
Recent Energy Development in APEC

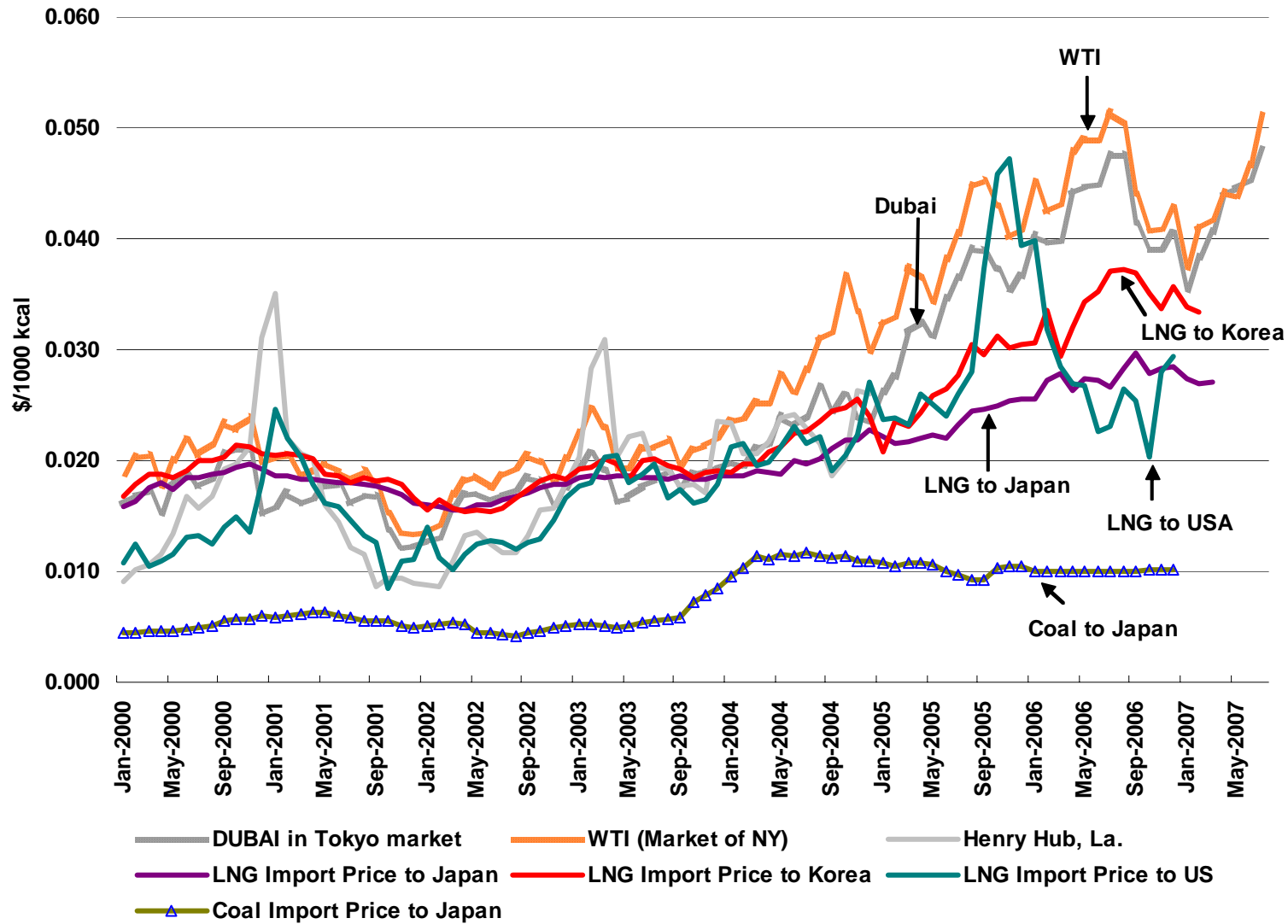
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Asia-Pacific
Economic Cooperation

Rising Oil and Natural Gas Prices



Recent Energy Trends in China

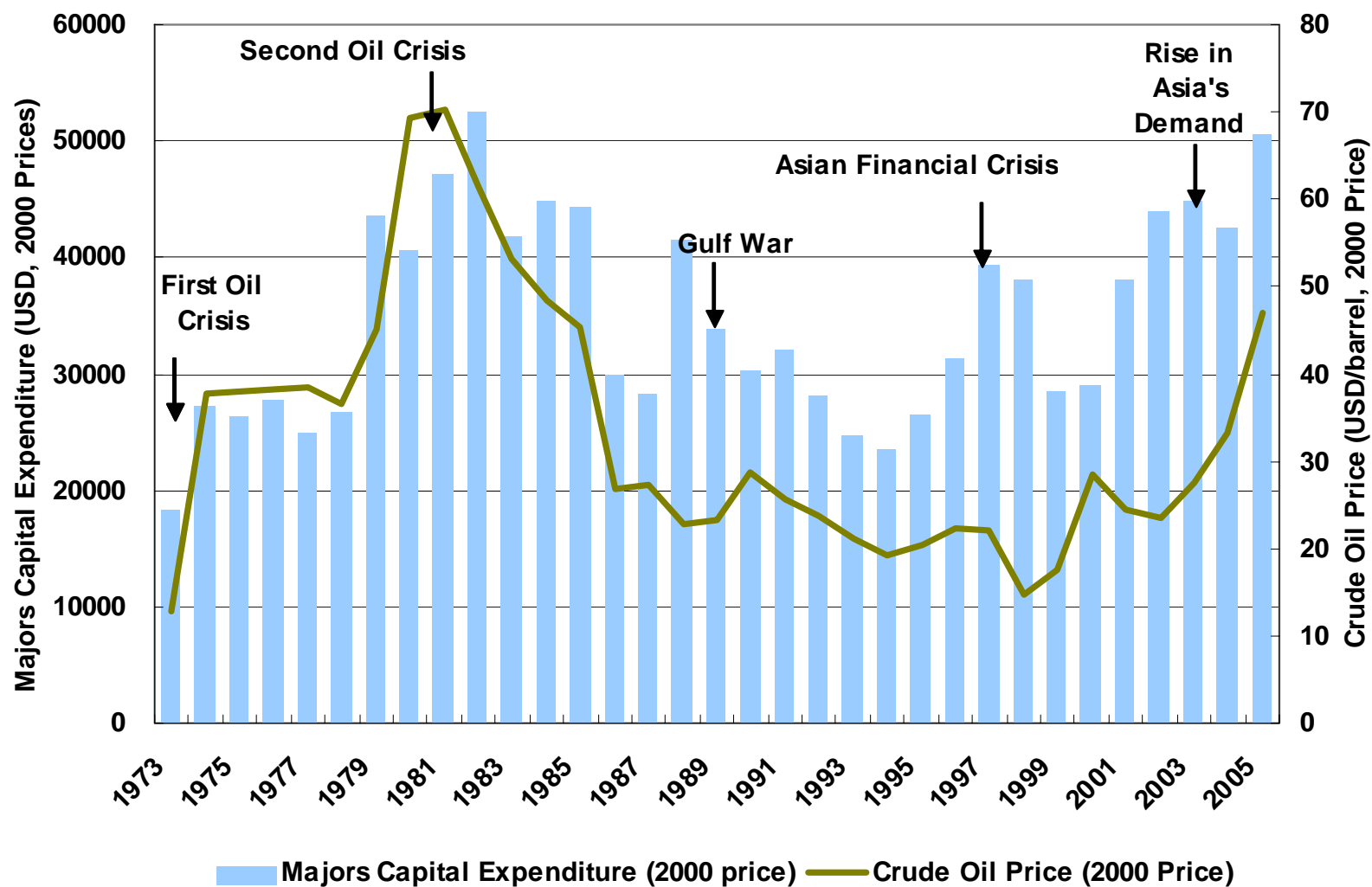
■ Energy demand

- 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)



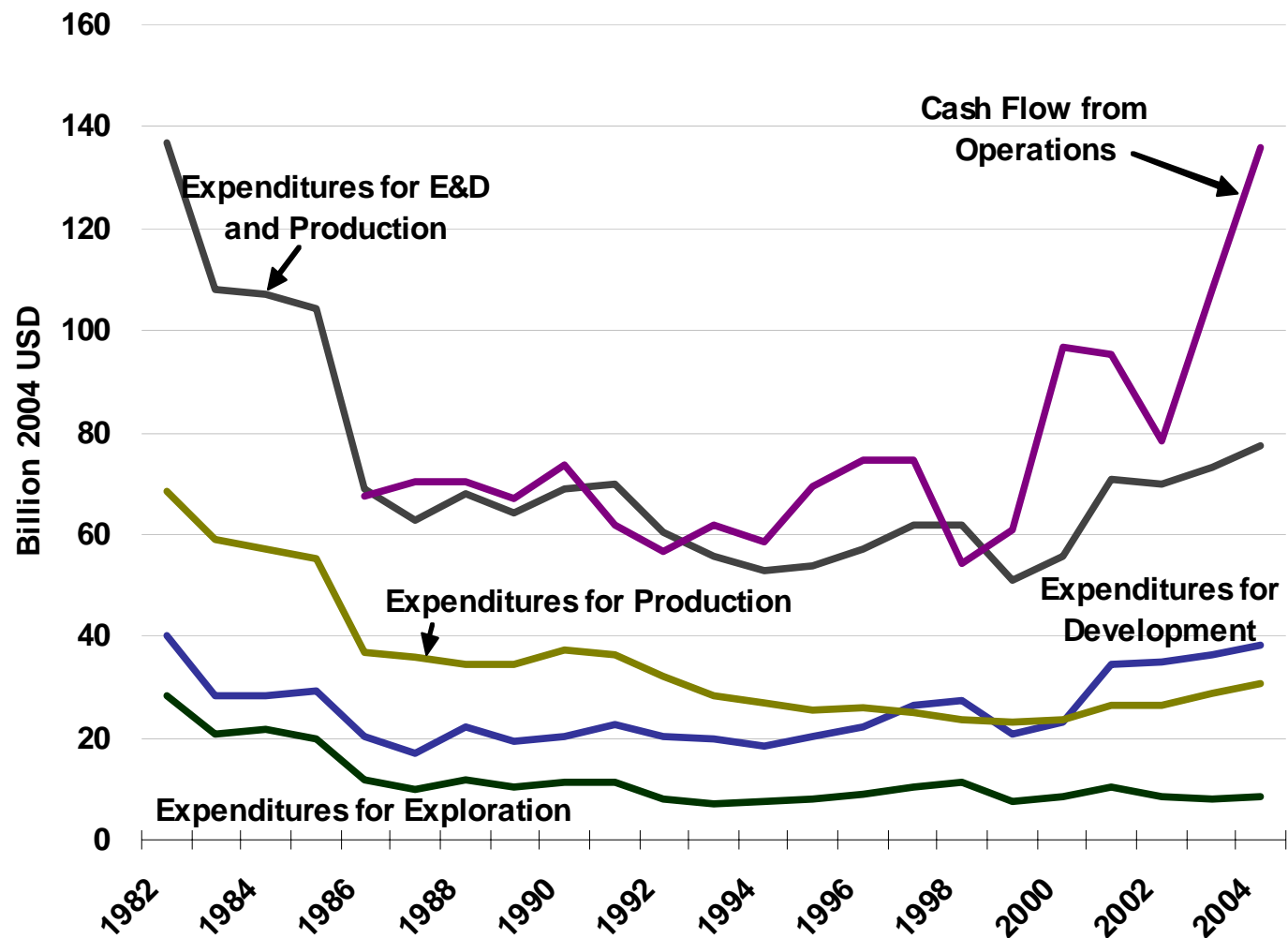
Cash Flow from Operations, and E&P Expenditures (1986-2004)

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

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

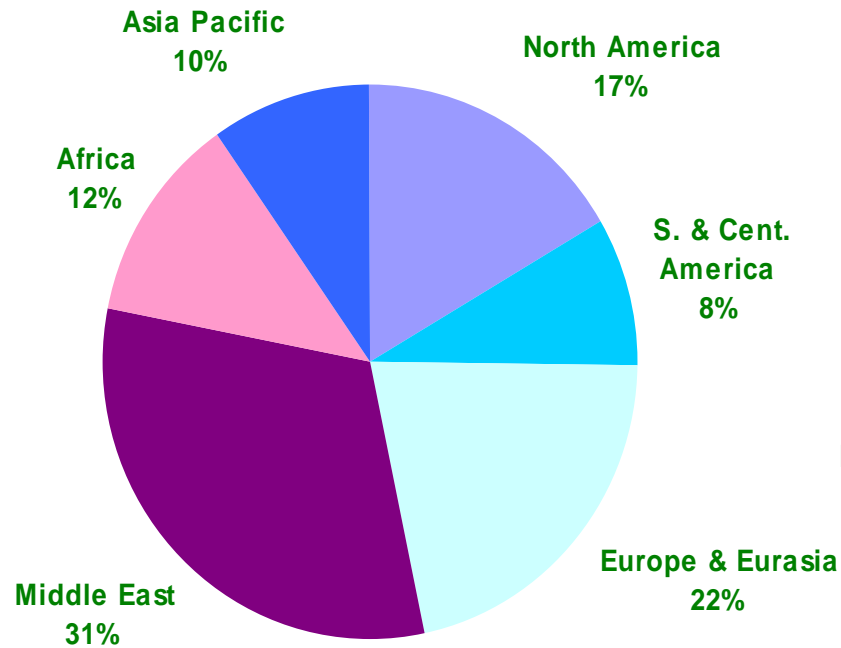
Oil majors are hesitant to increase Exploration budgets.

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

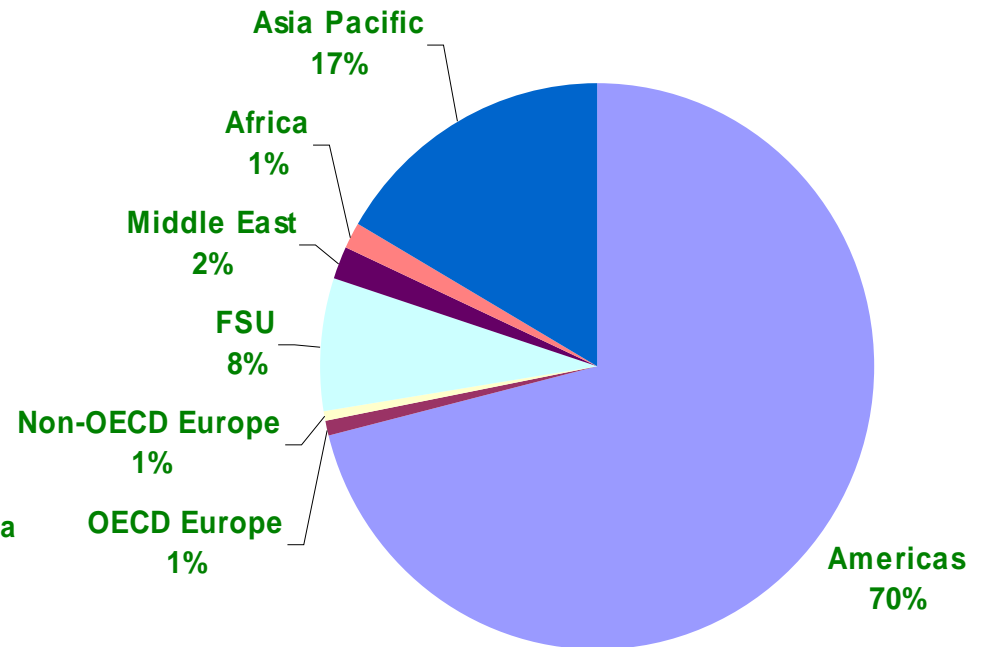


Oil Production and Wells Drilled Worldwide

Oil Production (2006)



Wells Drilled Worldwide (2003)



(Source) Bp (2007), "Bp statistical review of world energy", and Blackwell (2004), "Oil and Energy Trends: Annual Statistical Review"

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 Kazakfstan 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



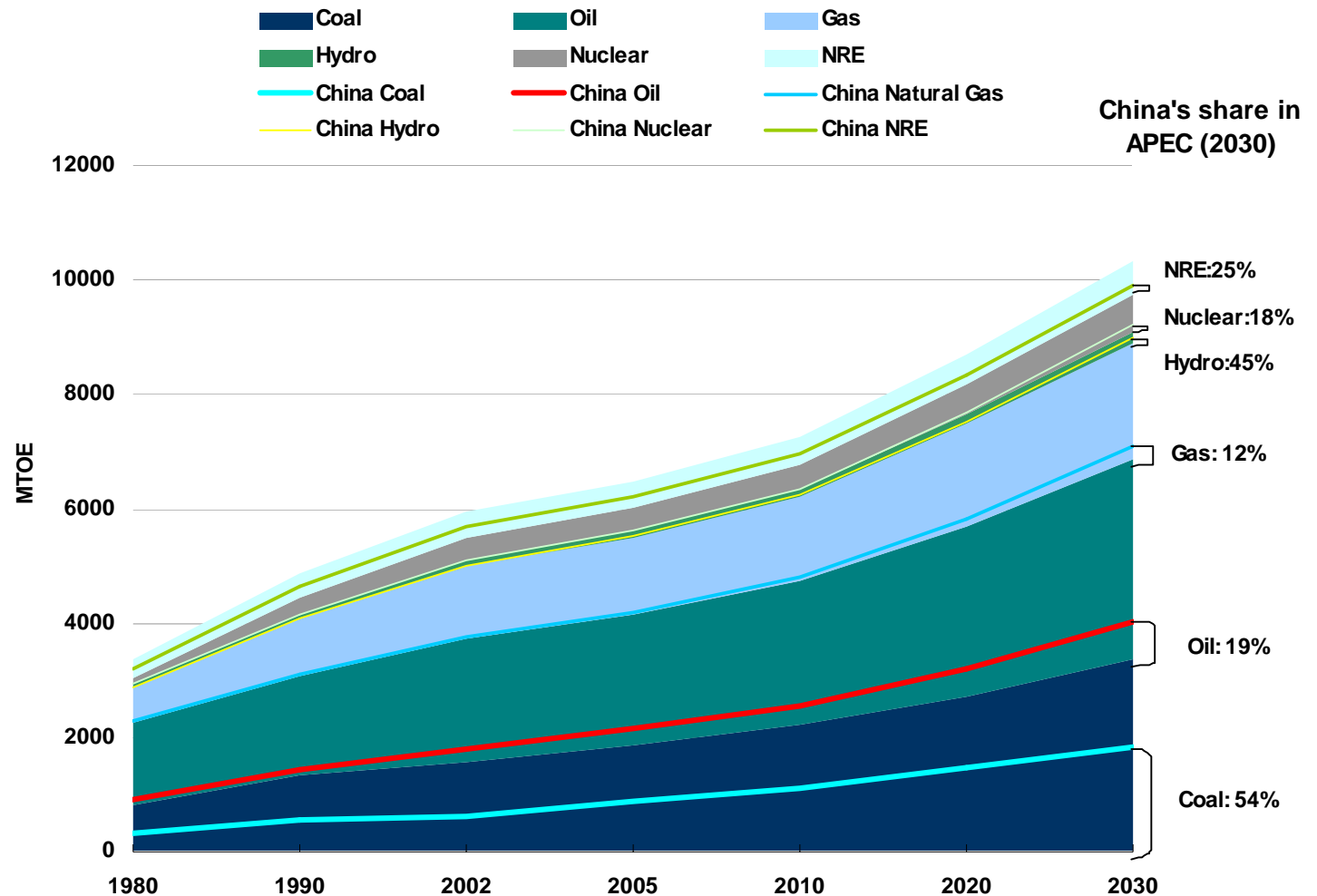
APEC Energy Demand Outlook (2002-2030)

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

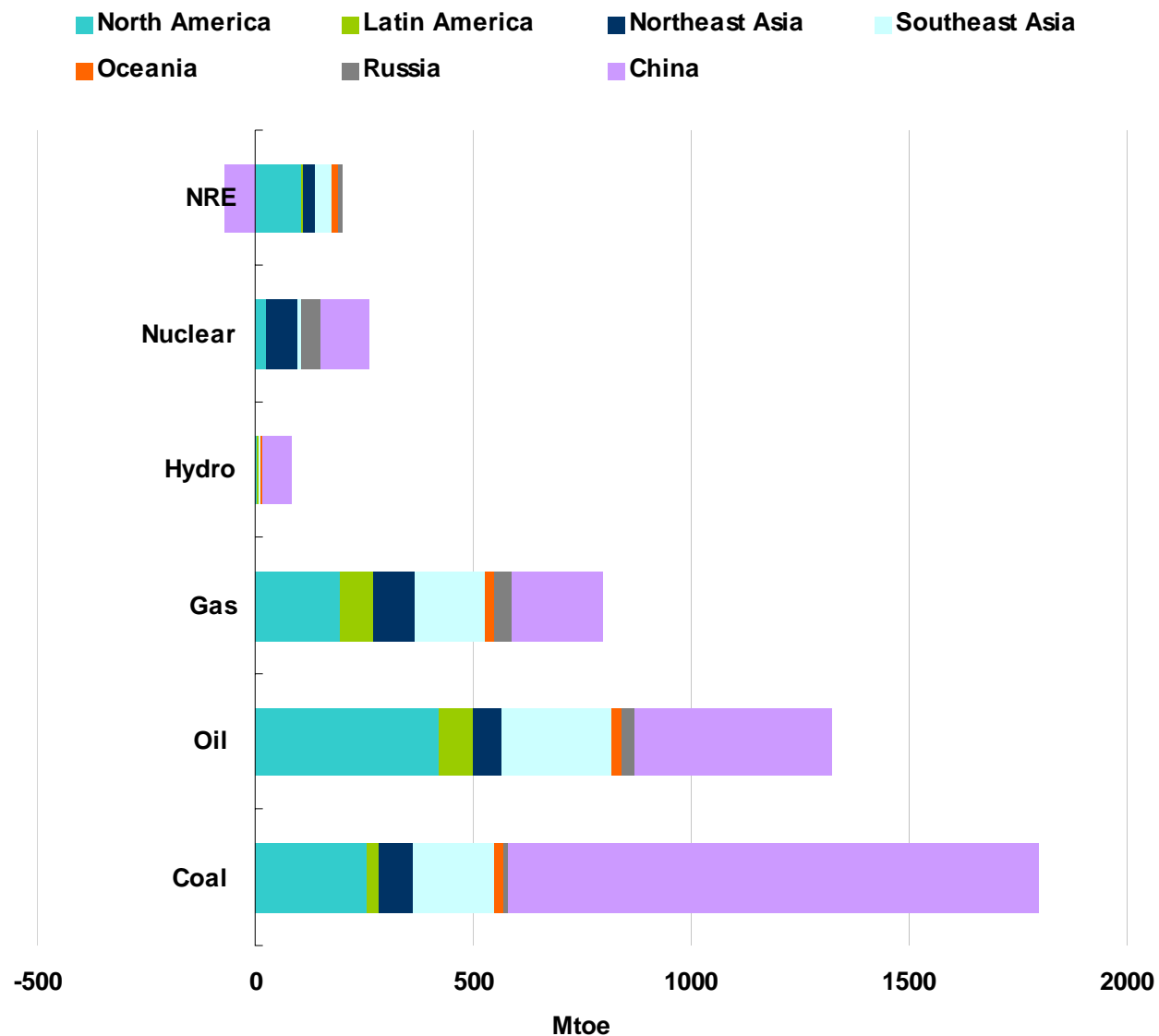


Incremental Growth by Source and by Region (2002-2030)

China to lead
APEC energy
demand, in
particular coal

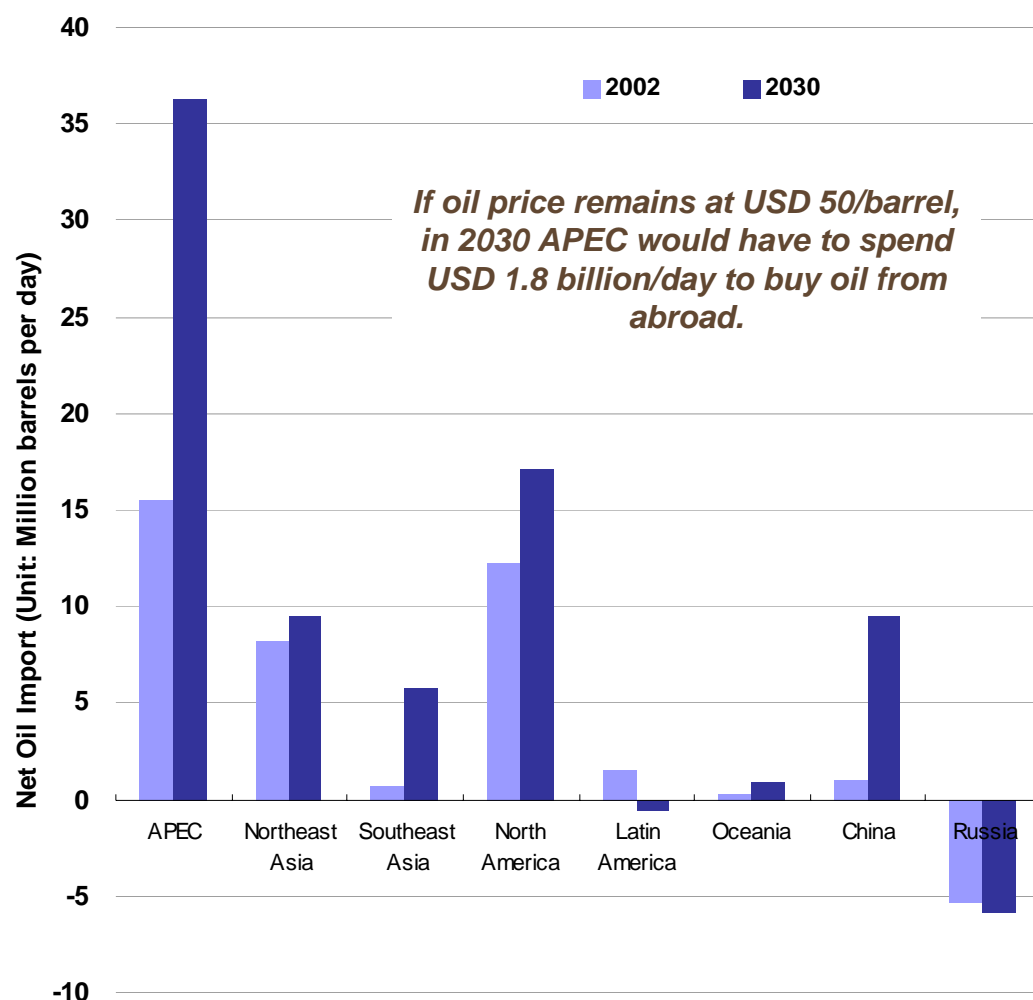
North America
and China to lead
demand for oil

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



Rising Oil Import in APEC

Net Oil Import (2002 and 2030)



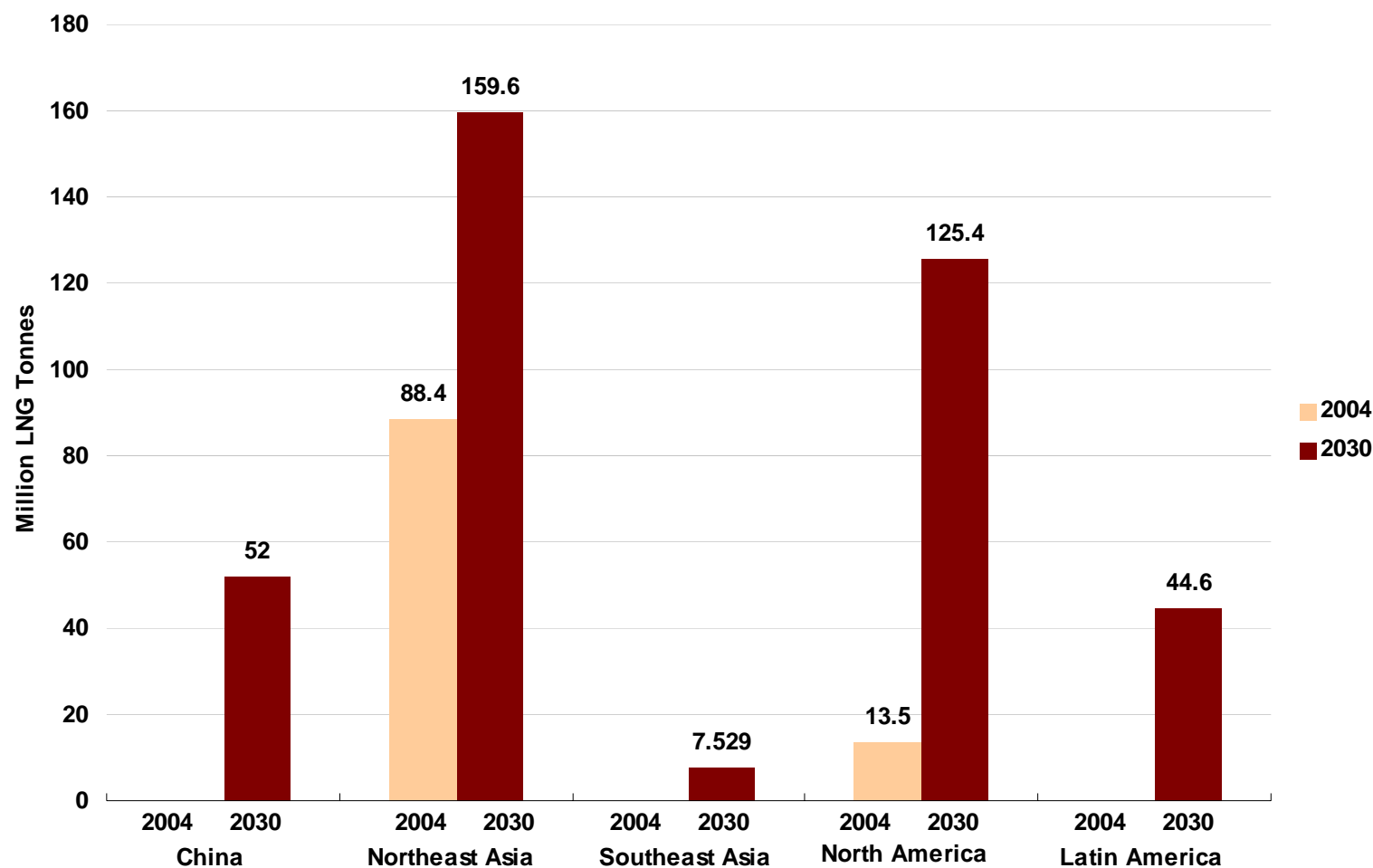
Rising Net Oil Import Dependency across the Region

	APEC	NEA	SEA	NA	OCE	China
2002	36%	100%	19%	55%	26%	22%
2005	37%	100%	27%	53%	29%	34%
2010	38%	100%	35%	49%	42%	44%
2015	41%	100%	44%	51%	50%	46%
2020	44%	100%	56%	50%	55%	57%
2025	50%	100%	63%	53%	59%	65%
2030	52%	100%	69%	56%	62%	70%

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

Natural Gas Imports in LNG (Unit: Million LNG Tonnes)

Increasing LNG Imports by Existing Importers
Emergence of New LNG Importers



Major Drivers for Energy Demand

Income Growth

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

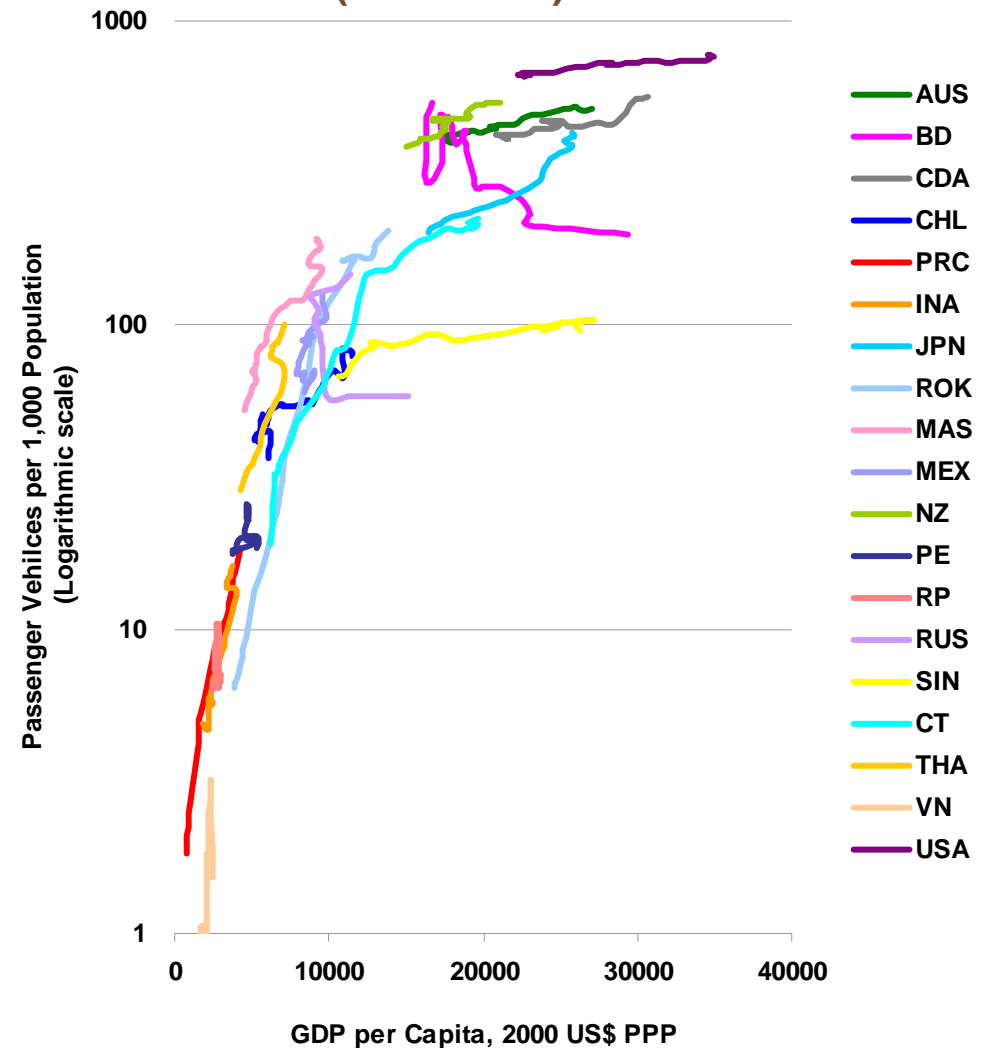
Urbanisation

- 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.

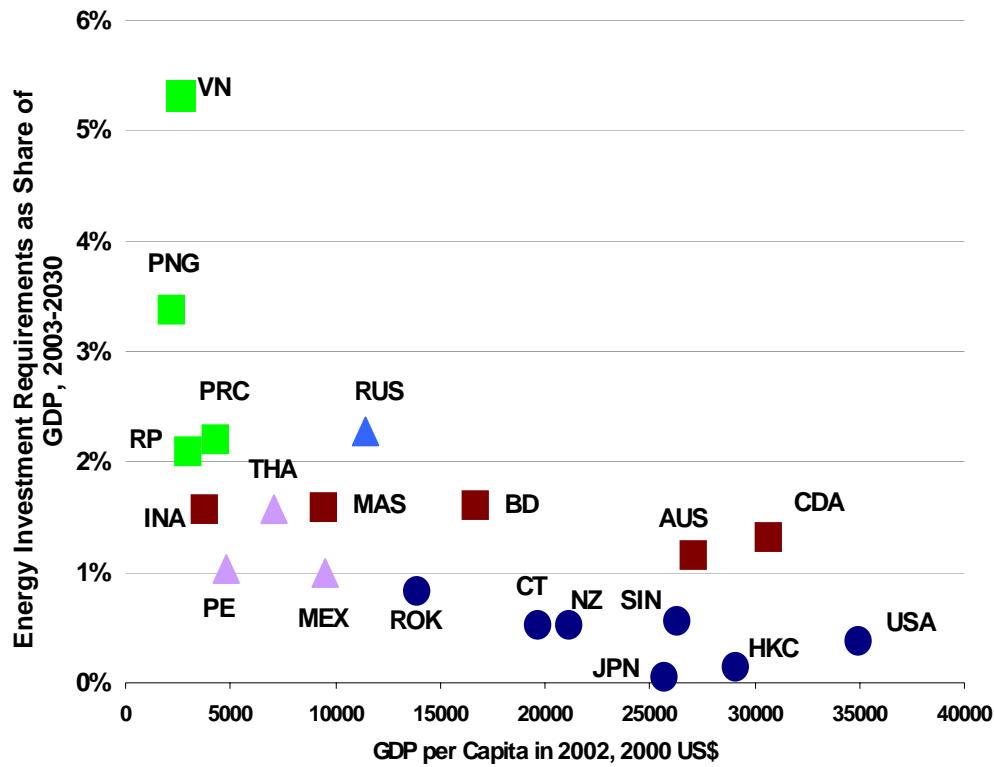
Passenger Vehicles per 1,000 Population (1980-2030)



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

Energy Investment Requirements (2002-2030)

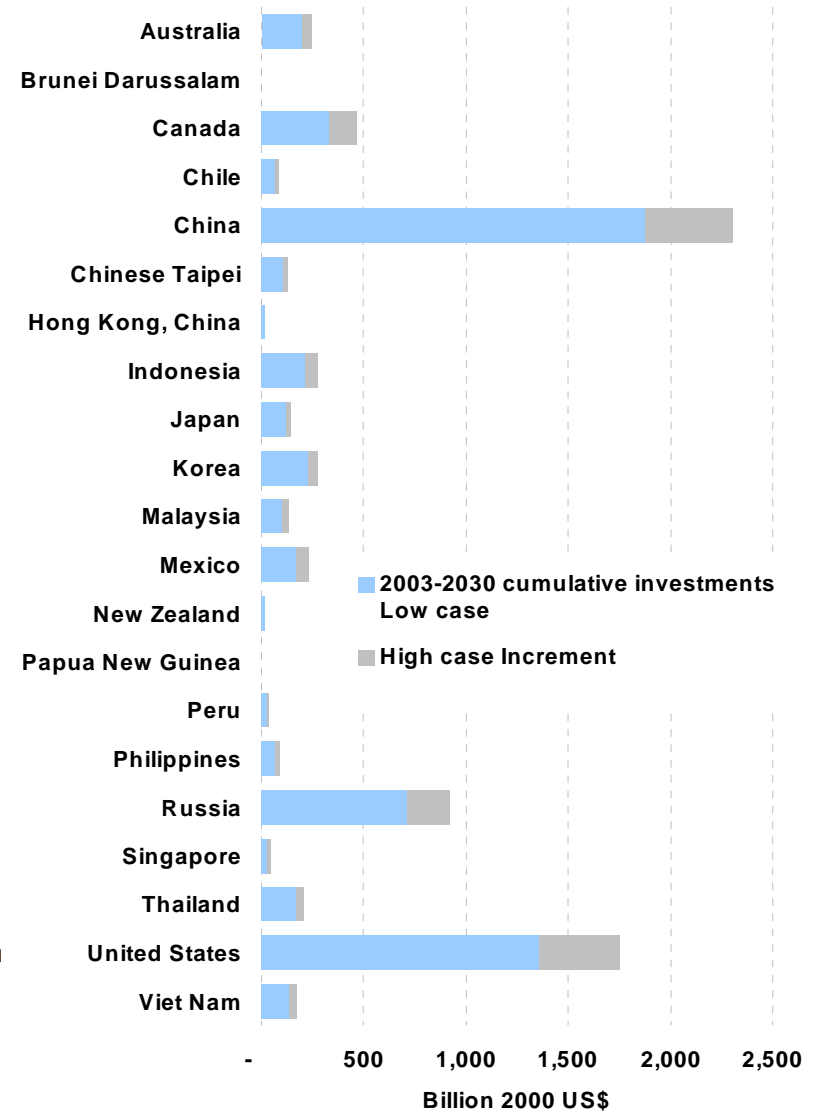
30-year investment requirements per GDP



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

APERC
Asia Pacific Energy Research Centre
Tokyo

30-year investment requirements by economy



APERC'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**

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