



Update on African regasification terminals

March 15, 2016

Agenda



ECONOMICS OF FSRU - GLOBAL MARKET AND TRENDS



ECONOMICS OF FSRU - STRENGTHS AND WEAKNESSES



OVERVIEW OF FSRU PROJECTS IN AFRICA



HOW TO STRUCTURE THE PROJECT?



RISK MITIGATIONS



KEY COMMERCIAL ISSUES FOR THE DEVELOPMENT OF AN LNG-TO-POWER PROJECT



Economics of FSRU – Global Market and Trends

FSRU : “The Hottest Commodity Asset Right Now Is a 35,000-Ton Steel Ship” (Bloomberg September 16, 2015)

- Low oil price = Lower competitiveness for gas on the short term
 - + Low oil price = cheaper LNG supply (Brent based contracts)
 - + Lower energy production cost **BUT** cannot compete with coal on cost alone
 - + FSRU - IPP combination more attractive : LONG TERM PROJECT

- LNG production capacity (over capacity)
 - + Huge decrease in LNG prices
 - + Security in LNG supply with diverse portfolios (US, Middle East, Oceania, Africa...)

- International climate change policy (COP 21)
 - + Transition to lower carbon fuels such as natural gas
 - + Funds for “clean” energy (less support for coal projects)

- Energy demand and population growth in the African continent
 - + Current shortage of gas to fill
 - + Future gas demand for industrial and domestic consumption



Economics of FSRU – Strengths and Weaknesses

FSRU : “The Hottest Commodity Asset Right Now Is a 35,000-Ton Steel Ship” (Bloomberg September 16, 2015)

- Cheaper, cleaner fuel supply to gas constrained locations
 - > Less capital intensive:
 - Building a vessel is cheaper than an onshore plant
 - » Converting a LNG carrier into a FSRU
 - Possibility to lease the vessel
 - > Speed to market: short implementation timescale
 - > Flexibility: possibility to use it as a temporary solution (5 years) and deploy the vessel on a short lease
 - > Smaller environmental footprint

- Innovative Project Structure
 - > Integrating multiple parties and transactions in one project
 - > Commercial challenges
 - > Creditworthy participants are required



Overview of FSRU Projects in Africa

More than 68 floating regasification terminal projects are proposed today around the world, of which 14 are in Africa.



Operating terminals:

- A. Ain Sokhna - EGYPT → EGAS/Hoegh: 170,000m³ - 500 mmscf/d from April 2015 for 5 years
- B. Ain Sokhna - EGYPT → BW :175,000m³ - 750 mmscf/d from September 2015 for 5 years

Projects:

- C. Cotonou - BENIN → Gasol to import 1.2 mtpa for Benin, Togo and Ghana (2nd stage: 2 mtpa)
- D. Tema - GHANA → Quantum Power/Golar up to 1.75 mtpa
- E. Tema - GHANA → WAGL (Sahara-NNPC) 1.7 mtpa with Golar
- F. Takoradi - GHANA → Ghana 1000, Aboadze - Excelerate/GE/Endeavor combined with 1,300 MW gas fired power plant
- G. Abidjan, IVORY COAST → Endeavor/Starenergie/Excelerate/METKA regasified LNG to power plant at Songon
- H. Dakar - SENEGAL → Senelec/Nebras Power/Mitsui have signed a MoU for energy project including 400 MW IPP and FSRU
- I. Adabiya - EGYPT → EGAS considering charter of third and fourth FSRUs
- J. Maputo - MOZAMBIQUE → FSRU linked to LNG multi-phased power generation project of 3,500 MW
- K. Saldanha Bay/Mossel Bay/Richards Bay - RSA → SA plans for FSRU as part of Gas MasterPlan
- L. Walvis Bay - NAMIBIA → Xaris Energy/Excelerate to fuel 300MW power plant



How to structure the FSRU project?

- One project or different projects?
 - FSRU, pipelines, IPP, marine infrastructure...

- Partners: Shareholders or subcontractors?
 - Partnerships for complementary skills
 - With EPC
 - With LNG supplier/trader
 - With vessel supplier
 - With technical experts (O&M)

- Sovereign financing or private financing?
 - Creditworthy participants required to underpin long term arrangements throughout the structure



Risk mitigation

- Investment guarantee
 - Government Consent and Support Agreement
 - MIGA/ICIEC cover

- Payment guarantee
 - Offtakers = SoE companies
 - Letter of credit
 - Contracts (GSA, LNG PA) must include same terms

- Force majeure, Seller/Supplier failure to deliver, Gas quality...



Key Commercial Issues for the Development of an LNG-to-Power Project

- Interface Management
- Importance of Met/Ocean Data
- FSU Disconnection
- Allocation of FM Risks
- Importance of a Take or Pay Regime to Regulate Fuel Supply
- LNG SPA Considerations



Key Commercial Issues for the Development of an LNG-to-Power Project

Interface Management

- Separate work packages (LNG import & regas/FSU) with common deadline
- Coordination of works to reduce claims for delay caused by individual work streams
- Need to protect the project against the failure of a contractor to perform
 - level of performance bonds and LDs can be difficult to set
 - value of individual work streams can be substantially less than overall damage to the project caused by a contractors failure to perform



Key Commercial Issues for the Development of an LNG-to-Power Project

Importance of Met/Ocean Data

- It is key to get actual data for proposed anchorage systems as far in advance as possible - This can take up to 1 year
- Models using generalised data for the area or extrapolated data from similar mooring systems are not sufficient- as even small deviations can result in expensive jetty redesigns and require amendments to permits
- Can affect arrangements regarding guaranteed availability of the project facilities



Key Commercial Issues for the Development of an LNG-to-Power Project

FSU Disconnection

- Can be caused by bad weather\damage to the ship
- Need to align requirements for FSU disconnection with guarantees to be given to off-taker regarding availability of the project facilities
- Consider small scale onshore storage to maintain supply during FSU disconnection



Key Commercial Issues for the Development of an LNG-to-Power Project

Allocation of FM Risks

- LNG suppliers will not accept downstream FM risk (e.g. FM affecting off-taker)
- Off-takers often unwilling to pay for LNG during FM
- Project Co (in the middle) cannot accept risk of paying to divert LNG cargoes it cannot accept
- No network to absorb LNG/gas
- Solution? - imperfect
 - in the short term, insurance can help but no assurance of long term protection/affordability
 - risk sharing - each party (LNG supplier/project company/off-taker/ project sponsors) bears a portion of the cost of diverted cargoes up to a pre-set level



Key Commercial Issues for the Development of an LNG-to-Power Project

Take or Pay Regime Required to Regulate Fuel Supply

- ToP regime will be required to manage fuel supply - typically set at minimum 85% or 90% of annual volumes
- LNG not like coal or network gas
- Storage capacity of the FSU is limited
- Project must be able to accept new LNG deliveries or have funds available to cover cost of diverting cargoes that cannot be accepted
- LNG deliveries set far in advance - can't be altered at short notice



Key Commercial Issues for the Development of an LNG-to-Power Project

LNG SPA Considerations

- Scheduling of LNG cargoes to optimise cargo sizes, frequency of deliveries, and to meet minimum fuel supply obligations
- Flexibility/Adjustments to the delivery program to match the nomination arrangements in the GSA
- Risks/consequences of failure to supply
- Mitigation/solutions- track record, supply from portfolio of gas sources, spot cargoes)
- Management of LNG supplier approval rights over project facilities

Contact

Gasol plc

40 New Bond Street
London
W1S 2RX
United Kingdom

Alan Buxton
Chief Operating Officer
T: +44 (0)20 7290 3301
E: alan.buxton@gasolplc.com