

# PetroMall

**Putting relevant science and engineering back into every decision made!**

***The Energy Transition in East Africa***

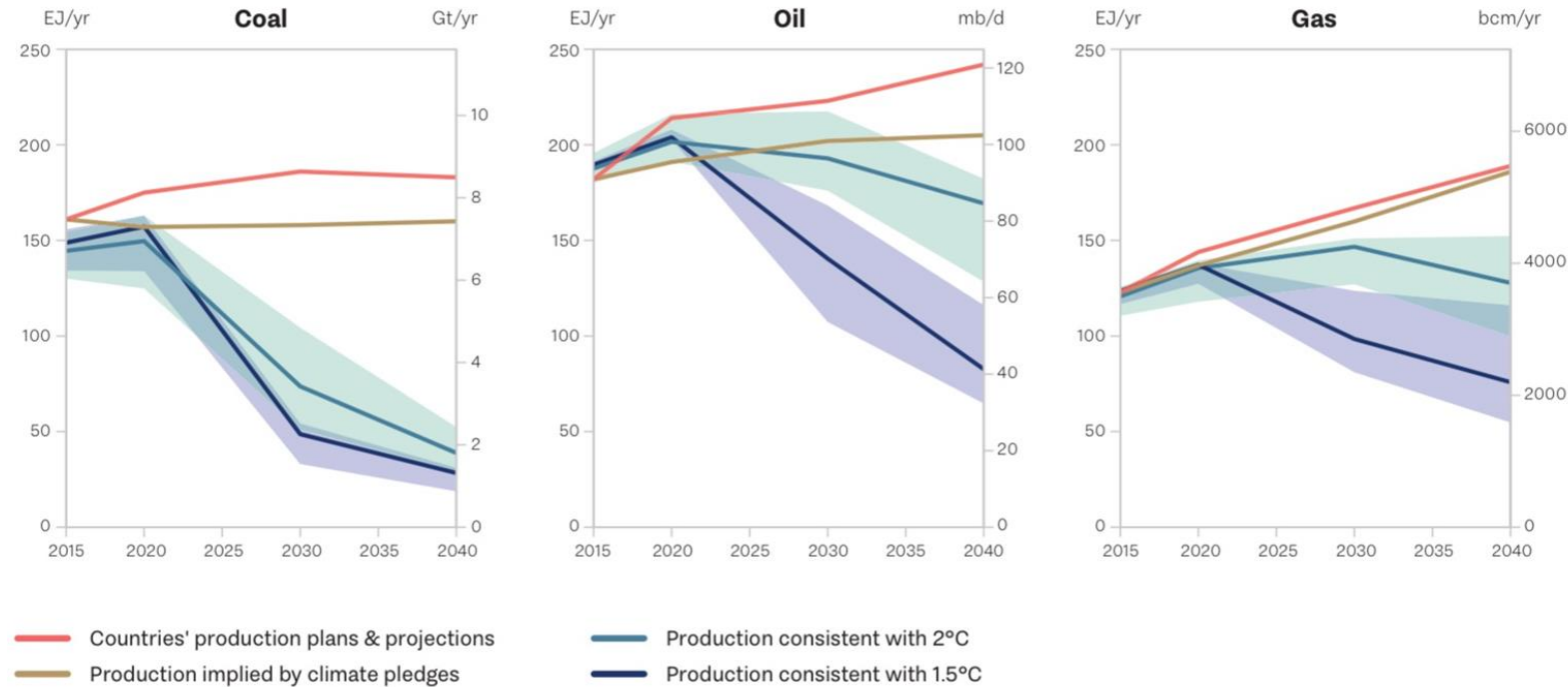
***ESG in action***

**December 6th 2019**

# UN Env Report- The Production Gap

**Figure ES.2**

The production gap is widest for coal but grows rapidly for oil and gas. By 2040 the production gap, in energy terms, is as large for oil as it is for coal. Physical units are displayed as secondary axes: billion tonnes per year for coal, million barrels per day for oil, and billion cubic meters per year for gas.



## What about in East Africa?

- Hydro- Some
- Solar- a little
- Geothermal- Kenya
- Wind- no
- Waste- Ugly

# Interlinked Goals

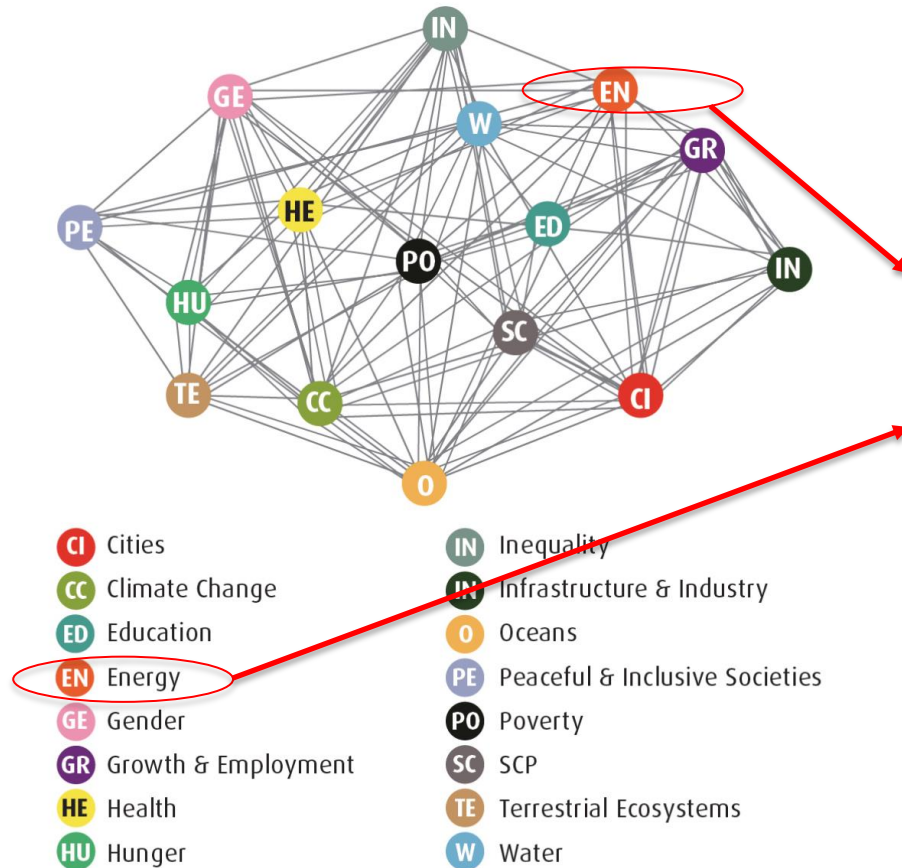
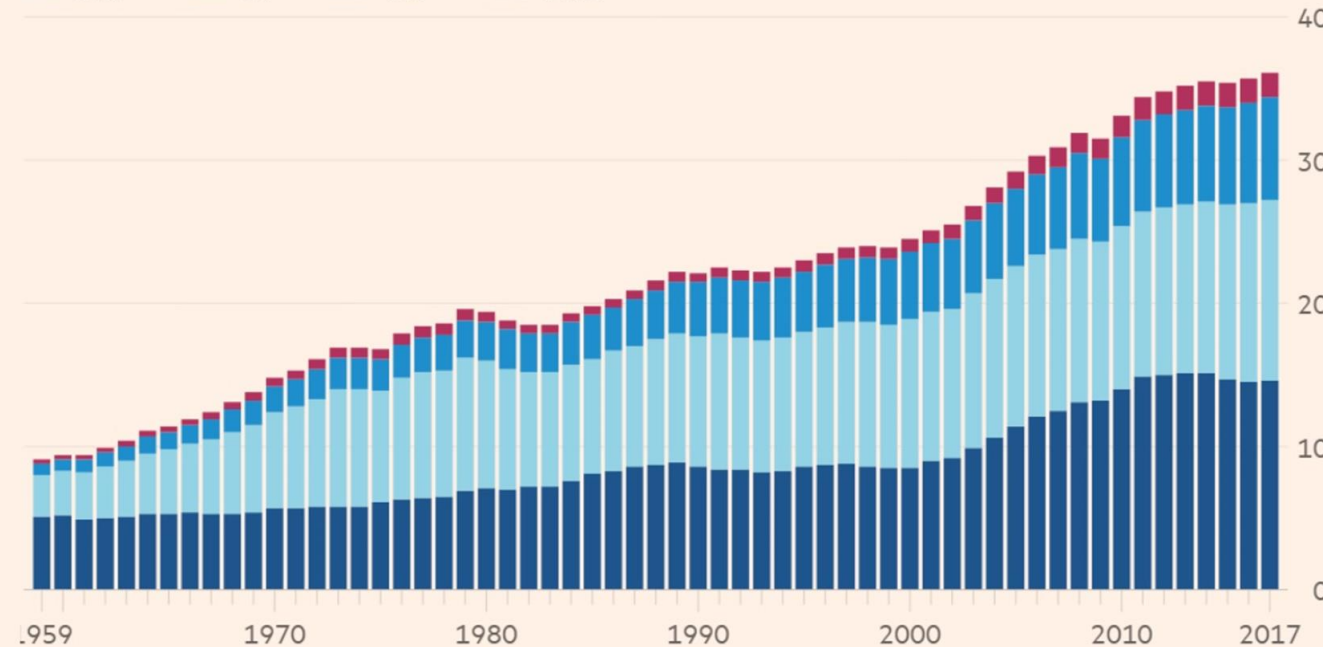


Figure 2: UN 2015 Global Sustainable Development Report

## CO2 emissions from fossil fuels

Tonnes (bn)

Coal Oil Gas Other



Source: Global Carbon Project

© FT

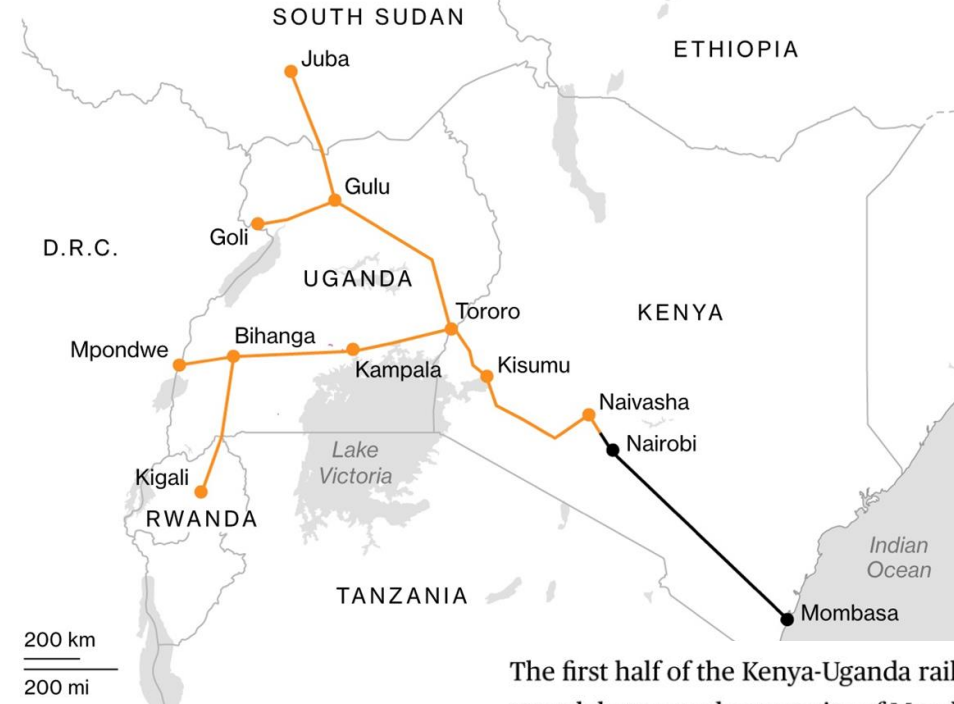




## Kenya's Railway to Nowhere

Construction of a Chinese-built line across East Africa has halted

Complete Planned



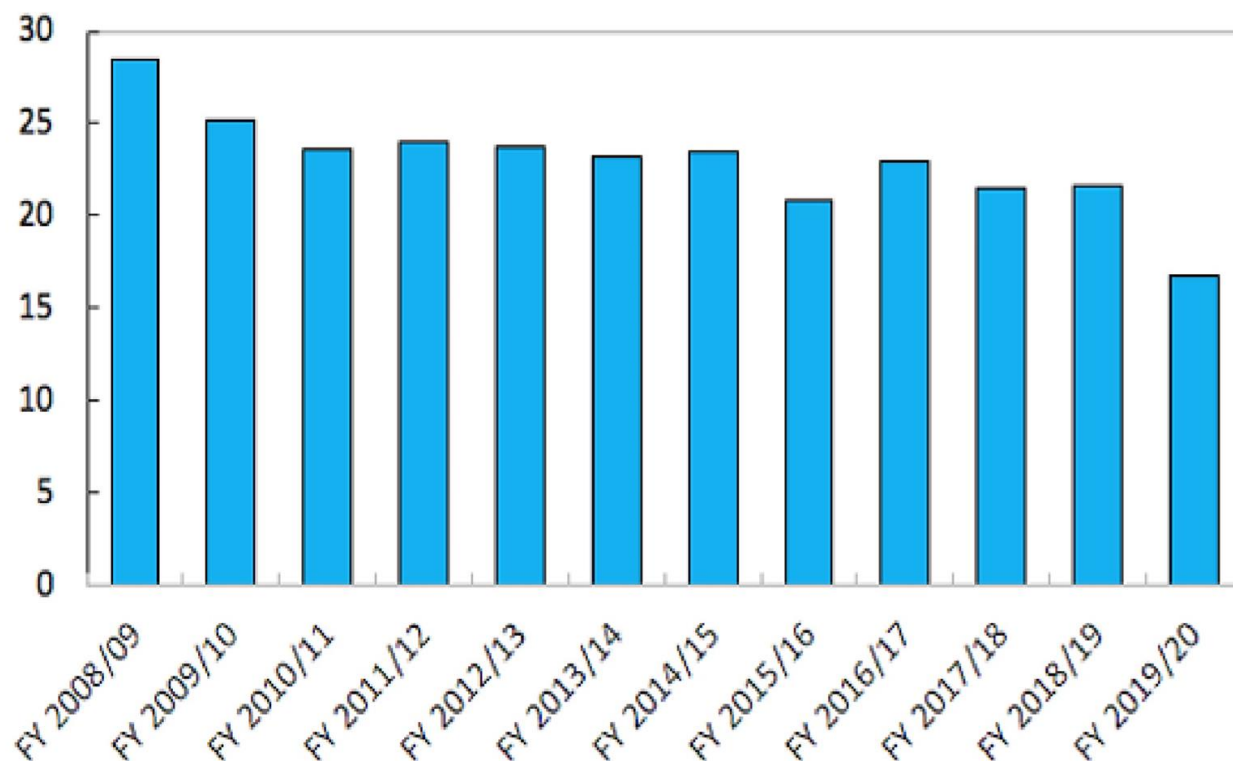
Note: Map shows only selected stops  
Source: Kenyan and Ugandan government documents





# Infrastructure not Social

(total social spending, percent of total expenditure)



Sources: Ugandan authorities; and IMF staff calculations.

## PORT EXPANSION PROJECTS IN AFRICA

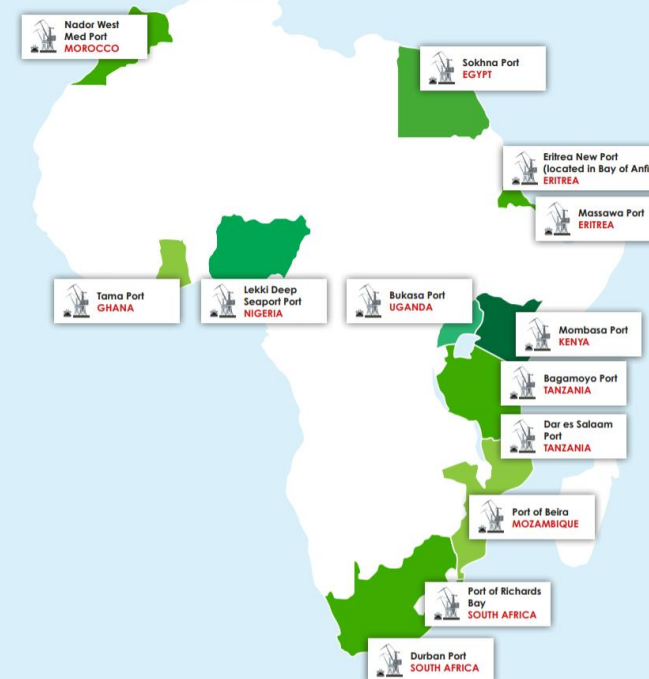
INTERACTIVE PROJECT MAP  
Hover over the icon and see the detailed information

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# Ethiopia- FDI or Aid?

## An Economic Snapshot of Ethiopia

Ethiopia's economy has been largely state-driven in recent decades. This has led to distortions such as the ongoing foreign exchange shortage. The government's plan to unleash the private sector as the new engine for the economy will depend on its ability to reduce bureaucratic roadblocks, among other key factors.

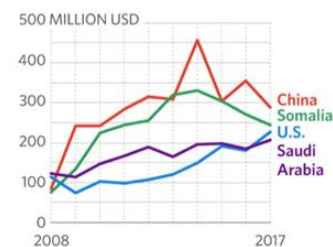
### Inflation



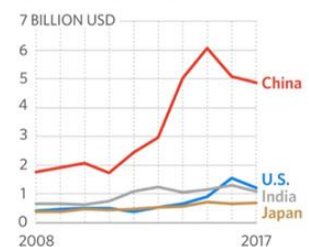
### Gross Domestic Product Growth



### Top Export Partners



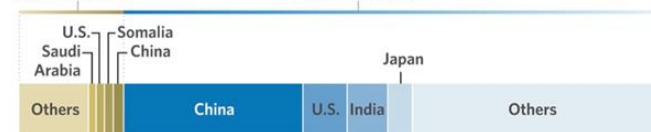
### Top Import Partners



### 2017 Foreign Trade

Exports: \$2.86

Imports: \$14.69



Sources: International Monetary Fund, Trade Map

Copyright Stratfor 2019

## Ethiopian Liberalization and French Companies

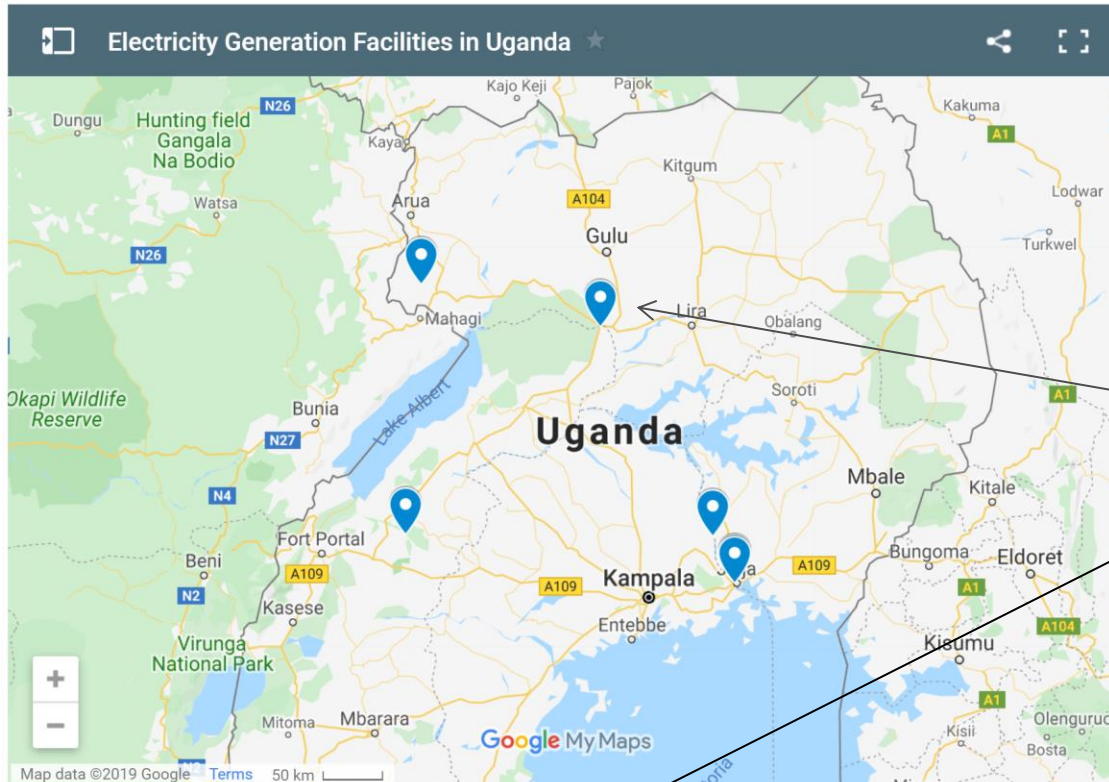
Ethiopia, with a population of over 110 million and high growth potential, is liberalizing multiple economic sectors and diversifying its external partnerships. French companies will be particularly well placed to take advantage, given their history of African operations and support from Paris.

Sector	Ethiopian Economic Liberalization Policy	French Companies Poised to Benefit from Liberalization
Telecom	The breakup of <b>EthioTelecom's</b> monopoly, and opening up open up the sector to outside competition by end of 2020	<b>Orange Telecom</b> (already in contract with EthioTelecom)
Aviation	The partial privatization <b>Ethiopian Airlines</b> , which is considered one of the best companies on the continent	<b>Airbus</b> , following the deadly Ethiopian Airlines crash of a Boeing 737 MAX 8
Logistics	The breakup of the <b>Ethiopian Shipping and Logistics Services Enterprise's</b> monopoly	<b>Bolloré Africa Logistics</b> and <b>CMA CGM Group</b> , which have ventured with Ethiopian companies

Source: Stratfor analysis

Copyright Stratfor 2019

# HydroPower



China Financed  
\$568m

## MAJOR POWER PLANTS

### Kiira Power Station

The 200MW Kiira Power Station is located in Kimaka, Jinja District in Eastern Central Uganda, also known as Owen Falls Extension.

### Nalubaale Power Station

The 180MW Nalubaale Power Station formerly District. The power station is operated and managed under a lease contract.

### Karuma Hydro Power Station

The 600MW Karuma HPP is located on the Nile River, 110Km downstream of Lake Kyoga and 270Km from Kampala.

### Isimba Hydro Power Station

The 183MW Isimba HPP is located 4km downstream of Lake Kyoga and 50km downstream off the source of Nile.

### Muzizi Hydro Power Station

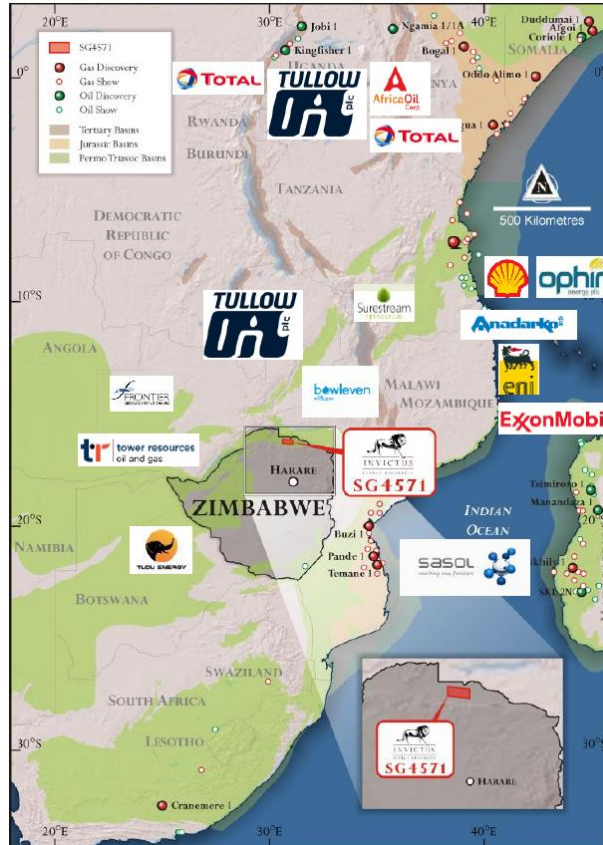
The 44.7MW Muzizi HPP is located along Muzizi River in the District of Kibaale. Its foot prints however extends to Kabarole, Kyenjojo and Ntooroko districts in the western part of Uganda.



15% of population have access to electricity  
Mainly biomass 90% of supply



# Activity in East Africa



Source: Invictus Sept 2018

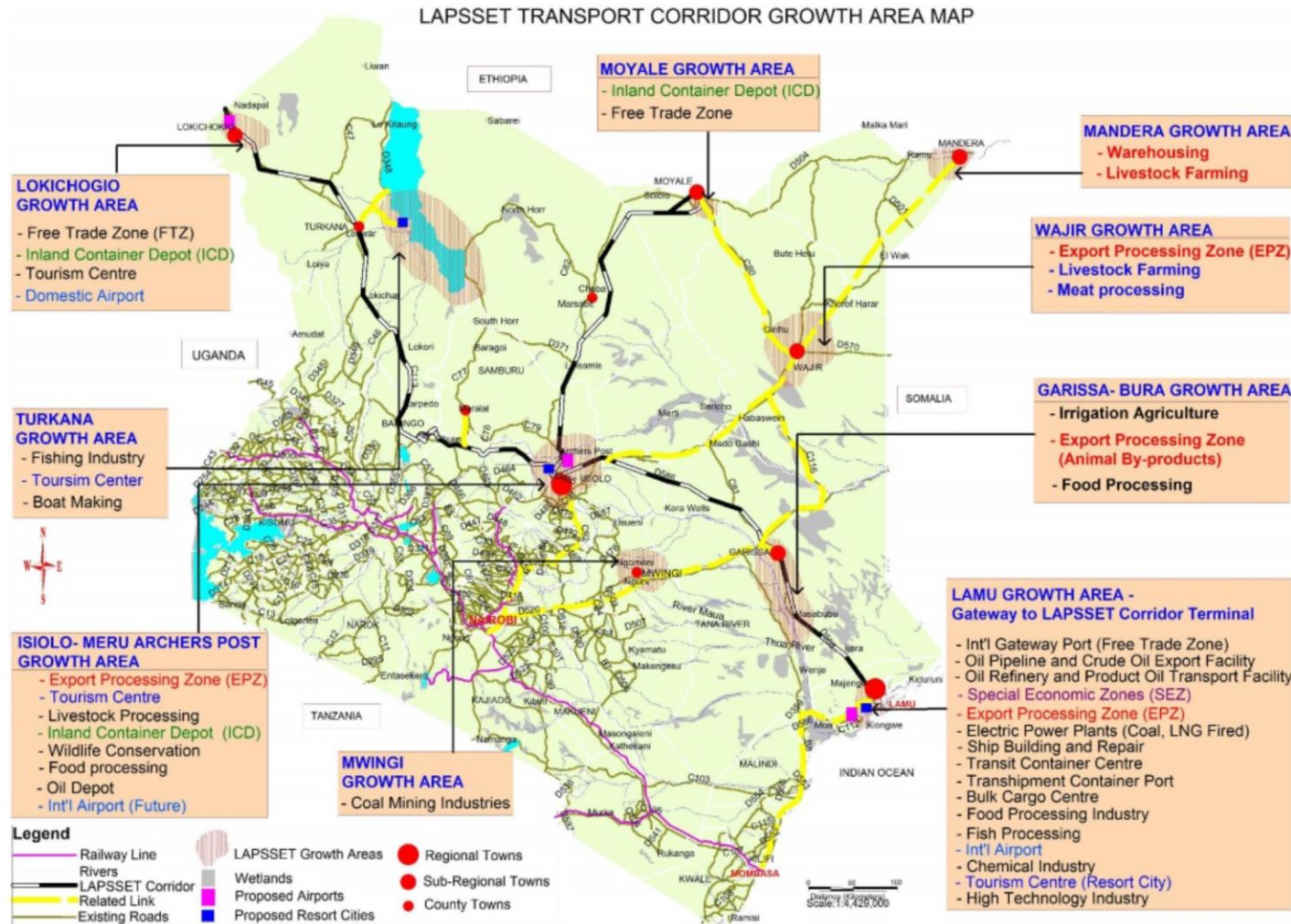


## Hydrocarbon Resources are being developed

- South Sudan- 350k bopd now 40-70K
- Mozambique 160TCF to support 2 LNG schemes
  - Existing gas to South Africa
- Uganda- 1.2bn bbls awaiting FID
- Tanzania 40TCF for LNG;
  - 1-2TCF for local gas use
- DRC- exploration
- Zimbabwe- exploration for local gas supply
- Kenya- Lockichar/Turkana awaiting FID
- Somalia- exploration?



# Kenya- LAPSSET



'Lamu Port South Sudan Ethiopia Transport Corridor'



# Tullow Kenya

Overview presentation

## DEVELOPING KENYA'S DISCOVERED RESOURCES

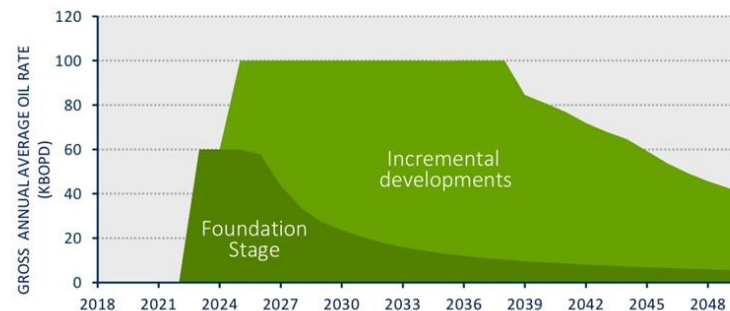
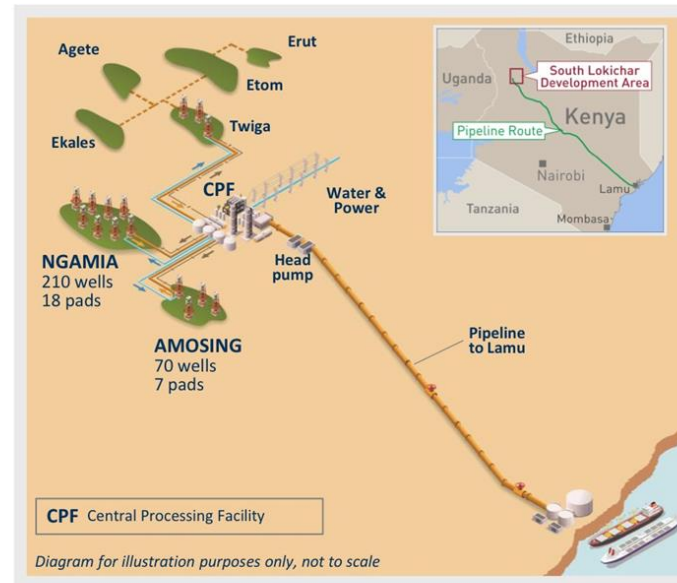


### South Lokichar development plan

- Discovered resources support development via export pipeline to Lamu
- Phased development approach planned
- Incremental developments to follow initial Foundation Stage, utilising installed infrastructure
- Full development to achieve plateau production of 100,000 bopd+

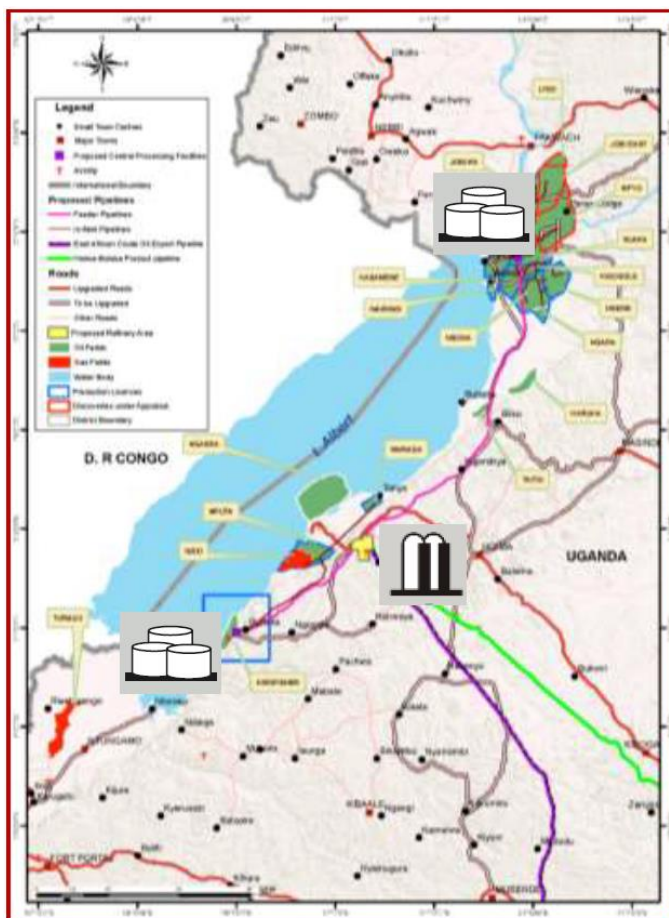
### Amosing/Ngamia/Twiga Foundation Stage

- Foundation Stage targeting 210 mmbo
- Initial production of 60,000 - 80,000 bopd
- Allows early FID to take advantage of low cost environment
- Targeting FID: 2019, First Oil 2022
- Foundation Stage gross capex of \$2.9bn
  - Upstream \$1.8bn
  - Pipeline \$1.1bn
  - ~80% spend to First Oil





# Uganda Upstream Plan



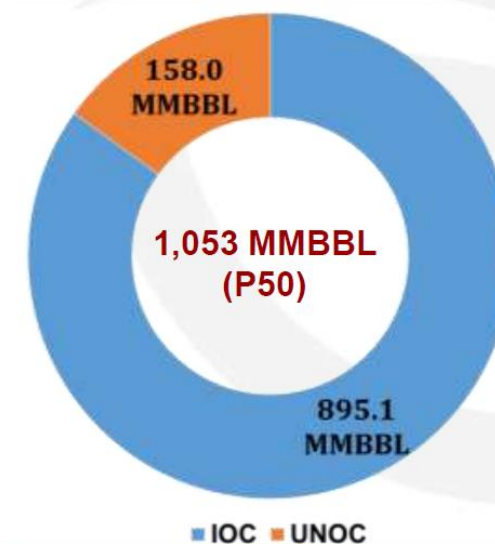
## Tilenga (190k bopd)

- Operated by Total E&P Uganda B.V
- Consists of 8 fields, covering ~ 230Km<sup>2</sup>
- Discovered between 2008 & 2011
- PLs (5) issued in August, 2016
- STOIIP - 3.9Billion BBL and recoverable – 857MMBBL
- Phase: FEED**

## Kingfisher (40k bopd)

- Operated by CNOOC (U) Ltd
- Discovered in 2006, covers an oil area of 32.8 Km<sup>2</sup>
- Production License issued in February, 2012
- STOIIP – 635MMBBL & Recoverable – 196MMBBL
- Phase: FEED**

Partners (Tilenga & Kingfisher)	Current	Future
Total E&P Uganda B.V	33.33	37.5%
CNOOC Uganda Ltd	33.33	37.5%
UNOC	-	15.0%
Tullow Uganda Ltd	33.33	10.0%



## REGULATORY STRUCTURE AND PRIORITIES

**Uganda Ministry of Energy & Mineral Resources**  
Resource owner

**The Uganda National Oil Company**  
State share of Ugandan oil and gas assets

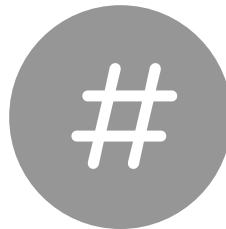
**The Uganda Petroleum Authority (UPA)**  
Regulator

**National Oil and Gas Policy 2008**  
Benefit local economy, train and develop local talent

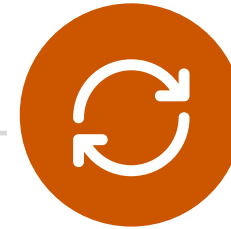
**National Council for Higher Education**  
National Supplier Database



Government aiming for 2020 first oil



UPA states that there are ca. 40 oil and gas experienced professional Ugandans



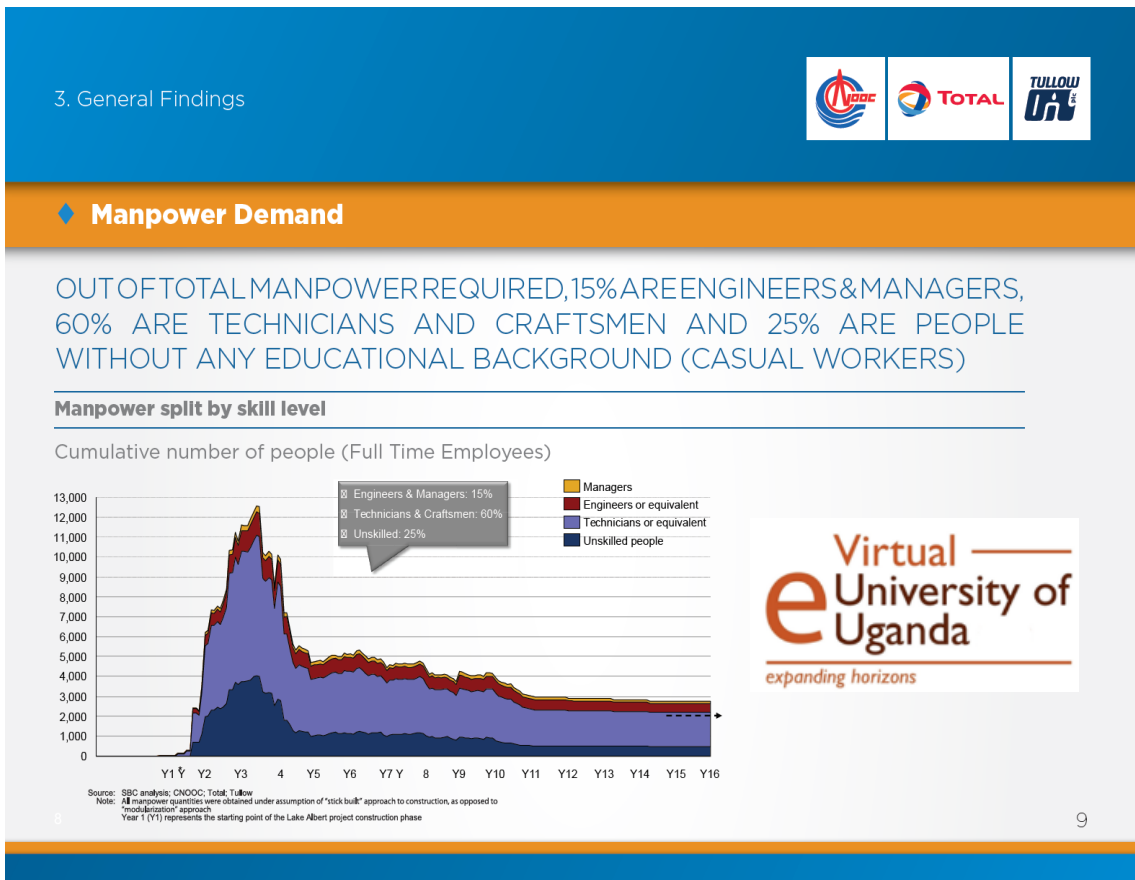
CNOOC targeting FDP approval in 4Q2018 with first oil in 2022



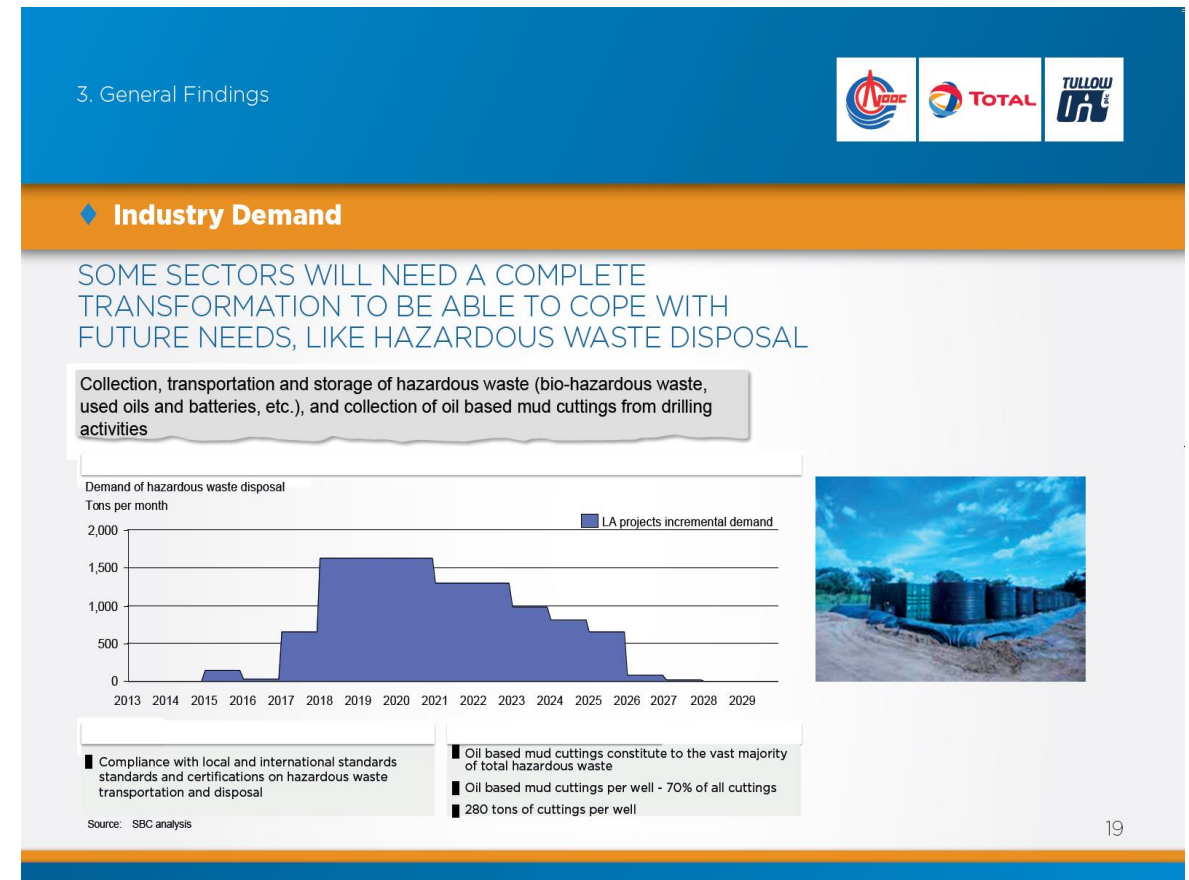


# UGANDAN TALENT DEMANDS

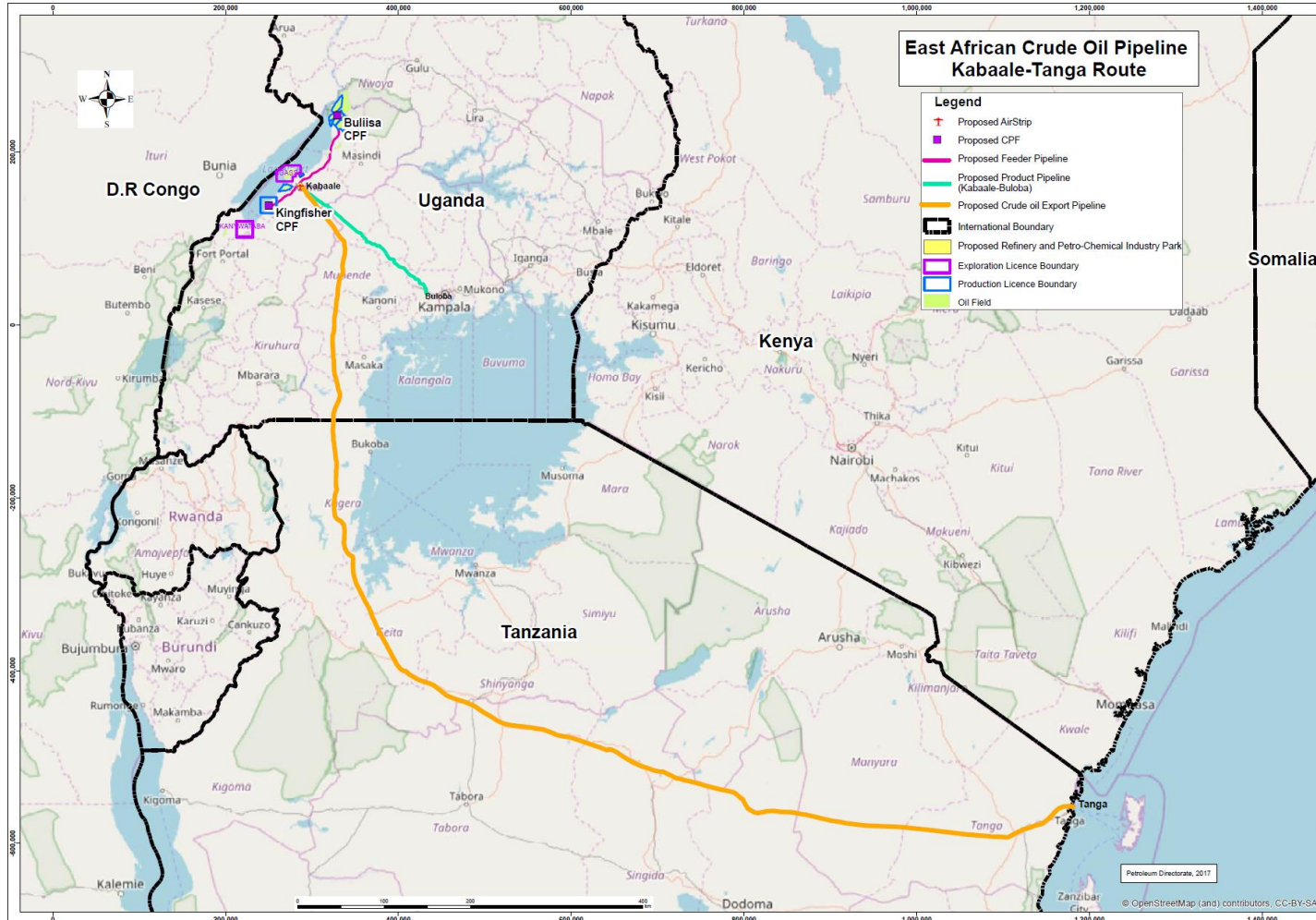
## > Demand for talent ramping up dramatically



## > Transformation required in some areas



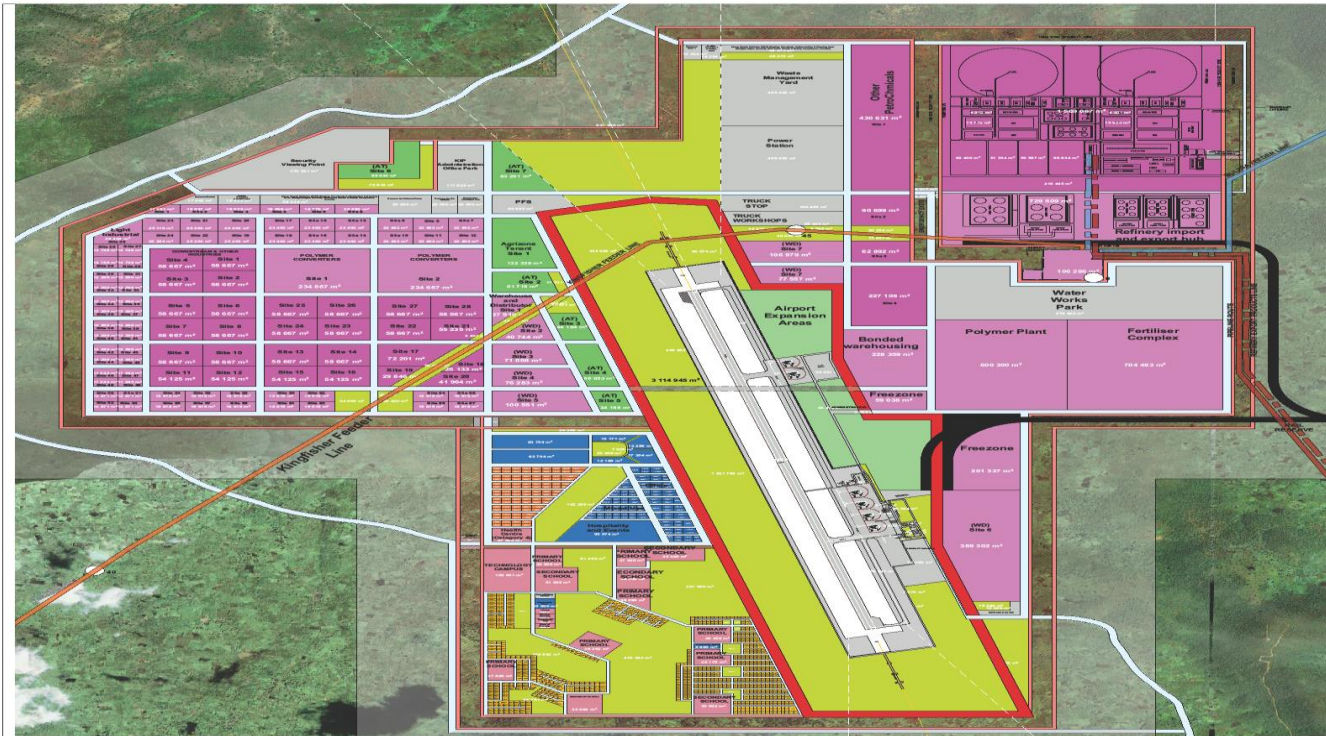
# Planned Infrastructure & Export Routing



\$4bn on roads and bridges  
 1500 km 200,000 bopd export pipeline  
 Export facility at Tanga  
 Product line to Kampala for 3m l storage facility



# Uganda- Kibaale Industrial Park



## The Park

- 29 km<sup>2</sup> land acquired
- World class architect designer and approved by National Infrastructure Authority
- \$300m Int'l Airport Funded by UKAID
- 60,000 bopd refinery
- Petrochemical plant
- Housing for '000's of workers

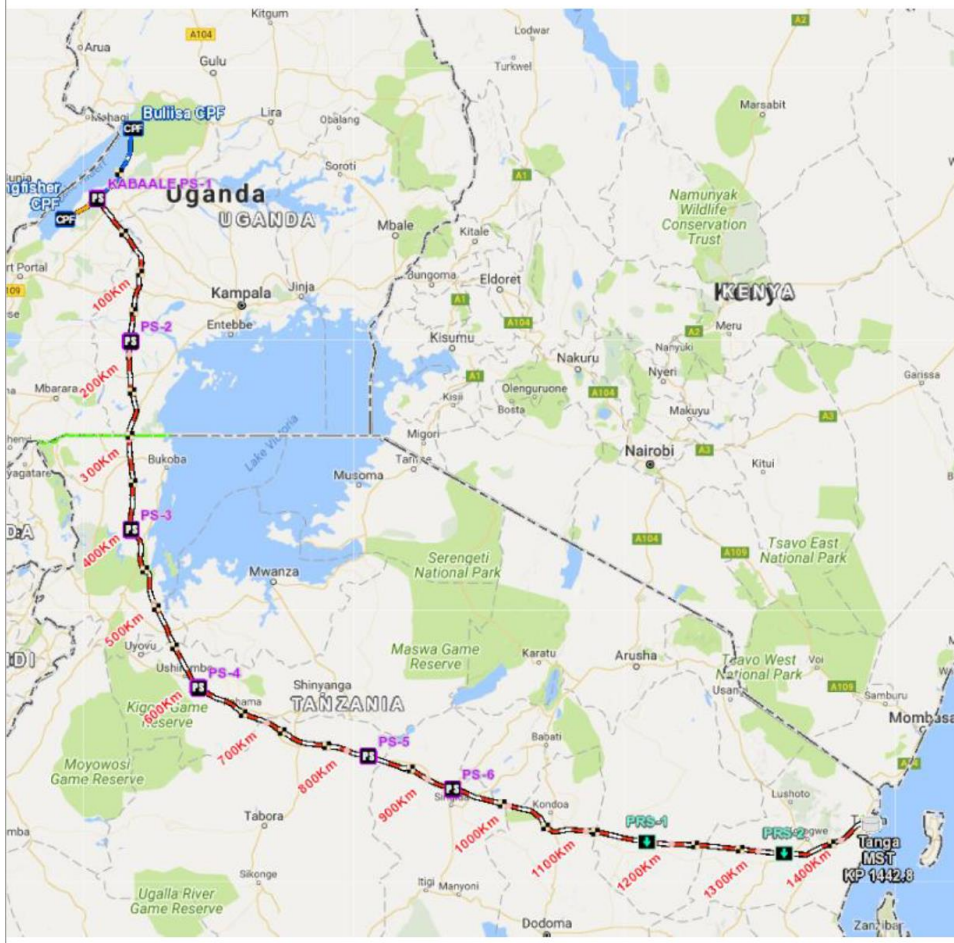
1.	LOW DENSITY RESIDENTIAL	FAR	COV. (%)	6.	INSTITUTIONAL	FAR	COV.	11.	SECURITY FENCE BUFFER	FAR	COV.
2.	HIGH DENSITY RESIDENTIAL	1	20%	7.	UTILITIES AND TRANSPORT	n/a	n/a	12.	AIRPORT FENCE	n/a	n/a
3.	LIGHT INDUSTRY	1	40%	8.	OPEN SPACE	n/a	n/a				
4.	HEAVY INDUSTRY	0.5	70%	9.	AGRICULTURE	n/a	n/a				
5.	COMMERCIAL	0.5	70%	10.	EXPANSION AREAS	n/a	n/a				

**KIP OIL AND GAS INTERIMS MASTERPLAN**  
**Final Layout - Phase 3\_Zoning Plan**

SCALE: 1: 12000



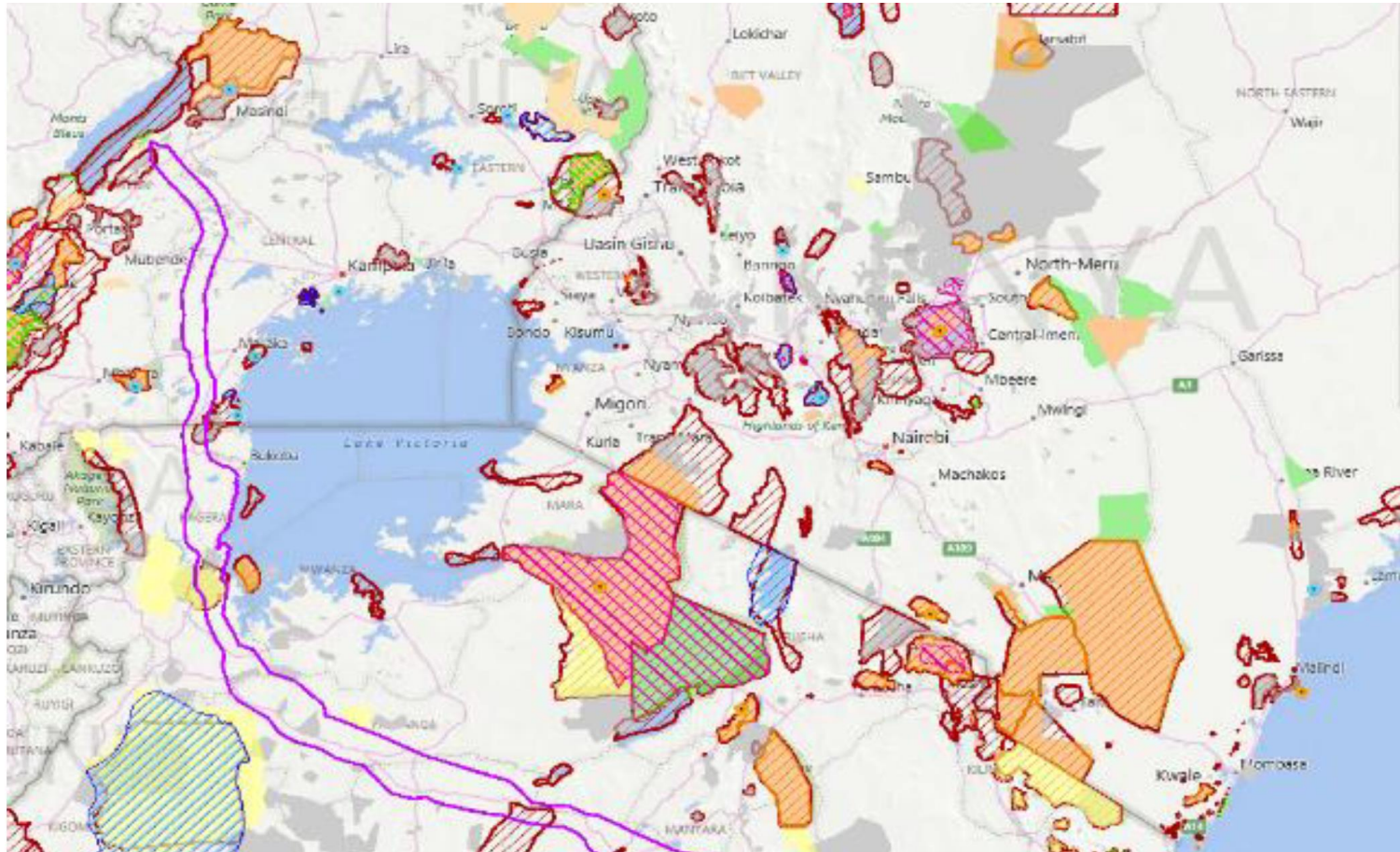
# EACOP- Multi Country



- Insulated 24" pipeline
- 216,000bopd design capacity
- **Longest Trace Heated Pipeline in the World**
- Waxy Crude (up to 45°C PP) & Viscous Oil
- 16 camps and 1 coating plant for construction purpose
- 6 Pumps Stations (PS)
- 2 Pressure Reduction Stations (PRS)
- Power Generation at PS 3 & 5 and Terminal
- Marine Storage and Export Terminal



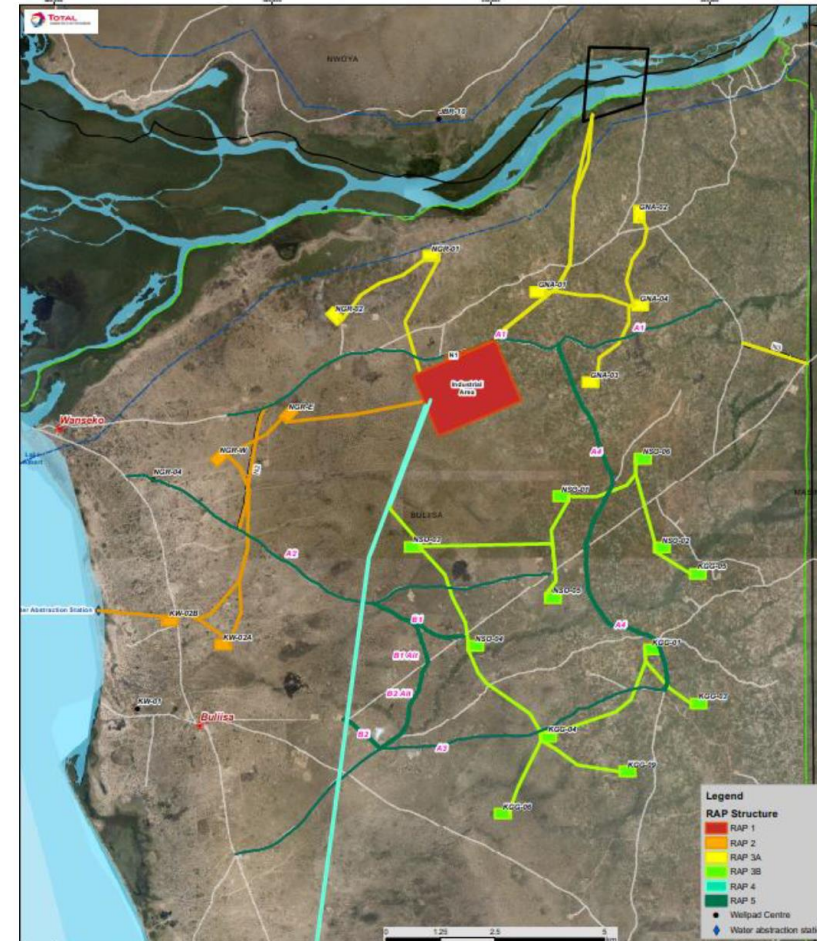
# Uganda Sensitive Areas



**Route with the least impact on protected areas identified**

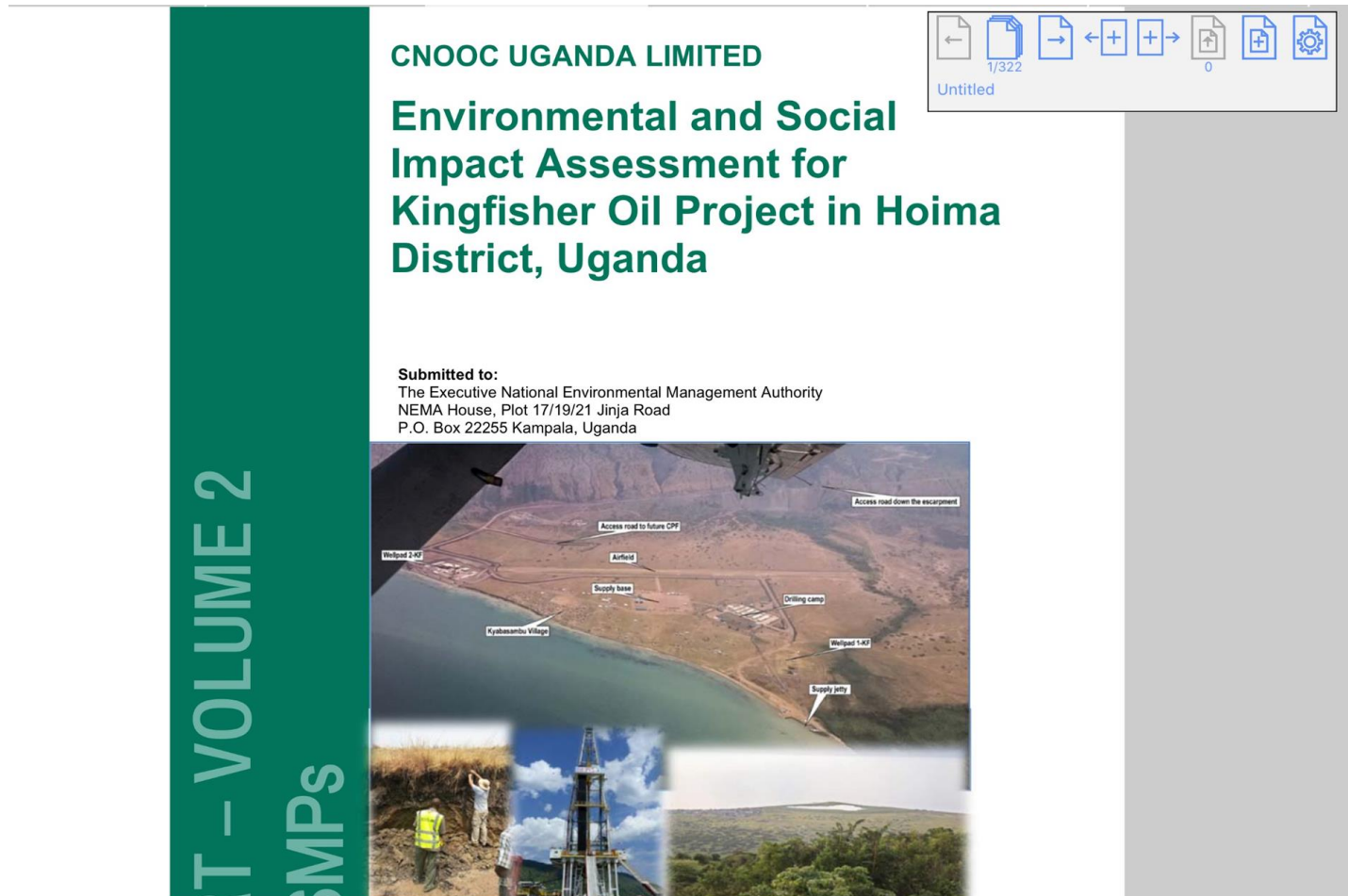
# Land Acquisition

- Overall land needs: ~ **1800ha (including Feeder & Public land)**
- Split into 5 RAPs
- RAP 1:
  - Report approved by GoU in Jan 2018
  - Implementation ongoing since Feb 2018
  - Full access to land before FID
- 650 PAPs; 150 land owners, 10 yet to sign compensation agreements
- IFC Compliance
- **Land acquired on behalf of GoU using rates approved by GoU**





# ESIAs in Uganda

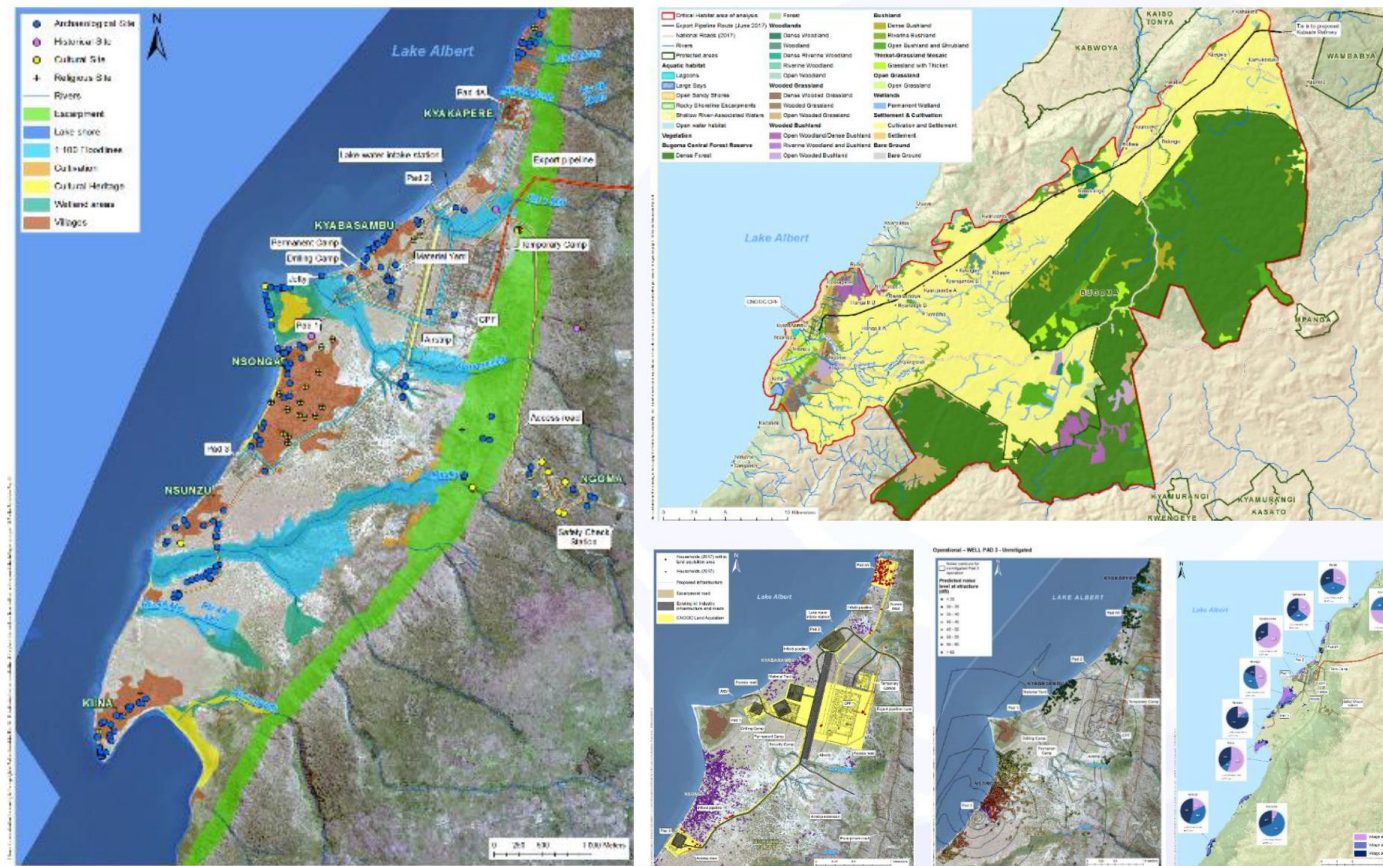


**Community Consultation !**

Kingfisher ESIA 3400 pages  
Tilenga ESIA 2400 pages

# Kingfisher ESIA

- Environmental and Social Impact Assessment(ESIA) was carried out for the areas of Kingfisher oil field and feeder pipeline.





# East Africa- Lake Albert- Kingfisher





# Uganda Early Days- Exploration & Appraisal

Assessing the Impacts of Energy Developments and  
Developing Appropriate Mitigation  
in the Uganda portion of the Albertine Rift



## Report of findings

prepared by  
**Louise Johnson**  
on behalf of



Wildlife Conservation Society



Uganda Wildlife Authority

February 2007



Photo 2: abandoned camp equipment at Turaco-3 (Photo: LOwunji)



Photo 3: cattle drinking from abandoned waste pit at Turaco-3 (Photo: LOwunji)



Photo 5: the open waste pit containing non-flared oil at Waraga



Photo 6: the damaged flare pit following the Kingfisher-1 well test, showing damaged steel sheets



# Overview of PetroMall

PetroMall is an energy consultancy dedicated to ensuring the supply of natural resources required is undertaken in a responsible and professional manner across different countries and improving the economics of prospective and existing projects.

The company was set up in 2012 by senior industry executives and academics. We consider the risks faced by today's energy environment are going to require inspired acts of leadership and technical skill to solve, in order to prosper as an industry in a sustainable way.

The PetroMall proposition brings together:

- A highly experienced team of associates,
- Proven track records in project design and execution,
- The best in asset management,
- Extensive experience in planning and negotiating development projects,
- Experienced with global standards and regulations
- Practical knowledge of the global energy supply chain



PetroMall prides itself on technical and commercial excellence in selected fields; we supplement business management and leadership in order to mitigate emerging risks.

# PetroMall

**Putting relevant science and engineering back  
into every decision made!**

## Contacts

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