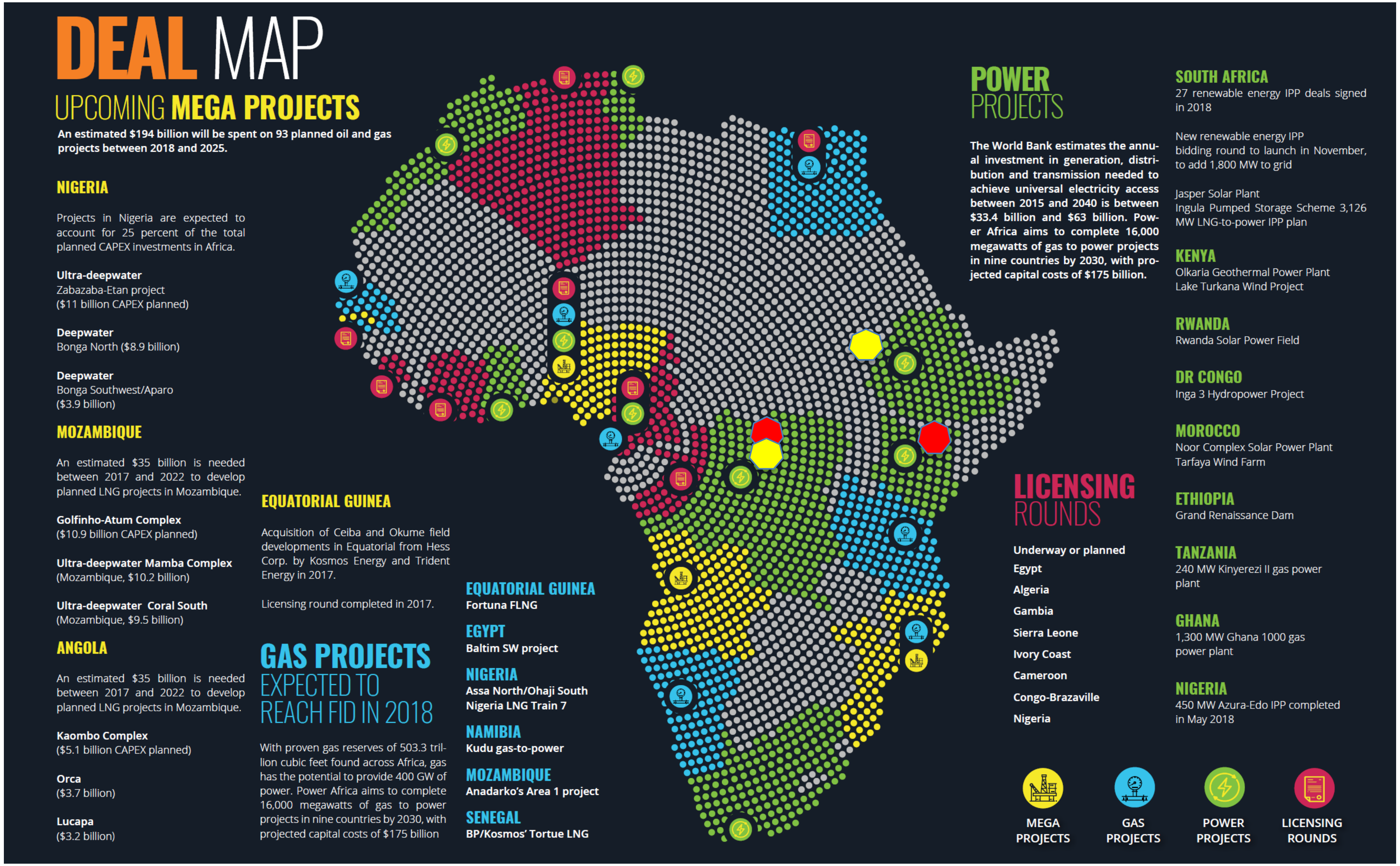
Energy Challenges & Opportunities in East Africa

Finding Petroleum Event

February 25th, 2019

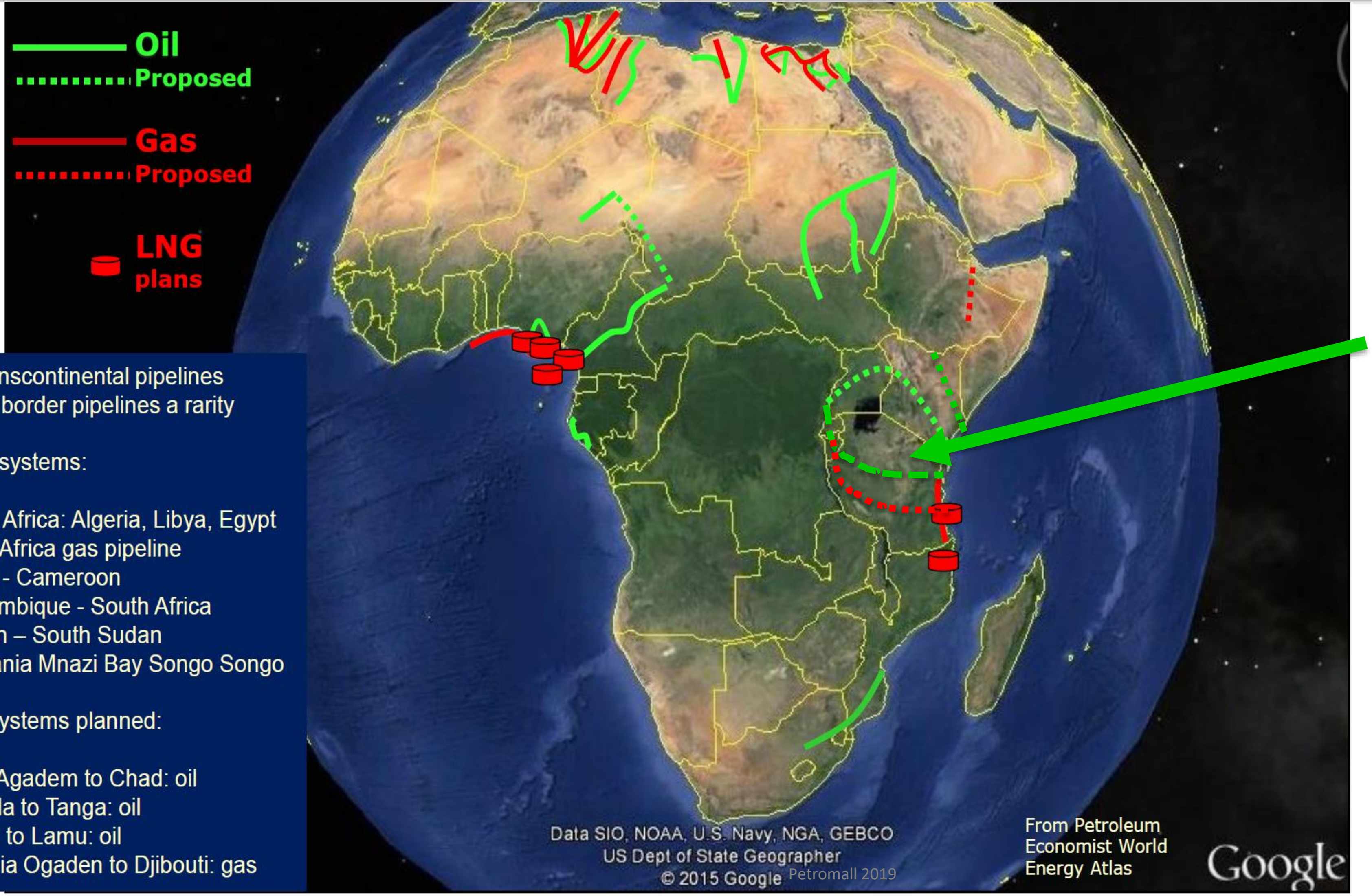
Petromall

Africa Projects- Growing Gas Portfolio



Petromall

AFRICAN INFRASTRUCTURE PLANS



No transcontinental pipelines
Cross border pipelines a rarity

Major systems:

North Africa: Algeria, Libya, Egypt
West Africa gas pipeline
Chad - Cameroon
Mozambique - South Africa
Sudan – South Sudan
Tanzania Mnazi Bay Songo Songo

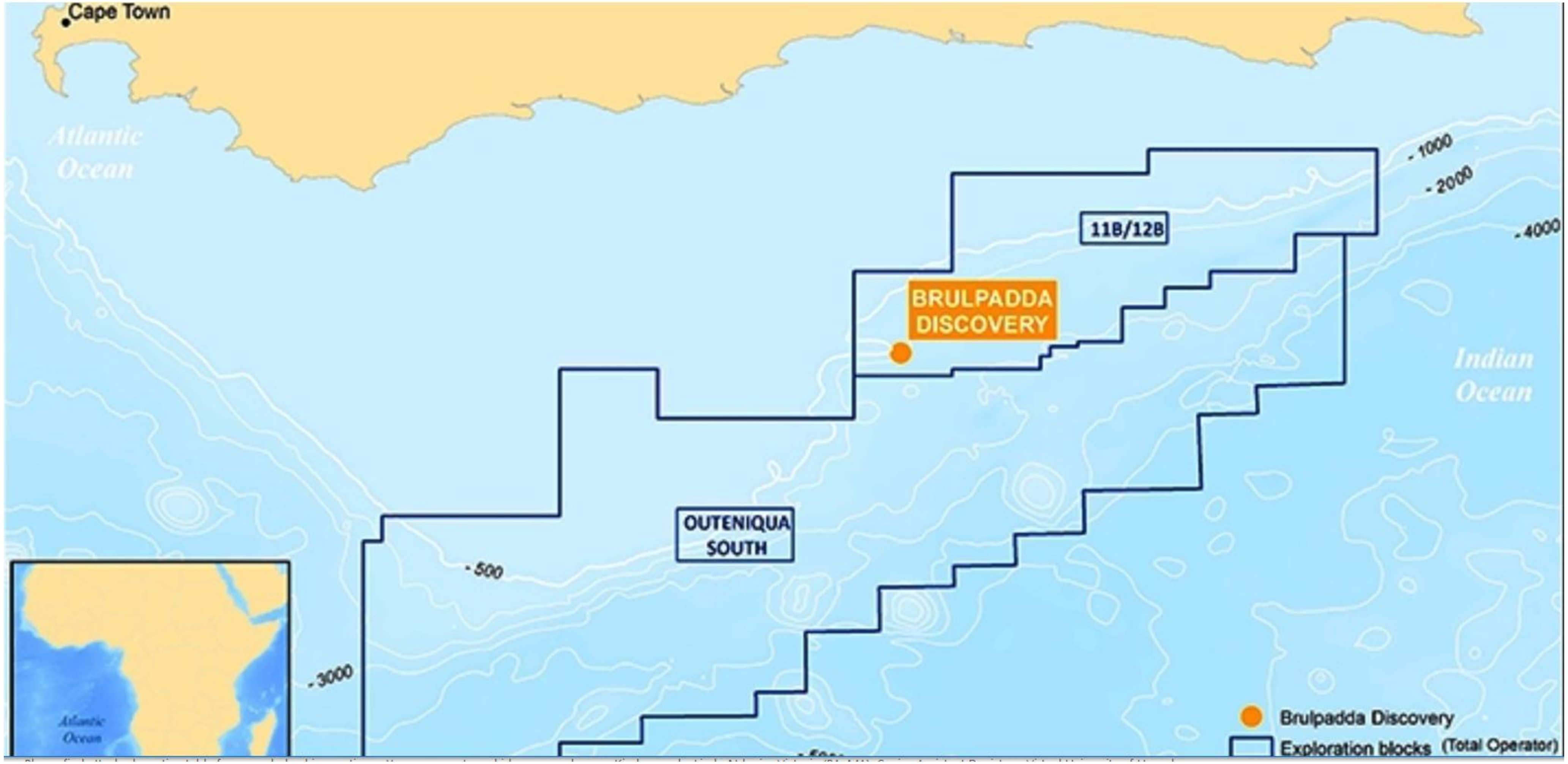
New systems planned:

Niger Agadem to Chad: oil
Uganda to Tanga: oil
Kenya to Lamu: oil
Ethiopia Ogaden to Djibouti: gas

Previous & Current Planned Ugandan export route in green…Now through Tanzania

Petromall

‘Major’ Discovery Offshore South Africa



Petromall

Global LNG Projects

Probable FIDs

Represents ~$160 of total project spend

Plant Name	State / Province	Region	Target FID Date	Capacity (MMtpa)	Unit Cost ($ / Metric ton)	Project Cost ($B)
LNG Canada	British Colombia, Canada	Americas	3Q18	26.0	$1,180	$30.7
Magnolia LNG	Louisiana, U.S.	Americas	4Q18	8.0	$625	$5.0
Calcasieu Pass LNG	Louisiana, U.S.	Americas	1Q19	10.8	$420	$4.5
Golden Pass LNG	Texas, U.S	Americas	1Q19	15.6	$640	$10.0
Driftwood LNG	Louisiana, U.S.	Americas	2Q19	27.6	$550	$15.2
Rio Grande LNG	Texas, U.S	Americas	2Q19	9.0	$640	$5.8
Sabine Pass (T6)	Louisiana, U.S.	Americas	4Q19	4.5	$560	$2.5
Texas LNG	Texas, U.S	Americas	4Q19	4.0	$600	$2.4
Total U.S. & Canada				105.5	$613	$76.1

Plant Name	Country	Region	Target FID Date	Capacity (MMtpa)	Unit Cost ($ / Metric ton)	Project Cost ($B)
Tortue FLNG	Mauritania / Senegal	EMEA	4Q18	2.5	$1,160	$2.9
Mozambique LNG	Mozambique	EMEA	2Q19	12.9	$1,553	$20.0
Qatargas 5, 6 & 7	Qatar	EMEA	2Q19	23.4	$1,179	$27.6
Artic LNG-2	Russia	EMEA	4Q19	19.8	$1,010	$20.0
PNG LNG Train 3	Papua New Guinea	APAC	4Q19	8.0	$1,625	$13.0
Total International				66.6	$1,179	$83.5

Source: Evercore January 2019

UGANDAN TALENT DEMANDS

> Demand for talent ramping up dramatically

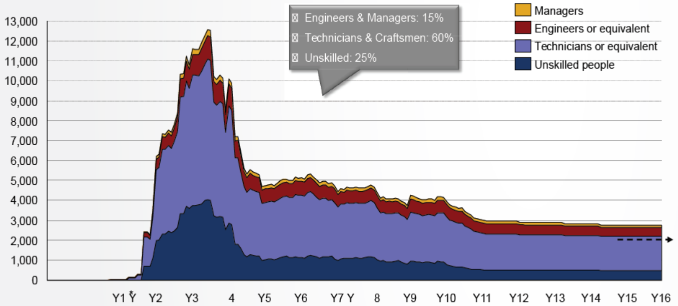
3. General Findings

Manpower Demand

OUT OF TOTAL MANPOWER REQUIRED, 15% ARE ENGINEERS & MANAGERS, 60% ARE TECHNICIANS AND CRAFTSMEN AND 25% ARE PEOPLE WITHOUT ANY EDUCATIONAL BACKGROUND (CASUAL WORKERS)

Manpower split by skill level

Cumulative number of people (Full Time Employees)



Source: SBC analysis; CNOOC; Total; Tullow
Note: All manpower quantities were obtained under assumption of "stick built" approach to construction, as opposed to "modularization" approach
Year 1 (Y1) represents the starting point of the Lake Albert project construction phase

> Transformation required in some areas

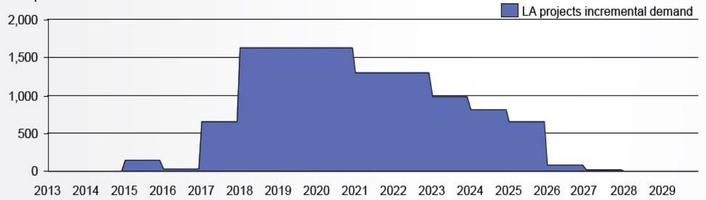
3. General Findings

Industry Demand

SOME SECTORS WILL NEED A COMPLETE TRANSFORMATION TO BE ABLE TO COPE WITH FUTURE NEEDS, LIKE HAZARDOUS WASTE DISPOSAL

Collection, transportation and storage of hazardous waste (bio-hazardous waste, used oils and batteries, etc.), and collection of oil based mud cuttings from drilling activities

Demand of hazardous waste disposal
Tons per month

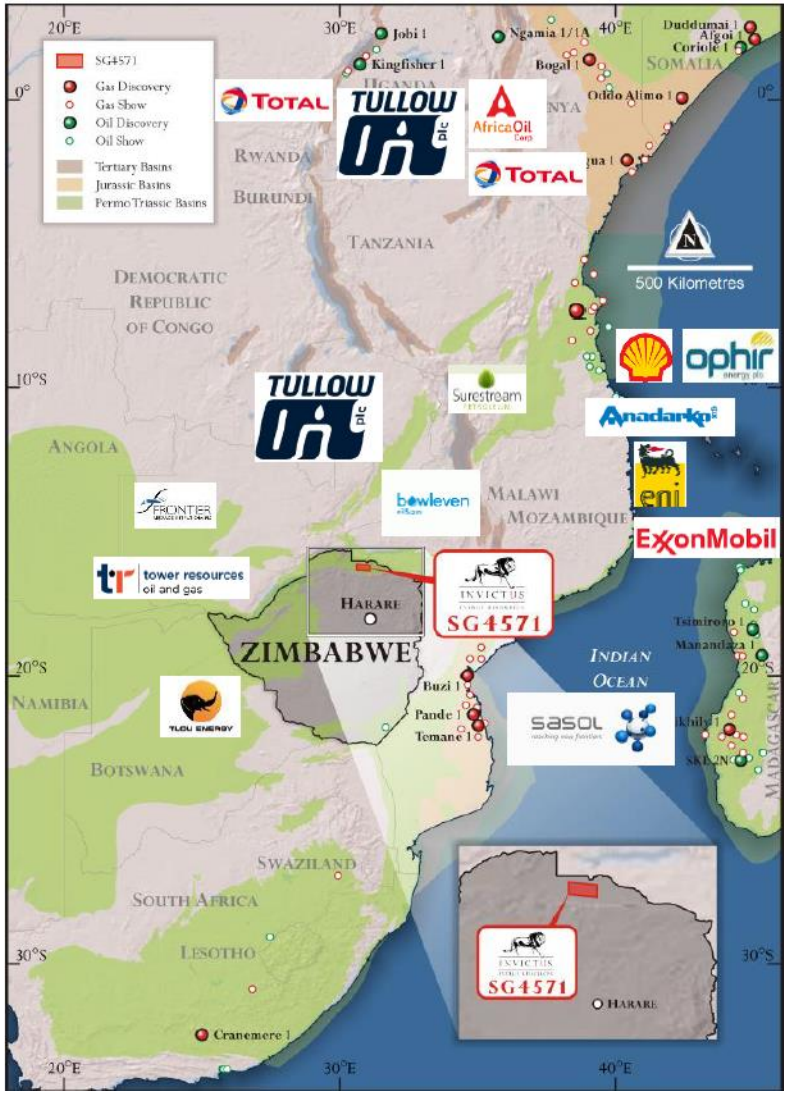


- Compliance with local and international standards standards and certifications on hazardous waste transportation and disposal

- Oil based mud cuttings constitute to the vast majority of total hazardous waste
- Oil based mud cuttings per well - 70% of all cuttings
- 280 tons of cuttings per well

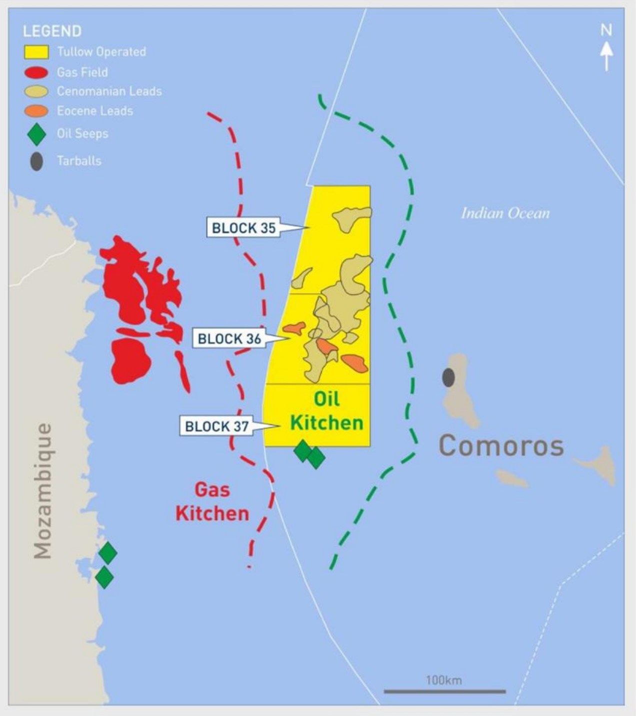
Source: SBC analysis

Activity in East Africa



Source:Invictus Sept 2018

Tullow Exploration



~7 BBO

17 Leads

16,063 sq km

35% equity

- Large, operated, offshore oil play in East Africa
- Simple drilling and attractive fiscal terms
- Managed cost exposure in frontier acreage
- Flexible options to leverage seismic market
- Rapid deal-making with like-minded partner

Petromall

East Africa Transactions

Year	Country	Block	Buyer	Seller	Transaction Type	Asset Stage	Equity Acquired	Equity Value US$(M)	Total Value US$(M)
2018	South Africa, Namibia	Block 11B/12B & 2B, PEL 37	Africa Oil	Africa Energy	Corporate	Exploration	6.09%	18	295
2017	Kenya, Ethiopia	Various	Maersk	Africa Oil	Farm in	Pre-Development	25%	~500	2,000
2014	Zambia, South Africa	Block 40 & 41; Algoa-Gamtoos	Tower Resources	Rift Petroleum	Corporate	Exploration	100%	32	32
2013	Mozambique	Buzi	PT EnergiMega	ENH	Farm in	Post Discovery	75%	175	233
2013	Kenya	Block 2B	Premier Oil	Taipan Resources	Farm in	Pre Drill	55%	14	25
2013	Kenya	Block 2A	Ajax Exploration	Simba Energy	Farm in	Exploration	66%	16	24
2012	Kenya	Block 9, Block 12A	Marathon Oil	Africa Oil	Farm in	Exploration	50% + 15%	57	~100
2012	Ethiopia	South Omo	Marathon Oil	Agiterra Ltd	Asset Sale	Exploration	20%	40 + 10	200
2012	Kenya	11B	Bowleven	Adamantine Energy	Farm in	Exploration	50%	10	20
2012	Madagascar	Morovoay	Octant Energy	Ophir	Farm in	Exploration	50%	40	80
2012	Somaliland	Odewayne	Genel	Jacka Resources	Farm in	Exploration	50%	26	52
2011	Tanzania, Kenya	Block 7, Block L-9, Block L-15	Ophir	Dominion	Corporate	Exploration	100%	175	175
2011	Kenya, Somalia	Various	Africa Oil	Lion Energy	Corporate	Exploration	Various	36	36
2010	Kenya, Mali	Block 10BA, Block 7, Block 11	Africa Oil	Centric Energy	Corporate	Exploration	100%	55	55
2010	Kenya	Block 10BA	Tullow Oil	Centric Energy	Farm in	Exploration	50%	25	50
2010	Various	Various	Afren	Black Marlin Energy	Corporate	Exploration	100%	103	103

Source:Invictus Sept 2018

Petromall

Tullow Kenya

Overview presentation

DEVELOPING KENYA'S DISCOVERED RESOURCES

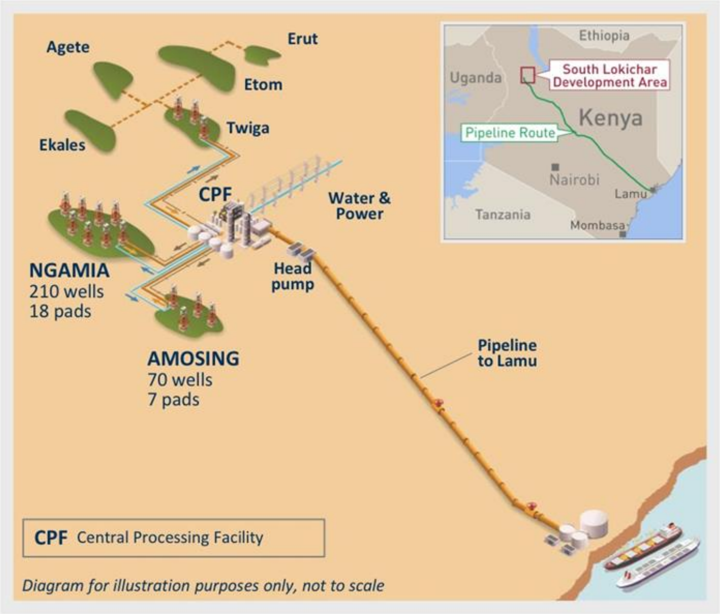
TULLOW plc

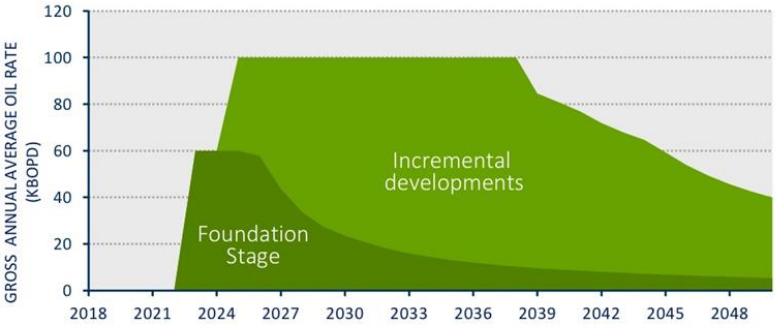
South Lokichar development plan

- 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





THE OIL AND GAS INDUSTRY IN UGANDA

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

Petromall

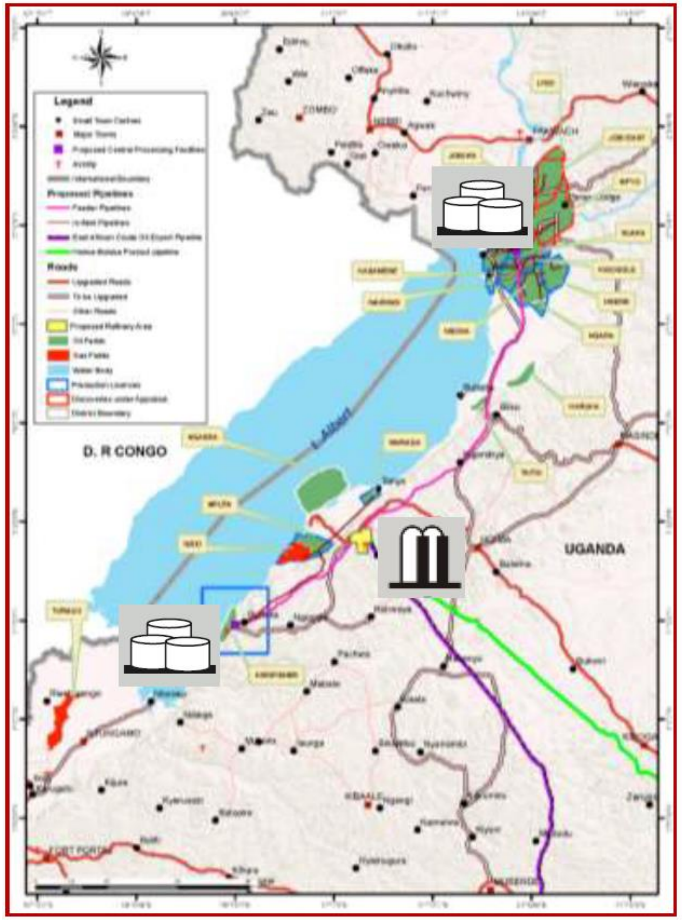
Upstream Development

20 separate discoveries
400m depth down to 1800m in the south(Heritage)
15-24 degree pore point….30-33 API
Darcies permeability
75 Successful wells out of 83 drilled
1.4 billion barrels of 2C- Contingent Resources
478mmb single discovery at Jobi-Rii
Waraga-1 tested at 12,000 bopd

Source: GeoExPro October 2018 Cloke, Cowley & Rindfuss

Petromall

Uganda Upstream Plan



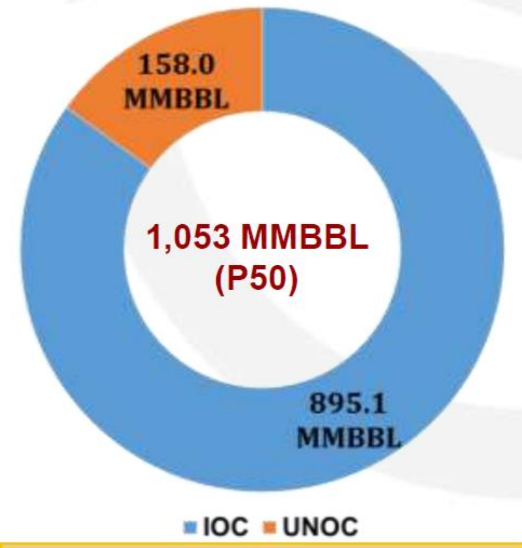
Tilenga (190k bopd)

- Operated by Total E&P Uganda B.V
- Consists of 8 fields, covering ~ 230Km^2
- 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^2
- Production License issued in February, 2012
- STOIIP – 635MMBL & 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%



Petromall

Plans for Uganda- Total/CNOOC/Tullow

Key milestones to FID

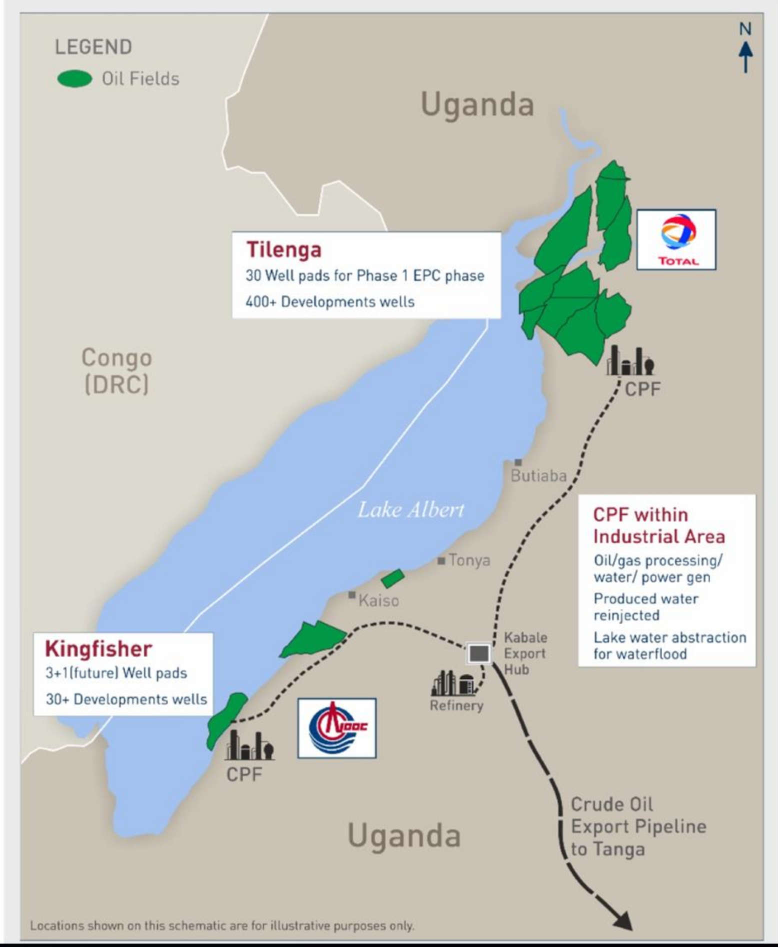
Partner & Operator roles defined
- Total operate Tilenga
- CNOOC operate Kingfisher
- Tullow non-operator

Upstream
- FEED & Tilenga ESIA Completed
- EPC contracts ready for award
- CPF & well pad locations finalised
- 90% land acquired for CPF

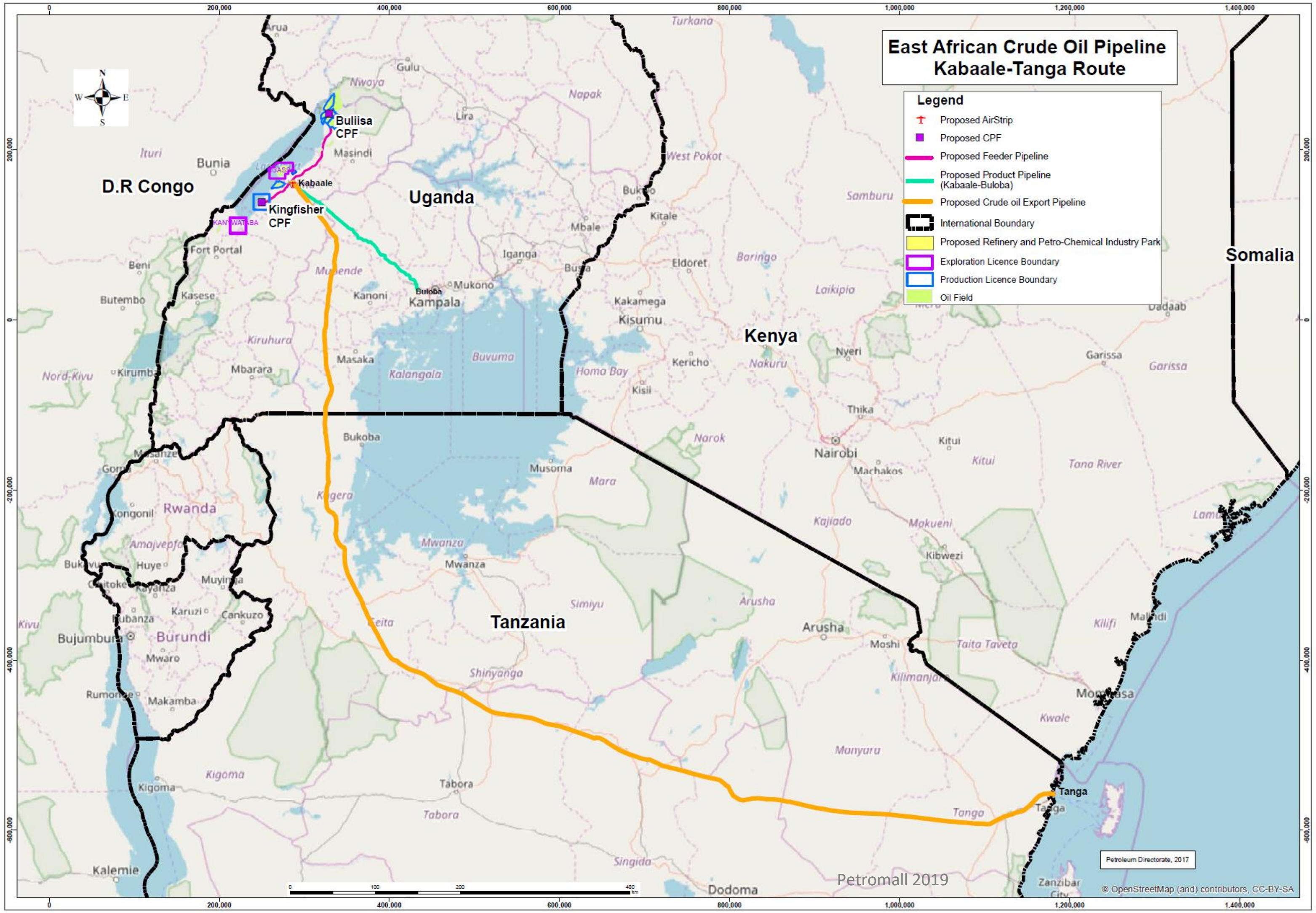
Pipeline
- FEED completed on Uganda-Tanzania route
- Contracts for pipe & long-lead items prepared

Upcoming activities
- Award of major upstream EPC contracts
- Approval of Pipeline & Kingfisher ESIAs
- Completion of pipeline geotechnical/ geophysical surveys

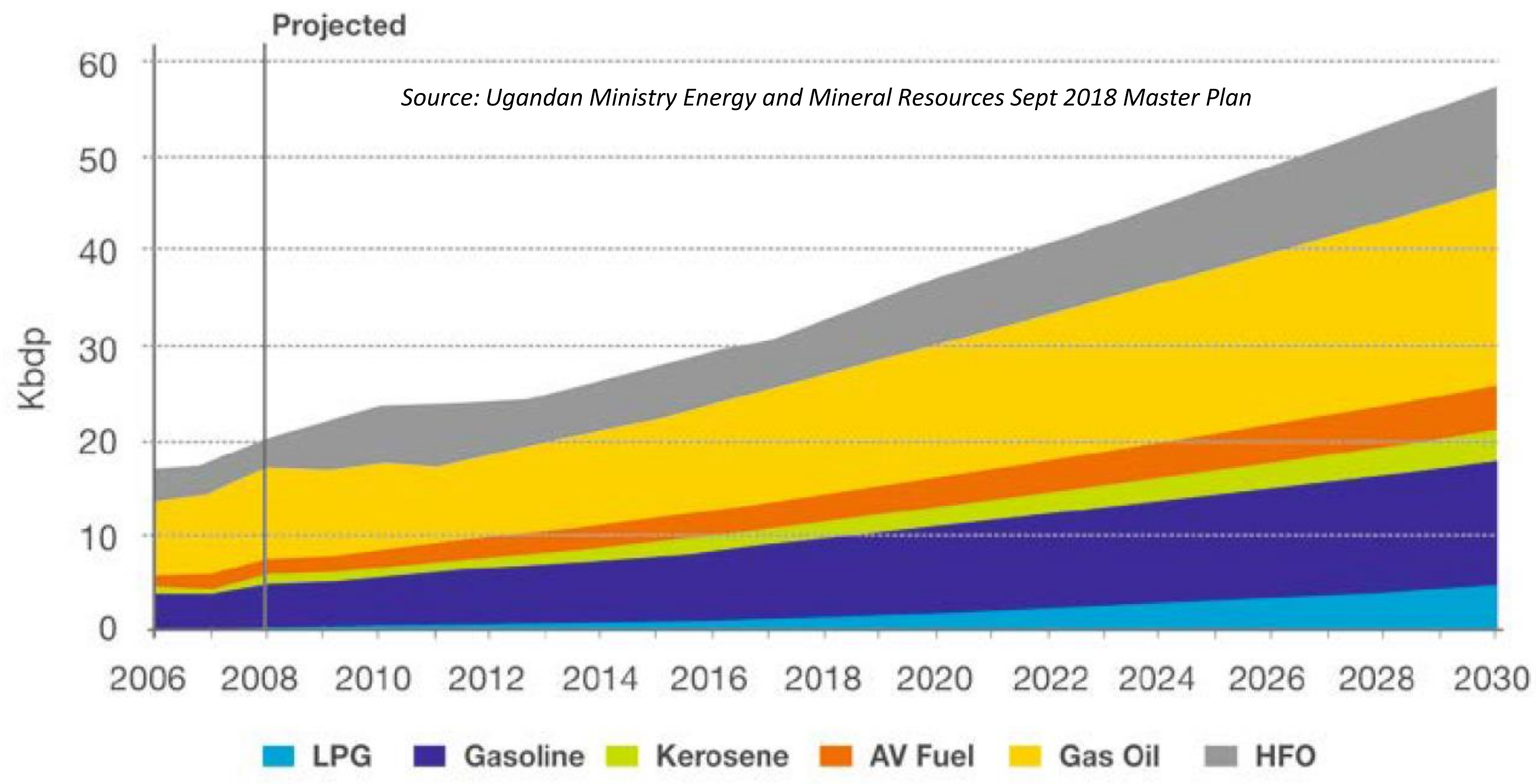
FID
- Partners targeting 1H 2019



Planned Infrastructure & Export Routing

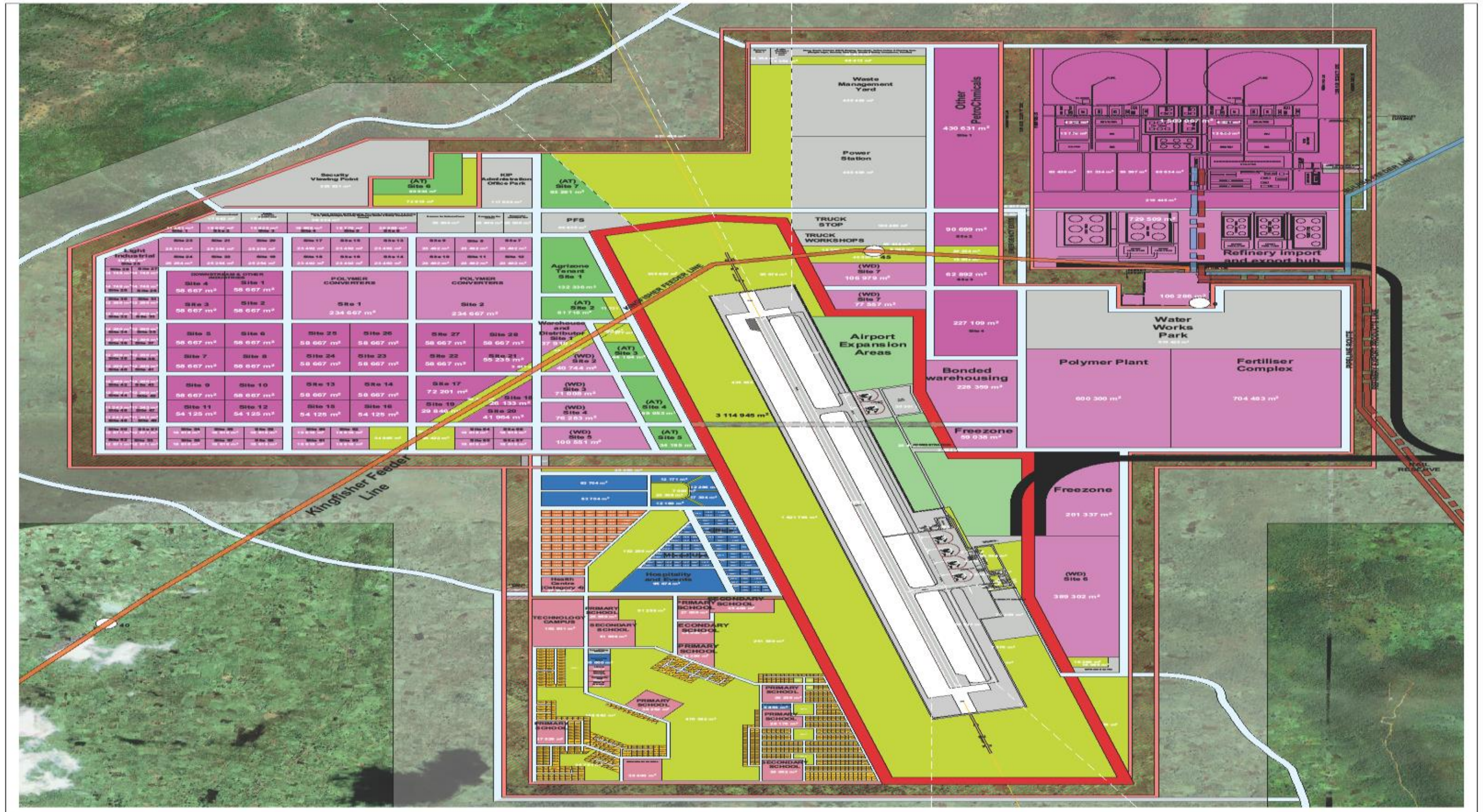


Ugandan Refinery Demand Projections



Uganda Base Case petroleum product demand to 2030 (Source: GCA study 2009 (adapted)

Oil Industry in Uganda- Kibaale Industrial Park



			FAR	COV. (%)				FAR	COV				FAR	COV
1.	LOW DENSITY RESIDENTIAL		1	20%	6.	INSTITUTIONAL		n/a	n/a	11.	SECURITY FENCE BUFFER		n/a	n/a
2.	HIGH DENSITY RESIDENTIAL		1	40%	7.	UTILITIES AND TRANSPORT		n/a	n/a	12.	AIRPORT FENCE		n/a	n/a
3.	LIGHT INDUSTRY		1	70%	8.	OPEN SPACE		n/a	n/a					
4.	HEAVY INDUSTRY		0.5	n/a	9.	AGRICULTURE		n/a	n/a					
5.	COMMERCIAL		0.8	75%	10.	EXPANISON AREAS		n/a	n/a					

DATE: 07.07.17 | REV: 010

KIP OIL AND GAS INTERIMS MASTERPLAN

Final Layout - Phase 3_Zoning Plan

SCALE: 1: 12000

N

PROGRAMMES WE OFFER

WE ARE GROWING

- Public Health
- International Development
- Business Administration
  - + Executive MBA
  - + Tourism and Hospitality
  - + Environmental Managemental
  - + Women in Finance
- ICT for Development
- Oil and Gas MBA
  - + MSc Oil & Gas Upstream O&G – coming soon
  - + Diploma in Upstream O&G Management – coming soon
- Corporate Academy

+ Specialisations

Petromall

Petroleum in East Africa- Summary

1. Plenty of opportunity, BUT
   - Security issues
   - Multinational institutions need to deliver
   - Capital is required BUT….it comes with significant conditions
2. Mega projects are coming- slowly
   - International investors are cautious
3. Local content is essential…but
4. Shortage of talent- Education Education Education