# Natural Gas and LNG Fundamentals

**ExxonMobil Gas & Power Marketing** 

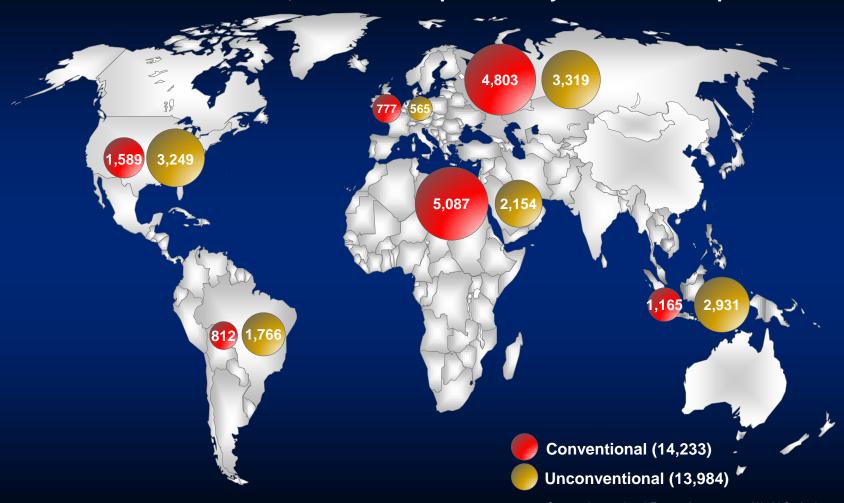


Taking on the world's toughest energy challenges.™

This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein (and in Item 1 of ExxonMobil's latest report on Form 10-K).

# The World Has Changed

Combined resources of 28,600 TCF are equal to 250 years of current production



Source: International Energy Agency 2011 World Outlook

## North America on the Forefront



Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI. Updated: May 9, 2011

## Natural Gas Fundamentals More Challenging Than Oil



- More complexities in marketing and handling natural gas
- Regional supply and demand drive gas prices, oil more globally based
- Assurance of market outlet required to justify investment costs
- 87 LNG terminals, 360 ships vs. thousands of crude terminals, 4,000 ships

## Major Natural Gas Monetization Options

#### **Transportation from Production to Market Area**



**Pipeline Gas** 



**LNG** 

### **Market Area Options**



**Power Generation** 



Chemicals Industrial Gas to Liquids



**Residential / Commercial** 

# Gas Project Development





Resource

Market Consumer



# Gas Project Development



Resource

LNG links remotely located gas to the market consumer



Market Consumer













Market Consumer

# The development of a LNG project includes several interdependent projects



Resource





Market Consumer

# **Pipeline**

Transportation is required from resource to liquefaction plant





Resource





Market Consumer

# Liquefaction

Cooling gas to -260°F reduces its volume by 600 times





Resource





Market Consumer

# Shipping

- Transportation from liquefaction to market area
- Large purpose built ships



Resource





Market Consumer

# **Receiving Terminal**

- LNG storage in insulated tanks
- Heated and converted back to gaseous state, expanding its volume 600 times
- Connected to local distribution system





- Both resource and market consumer must be robust for the development of a large scale gas project
- All elements are must be well defined
- Significant investment in each link

# Feasibility Analysis of a LNG Project

#### 2-3 Years

#### **Experienced Developers**

Development and marketing expertise

#### **Quality Resource**

- Proven high-quality reserves
- Attractive return to resource owner and investor

#### **Executable Project**

- Technically viable concept
- Durable project execution plan

Commitment to Fund

#### **Buyers**

- Off-take surety over project life
- Diverse, creditworthy

#### Fiscal & Regulatory

- Stability throughout project life (both ends of chain)
- "Permitable" project

#### **Alignment / Risk Allocation**

**Economic Viability** 



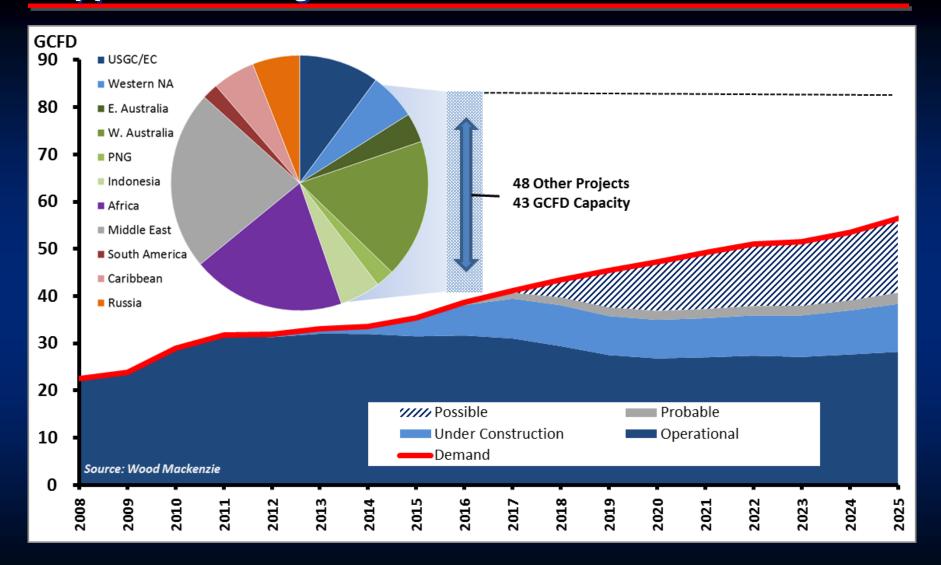
## Execution of a LNG Project



- Front end alignment critical for project development
- Chain is defined by interdependence of projects (shared risks)
- All links of the chain are capital intensive businesses
  - More than a million tons of steel for a thousand mile pipeline
  - 15 30 million man-hours to build a liquefaction plant
  - A LNG ship is very complex and twice the cost of the largest crude carriers
  - 4 6 million man-hours to build a receiving terminal



# Suppliers Seeking to Meet Global LNG Demand



## Alaska Gas and the Global Market

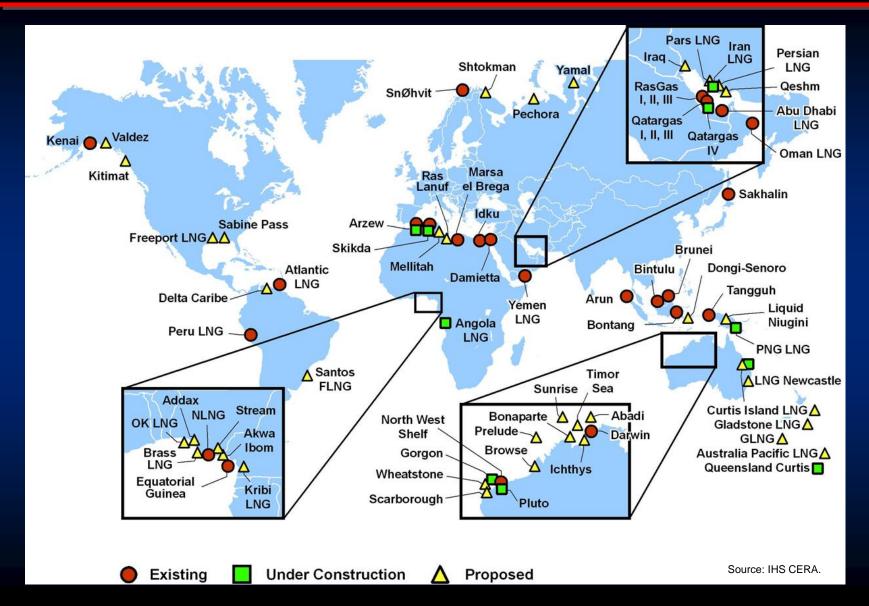
- Global resource base has changed; driving Alaska to look for a broader customer portfolio
- Alaska gas can compete with other LNG suppliers, but inherent challenges (geography, infrastructure) require alignment and commitment by all parties
- Predictable and durable fiscal terms essential to allow project to remain viable throughout its life
- Critical success factors include economies of scale, experience to execute large complex projects, and ability to finance
- Gas development creates jobs, long-term energy supplies, state revenues, and new investment opportunities for Alaska



# Back Up



## LNG Global Liquefaction Plants (January 2011)



# The World Has Changed

