

APEC Energy Outlook until 2030

The 7th APEC Energy Ministers' Meeting
Gyeongju, Republic of Korea
19 October 2005

Masaharu Fujitomi

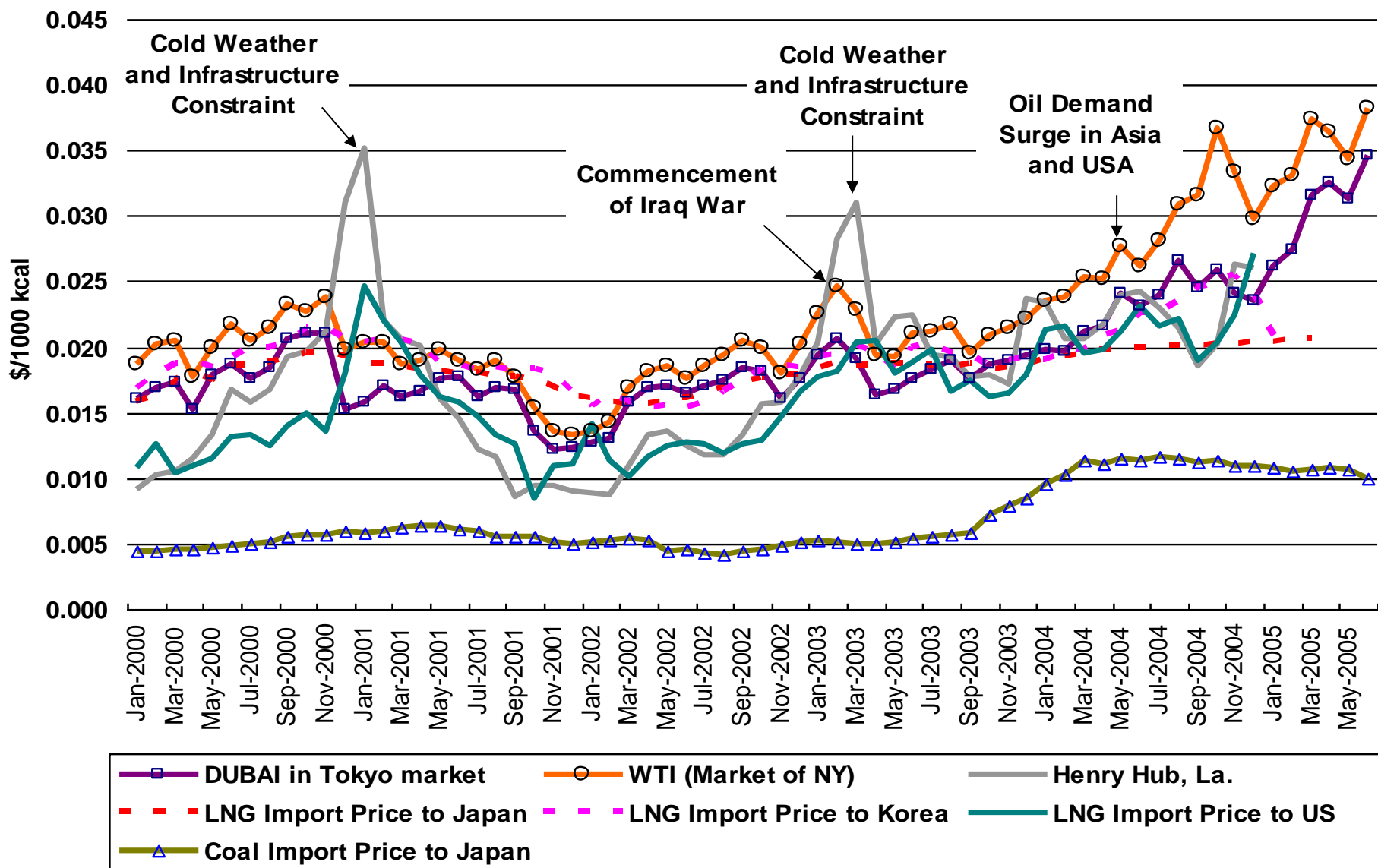
President

Asia Pacific Energy Research Centre

APERC
Asia Pacific Energy Research Centre

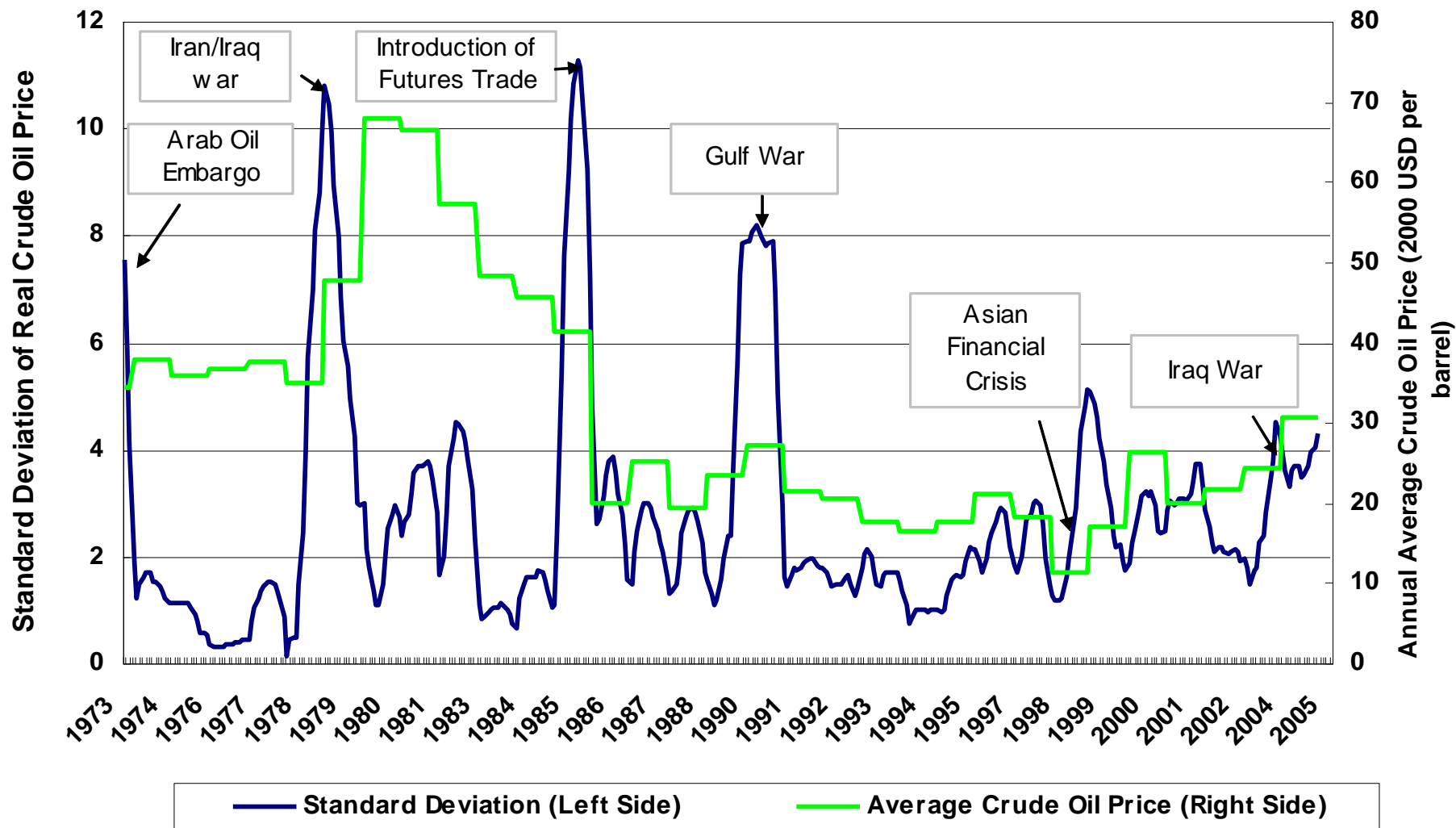


Rising Energy Prices: Oil, Natural Gas and Coal



(Source) Asia Pacific Energy Research Centre (2005)

Yearly Volatility of Crude Oil Price (1973-2005)

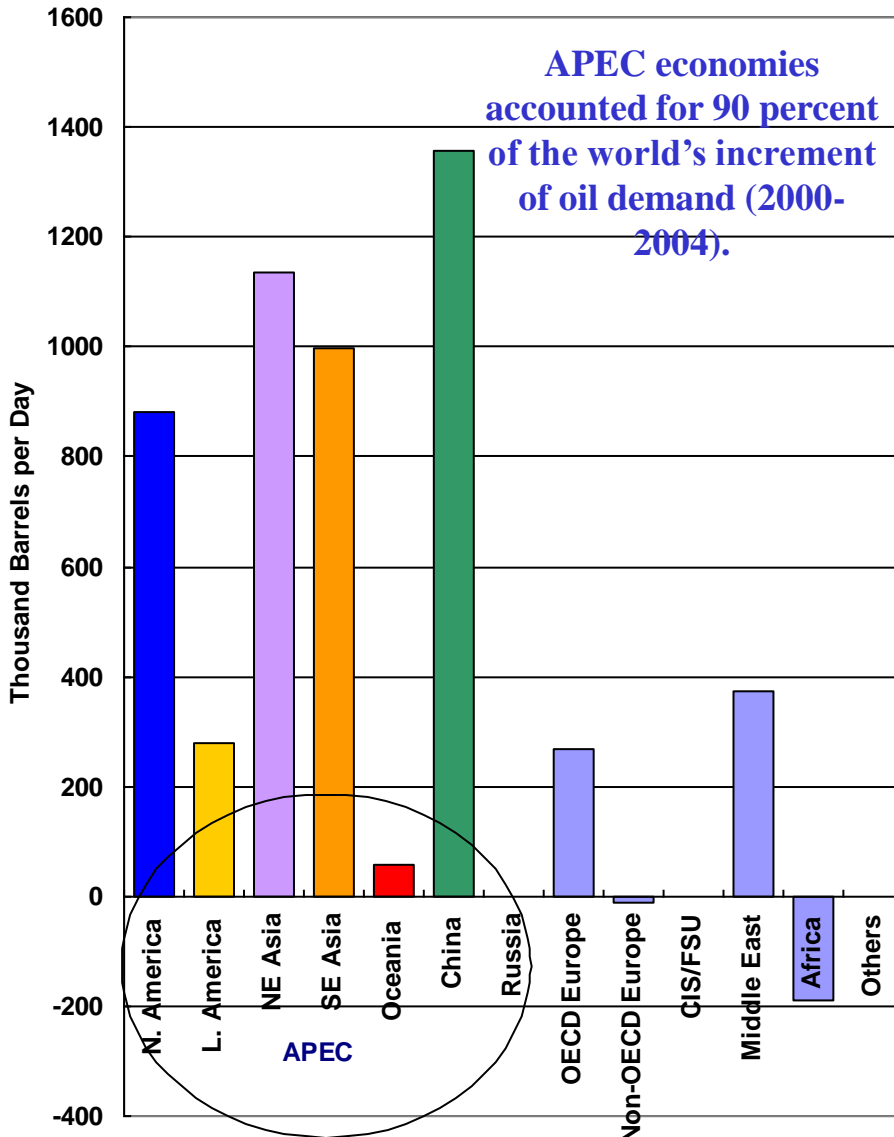


(Source) Asia Pacific Energy Research Centre (2005)

(Note) Yearly volatility represents standard deviation of one year mean value of US FOB crude oil price (2000 real value).

Drivers for the APEC Energy Demand

Growth of Oil Demand (2000-2004)



• Income Growth

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

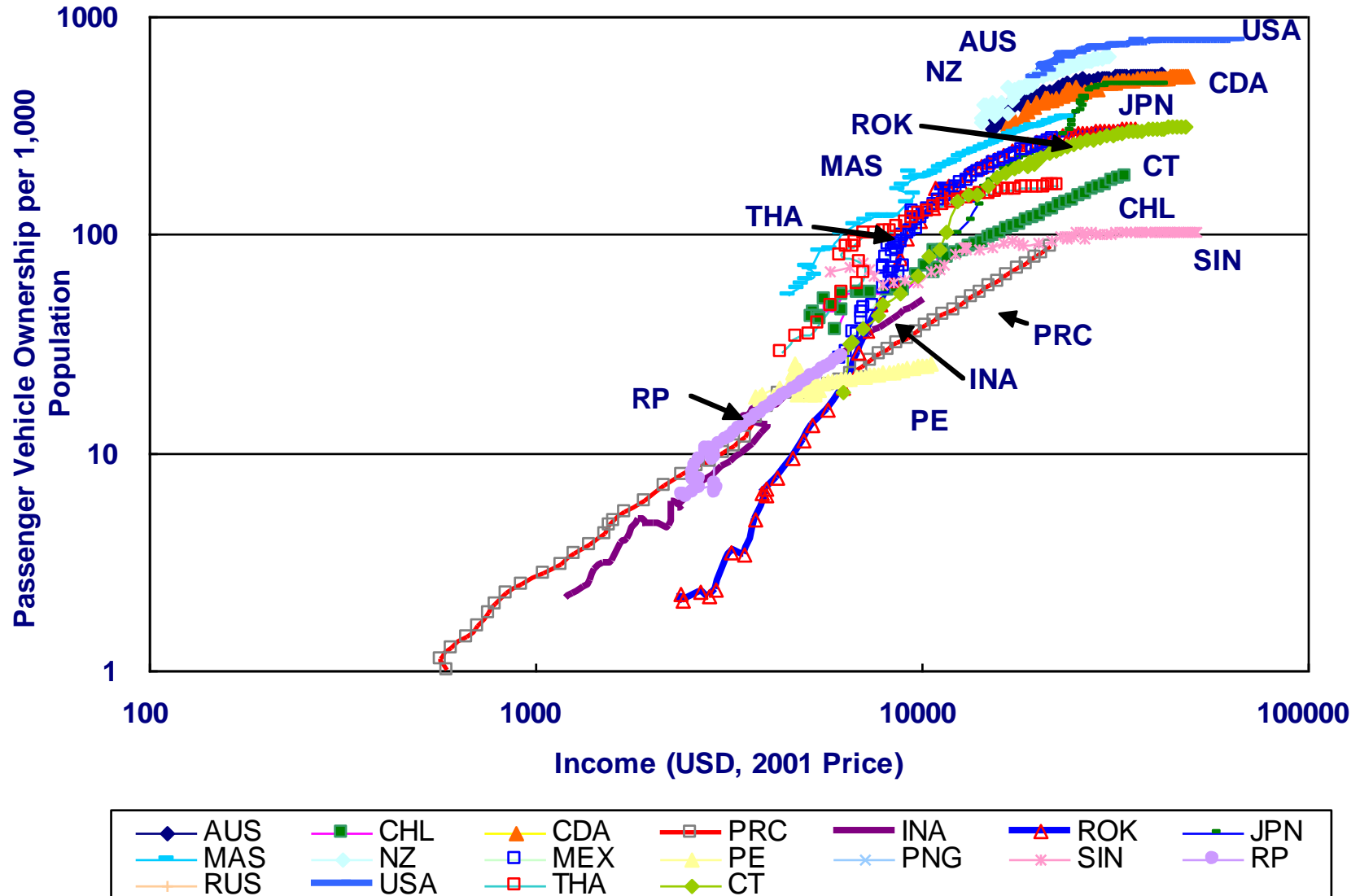
• Urbanisation

- By 2030, share of urban population will reach 68 percent of the total from 52 percent in 2003.
 - 26 million people per year will move from rural to urban cities.

• Industrialisation

- Industry value added will grow by 4.8 percent per year, while GDP will grow by 4.1 percent per year.

Income Growth and Fast Pace of Motorisation (1980-2030)

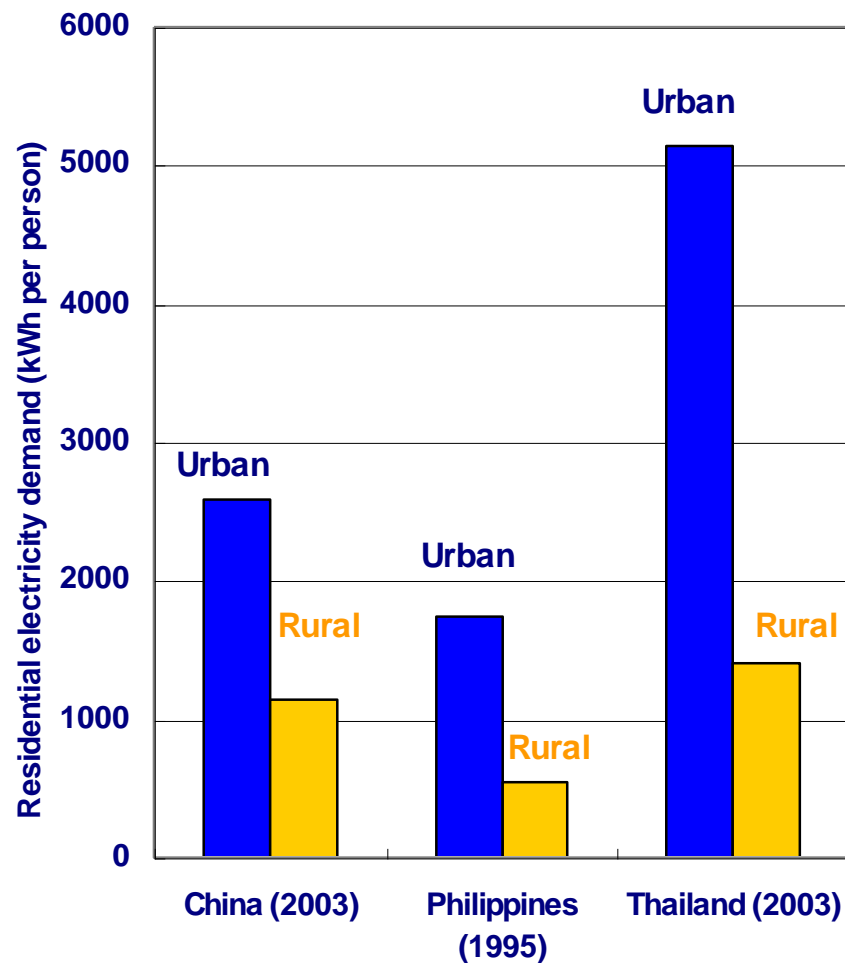


Urbanisation and Residential Energy Demand in the Selected APEC Economies

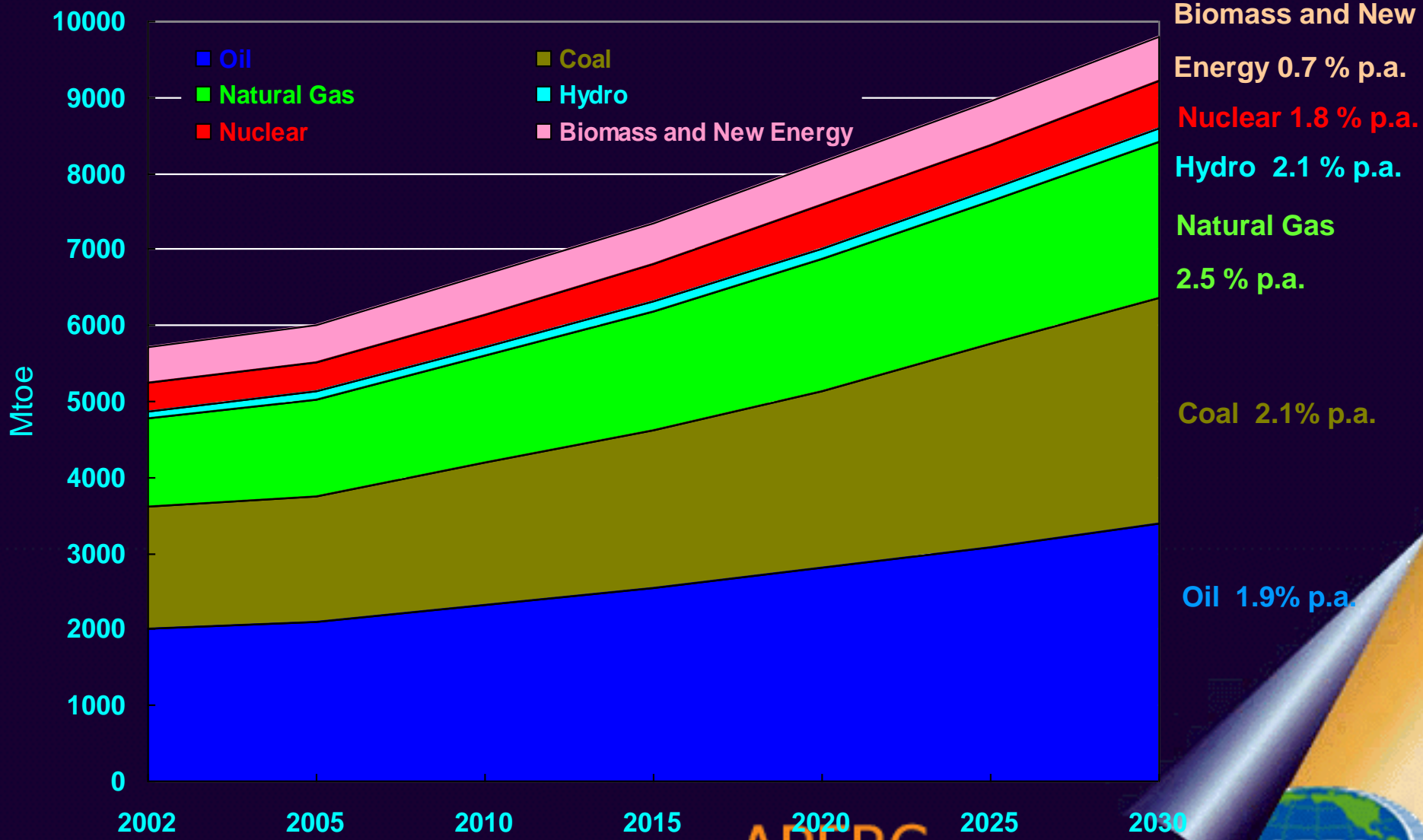
Urbanisation

	Urban Population (Millions)		Share of Urban Population	
	2003	2030	2003	2030
N. America	261	354	80%	87%
L. America	112	160	76%	84%
NEA Asia	146	159	71%	78%
SEA Asia	210	389	44%	63%
Oceania	22	29	76%	77%
China	504	878	39%	61%
Russia	105	94	73%	78%
APEC	1,360	2,063	52%	68%

Urban and Rural Residential Electricity Demand Per Person



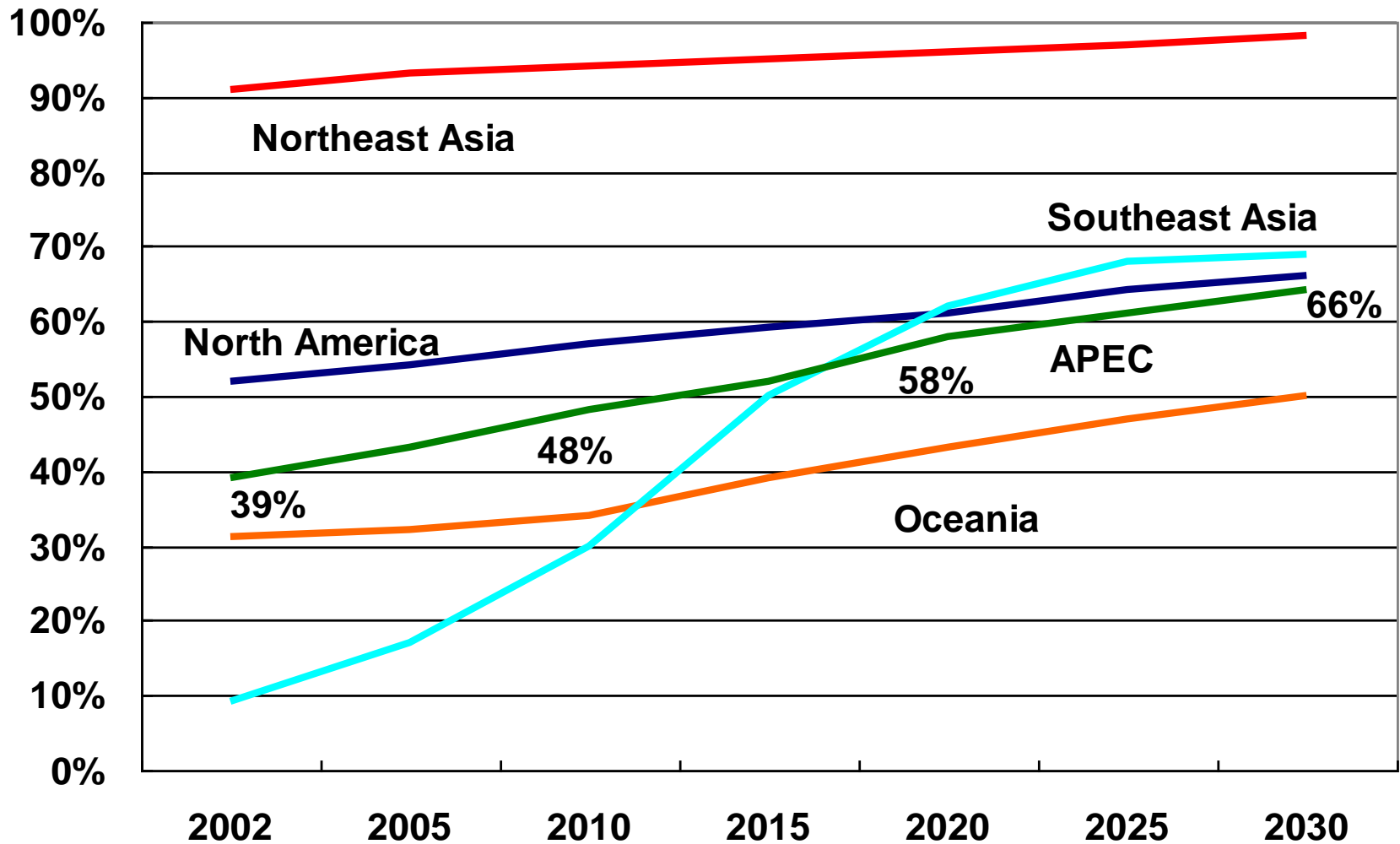
Total Primary Energy Demand in APEC (2002-2030)



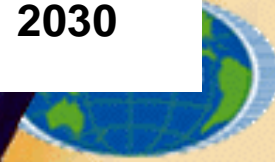
(Source) Asia Pacific Energy Research Centre (2005)



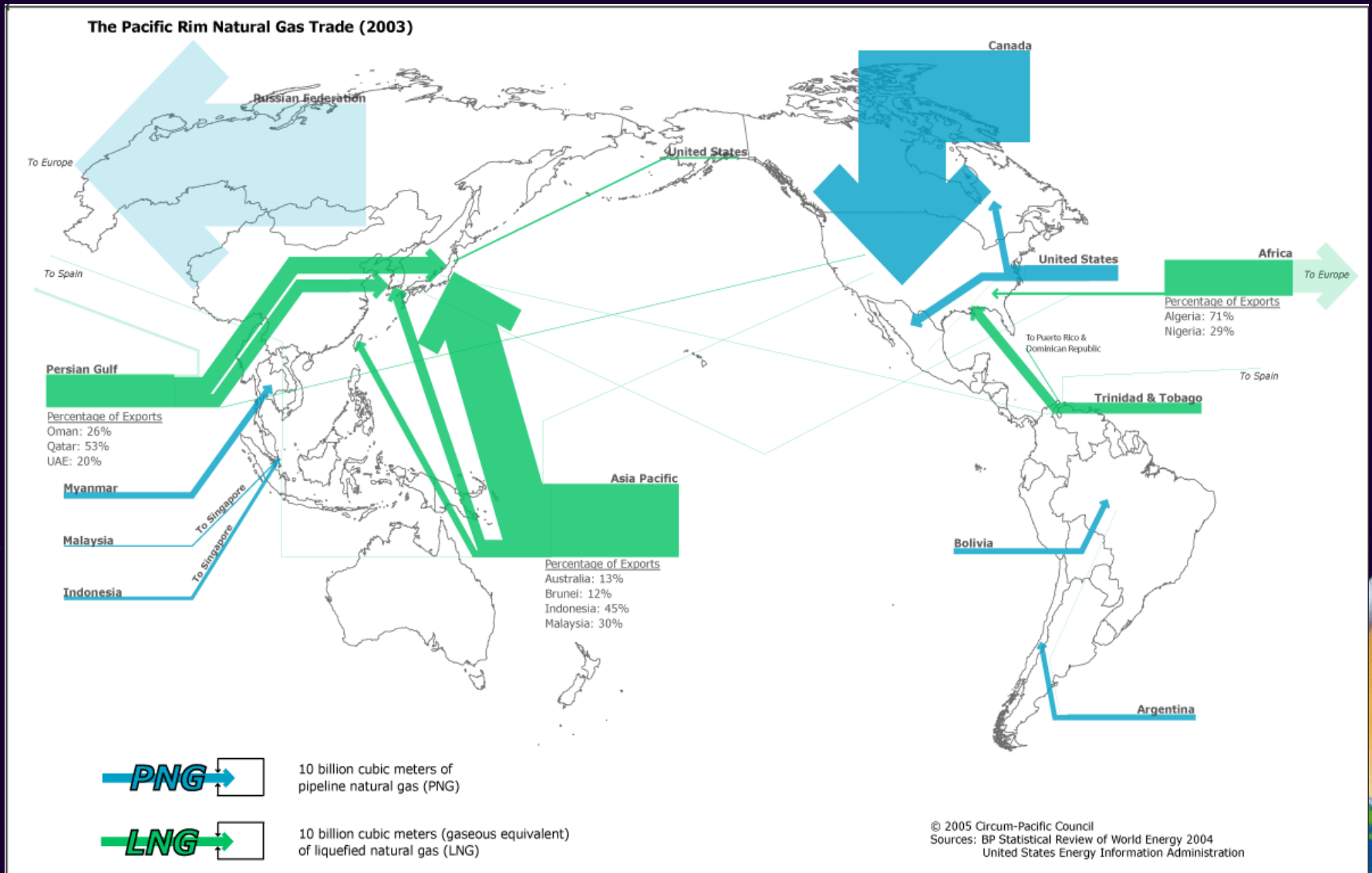
Rising Oil Import Dependency



(Source) Asia Pacific Energy Research Centre (2005)

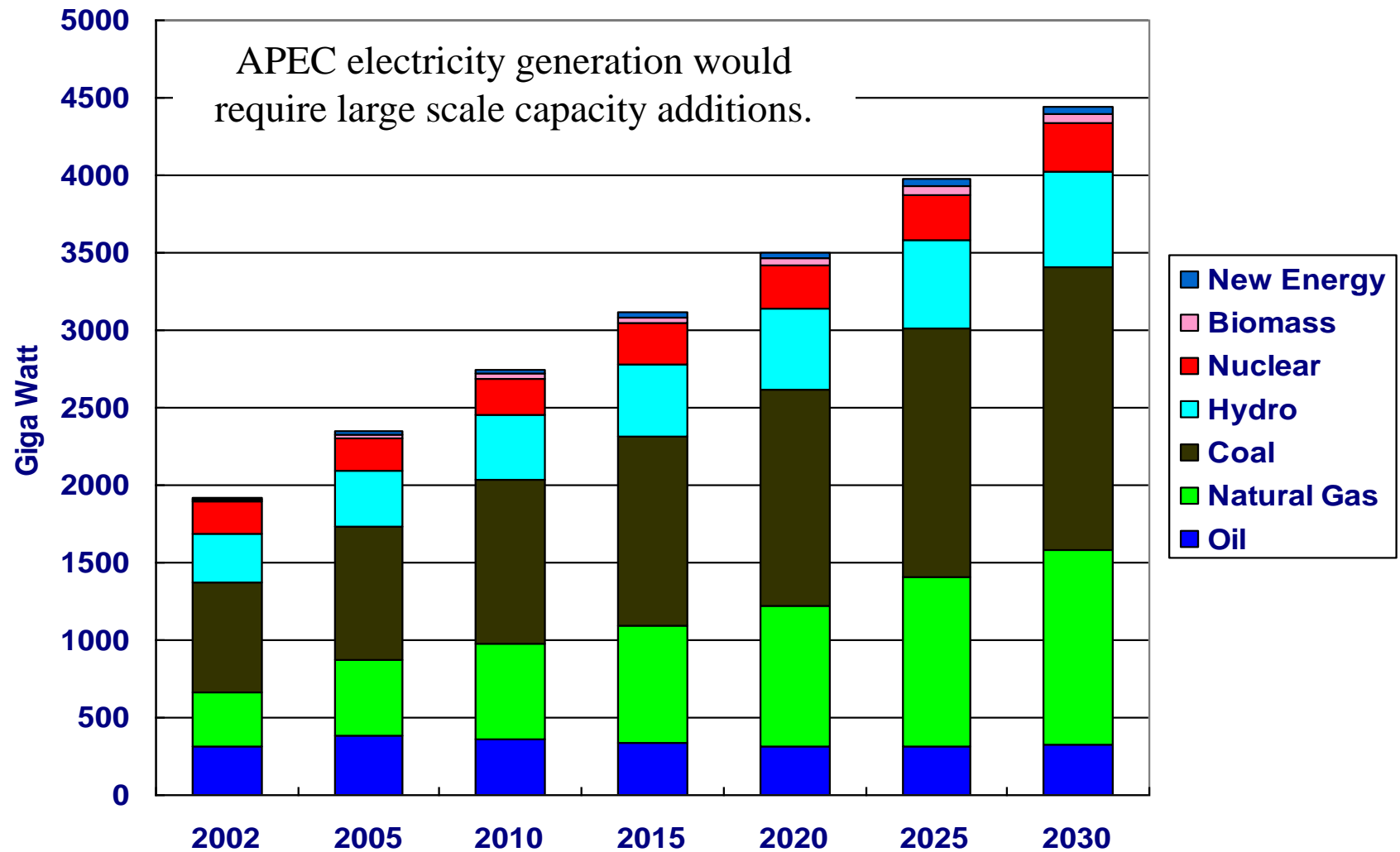


Natural Gas Trade: LNG and PNG

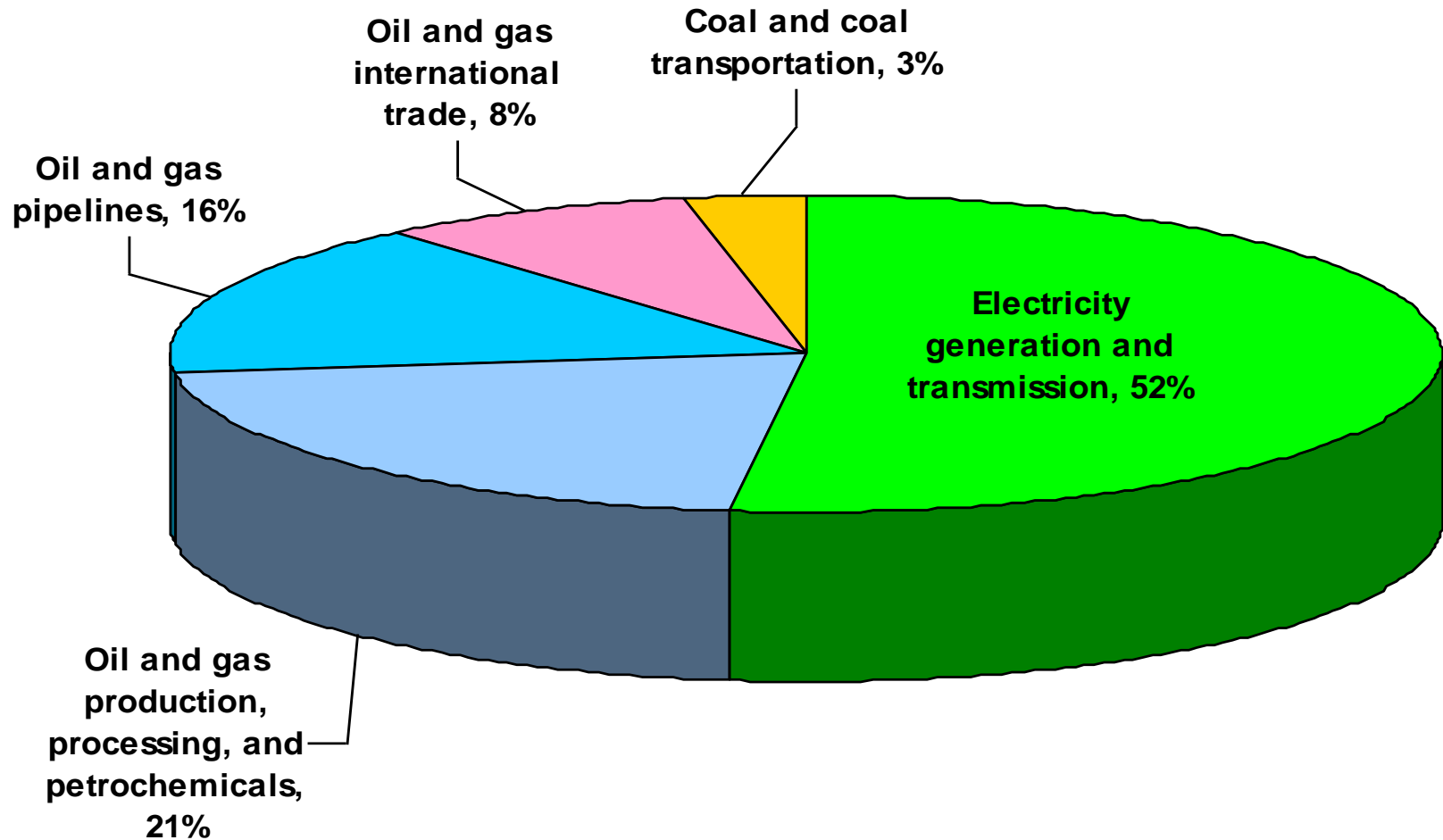


(Source) Circum-Pacific Council (2005)

Required Capacity for Electricity Generation (2002-2030)



Energy Investment Requirements in APEC: Between US\$5.3 Trillion to \$6.7 Trillion (2002-2030)



Challenges for the Energy Sector of APEC

- **Energy Security**

- Increasing Import Dependency
 - Oil and Natural Gas
- Growing Need for Energy Infrastructure
 - Tankers, Pipeline, Refineries, Power Plants, and etc.
- Looming Shortage of Human Resources for Energy Sector
 - Engineers, Operators and Scientists
- Increasing Flow of Energy Transportation
 - Maritime Congestion, Sea-lane Security, Long Distance Pipeline Security

- **Investment**

- Substantial Investment Requirements
 - Upstream, Midstream and Downstream

- **Environment**

- Damaging Impact from Expansive Energy Use on Environment
 - Local and Global

Options for the Future

- **Enhancing Energy Efficiency Improvement**
 - Supply Side
 - CCGT, Clean Coal Technology, Fuel Cells
 - Demand Side
 - Electricity Appliances: Air Conditioner, Refrigerator, Washing Machine
 - Automobile: Fuel Efficient Automobile, Hybrid Vehicle
- **Developing Alternative Energy Sources**
 - New and Renewable Sources, Bio Fuels, Non-conventional Oil, LNG, and Advanced Nuclear
- **Promoting Cross-border Resource Allocation**
 - Power Interconnection
 - Oil Pipeline
 - Natural Gas Pipeline
 - Joint Stockpiling: Oil and Natural Gas