UNCONVENTIONAL GAS AND LNG: THE YIN AND YANG OF CHINESE NATURAL GAS PLANNING

By: Raj Rattanavich, Stephen Thompson, Ming Cai

Poten & Partners

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How will China satisfy its voracious gas appetite?

- **Central Asia Pipeline Gas**
  - Junggar
  - Tuja
  - Tarim

- **Ordos**
- **Songliao**
- **Bohai Bay**
- **Sichuan**
- **Jiangshan**
- **Junggar**
- **Tuja**
- **Tarim**
- **Shanghai**
- **Beijing**
- **Myanmar**
- **Pipeline Gas**

Legend:
- Shale gas basin
- **Red**: Existing LNG import
- **Orange**: Under construction LNG import
- **Blue**: Pipeline gas import

- **LNG Imports**
12th five year plan aims for gas to be 8.3% of total energy by 2015

Reducing carbon emission below 2005 level by 2015
Unconventional gas development is critical to the aggressive domestic production targets.

Unconventional gas production targets

- **Shale Gas**: 78% CAGR from 2012 to 2020
- **CBM**: 61% CAGR from 2012 to 2020

Source: NDRC, Poten & Partners
…But shale gas development faces many challenges…

78% CAGR

Water resources
Land acquisition
Pipeline infrastructures
Fiscal regime
Local industry services
LNG growth highly dependent on shale gas success

Poten’s LNG demand forecasts

- **High LNG demand**: Unsuccessful shale gas development
- **Likely LNG demand**: Shale gas production meets government’s targets
- **Low LNG demand**: Shale gas production meets government’s targets

**Source**: Poten & Partners

- **MMt/y of LNG**
  - 2014:
    - High demand: 20
    - Likely demand: 10
    - Low demand: 0
  - 2016:
    - High demand: 30
    - Likely demand: 20
    - Low demand: 0
  - 2018:
    - High demand: 40
    - Likely demand: 30
    - Low demand: 0
  - 2020:
    - High demand: 50
    - Likely demand: 40
    - Low demand: 0
China has unique LNG procurement strategy

Chinese built LNG ships

Low LNG price

Upstream equity
But local pricing regime doesn’t incentivize importers

<table>
<thead>
<tr>
<th>Producers &amp; Importers ($/MMBtu)</th>
<th>City Gas Company ($/MMBtu)</th>
<th>End-users ($/MMBtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic gas price (ex-plant)</td>
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<tr>
<td>Residential use: $4.27</td>
<td>$9.44</td>
<td>Residential use: $10.71</td>
</tr>
<tr>
<td>Industrial use: $5.97</td>
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<td>Industrial use: $16.66</td>
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<tr>
<td>Central Asia pipeline gas</td>
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<td>(Turkmenistan-China Border - $10.14)</td>
<td>$15.47</td>
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<td>LNG price (DAP)</td>
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<td>($17.87 for Qatari LNG)</td>
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LNG price (DAP) ($17.87 for Qatari LNG)

Average ex-terminal price

Around $7/MMBtu negative margin
Chinese price deregulation a very early experiment

- VAT rebate on gas imports in mid-2011
- Pilot reform in Guangdong and Guangxi regions at wholesale level in Dec 2011
- Aims to liberalize wellhead gas prices

**Gas price comparison at city-gate**

- Shanghai (regulated)
- Guangdong cap (pilot reform)
- New LNG Price

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<td>$/MMBtu</td>
<td>9</td>
<td>12</td>
<td>18</td>
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LNG importers need to carefully plan their strategy

LNG importers strategic options

- Increase wholesale price
- Absorb the losses
- Increase efficiency

Losses → Retailers & End users?

- Government subsidies
- Maximize expansions
  Minimize spare capacity
Utilization rate optimization and expansion plans could help supporting China’s LNG requirement.

Drivers

Regional LNG requirement

Cost

Economics

China Twelfth Five-Year Plan → LNG Import capacity

Build new terminals

Expansions & Utilization rate
The Yin and Yang of Chinese natural gas planning

- Successful shale gas development in the country
- Sophisticated LNG procurement strategy and sustainable LNG import business model