North America LNG exports

Betsy Spomer
LNG 17 • Houston • 17 April 2012

Lake Charles LNG terminal
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BG Group’s “skin in the game”

• First and largest buyer from Sabine Pass
  – 5.5 mtpa starting from Train 1
• Developing Lake Charles export project with Energy Transfer
  – Second in queue at DOE
  – BG sole customer for up to 15 mtpa of off-take
• Developing Prince Rupert LNG project in Western Canada
  – Validated Prince Rupert Ridley Island site for LNG plant
  – Working with Spectra Energy on pipeline study
  – Project descriptions filed for plant and pipeline
US exports: key industry uncertainty

• Timing and scope of US exports key uncertainty facing the industry

• Outcome will:
  – Impact global supply and demand balances
  – Impact market structure: liquidity and flexibility
  – Impact pricing and price formation
What is on this man’s mind?
Canada LNG exports – geography
North America observations

• US exports
  – US exports will be project and market limited
  – No such thing as “cheap” LNG
  – Insufficient to balance Asian demand in 2020
  – Policy delays will act to extend market tightness

• Western Canada
  – Traditional resource play – very different from US
  – Requires traditional pricing to go forward
Thank you!
Kitimat LNG
Canada’s First LNG Export Project
By: Janine McArdle, Apache
April 17, 2013
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PROJECT OWNERSHIP

Upstream

Apache Canada 50%
Upstream Operator
Chevron Canada 50%

Horn/Liard Basin

Downstream

Apache Canada 50%
Upstream Operator
Chevron Canada 50%

Chevron Canada 50%
Downstream Operator

KITIMAT LNG
CVX/APA – LNG PROJECTS

- **Kitimat LNG**
  - ~10 MTPA
  - Apache (50% WI)
  - Chevron (50% WI)
  - Export license granted
  - Environmental approvals
  - Expansion potential

- **Wheatstone LNG**
  - 8.9 MTPA
  - Apache (13% WI)
  - Chevron (64% WI)
  - FID achieved Q3 2011
  - First cargo target 2016

Source: Apache Corporation
GLOBAL LNG Trade 2012 (MTPA)

2012 LNG Trade ≈ 240 MTPA

Data Source: Poten & Partners, Wood Mackenzie, other
GLOBAL LNG Trade 2017 (MTPA)

2017 LNG Trade
≈ 315 MTPA
(Plants Under Construction)

2020 Global Demand
≈ 360 MTPA

2020 Asia Demand
≈ 250 MTPA

Data Source: Poten & Partners, Wood Mackenzie, other
Challenges: CAPEX $/ton of LNG CAPACITY

($/ton in 2012 dollars)

LNG Project Start-up 1970-2000

LNG Projects 2000-2010

Post 2010: All LNG projects > $1000 /ton

Source: Apache from Public Data
Will East Coast of North America be Exporter or Importer of LNG?

Phil Ribbeck - Repsol

April 2013
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Forward Looking Statements

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NORTH AMERICAN EAST COAST PROJECTS

• Current Status (April 2013)
  ➢ Elba Island: importing
  ➢ Cove Point: importing for cooling purposes only
  ➢ Neptune: not importing
  ➢ Northeast Gateway: not importing
  ➢ Everett: importing below previous levels to meet certain market commitments
  ➢ Canaport LNG: importing below previous levels to meet certain market needs
  ➢ Greenfield projects seeking support

• Future Status Potential
  ➢ Let’s see what is needed
EAST COAST LNG EXPORT PROJECTS
Factors Impacting Development

• Typical Project Development
  ➢ Suitable site with good logistics
  ➢ Solid development plan
  ➢ Good engineering
  ➢ Supportive community
  ➢ Competitive offering
  ➢ Sufficient natural gas supply
  ➢ Credit worthy buyers
  ➢ Capable EPC Contractor
  ➢ Technology licenses
  ➢ Strong partnership and commercial structure
  ➢ Positive economic drivers
  ➢ Acceptable risk allocation
  ➢ Permits
  ➢ Financeable package
  ➢ Good timing for all pieces to come together

• Other key factors in USA
  ➢ LNG Export License – yes if FTA countries; ??? for non-FTA countries
  ➢ Politics
## NEW LIQUEFACTION PROJECTS
### United States

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<thead>
<tr>
<th>Project</th>
<th>Trains</th>
<th>Capacity (MMtpta)</th>
<th>Capacity (Bcf/d)</th>
<th>Start-up Year</th>
<th>DOE Processing Order (non-FTA)</th>
<th>Customers</th>
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<tr>
<td>Sabine Pass</td>
<td>4</td>
<td>18.0</td>
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<td>2016</td>
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<td>BG, Gas Natural, KOGAS, GAIL</td>
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<td>Freeport LNG</td>
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<td>13.2</td>
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<td>2017</td>
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<td>Osaka Gas, Chubu Electric, BP</td>
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<td>Lake Charles</td>
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<td>15.0</td>
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<td>2018</td>
<td>2</td>
<td>BG</td>
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<td>7.8</td>
<td>1.0</td>
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<td>3</td>
<td>Sumitomo, GAIL</td>
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<td>Jordan Cove</td>
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<td>1.3</td>
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<td>1.8</td>
<td>2017</td>
<td>8</td>
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<td>filed but not on DOE list</td>
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<td><strong>Total</strong></td>
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<td><strong>213.5</strong></td>
<td><strong>29.34</strong></td>
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</table>

**NOTE:** Not applied for exports: Everett, Northeast Gateway and Neptune
The average Algonquin City-gate GDA for February was $17.87, so prices in this region during periods of peak winter demand can attract LNG imports.

Source: Waterborne LNG
New Gas Supply Sources = Liquefaction
Several Options Being Developed

MARCELLUS SHALE

New Gas Supply Sources = Liquefaction
Several Options Being Developed

New Greenfield P/L
PNGTS Expansion
TCPL Expansion to NB
Frederick Brook Shale
Brunswick P/L
M&NE P/L
THANKS FOR YOUR ATTENTION!
What’s the real issue for remaining projects?

- Will current price spreads between US and other markets continue at a level that supports long term LNG exports?

  **US Side Pressures**
  - Gas rig count is at lowest level since 1999
  - Rapid initial production depletion of unconventional gas wells makes production and price very responsive to drilling activity.
  - Leasehold drilling and carried interest drilling are subsiding
  - Vast inventory of uncompleted wells is declining
  - Unlike most worldwide sources of LNG, US natural gas is not stranded and has a very liquid indigenous market

  **Worldwide LNG Prices**
  - New sources of LNG are coming on line but will they shift the s/d balance?
  - Shale gas resources are prevalent outside of North America; will they be tested and developed sufficiently to reduce LNG demand?
  - Over the long term, will other new technologies, such as gas hydrates, reduce demand for LNG in key markets?
  - Will Japan’s nuclear power generators resume operation?