Liquid Markets: Assessing the Case for U.S. Exports of LNG

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Research Introduction

• Research Process
  » Expert input from Natural Gas Task Force
  » Report reflects task force input but not group consent
  » Invited expert testimonials on specific topics
  » Analysis of existing data and additional research/ interviews
Research Introduction

• Study Outline

» Part 1: **Feasibility** of LNG exports
  - Domestic supply, domestic demand, and international gas markets

» Part 2: **Implications** LNG exports
  - “Public interest”: impact on other sectors, economic impact, jobs, US energy security, balance of trade, international implications, environment

» Part 3: **Conclusions and recommendations**
Feasibility

- Dependent on:
  - Size of resource base
  - Environmental policy and regulations
  - Sustainability of production

- Given existing knowledge, exports are technically and logistically feasible
Implications: Natural Gas Price Increase

* The price implications of exports on domestic prices is likely to be modest

Study-by-study comparison of the Average Price Impact from 2015-2035 of 6 bcf/day of LNG exports (unless otherwise noted)

<table>
<thead>
<tr>
<th>Study</th>
<th>Average Price without Exports ($/MMBtu)</th>
<th>Average Price with Exports ($/MMBtu)</th>
<th>Average Price Increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIA*</td>
<td>$5.28</td>
<td>$5.78</td>
<td>9%</td>
</tr>
<tr>
<td>Deloitte</td>
<td>$7.09</td>
<td>$7.21</td>
<td>2%</td>
</tr>
<tr>
<td>Navigant (2010)** (2 bcf/day of exports)</td>
<td>$4.75</td>
<td>$5.10</td>
<td>7%</td>
</tr>
<tr>
<td>Navigant (2012)*****</td>
<td>$5.67</td>
<td>$6.01</td>
<td>6%</td>
</tr>
<tr>
<td>ICF International***</td>
<td>$5.81</td>
<td>$6.45</td>
<td>11%</td>
</tr>
</tbody>
</table>

* Price impact figure for EIA study reflects the reference case, low-slow export scenario.
** The Navigant study did not analyze exports of 6 bcf/day.
*** Navigant (2010 and 2012) and ICF International studies are based on Henry Hub price.

Source: EIA, Deloitte, Navigant, ICF International.
Implications: Electricity and Industrial Sectors

- The electricity and industrial sectors will not see dramatic changes in prices or competitiveness.

Increase in Electricity Prices as a Result of 6 bcf/day of exports, 2035

<table>
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<th>Study</th>
<th>Estimated Increase in Electricity Prices ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIA*</td>
<td>$1.40-$2.90/MWh</td>
</tr>
<tr>
<td>Deloitte</td>
<td>$1.65/MWh</td>
</tr>
<tr>
<td>ICF International</td>
<td>$1.66-$4.97/MWh</td>
</tr>
</tbody>
</table>

* EIA range does not include high-rapid export scenario

Source: EIA, Deloitte, ICF International

Brent-to-Henry Hub Price Ratio, 2000-2012*

* 2012 prices average of prices from January-March 2012

Source: EIA
Implications: International Pricing and Geopolitics

- The market will put a natural cap on how much LNG will be economic to export

**Estimated Costs of Delivering LNG to Japan in 2020 ($/MMBtu)**

[1]: Assumes 1 bcf/day of exports from Valdez, Alaska
[2]: Assumes 3.1 bcf/day of exports from Valdez, Alaska
[3]: Dry gas penalty is assumed at 2%
[4]: Opportunity cost for Alaska and B.C.

*Source: Client Presentation by James Jensen, President, Jensen and Associates*
Conclusions

• Exports are feasible
• Natural gas prices will increase modestly
• Negligible impact on price and competitiveness of electricity and industrial sectors
• Limited macroeconomic, jobs, or environmental impact
• Exports would erode (but not dramatically alter) oil-linked LTCs in Asia and Europe
• Geopolitical benefits to increased LNG supply and supply diversity
• Market considerations will limit the arbitrage opportunity and economic feasibility of export projects
Recommendations

• The U.S. government should neither prohibit nor promote LNG exports

• Capping exports would distort markets and likely have unintended consequences

• The U.S. has an interest in continuing to promote free trade