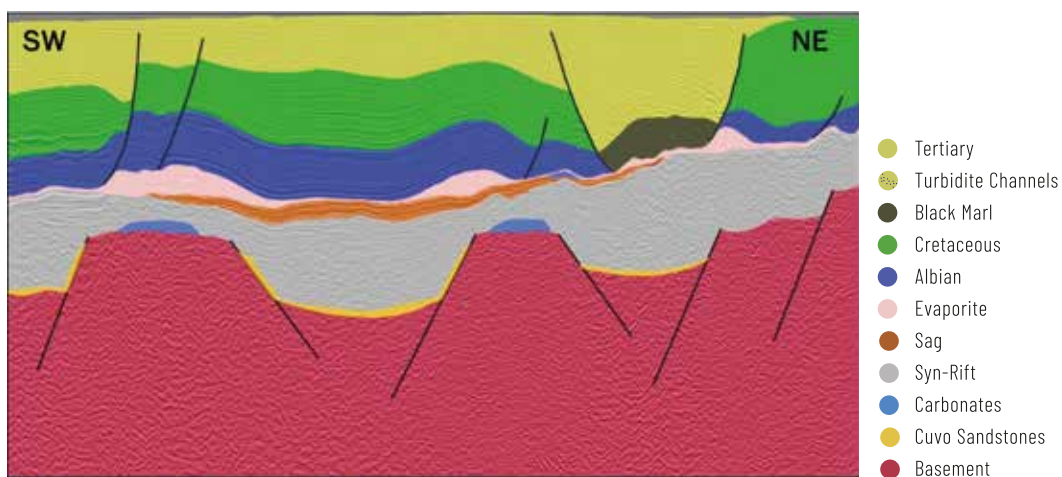
KON 17 Location



Magnetometric Coverage

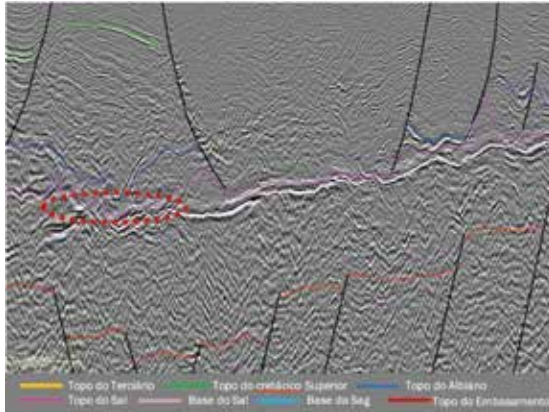


Wells and Seismic Coverage



Geological Model

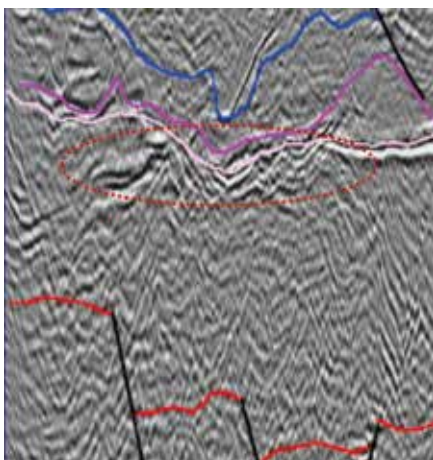
PROSPECTIVITY



Leads have been identified at the following stratigraphic level:

- Pre-salt: Syn-rift, Sag
- Post-salt: Albian, Upper Cretaceous and Tertiary.

Identified Leads:



Pre-salt Leads (Sag):

the reservoir is made up of microbiolitic carbonates of Gray Cuvo Fm., confirmed by the Quembeje-1 and Gunza-1 wells.

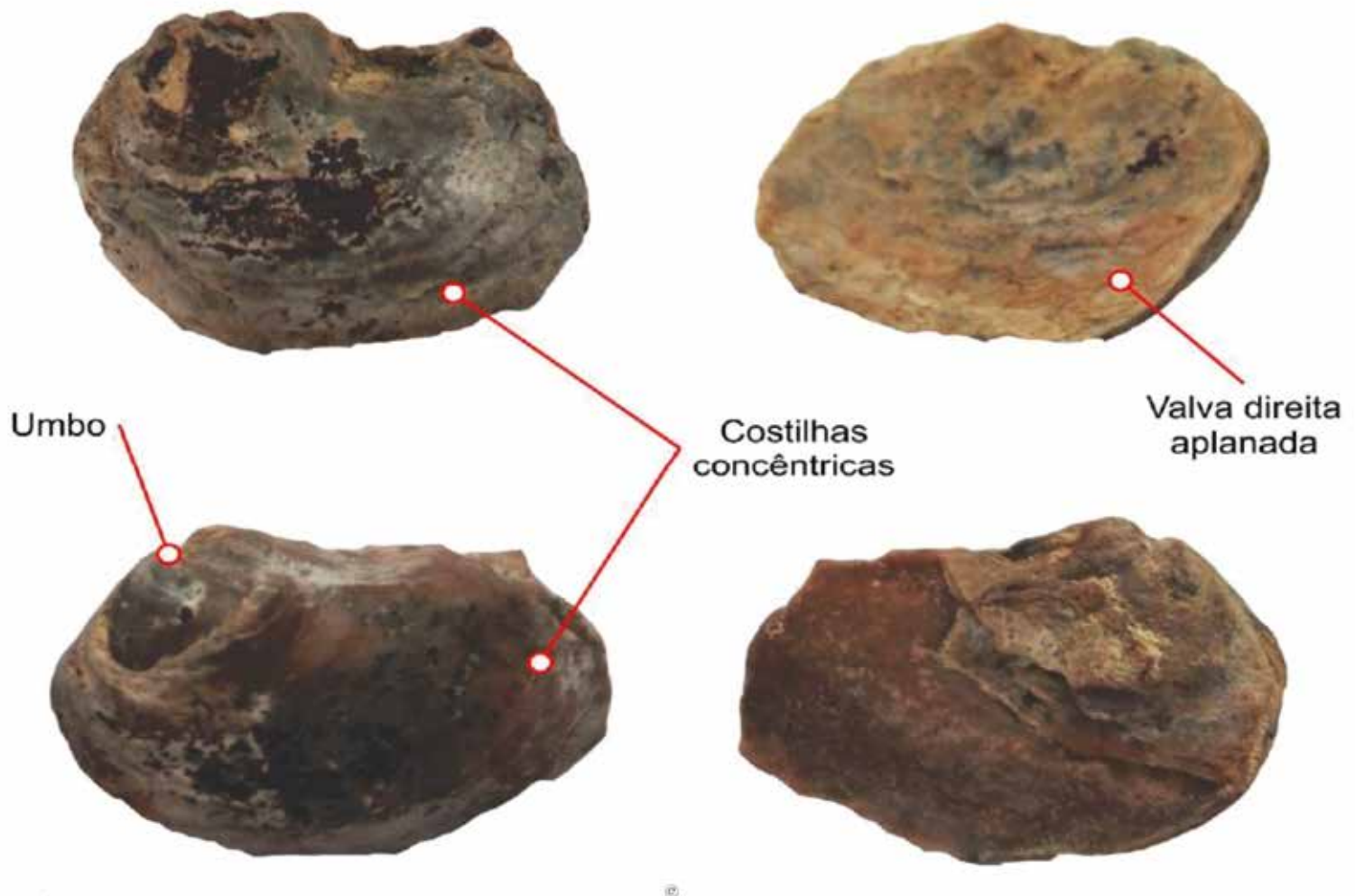
The salt layer represents a regional seal.

The clays from the Red Cuvo Fm., located in the structural lows and clays from the Gray Cuvo Fm., represents the main source rocks for this section.

It presents a combined trap type.

ONSHORE KWANZA BASINS

Block KON 20



Bivalves fossils of inoceramus type

INTRODUCTION

Location: Southeast of the Offshore Kwanza Basin limited to the North by Block KON 17, to the East by Block KON 18, to the South by Block KON 22 and to the East by Block KON 19.

Area: 1.014.75 km²

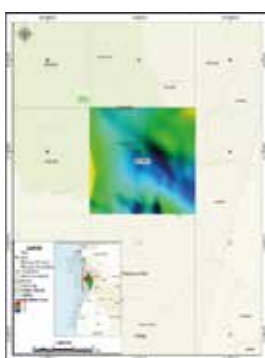
Historic:

- 1 appraisal well drilled in the Block
- 2D Seismic: 121,89 km (PSTM), during the 70's and 127,53 km (PSTM/PSDM) in 2010.

Block KON 20 presents outcrops that date back to the Oligocene to recent age. According to the geological model, the basement is characterized by normal faults that originated the formation of horsts and grabens and on these structures the syn-rift sequence was deposited. The post-salt is defined by normal syndepositional growth faults. The salt tectonics originated the formation of rafts and tertiary pits that occur in the west part of the block.



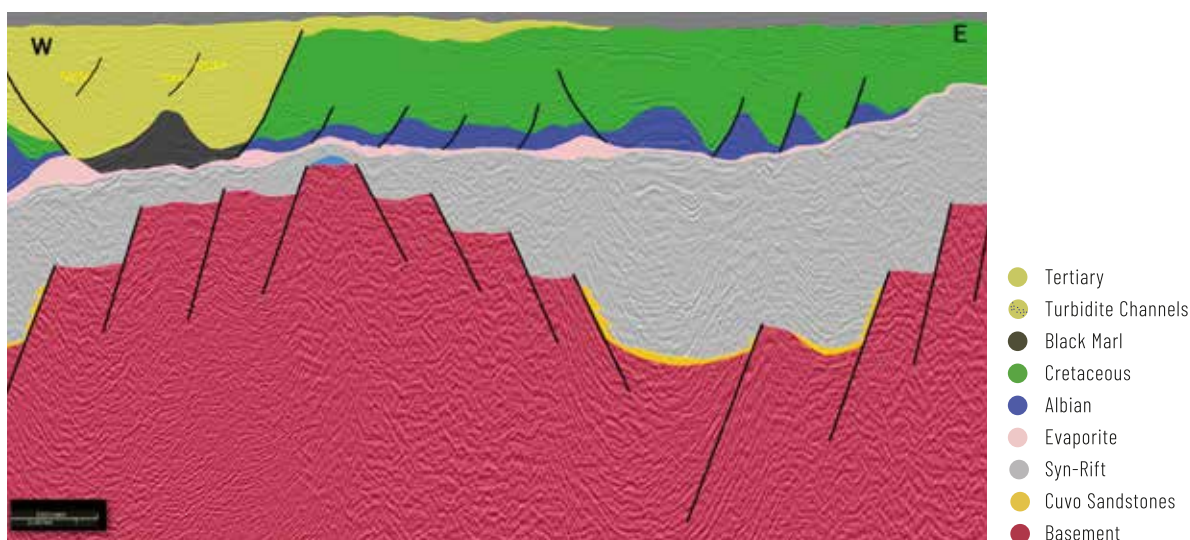
KON 20 Location



Magnetometric Coverage

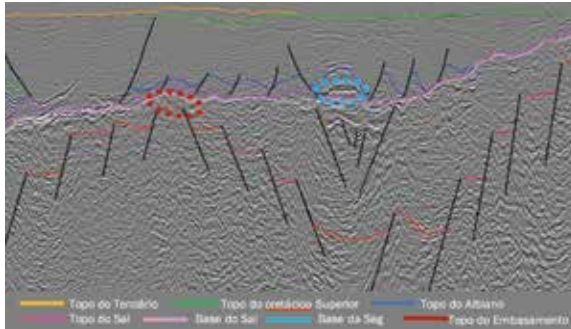


Wells and Seismic Coverage



Geological Model

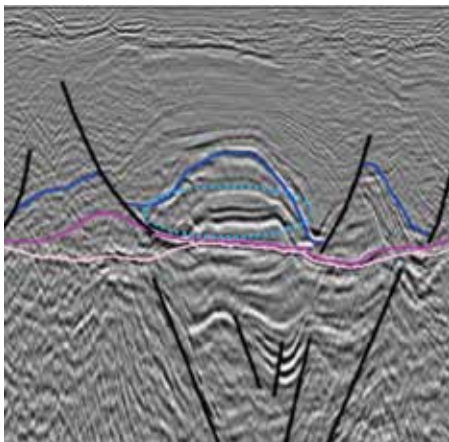
PROSPECTIVITY



Leads have been identified at the following stratigraphic level:

- Pre-salt: Syn-rift, Sag
- Post-salt: Albian, Upper Cretaceous and Tertiary.

Identified Leads:



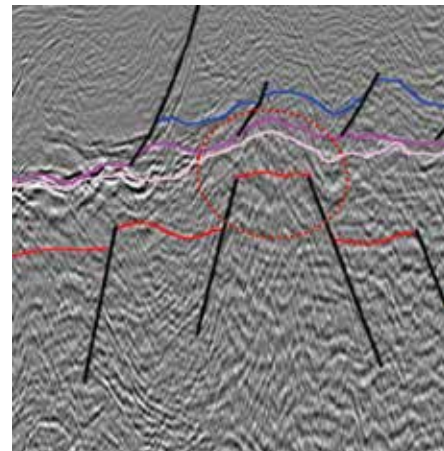
Post-salt Leads (Albian):

reservoir consisting of oolitic and/or sandstone carbonates from Binga Fm.

Rich organic matter rocks from the Binga, Gray and Red represent the source rock in this section.

The intraformational clays from Cabo Ledo Fm., constitute the seal.

The trap is of a combined type.



Pre-salt Leads (Sag):

reservoir consisting of carbonate sediments from Gray Cuvo Fm. Identified in the Capolo-1.

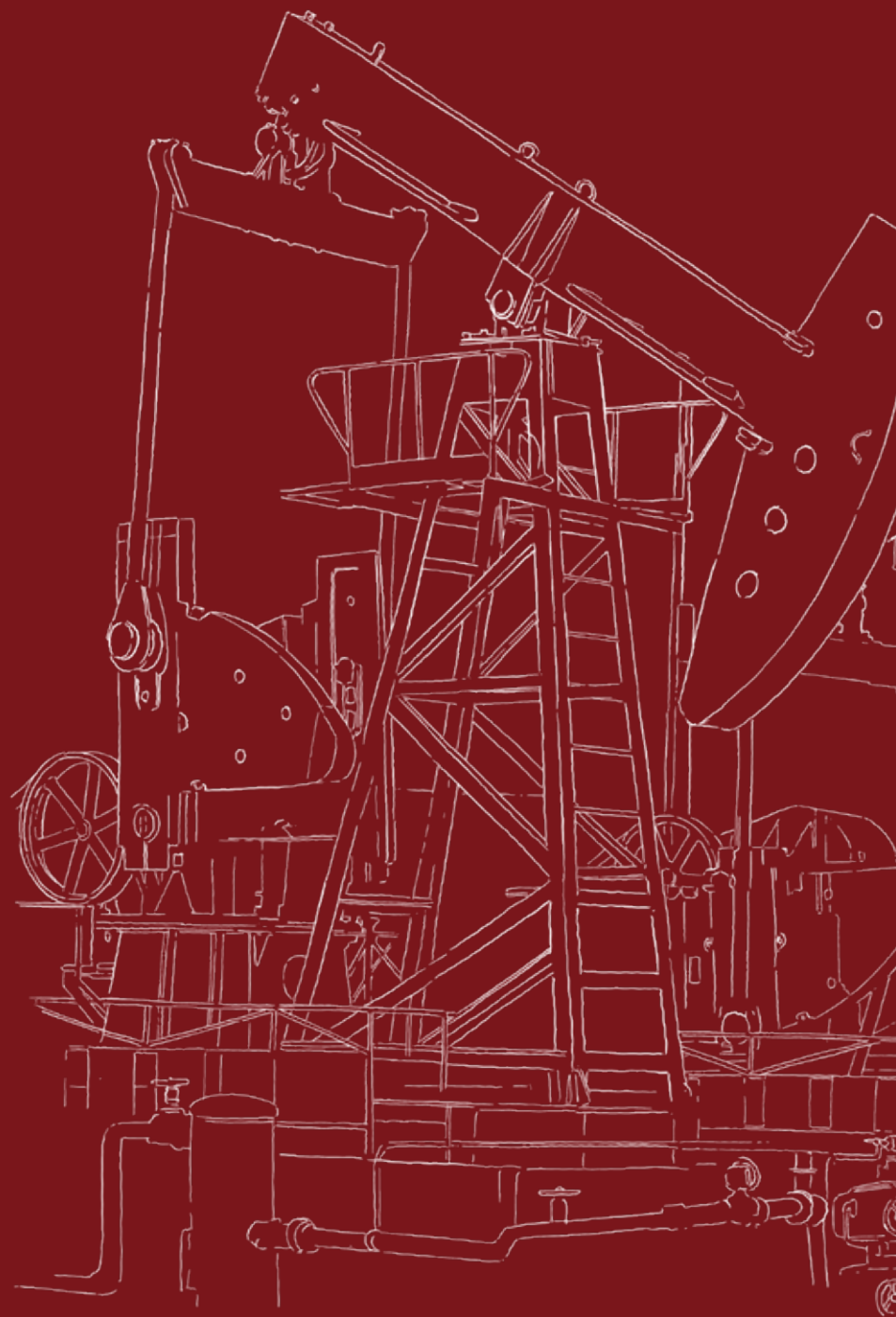
The clays from the Red Cuvo Fm., located in the structural lows, crossed by the Capolo-1 well, represents the main source rocks for this section.

The Aptian salt layer represents a regional seal for both syn-rift and sag.

The trap for this lead is combined.



LICITAÇÃO
DAS CONCESSÕES
PETROLÍFERAS 2020







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