East Africa: Opportunities and Challenges for LNG in a New Frontier Region
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16 April 2013
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Agenda

• BG Group in East Africa
• Tanzania LNG project
• Global LNG context
• Potential socio-economic impacts of a LNG project in Tanzania
• Closing thoughts
Emerging hydrocarbon province

• Relatively unexplored frontier play
• East Africa: new exploration hotspot with recent material discoveries
• Reliable government institutions
• Favorably positioned to access robustly priced Asia-Pacific LNG markets
• Likely to underpin next wave of LNG developments
• BG Group has a strong acreage position in East Africa
BG Group in Tanzania

- Acquisition of 60% of Ophir’s interests in Blocks 1, 3 & 4 in June 2010
- BG Group appointed operator in July 2011
- Nine consecutive successful gas wells
- 13,500 km² of seismic data acquired
- Circa US$1 billion spent on E&A to date
- First DST commenced offshore Tanzania in January 2013
- Further E&A in 2013/14 to enhance resource base in support of land-based LNG project
BG Group in Kenya / Madagascar

**Kenya**
- BG Group operator on L10A & L10B blocks
- 10,400 km$^2$ of acreage in water depths from 200 to 2,000 metres
- 2,630 km$^2$ of 3D seismic acquired over two blocks
- Drilling planned for late 2013 / early 2014

**Madagascar**
- Non-operated block in unexplored frontier basin
- North-west coast of Madagascar
- 15,840 km$^2$ of acreage in water depths from 200 to 3,000 metres
- Believed to be oil-prone

Source: Wood Mackenzie
Nature of discoveries

- Discovered reservoirs not particularly complex geologically
- Highly permeable sandstones deposited in deep marine channel systems
- Normally pressured, low temperature reservoirs
- Multi-TCF discoveries in gas column ranging from 40 to 50 metres
- Dry gas with little or no contaminants
- Challenging design of high deliverability well in extreme water depth
Tanzania LNG development

- Discoveries scattered across four large blocks, distant from the shore
- Water depths also limit offshore facility design
- Subsea only solutions controlled and monitored from the beach and floating production unit option considered
- FLNG option still considered while preferred option is land-based LNG plant
Global LNG supply / demand

- LNG demand is expected to continue to grow, mostly in Pacific Basin
- LNG supply growth driven by Qatar and Australia
- However, supply / demand gap expected to increase over the next decade
- Where is the next Qatar or Australia?
- Mozambique and Tanzania? Recent discoveries have built up significant resource base in East Africa

Source: BG Group interpretation of Wood Mackenzie (Nov 2012)
Note: Supply adjusted by BG Group to account for chain losses
From East Africa to markets

- Well located to supply multiple markets on long-term basis or in response to short-term market fluctuation
- Equidistant from North East Asia and North East Europe
- Extremely well located in respect to West Coast Indian markets
- Similar distance from market compared with Middle East exporters
- But East Africa LNG projects emerging at the same time as new potential exporters: US and Canada

**Distance from Tanzania to markets**

- UK: 6,775 nautical miles
- Spain: 5,320 nautical miles
- India: 2,689 nautical miles
- Tanzania: 4,057 nautical miles
- Japan: 6,945 nautical miles
- Korea: 6,616 nautical miles
- China: 5,759 nautical miles

Note: nautical miles – single leg trip
Sources of state income

• Significant economic progress in East African countries in recent years

• Fairly modest level of human development:
  - Kenya 143
  - Tanzania 152
  - Madagascar 151
  - Mozambique 184

• Development of LNG projects has potential to transform economy

• Various direct and indirect benefits of deepwater LNG projects

  Out of 187 countries in the United Nations Human Development Index

• Direct benefits:
  - Foreign direct investment
  - Employment
  - Government take from the project
  - Contribution to gross domestic product and gross national income
  - Retained national income and national expenditure

• Indirect benefits:
  - Induced impacts
  - Multiplier effects from industry

Source: UNDP 2011
Employment: Multiplier effect

4 – 10 indirect jobs for every direct job

Source: Oxford Management Policy
Note: Based on a two-train LNG project in Tanzania, LNG train size yet to be decided
Gas market development

- Governments have a key role in delivering investment enabling policy and regulation
- Mutually beneficial outcome to both in-country societies and multinational investors
- Possible step-change in economic development thanks to deep water LNG projects
- Can also facilitate development of fertiliser plants and power generation that have high multiplier impacts to economy
- Enough gas for all sustainable requirements
Closing thoughts

• Further exploration, appraisal and testing needed to bring LNG projects in East Africa to FID
• Further exploration and well testing planned by BG Group in Tanzania
• Global gas demand believed to outstrip gas supply
• Market opportunity for well located East African gas discoveries
• Potential significant economic contribution of LNG projects to East African countries
• Upcoming drilling in offshore Kenya to further build East Africa’s importance as an emerging hydrocarbon province

Thank you!