Recent Energy Development in APEC

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Rising Oil and Natural Gas Prices

Recent Energy Trends in China

Energy demand
- Between 2003 and 2005, energy consumption grew by 28%.
  - Coal consumption grew by 28%.
  - Consumption of petroleum products increased by 20%.
  - Electricity consumption increased by 31%.
  - The industry, transport, and commercial sectors are growing rapidly, at 14% per year respectively.

Energy supply
- Coal production increased from 1.95 billion tonnes in 2004 to 2.19 billion tonnes in 2005.
- Offshore and western oil production have been intensified to make up for the decline in Daqin oil field.
- Oil import dependency increased 71 percent from 2002 to 2004.
- In 2006 China is reported to have added new generation capacity at 101 GW.
Oil Majors’ Upstream Investment in Oil and Gas: Exploration, Development and Production (1973-2005)

Between 2003 and 2004, cash flow from upstream operations increased by 26%.

Exploration, development and production expenditures increased only by 5%.

Oil majors are hesitant to increase Exploration budgets.

Expenditures for development of the known reserves reached USD 38.4 billion – the highest level since 1982.

Oil Production and Wells Drilled Worldwide

Oil Production (2006)

- Middle East: 31%
- Americas: 22%
- Asia Pacific: 17%
- Europe & Eurasia: 10%
- S. & Cent. America: 8%
- Africa: 12%


- Americas: 70%
- Asia Pacific: 17%
- Africa: 1%
- FSU: 8%
- OECD Europe: 1%
- Non-OECD Europe: 1%

Intensifying Competition for Oil and Gas

■ China
  – China’s oil firms have invested in 50 countries worldwide, for 60 projects.
  – In 2004, imports from overseas oil project accounted for 21 percent of total oil imports.
  – CNPC’s equity purchase of Kazaf Oil
  – In August 2007, China reached an agreement with Kazakhstan to develop oil and gas pipelines

■ Japan
  – New energy strategy sets a target for the ratio of equity oil to total oil import, increasing from 15 percent in 2004 to 40 percent in 2030.
  – In August 2007, Prime Minister Abe visited Indonesia to reach an agreement on energy cooperation on LNG project among others.

■ Korea
  – Korea plans to increase the ratio of equity oil from current 4 percent to 15 percent in 2013.
Political Situations in Some Oil Producing Countries

- **Iran**
  - The world’s 4th largest oil exporter (2003)
  - Nuclear programme for weapons
  - Threat of oil supply disruption

- **Nigeria**
  - The world’s 5th largest oil exporter (2003)
  - Coercion between the state and civilian forces to gain control over oil resources in the Niger Delta region

- **Russia**
  - The 2nd biggest oil exporter in the world (2003)
  - Nationalisation of YUKOS
  - Temporary gas supply cut to Ukraine (January 2006)

- **Venezuela**
  - The world’s 8th largest oil exporter (2003)
  - Expansion of armaments using oil revenues
  - Threat of oil supply disruption to the US
APEC Energy Demand and Supply Outlook
Coal to grow at the fastest rate of 2.8% per year

Oil to maintain dominant share in TPED at 34% in 2030.

Natural gas demand to grow at 1.8% per year – a faster rate than that of APEC production at 0.9% per year

NRE to grow at a moderate rate of 0.9% per year due to fuel switching from biomass to commercial sources in the residential sector

(Source) Asia Pacific Energy Research Centre (2006), “APEC Energy Demand and Supply Outlook”
China to lead APEC energy demand, in particular coal

North America and China to lead demand for oil

China to show negative growth for NRE due to fuel switching from biomass to commercial energy sources

(Source) Asia Pacific Energy Research Centre (2006), “APEC Energy Demand and Supply Outlook”
If oil price remains at USD 50/barrel, in 2030 APEC would have to spend USD 1.8 billion/day to buy oil from abroad.

Rising Net Oil Import Dependency across the Region

<table>
<thead>
<tr>
<th>Year</th>
<th>APEC</th>
<th>NEA</th>
<th>SEA</th>
<th>NA</th>
<th>OCE</th>
<th>China</th>
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<tbody>
<tr>
<td>2002</td>
<td>36%</td>
<td>100%</td>
<td>19%</td>
<td>55%</td>
<td>26%</td>
<td>22%</td>
</tr>
<tr>
<td>2005</td>
<td>37%</td>
<td>100%</td>
<td>27%</td>
<td>53%</td>
<td>29%</td>
<td>34%</td>
</tr>
<tr>
<td>2010</td>
<td>38%</td>
<td>100%</td>
<td>35%</td>
<td>49%</td>
<td>42%</td>
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<td>2015</td>
<td>41%</td>
<td>100%</td>
<td>44%</td>
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<td>2020</td>
<td>44%</td>
<td>100%</td>
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<tr>
<td>2025</td>
<td>50%</td>
<td>100%</td>
<td>63%</td>
<td>53%</td>
<td>59%</td>
<td>65%</td>
</tr>
<tr>
<td>2030</td>
<td>52%</td>
<td>100%</td>
<td>69%</td>
<td>56%</td>
<td>62%</td>
<td>70%</td>
</tr>
</tbody>
</table>

(Note) Net Oil Import Dependency = (Oil Import + Oil Export)/Primary Oil Demand

(Source) Asia Pacific Energy Research Centre (2006), “APEC Energy Demand and Supply Outlook”
Natural Gas Imports in LNG (Unit: Million LNG Tonnes)

Increasing LNG Imports by Existing Importers
Emergence of New LNG Importers

(Source) Asia Pacific Energy Research Centre (2006), “APEC Energy Demand and Supply Outlook”
**Major Drivers for Energy Demand**

**Income Growth**
- GDP per capita will grow at an annual rate of 3.5 percent.

**Urbanisation**
- By 2030, share of urban population will reach 68 percent of the total from 52 percent in 2003.
  - 26 million people per year or half a million people per week will move from rural to urban cities.
  - Urban population uses a lot more energy than rural population.

**Industrialisation**
- Industry value added will grow by 4.5 percent per year, while GDP will grow by 4.1 percent per year.

(Source) Asia Pacific Energy Research Centre (2006), “APEC Energy Demand and Supply Outlook”
Energy Investment Requirements (2002-2030)

30-year investment requirements per GDP

(Source) Asia Pacific Energy Research Centre (2006), “APEC Energy Demand and Supply Outlook”

APERC
Asia Pacific Energy Research Centre
Tokyo
APEC’s Current Research Studies

Research Projects (2007/08)

- Energy Efficiency in the APEC Region
- Economy Review of China
- Understanding International Energy Initiative – Phase II
- Urban Transport Energy Use in the APEC Region – Phase II
Energy Efficiency in the APEC Region

Background

- Rising energy prices and increasing energy import dependency in most APEC economies
- Growing energy security concerns and environmental challenges

Objectives

- To examine how to improve efficiency in energy supply, with the special focuses on the electricity sector
- To layout technological options for the improvement in generation efficiency, and provide priorities in terms of their development

Progress

- Literature review
- Survey on the major power generation technologies
- Data collection on power generation
Economy Review of China

Background

- China’s rapid growth in energy demand
- Increasing energy import dependence and its implications to the world

Objectives

- To analyse factors affecting energy demand growth by province
- To project future energy needs by province, and
- To draw policy implications for energy security within the APEC region

Progress

- Literature survey
- Development of provincial level database
- Fact-finding mission trips: Beijing, Guangzhou, and Changsha
- Analysis on regulatory framework for coal, oil and gas pricing
Understanding International Energy Initiatives – Phase II

Background

- The number of collaborative energy related initiatives being conducted within the APEC region are numerous, often inter-linked and innately complicated to comprehend.

Objectives

- To identify factors behind initiative’s successful/unsuccessful development, and investigate if there are any gaps/cross-cutting issues

Progress

- Investigations on activities for international cooperation
  - Energy infrastructure, technological R&D, and environmental issues

- Development of analytical framework to identify cross-cutting issues for international energy initiatives, and gaps within the initiatives in APEC
Urban Transport Energy Use in the APEC Region – Phase II

Background

- Robust pace of urban development in APEC and transport energy demand growth in urban areas
- Rising concerns over energy security and air quality problem

Objectives

- To analyse factors affecting urban transport energy consumption
  - Passenger vehicles, buses, rails and subways
- To provide cost and benefits on the options for curbing the growth in urban transport energy consumption

Progress

- Data collection
  - Updates on the existing database, and expansion of the coverage to establishment of several indicators to analyse historical trend for urban transport energy consumption, including passenger vehicles, buses, and rails/subways
- Literature survey