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EcoNomics

Angola Oil & Gas Industry

SPE Victoria & Tasmania – April 2010

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Outline

- Angola
- Development Areas
- Block 0
- Gas Export
- Living in Angola

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Angola

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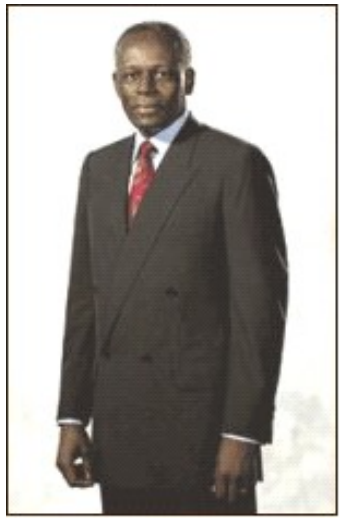
Angola

Angola – The Country

- Former Portuguese colony (400 years)
  - Republic formed in 1975
- Size: 1.25 million sq km
  - About the same as Vic + NSW
- Population: 17 million
  - Luanda 5 million
  - 75% live in poverty
- Official language: Portuguese
- Annual export income: US$59 billion
  - 90% petroleum, 10% diamonds
- Head of State: President dos Santos (MPLA), 67, petroleum engineer, in office for 30 years, appoints all ministers and judges
- Recovering from 27 year civil war – rebuilding economy and infrastructure



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Petroleum Industry

Petroleum Industry

- Commenced 1955 – small onshore fields & refinery (39kbd) by Petrofina
- In late 60s became world class exporter with Gulf's offshore discoveries in Cabinda enclave
- Significant deepwater discoveries in 90s now on stream – Kuito, Girassol, Xikomba, Kizomba A, Kizomba B
- 13.5 billion barrels of proved reserves
- Capable of producing more than 2 million b/d

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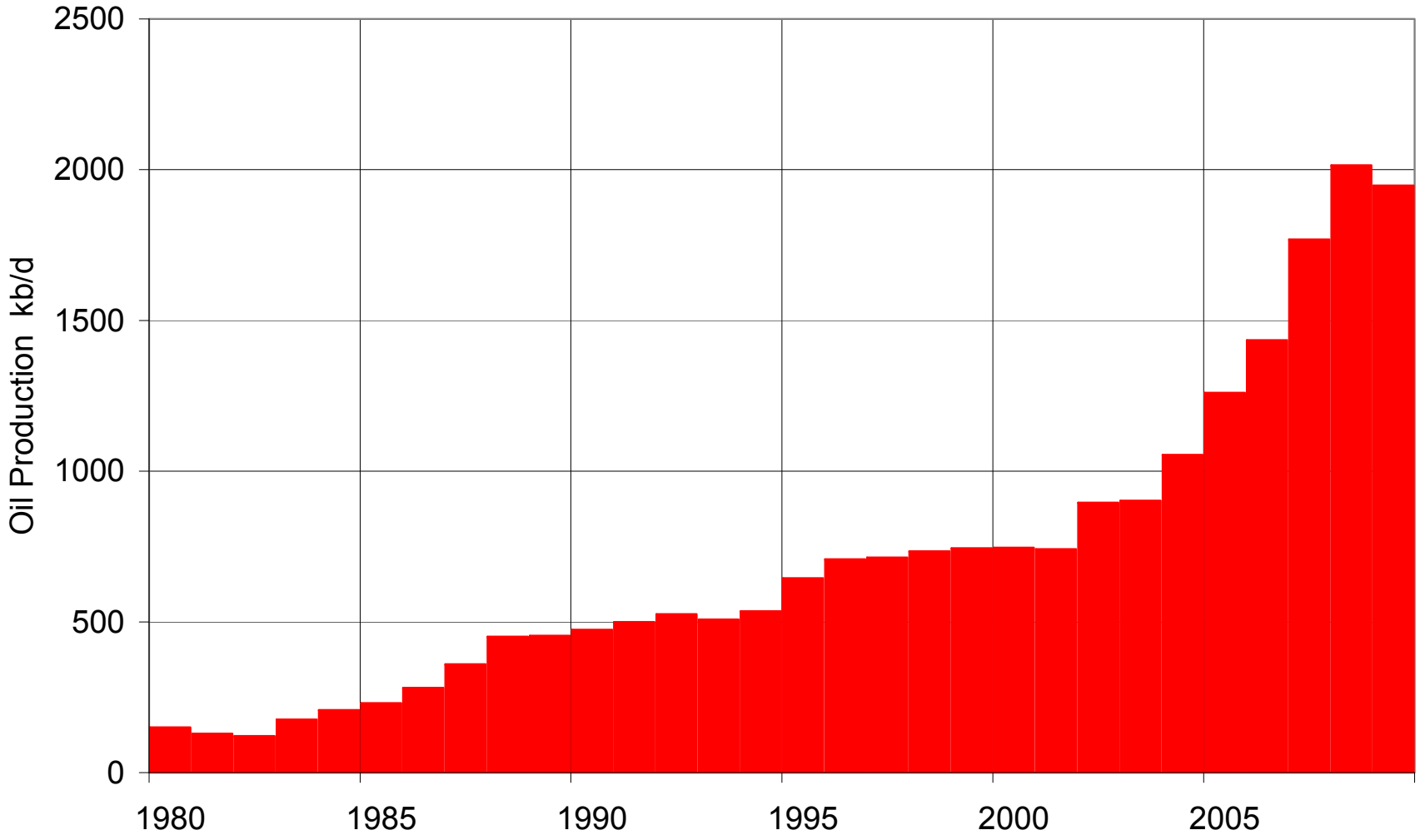
Angola Oil Production



US Energy Information Administration

EcoNomics

Sonangol

- State owned Sonangol owns and controls all mining rights
- Partners in every block
  - Operator in some blocks
- 200 kbd refinery at Lobito
- Progressing 4 mta LNG plant near Soyo
- Sonamet (Sonangol/Stolt) construction yard at Lobito – jacket, riser tower, CALM, etc

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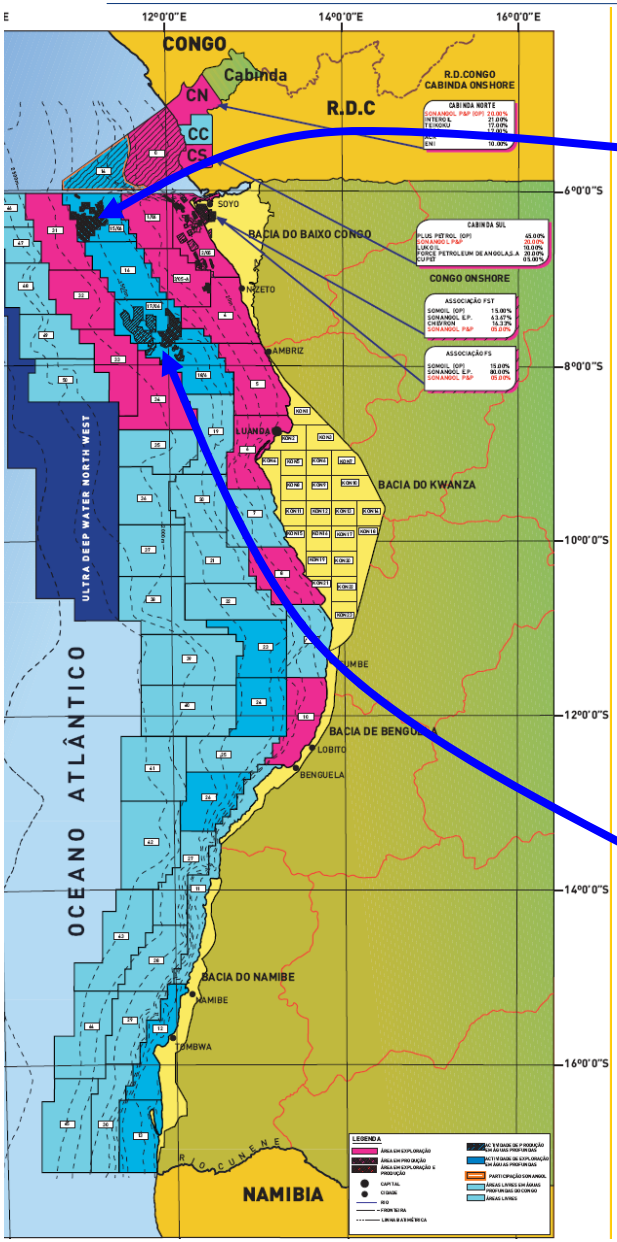
Deepwater Developments



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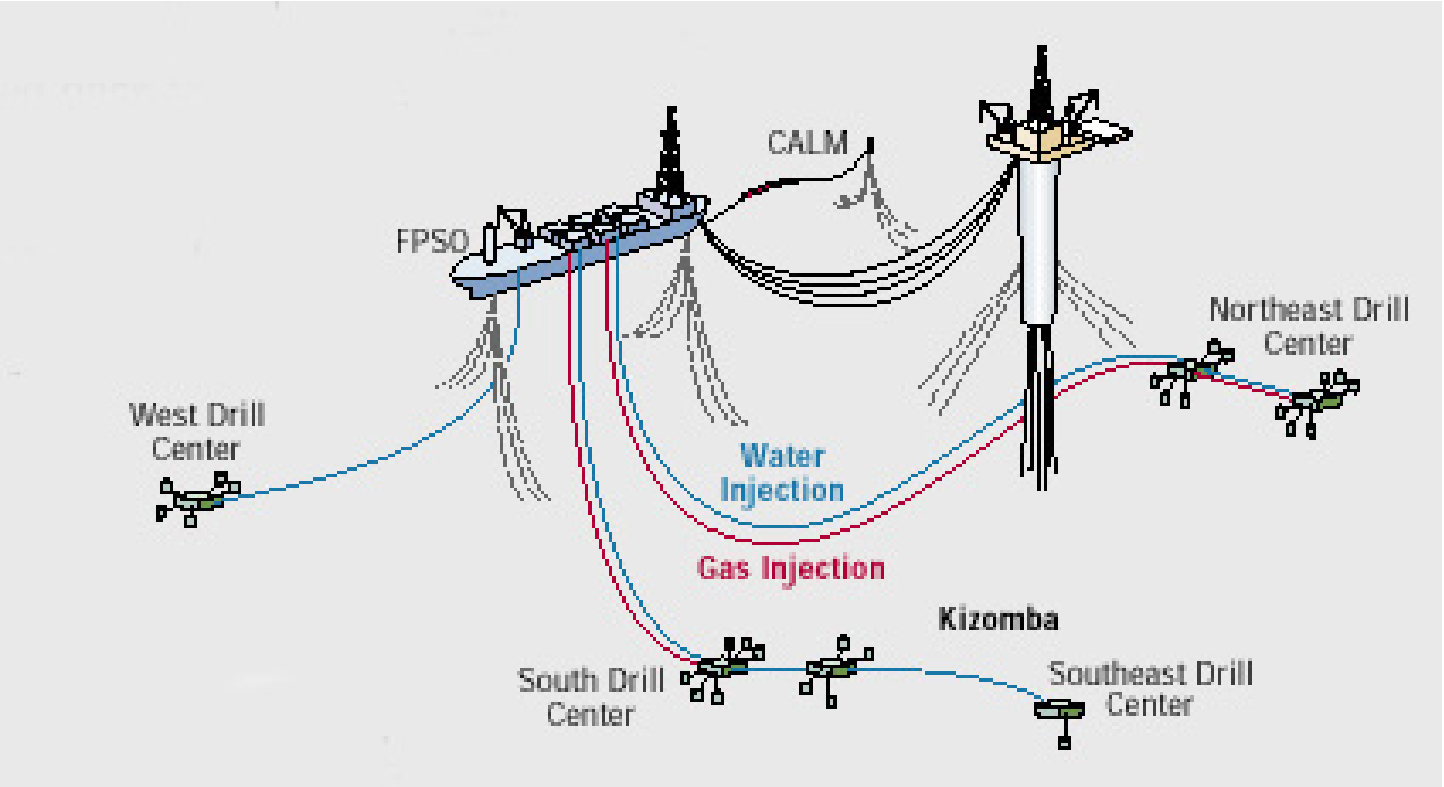
Typical Deepwater Development



Source: Exxonmobil.com

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Mighty Servant 3

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North Nemba

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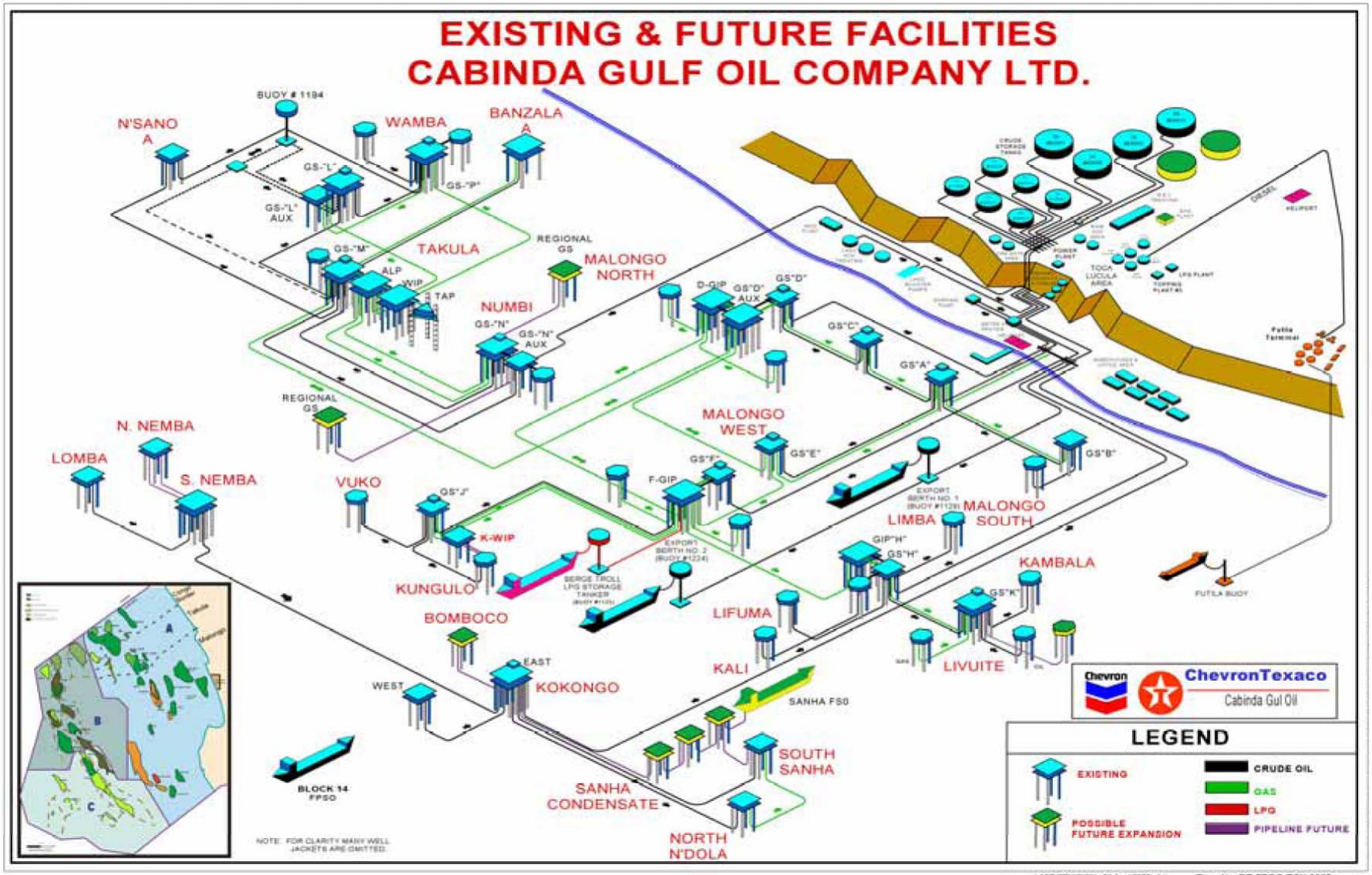
Chevron Block 0

- Activities date from 1950's
- Block 0
  - About 2100 square miles
  - Two areas – A and B
  - 21 fields
- 2008 production
  - Crude oil 323,000 b/d
  - LPG 21,000 b/d
  - Gas 1 bcf/d
    - 50% injected, rest flared


EXISTING & FUTURE FACILITIES
CABINDA GULF OIL COMPANY LTD.
BUOY # 1194
N'SANO A
WAMBA
BANZALA A
GS-"L"
GS-"P"
GS-"L" AUX
GS-"M"
TAKULA
REGIONAL GS
MALONGO NORTH
ALP
WIP
TAP
NUMBI
GS-"N"
GS-"N" AUX
D-GIP
GS"D"
GS"D" AUX
GS"C"
GS"A"
REGIONAL GS
N. NEMBA
LOMBA
S. NEMBA
VUKO
MALONGO WEST
GS"E"
GS"F"
F-GIP
GS"B"
GS"J"
K-WIP
KUNGULO
SERGE TROLL LPG STORAGE TANKER
EXPORT BERTH NO. 2 (BUOY #1224)
EXPORT BERTH NO. 1 (BUOY #1128)
LIMBA
MALONGO SOUTH
GIP"H"
GS"H"
KAMBALA
GS"K"
FUTILA BUOY
BOMBOCO
LIFUMA
EAST
WEST
KOKONGO
KALI
LIVUITE
SANHA FSO
SOUTH SANHA
SANHA CONDENSATE
NORTH N'DOLA
BLOCK 14 FPSO
NOTE: FOR CLARITY MANY WELL JACKETS ARE OMITTED.
CRUDE STORAGE TANKS
POWER PLANT
TOCA LUCULA AREA
LPG PLANT
TOPPING PLANTS
HELIPORT
Futila Terminal
ChevronTexaco
Cabinda Gulf Oil
LEGEND
EXISTING
POSSIBLE FUTURE EXPANSION
CRUDE OIL
GAS
LPG
PIPELINE FUTURE

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Crew Boats

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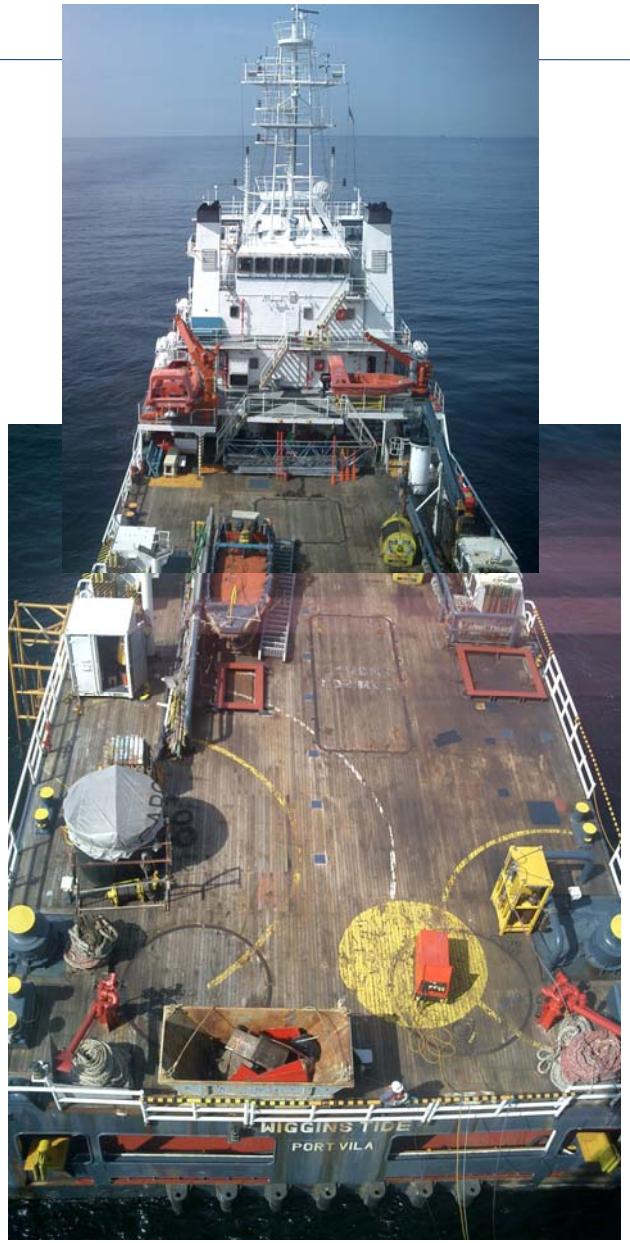
Lots of Small Platforms

Construction Services



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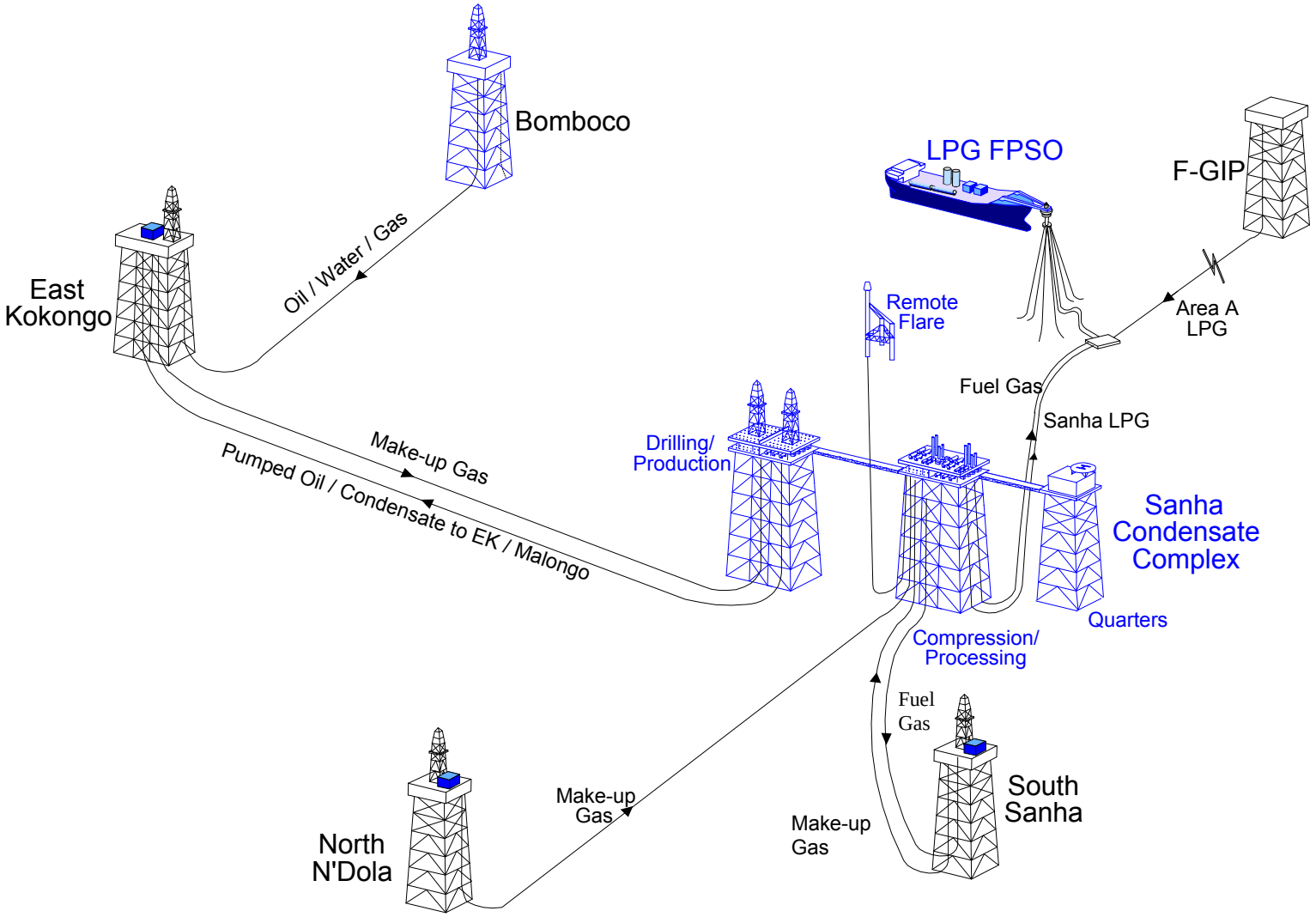
Sanha Complex



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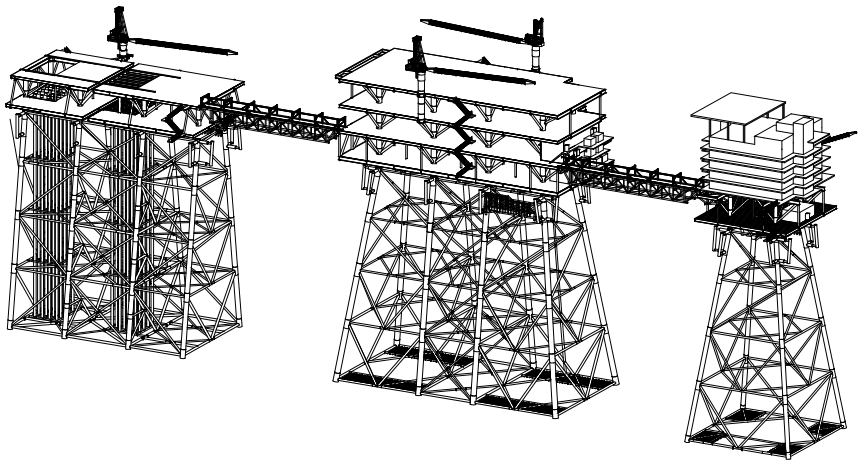
Sanha Complex



“DPP” PLATFORM

DRILLING/PRODUCTION PLATFORM:

Two Rig Operation
40 Well Slots
Primary Oil/Gas Separation

“PCP” PLATFORM

PROCESS/COMPRESSION PLATFORM:

Turbo-Expander LPG Plant
Condensate Stabilization
>150,000 HP of Compression

“QUP” PLATFORM

QUARTERS PLATFORM:

180 man Accommodation
“Safe” Utilities

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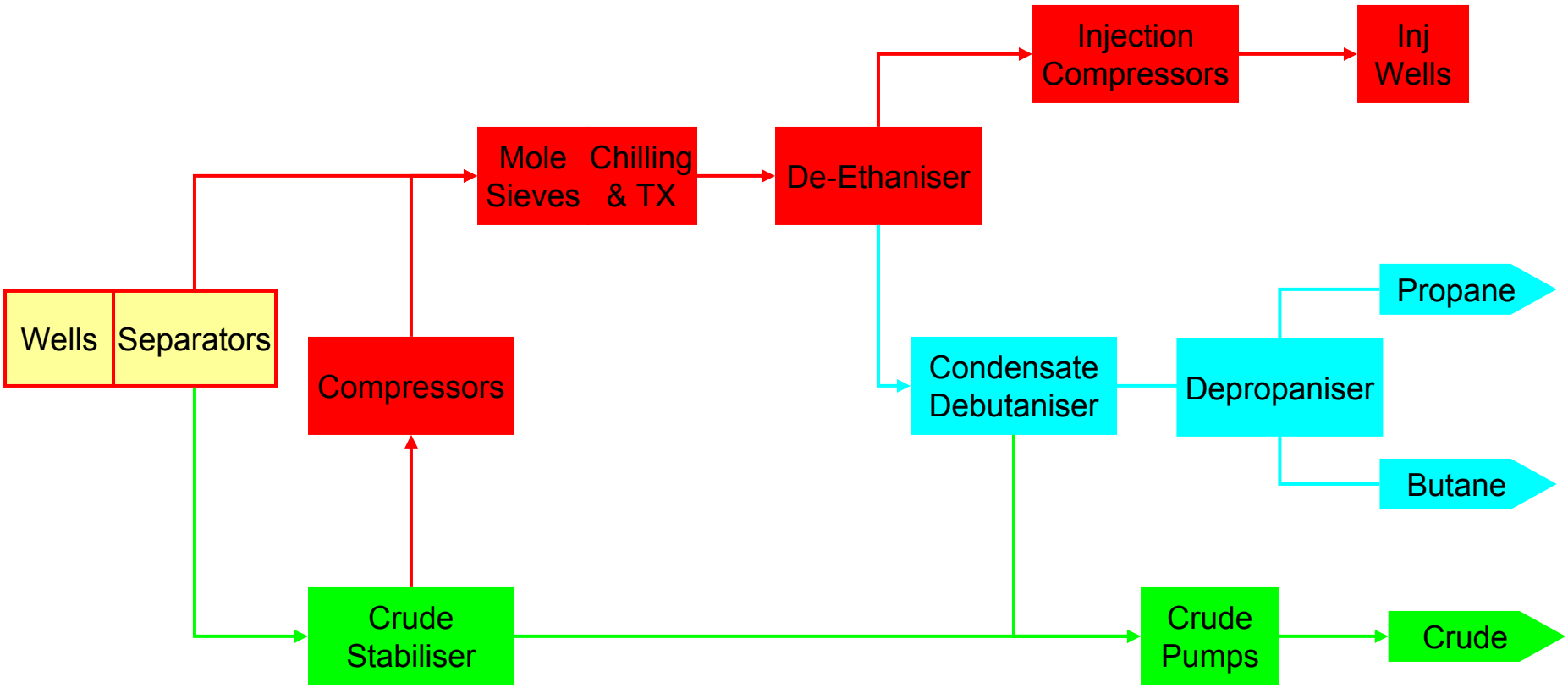
Sanha Complex

- PCP receives gas and oil from a number of sources:
  - From DPP platform gas and oil wells
  - From satellite fields (make-up gas) – South Sanha, North N'Dola and East Kokongo
- PCP produces four product streams:
  - Treated gas for reinjection into the Sanha reservoir
  - LPG for export to FPSO Sanha
  - Crude/condensate for export to East Kokongo and then to Malongo
  - Fuel gas for own use and export to South Sanha and FPSO Sanha
- The facilities comprise:
  - Gas compression
  - Condensate stabilization and export
  - LPG extraction (cold box, turbo-expander, de-ethanizer and de-butanizer)
  - Power generation


Injection Compressors
Inj Wells
Mole Sieves
Chilling & TX
De-Ethaniser
Wells
Separators
Compressors
Condensate Debutaniser
Depropaniser
Propane
Butane
Crude Stabiliser
Crude Pumps
Crude

Sanha Complex

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ENGINEERING

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Main Flare

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Sanha LPG FPSO

L P G

HYDRALIFT

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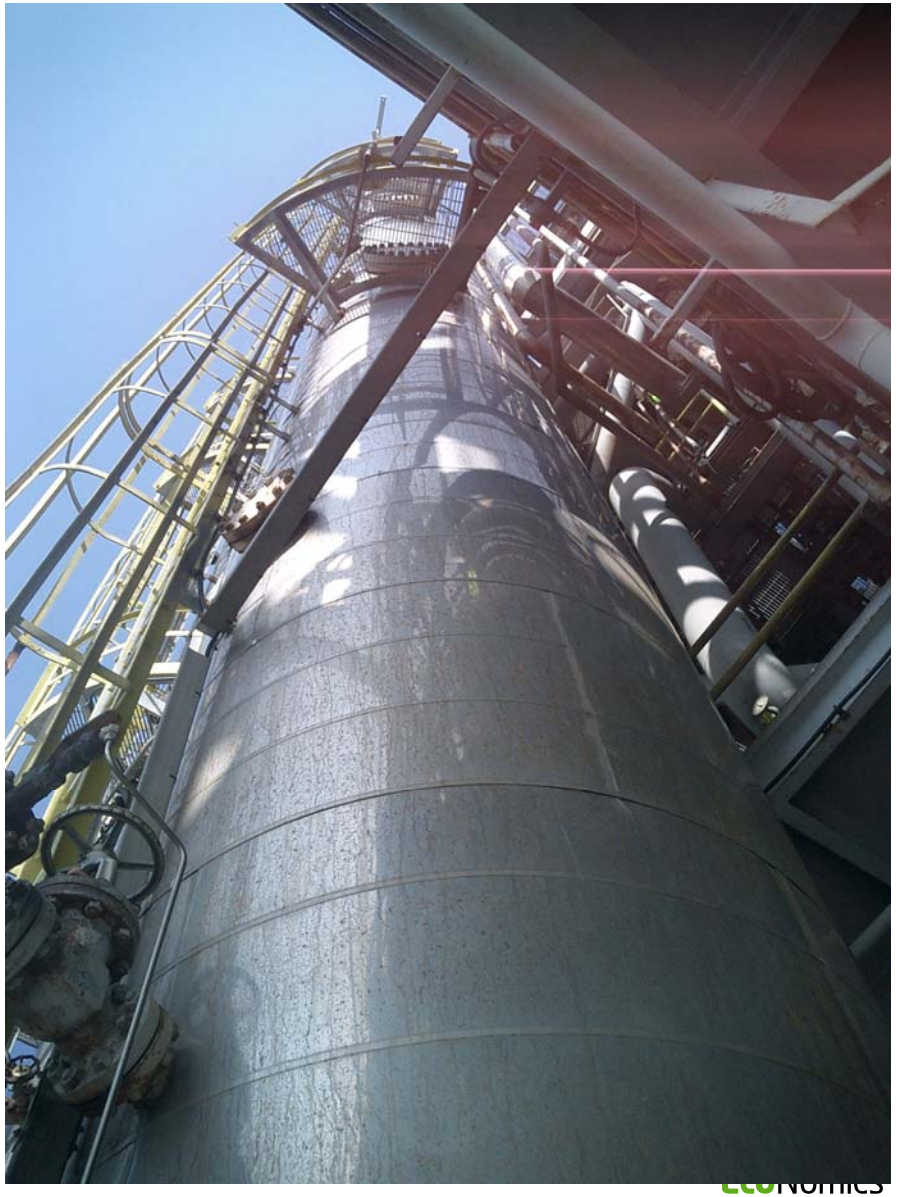
Fox GIF



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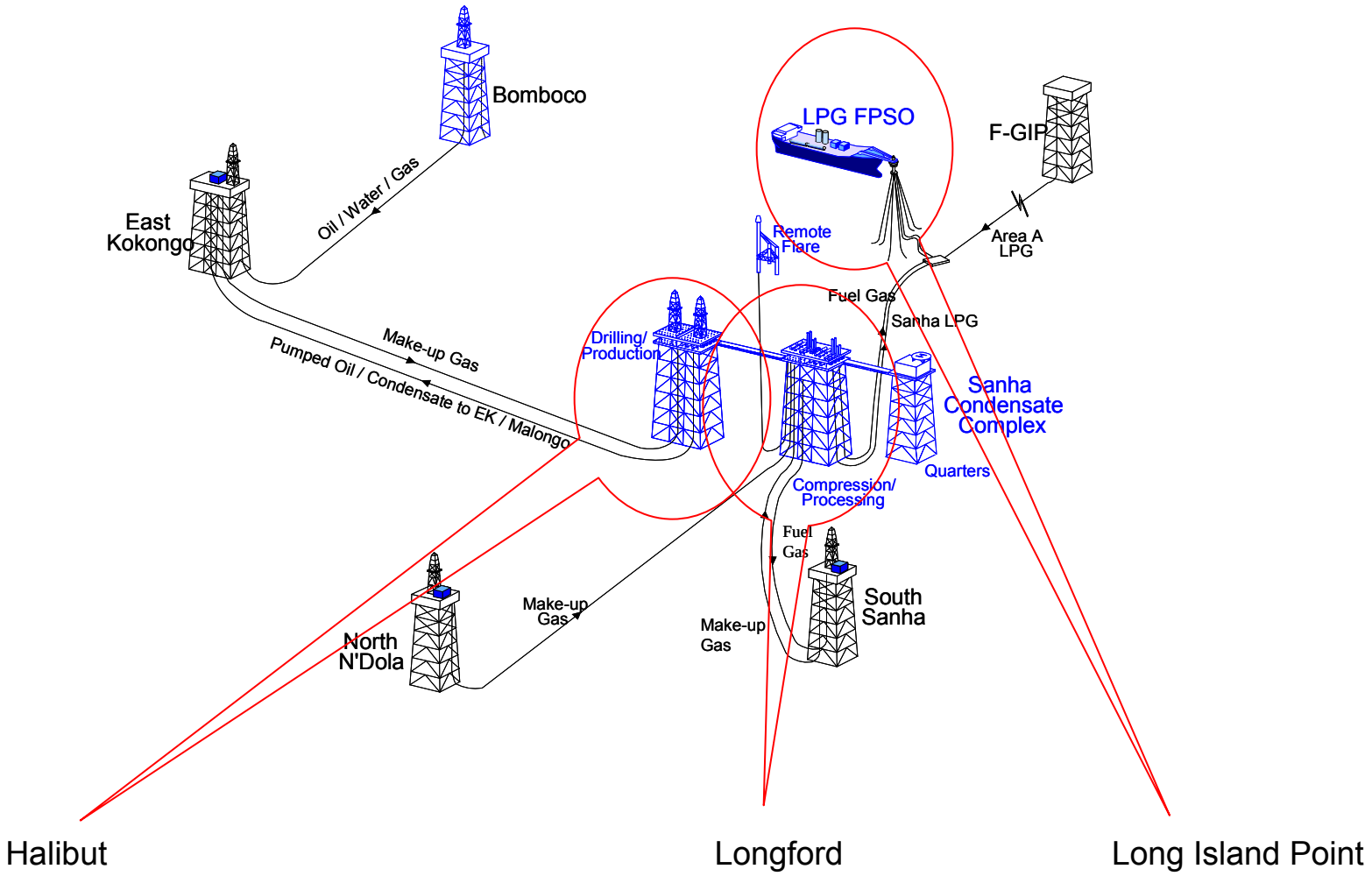
Fox GIF


Bomboco
LPG FPSO
F-GIP
East Kokongo
Oil / Water / Gas
Remote Flare
Area A LPG
Fuel Gas
Sanha LPG
Drilling/ Production
Make-up Gas
Pumped Oil / Condensate to EK / Malongo
Sanha Condensate Complex
Quarters
Compression/ Processing
Fuel Gas
South Sanha
Make-up Gas
Make-up Gas
North N'Dola
Halibut
Longford
Long Island Point

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Otway Gas Plant

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Sanha Audit

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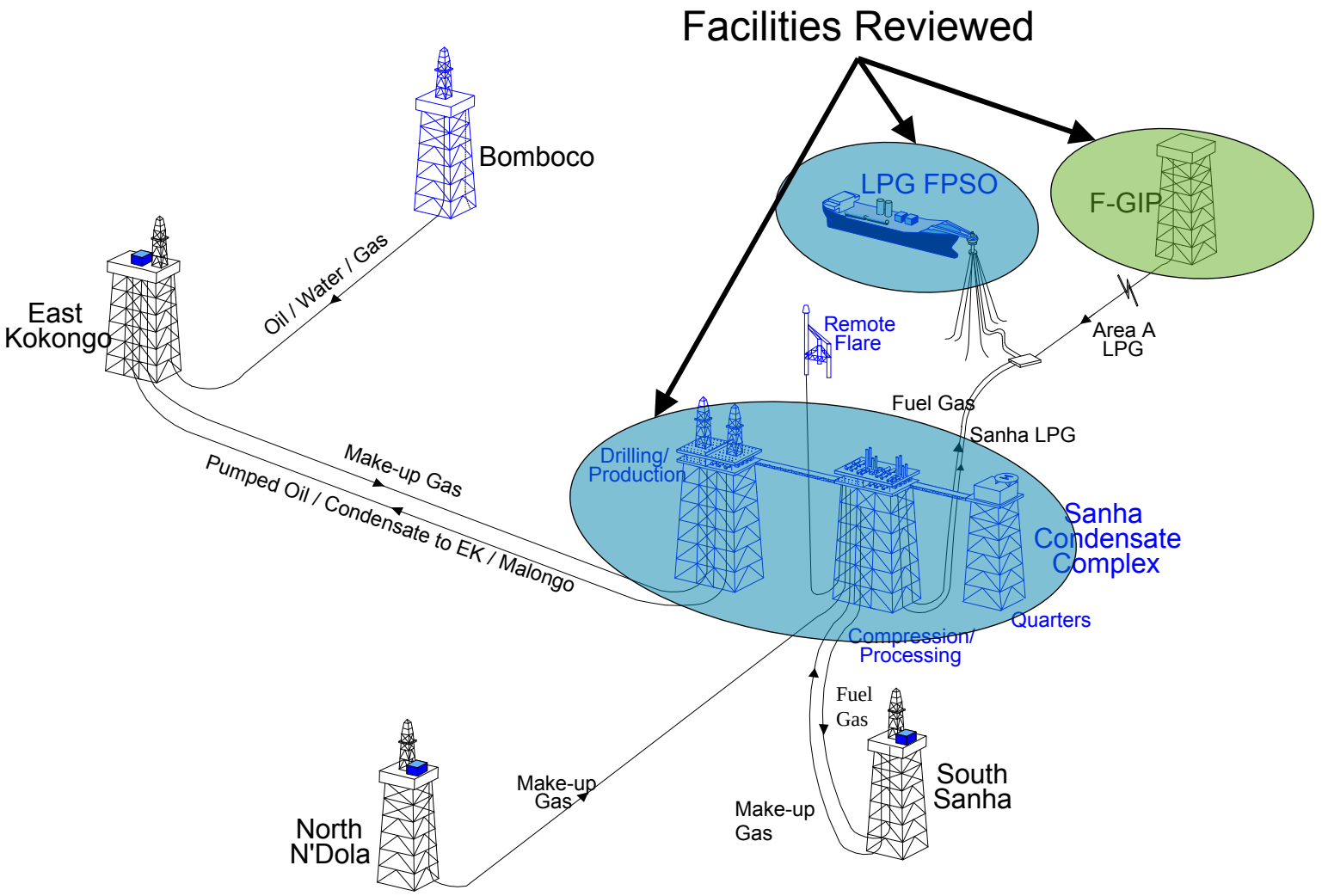
Scope of Audit



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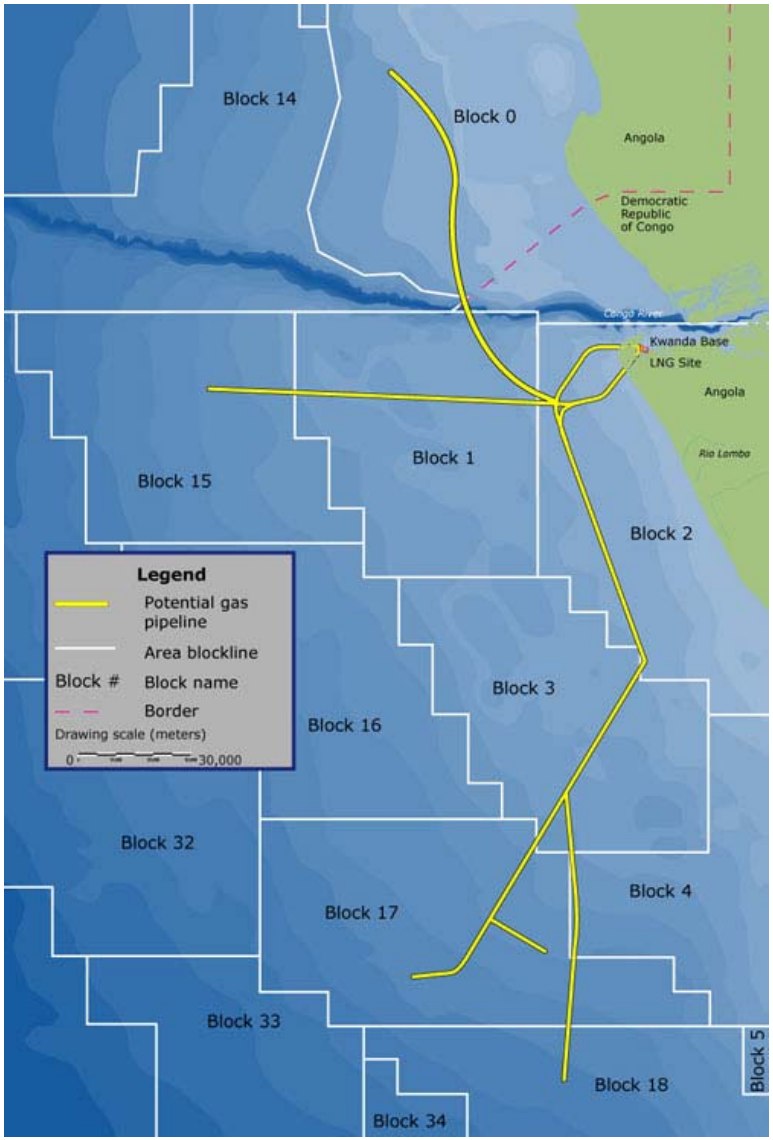
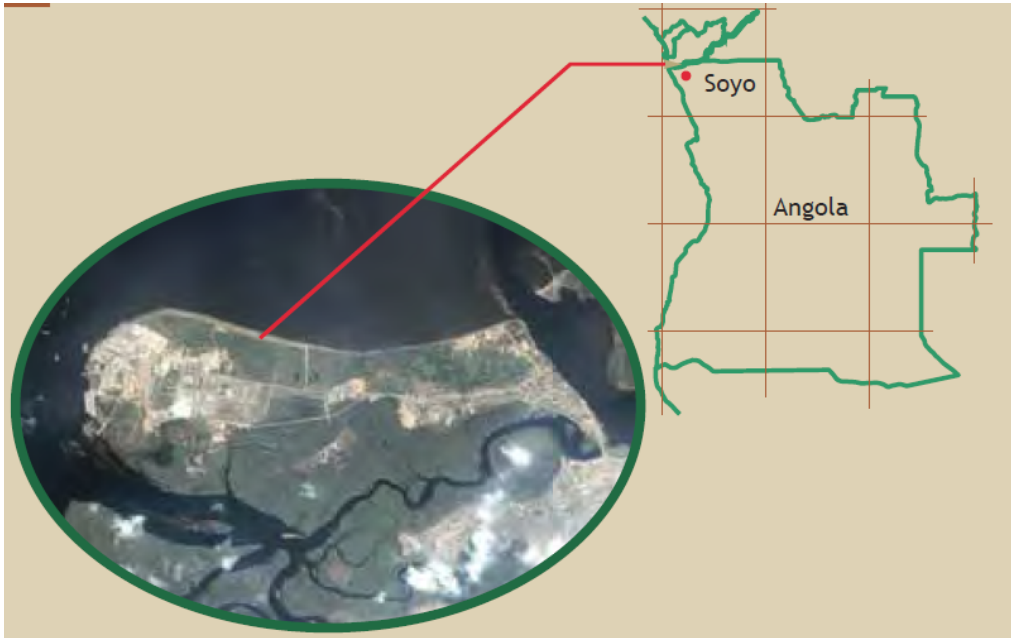
Gas Export Project





- 4 mta LNG plant
- Eliminate flaring of gas
- Monetising associated gas

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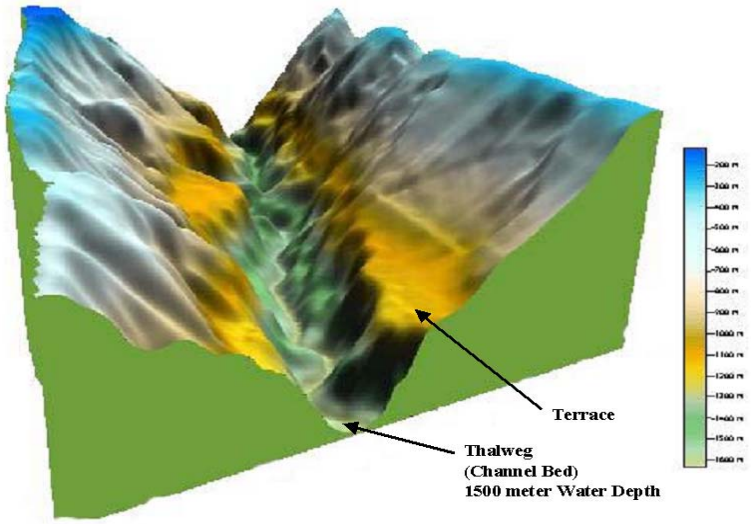
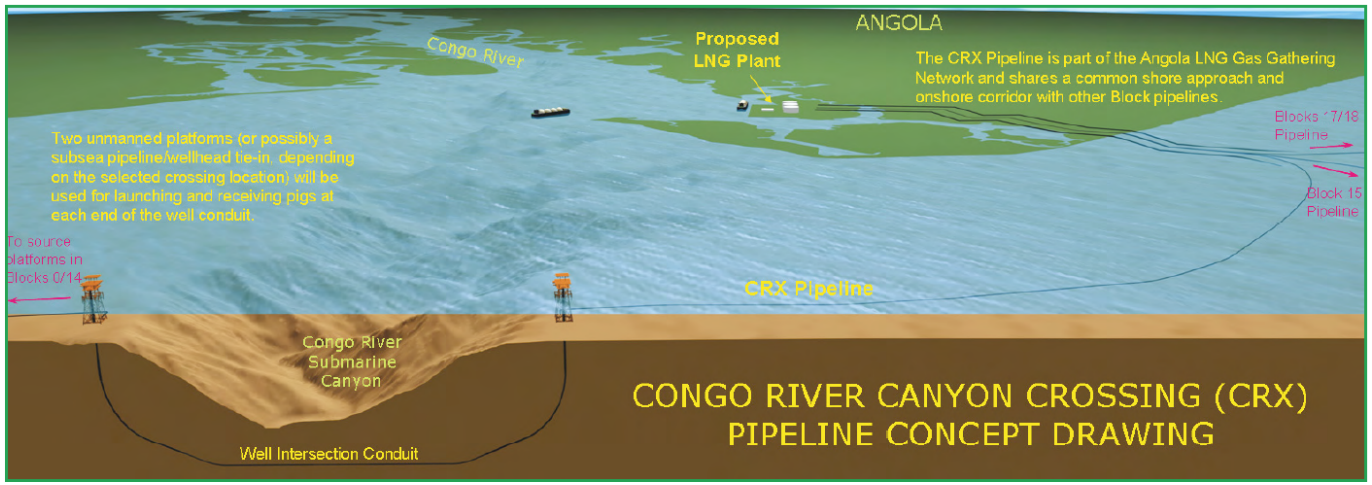
Congo River Crossing



Description

- Multiple FPS and Gathering Pipelines (500 km)
- Gas Gathering/Storage Platform
- Gas Export Pipeline (200 km)



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Benguela, Belize, Lobito, and Tomboco fields

BBLT Development

- In approximately 1,200 ft (366 m) water
- First Compliant Piled Tower (CPT) outside the Gulf of Mexico
- 40 slots
- Topside operating weight of 43,500t

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Life in Angola

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Coca-Cola

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TOYOTA
LD-71-61-BF

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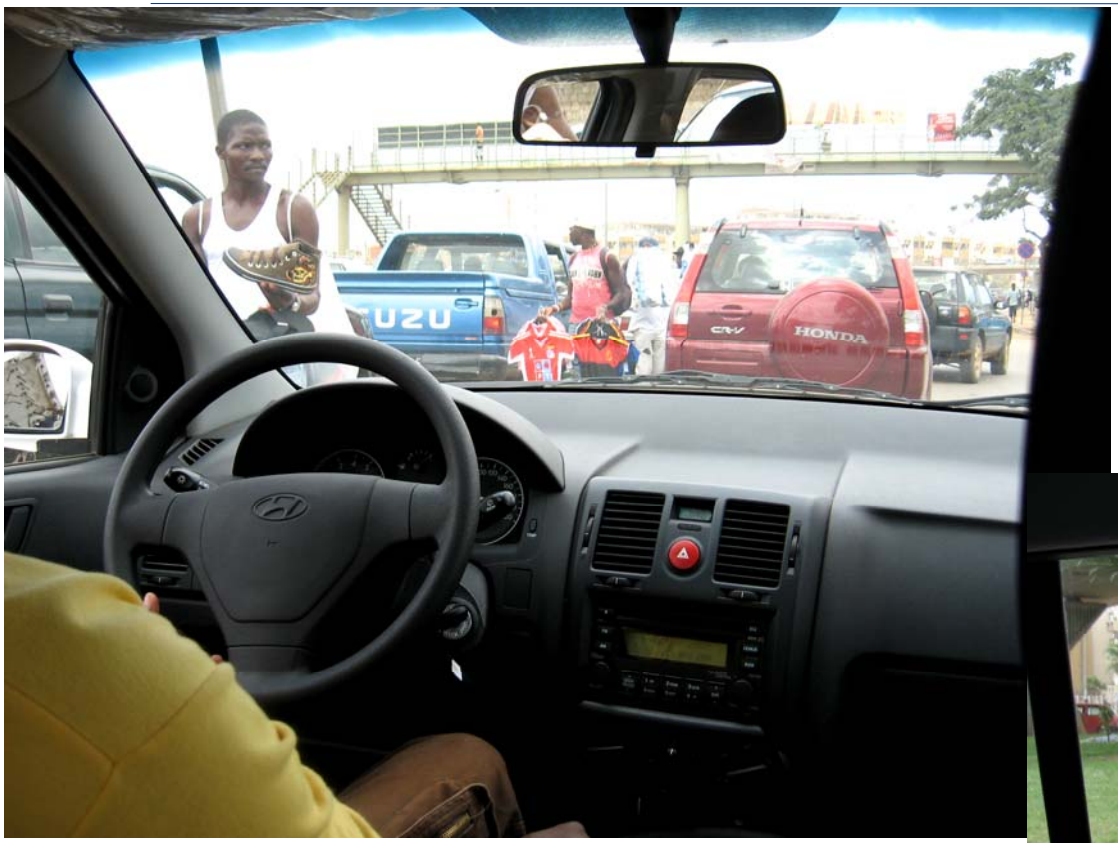
Retail Therapy



PROIBIDO
FUMAR
GASOLEO
2009/ 5/ 1

2009/ 5/ 1

2009/ 5/ 2

2009/ 5/ 2

2009/ 5/ 2

12
2009/ 5/ 3

2009/ 5/ 3

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Cabinda Airport

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Luanda Airport

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Thank You – Any Questions?