China’s Energy Import Dependency: Status and Strategies

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Outline

◆ Introduction
◆ China’s energy import dependency
◆ China’s energy security strategies
◆ Conclusion
1. Introduction

“China is the world's most populous country and the largest energy consumer in the world. Rapidly increasing energy demand has made China very influential in world energy markets”

---U.S. Energy Information Administration
- China is the world’s most populous country.
- In 2000-2009, the average annual growth rate of China’s real GDP is about 10 percent between 2000 and 2009 (IMF 2012).
- The rate is about 9.2% in 2011
- Energy use kept increasing, but at a smaller growth rate
China - Total Energy and Real GDP

Source: Tverberg (2011)
China’s energy consumption elasticity

Data source: China energy statistical yearbook
However, China’s production cannot meet its consumption requirement.
2. China’s energy import dependency

Energy consumption structure in China

- Coal: 70%
- Oil: 18%
- Natural Gas: 4%
- Renewable: less than 1%
- Hydroelectricity: 7%
- Nuclear Energy: 1%
China’s energy consumption structure vs. the world average

Data Source: BP (2011)
Coal

*China is the largest producer and consumer of coal in the world*
Coal Reserve and Production

- China held **114.5 billion tons** of proved coal reserves at the end of 2010, ranking the third in the world (BP, 2011)
  
  United States (27.6%), Russia (18.2%) , **China (13.3%)**, Australia (8.9%), India (7%)

- However, China was the largest coal producer (**3.24 billion tons** in 2010)
  
  **China (48.3%)**, US (14.8%) , Australia (6.3%), India (5.8%), Indonesia (5.0%)
Coal consumption vs. production

Coal imports

- China's coal imports increased quickly since 2002 because the cost of importing coal became competitive with domestic production.
- In 2009, China became a net coal importer, mainly from Indonesia, Australia, Vietnam, and Russia.
- China signed a $6 billion loan-for-coal agreement with Russia for importing 15 to 20 million tons of coal for 25 years (a total of 475 million tons)
Oil

China is the world’s second-largest consumer & net importer of oil behind the United States

Top Ten Net Oil Importers, 2010
(Million Barrels Per Day)

Source: EIA (2011)
Oil Reserves and Production

- China had **14.8 billion barrels** of proven oil reserves (1.1% of world total, a half of the US)
- China produced an estimated **4.3 million bbl/d** of total oil liquids in 2010, of which 96 percent was crude oil.
- China's oil production is forecasted to increase to over **4.5 million bbl/d** in 2012.
Oil consumption and import

- In 2010, China consumed an **9.2 million bbl/d** of oil.
- China's **net oil imports** reached about **4.8 million bbl/d** in 2010, while US imports **9.2 million bbl/d**.
- China's oil consumption is anticipated to grow by **1.1 million bbl/d**, almost **40 percent** of projected world oil demand growth during 2011 and 2012 (IEA).
China's Oil Production and Consumption, 1990-2012

(Thousand Barrels Per Day)

Source: EIA (2011)
Top ten source countries for China’s crude oil import in 2011

Source: China Customs
Natural gas

- China held 2.8 trillion cubic metres of proved NG reserves in 2010, 1.5% of world total
  - Russia (23.9%), Iran (15.8%), Qatar (13.5%), Saudi Arabia (4.3%), Turkmenistan (4.3%), US (4.3%)
- In 2010, China produced 96.8 billion cubic metres (bcm) of NG, while consumed 109.0 bcm of NG
- China became a net natural gas importer for the first time in 2007, mainly from Australia, Turkmenistan, Indonesia, Malaysia, Qatar
China's Natural Gas Production and Consumption, 1999-2009

(Billion Cubic Feet)

3. China’s energy security strategies

Strategy I:

- Diversifying energy resources by developing alternative clean energy resources
- Diversifying energy suppliers at the global level
- Diversifying import routes by reducing import dependence from the Middle East
### China's Crude Oil Imports by Origin (% share)

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<tr>
<td>Middle East</td>
<td>39.00%</td>
<td>48.00%</td>
<td>46.00%</td>
<td>44.00%</td>
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<tr>
<td>Russia/Central Asia</td>
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<td>3.00%</td>
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<tr>
<td>Asia Pacific</td>
<td>60.00%</td>
<td>26.20%</td>
<td>8.00%</td>
<td>4.00%</td>
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<td>Africa</td>
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<td>16.70%</td>
<td>n/a</td>
<td>32.00%</td>
<td>23.00%</td>
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<tr>
<td>Others</td>
<td>0.00%</td>
<td>9.00%</td>
<td>12.00%</td>
<td>4.00%</td>
<td>18.00%</td>
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<td>Total</td>
<td>100.00%</td>
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Import Source Diversification: *Diversification among suppliers is a major strategy for reducing the risks of overall dependency.*

The diversification index of China’s crude oil import over the year 1990-2010
Strategy II:

- Promoting energy conservation by multiple ways
  The shift from “intensity control” to “amount control” in the 12th Five-Year period

Strategy III:

- Strengthening energy exploration and production (E&P) of new oil fields domestically.
- Encouraging international cooperation in offshore oil exploration and production
- CNPC has been the most active company, while SINOPEC, CNOOC, and other smaller NOCs have also expanded their overseas investment profiles.

- Sign bilateral loan-for-energy agreements with a number of countries
Strategy III:

- Increasing the number of Strategic Petroleum Reserve sites;
- Raising mandatory stockpile requirements for major oil firms.
Layout of China’s SPR sites for three Phases
- China aims to hold a capacity equivalent to 90 days of net petroleum import which is 440 million barrels.
- The reserve facilities is expected to take 15 years in three phases, with a total investment of 100 billion RMB.
China’s SPR Plan

- Phase I (2004 – 2009): 102 million barrels of storage capacity in 4 separate sites. (finished)
- Phase II (2009-2012): 169 million barrels of storage capacity in 8 separate storage sites. (Under construction)
- Phase III (finish before 2020): 169 million barrels of storage capacity with the number of sites still to be determined. (Planned).
Fig. 1. The optimal oil acquisition size and inventory size, 2008–2020.

In Conclusion…

- The core strategy for China to reduce its energy import dependency may be:

  “开源节流” (Broaden sources of energy supply and reduce energy demand)

- Question:

  To what degree can and should China reduce its energy import dependency?
Thank you!