LNG Imports and the Development of the North American Pipeline Grid

2006 EIA Energy Outlook and Modeling Conference
Washington, D.C.

Greg Hopper
Vice President
Lukens Energy Group, a Black & Veatch company

March 27, 2006
Black & Veatch builds critical infrastructure and advises clients in the global energy markets.

Lukens Energy Group is part of B&V Enterprise Management Solutions.

We advise provide commercial, regulatory and strategic advisory services to clients in the natural gas and electric industries.
Today’s Discussion

Pipeline development trends driven by LNG imports

- Producer integration to trading hubs
- Netback enhancement investments
- Less likely infrastructure projects
- Renewed impetus for storage
Producer Integration to Trading Hubs – Cove Point

DTI/Cove Point Pipeline Expansion Project
- 47 miles 36” loop (MD), 81 miles 24” pipe and 33 miles 24” loop (PA, WV, NY)
- Capacity: 800 MMcf/d (MD), 700,000 Mmcf/d (PA, WV, NY)
- Capex: $402 MM
- FERC Status: Filed on 2Q 2005
- In-service: 3Q 2008

Cove Point LNG

Dominion Transmission
Cove Point Pipeline

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Producer Integration to Trading Hubs – Elba Island

Elba Express
- 105 miles 42" pipe, 86 mile of 36" pipe
- Capacity: 1.1 Bcf/d
- FERC Status: Prefiling
- In-service date: Mid 2010

Cypress Project
- Project Scope (Ph 1)
- 165 miles 24" pipe
- Capacity: 220 MMcf/d
- Capex: $240 MM
- FERC Status: Filed on 2Q 2005
- In-service May 2007
Producer Integration to Trading Hubs – Energia Costa Azul

North Baja Pipeline / Gasoducto Baja Norte Expansions
- 80 miles of 42", 48" pipe (Phase I), and 46 miles of 16" lateral (Phase II)
- Capacity: Together the expansions will allow to import up to 2.7 Bcf/d of gas into the U.S.
- Capex: $291 MM
- In-service Date: Phase I – Late 2007; Phase II – Mid 2009
Producer Integration to Trading Hubs – Jordan Cove LNG

Pacific Connector Gas Pipeline Project
- 250 mile pipe
- Capacity: 1 Bcf/d
- FERC Status: Filing in 1Q 2007
- In-service: 2010

Jordan Cove LNG

Northwest Pipeline
Gas Transmission NW
Tuscarora Pipeline
PG&E
Pacific Connector Gas Pipeline
Header strategies to enhance netbacks

- The total arbitrage value depends on operational characteristics – such as capacity and cost, as well as the price correlation between pricing points.
- The intrinsic value is captured by choosing the highest-valued delivery point at the beginning of each month.
- The realization of the extrinsic value depends on the market liquidity and portfolio management practice.

### Potential Header Value

<table>
<thead>
<tr>
<th>Year</th>
<th>Intrinsic $/Dth/d</th>
<th>Extrinsic $/Dth/d</th>
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<tbody>
<tr>
<td>2002</td>
<td>0.00</td>
<td>0.05</td>
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<tr>
<td>2003</td>
<td>0.11</td>
<td>0.02</td>
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<tr>
<td>2004</td>
<td>0.28</td>
<td>0.01</td>
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<tr>
<td>Average</td>
<td>0.13</td>
<td>0.03</td>
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**Historical Basis to Henry Hub**
Header System – Cheniere Creole Trail Pipeline

Proposed Creole Trail LNG Terminal

Terminal Boundary
Segment 2
Segment 3
Hedberry Lateral
Header System – Texas Eastern Logan Lateral, BP Crown Landing

Proposed 30" Texas Eastern Logan Lateral Pipeline
Gulf Coast-to-Northeast long haul expansions are less likely

Current Rates ~ $0.55/dt, plus fuel
Incremental Rates ~ $1.40/dt, plus fuel
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Maritimes & Northeast – Phase IV expansion uncertainty

Maritimes & Northeast Pipeline Phase IV – Open Season Results

<table>
<thead>
<tr>
<th>Shipper</th>
<th>Volume (MMBtu/d)</th>
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<tbody>
<tr>
<td>Anadarko LNG Marketing</td>
<td>813,000</td>
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<tr>
<td>(Bear Head LNG)</td>
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<tr>
<td>Repsol Energy NA</td>
<td>750,000</td>
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<tr>
<td>(Canaport LNG)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,563,000</td>
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</table>
Interregional projects influence and are influenced by LNG

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Mar-27-06
West Coast LNG may be influencing Rocky Mountain producer pipeline decisions

Monthly Average Basis - Socal vs. Chicago

Comparison of Rates
Kern River vs. Rockies Express

<table>
<thead>
<tr>
<th>Pipeline</th>
<th>Demand $/Dth/d</th>
<th>Commodity $/Dth/d</th>
<th>Fuel %</th>
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<tbody>
<tr>
<td>Kern River</td>
<td>0.3973</td>
<td>0.0618</td>
<td>1.83</td>
</tr>
<tr>
<td>Rockies Express</td>
<td>1.4269</td>
<td>0.0120</td>
<td>2.22</td>
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</table>
Baseloaded LNG may drive summer/winter prices wider and promote more storage development.
Historical values of a Gulf Coast storage facility
Thank You.

Greg Hopper
Vice President
713-590-2280
hoppergw@bv.com

March 27, 2006