LNG: THE NORTH AMERICAN GORILLA

USAEE/IAEE NORTH AMERICAN CONFERENCE
JULY 9TH, 2004
WASHINGTON, DC
Natural Gas – Proven Reserves 2003

North America
258 TCF

South America
254 TCF

Europe
201 TCF

Africa
487 TCF

Middle East
2,532 TCF

EE & FSU
1,998 TCF

Asia Pacific
476 TCF

Source: BP
Forecast Gas Production and Consumption in 2020 (TCF)

Source: EIA 2004
Does North America Change the World? - Yes

EXISTING (capacities as of 2008)
A - Everett MA (Tractebel); 4.4 MMtpa
B - Cove Point MD (Dominion; 14 MMtpa)
C - Elba Island GA (Southern; 5.8 MMtpa)
D - Lake Charles LA (So. Union; 14 MMtpa)
E - Guayanilla PR (Ecolectrica; 0.7 MMtpa)

PROSPECTIVE ONSHORE
E1 - Quebec, Canada (Gaz Metro, Enbridge, GDF; N/A)
E2 - Nova Scota, Canada (Bear Head LNG; 5.7 MMtpa)
E3 - New Brunswick, Canada (Irving Oil; 3.8 MMtpa)
E4 - Eastport, ME (Quoddy Bay LLC; 3.9 MMtpa)
E5 - Fall River MA (Weaver's Cove; 3 MMtpa)
E6 - Somerset MA (Somerset LNG; 3.3 MMtpa)
E7 - Providence RI (Keystone; 1 MMtpa)
E8 - Crown Landing LNG FL (BP; 7.0 MMtpa)
E9 - Grand Bahama Is. BH (Tractebel; 6 MMtpa)
E10 - Bimini Cay BH (AES/Repsol; 6 MMtpa)
E11 - Grand Bahama Is. BH (El Paso/PPGL; 5.9 MMtpa)
G1* - Mobile AL (ExxonMobil; 15.6 MMtpa)
G2* - Mobile AL (Cheniere; 7.5 MMtpa)
G3 - Cameron LNG LA (Sempra; 11.4 MMtpa)
G4 - Sabine Pass LA (Cheniere; 15.6 MMtpa)
G5 - Sabine Pass TX (ExxonMobil; 2.8 MMtpa)
G6 - Port Arthur LA (Sempra; 11.25 MMtpa)
G7 - Freeport TX (Freeport LNG; 11.4 MMtpa)
G8 - Corpus Christi TX (Corpus Christi LNG; 7.8 MMtpa)
G9 - Corpus Christi TX (ExxonMobil; 7.8 MMtpa)
G10 - Ingleside TX (Occidental; 7.3 MMtpa)
G11 - Brownsville TX (Cheniere; capacity N/A)
G12 - Altamira MX (Shell; Total; 8.3 MMtpa)
W1 - Cherry Point WA (Cherry Point Energy; capacity N/A)
W2 - Long Beach CA (Sound Energy Solutions; 5.2 MMtpa)
W3 - Ensenada Baja (Sempra/Shell; 7.6 MMtpa)
W4 - Colonet Baja (to be determined)
W5 - Puerto Libertad Sonora (Sonora Pacific LNG; 9.5 MMtpa)
W6 - Lazaro Cardenas (Repsol; 3 MMtpa)

PROSPECTIVE ONSHORE**
Gulf of Mexico (offshore LA)
1 - Vermillion 179 (Conversion Gas; 15 MMtpa)
2 - Gulf Landing (Shell; 7.6 MMtpa)
3 - Port Pelican (ChevronTexaco; 12 MMtpa)
4 - Energy Bridge (Excerente; 3.8 MMtpa)
5 - Main Pass Energy Hub (Freeport McMoRan; 7.6 MMtpa)
6 - Compass Port (ConocoPhillips; >7.5 MMtpa)
7* - Pearl Crossing (ExxonMobil; 7.5 MMtpa)

Offshore West Coast
8 - Coronado Is. (ChevronTexaco; 10.6 MMtpa)
9 - Caballo Port (BHP; 5 - 7 MMtpa)
10 - Offshore Oxnard CA (Crystal Energy; 7.8 MMtpa)

Offshore East Coast
11 - Energy Bridge (Excerente; 3 MMtpa)

* ExxonMobil will choose only one of the potential sites listed
** Locations of offshore terminals approximate
US LNG Import Capacity
Existing & Under Development

- Asia Pacific export capacity: 50 MMtpa
- Atlantic Basin / M.East export capacity: 94 MMtpa
- Existing terminal expansion
- Proposed USWC
- Proposed USG
- Proposed USEC

Source: Poten & Partners
North American Terminal Siting Issues

• Public perception versus reality

• Federal or state jurisdiction?

• Will terminals go where the market needs them?

• No perfect sites

• Not just a US problem

• Offshore may not be the solution
Offshore Terminals – Issues & Perceptions?

Negatives?
- Technology
- Market Access
- Operational Risk
- Execution Risk
- Competitiveness
- Security of Supply

Positives?
- Safety & Security
- Permitting
Rapid Expansion of the LNG Fleet
74,000m³ and above (Mid-June 2004)
Will Uncommitted Vessels be Stranded?

LNG SHIP BALANCE 2002-2010

Number of 140,000 m³ Ships

Available yard capacity

TOTAL SHIP REQUIREMENT BASED UPON CURRENT CONTRACTS

UNCOMMITTED

EXISTING

Source: Poten & Partners

POTEN & PARTNERS
“Mega Ships”
Are they the “monsters” or the next “standards”?

• Rationale behind this move?
  • Economies of scale – “lowest cost provider”
  • Dedicated trade routes: Mid East – USCG/UKC, Asia – USWC/Mexico

• Challenges
  • Technical
    – Step change in capacity between 50-100%
    – Sloshing loads in cargo tanks (50,000m³/tank)
    – Shallow draft, broad beam, high speed vessels (twin screws)
    – Dual fuel, diesel engines, re-liquefaction equipment
  • Commercial
    – Limited flexibility (port access, tankage)
  • Financial
    – Security of asset, residual value
    – Increased capital investment (vessel and shore facilities)
Influences on LNG Project Costs

- Capacity in EPC contractor market, or host country
- Impact of steel and nickel price increases
- Exchange rate fluctuations and material / equipment constraints and pricing
- Government and national aspirations can override cost considerations
- Potential impact of project delays
Is Global LNG the “New” Oil Market? - No

- Nature of the cash flow profile is different – longer payout for LNG
- “Security of supply” has over-ridden low cost
- Higher transportation cost per unit of energy
- Regional pricing, limited liquidity
- Fuel switching – asymmetric substitution favors oil
Issues & Challenges

• Timing is everything

• How long and how high can Henry Hub fly?
THANK YOU

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