

Understanding Natural Gas and LNG Options



LNG Handbook Program

December 2016



U.S. DEPARTMENT OF
ENERGY

LNG Handbook – Background

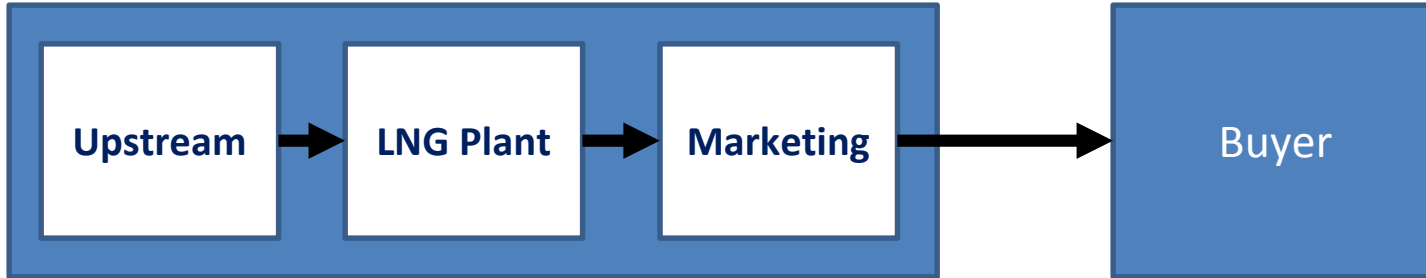
- ▶ Two out of three people in sub-Saharan Africa lack access to electricity, limiting access to quality health care, education, and economic opportunities for more than 600 million people.
- ▶ Power Africa, along with its partners, seeks to double access to electricity in sub-Saharan Africa by adding 30,000 megawatts (MW) and 60 million connections by 2030.
- ▶ The combination of vast gas resources, low prices, and emerging technologies is opening opportunity for both regional and global LNG trade to facilitate gas fired power development in Africa.
- ▶ Gas can serve as a bridge to and provides stabilizing base load power to support cleaner energy sources.

LNG Handbook – Background

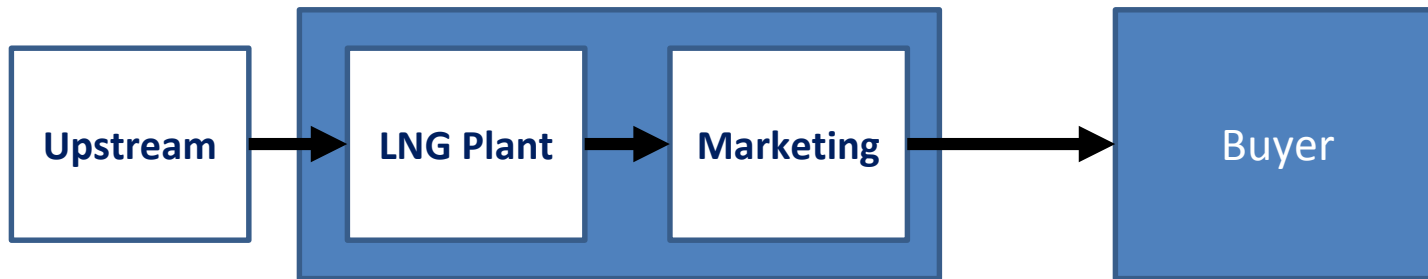
- ▶ We held several workshops to engage global experts and stakeholders throughout 2016 to gather best practices.
- ▶ The workshops developed a focus on factors that contribute to or deter successful project implementation.
- ▶ Our first workshop in February was a wide ranging brain storming session.
- ▶ For our second workshop in May we started the conversation from the vantage point of commercial and infrastructure models.

Commercial Models

Integrated Model



Merchant Model



Tolling Model



Infrastructure Models

Large (integrated)



Source www.rasgas.com

Medium-Large Phased



Source www.nlng.com

Small



Source www.line-engineering.com.hk

Floating



Source www.maritime-connector.com

Crosscutting Factors

Our third workshop in June focused on adding detail to the factors that emerged from the previous workshop.

- ▶ **Partner and Stake–Holder Alignment:** If expectations and interests are not aligned it will be difficult to pull off the project.
- ▶ **Government Objectives:** Clear objectives and clarity on the implications of policy, design, and model choices on revenue and project prospects.
- ▶ **Transparency:** Transparency across and within all stakeholder organizations leads to maximum trust.
- ▶ **Access to past experience** – role of experienced partners across factors?

Commercial and Economic Factors

- ▶ **Finance**
- ▶ **Marketing and Sales**
- ▶ **Operations and Scheduling or Capacity Utilization**
- ▶ **Domestic Use, Benefit, and Local Content**
- ▶ **Regulatory and Legal Complexity/Quality**

LNG Handbook: Understanding Natural Gas and LNG Options

- ▶ The book was developed by a diverse group of experts
 - Government
 - Industry
 - Finance
 - Law
- ▶ The factors developed in the previous workshops set the stage for the drafting of the handbook in November 2016.
 - Began with a brainstorming and sorting exercise.
 - The group of 17 experts used the outcome of the brainstorming to structure the document.

LNG Handbook: Understanding Natural Gas and LNG Options

► Contents:

- Global gas market,
- LNG and domestic gas value chains
- Domestic Market
- Project structure
- Government roles
- Capacity building
- LNG export project development
- Environment, social impact, and safety
- Pricing
- Contracts
- Financing
- Risk management
- Local content
- LNG import projects
- New and emerging markets and technologies for natural gas and LNG

LNG Handbook: Some Key Lessons

- ▶ Partner governments care most about development and jobs. The LNG project is a means to an end not an end in itself.
- ▶ LNG development is complicated. It is important to understand and follow deliberate time consuming established processes to maximize the odds of success. Keep the project as simple as possible.
- ▶ Develop a plan and develop capacity to monitor and implement the plan.
 - Use expert consultants where required.
 - Revisit the plan frequently in case circumstances change.

LNG Handbook: Some Key Lessons

- ▶ Cooperation and collaboration at all stages of the project are critical. Frequent and timely communication at all levels of local and foreign stakeholders prevents misalignment of expectations.
 - Compromise, patience, and understanding are critical for both sides.
 - Listen to your partners and communicate positive and negative feedback.
 - Laws, policies, rules, and regulations must be clear and consistent across projects – major changes in the project or the rules governing projects must be discussed among stakeholders at multiple stages of formulation and implementation.
 - Institutions and laws, policies, rules, and regulations must balance simplicity with checks and balances to maximize transparency.
 - Large development projects are very disruptive for poor rural societies. Try to minimize the social and environmental impact on local communities while trying to maximize tangible benefits. This will help to limit current and future opposition to the project.

LNG Handbook: Some Key Lessons

- ▶ The LNG project must show a connection with the local market and provide tangible benefits to local people or it will not be sustainable.
 - Domestic supplies must balance affordability and profitability.
- ▶ Analyzing foreign and domestic market demand for project output and full value chain planning is important
 - Production, liquefaction, and customers must be synchronized.
 - Market analysis should play a key role in determining the size, phasing, and timing of the project.
- ▶ Natural gas and LNG can be competitive with other fuels as long as the tariff rates and other parts of the local market structure, regulations, and fiscal regimes allow the whole value chain to be economically sustainable.

LNG Handbook: Some Key Lessons

- ▶ Some lessons are obviously themes of the book, some are more subtle.
- ▶ Many track with the key factors identified in the workshops.
- ▶ Some lessons came from the dialogue that occurred during the pre-drafting workshops or during the drafting of the book.
- ▶ While writing collaboratively we had to work through cultural boundaries, learn to listen to each other, be patient. and compromise to make this project work.

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