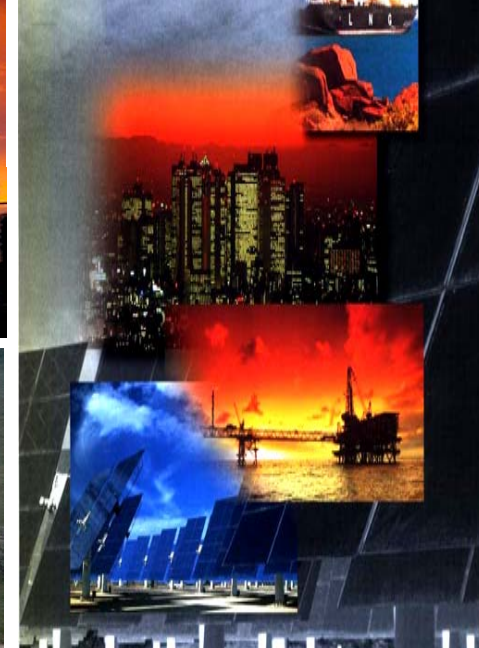
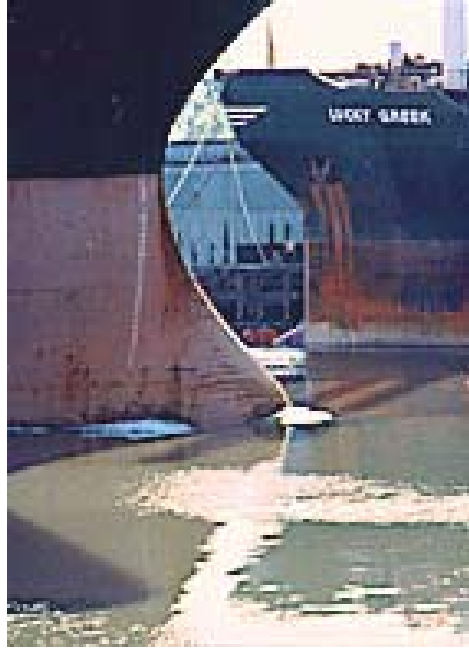




Asia-Pacific
Economic Cooperation

Asia Pacific Energy
Research Centre



APEC Energy Demand and Supply Outlook 2006

**APERC Mini-Workshop at the EWG32
Yuzhno Sakhalinsk, Russia
5 October 2006**

**Asia Pacific Energy Research Centre
Vice President
Yonghun Jung**



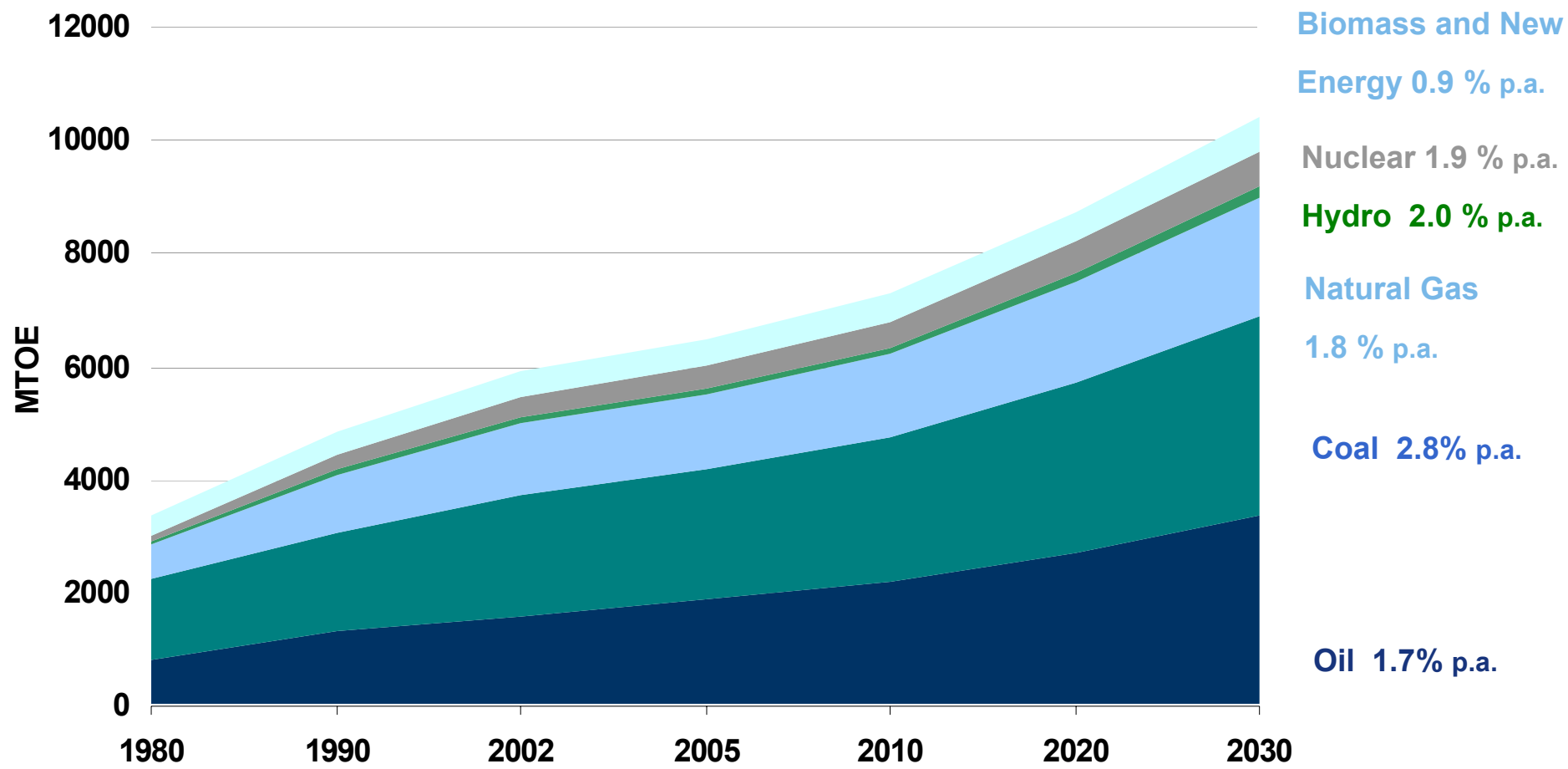
Contents

- Outlook of Total Primary Energy Demand
- Sectoral Contributions to the Incremental Growth by Source
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- Demand and Production of Oil, Coal and Natural Gas in APEC
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 - Tight Balance between Coal Demand and its Supply
 - Increasing LNG Imports
- Expansion of Nuclear Energy
- Power Generation
- Investment
- Outlook of CO2 Emissions
- Implications



APEC Energy Demand and Supply Outlook

■ Coal ■ Oil ■ Gas ■ Hydro ■ Nuclear ■ NRE

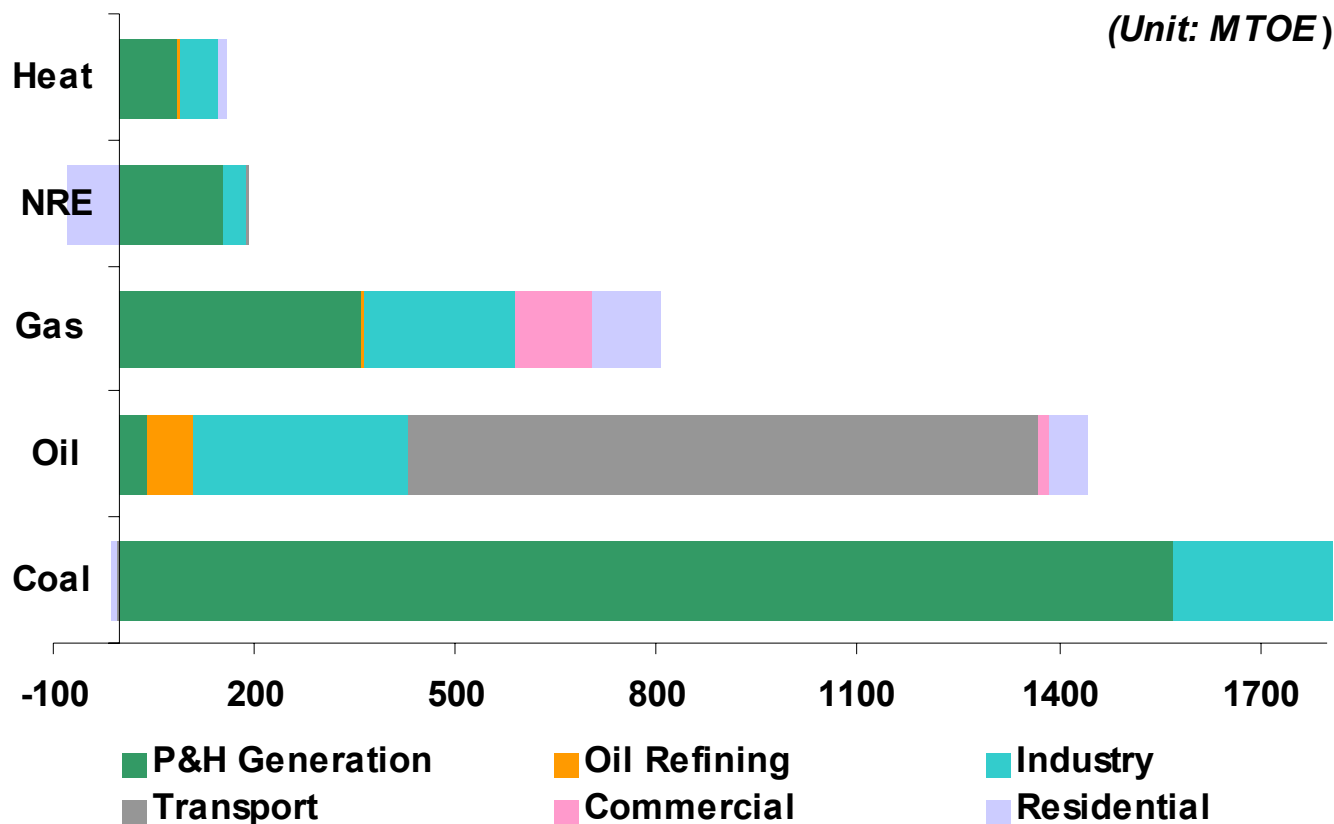


(Source) Asia Pacific Energy Research Centre (2006), "APEC Energy Demand and Supply Outlook"



Sectoral Contributions to the Incremental Growth by Source in APEC (2002-2030)

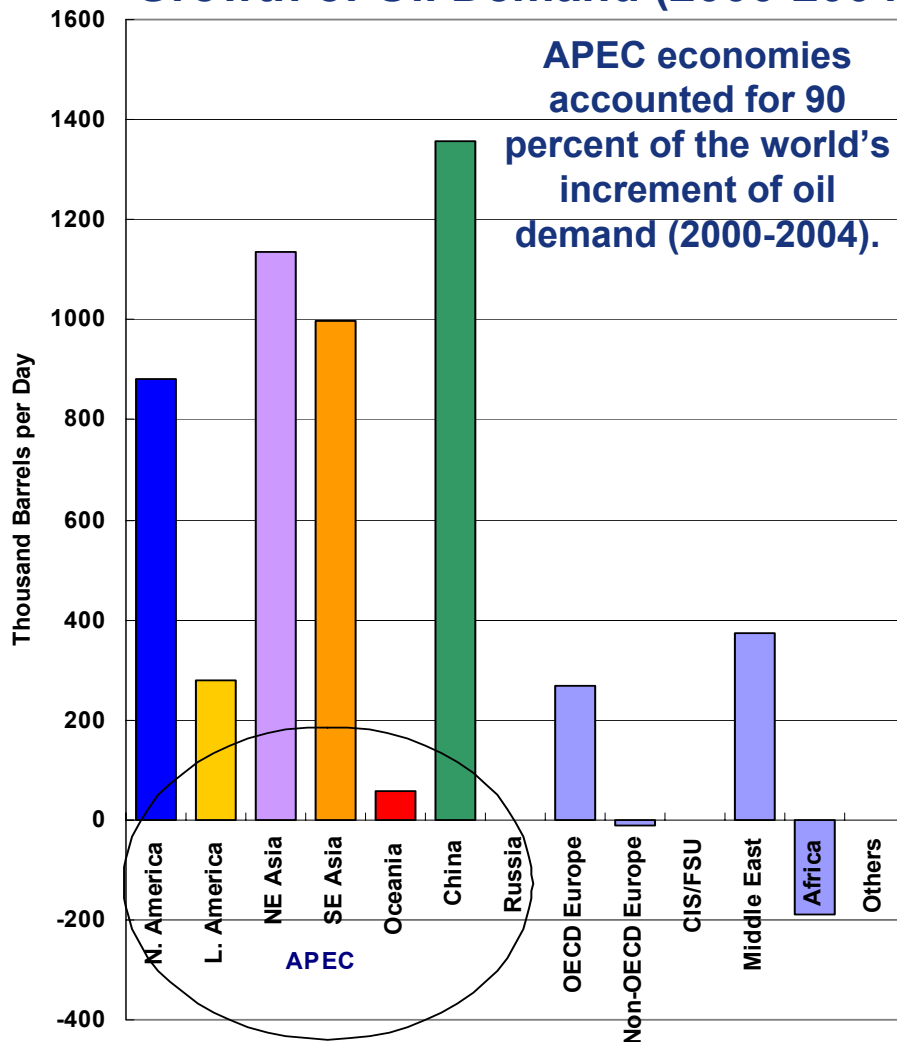
The power sector to lead coal demand, the transport sector to drive oil demand, and the power and industry sectors to increase natural gas demand





Drivers for the APEC Energy Demand

Growth of Oil Demand (2000-2004)



(Source) Blackwell (2005)

Income Growth

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

Urbanisation

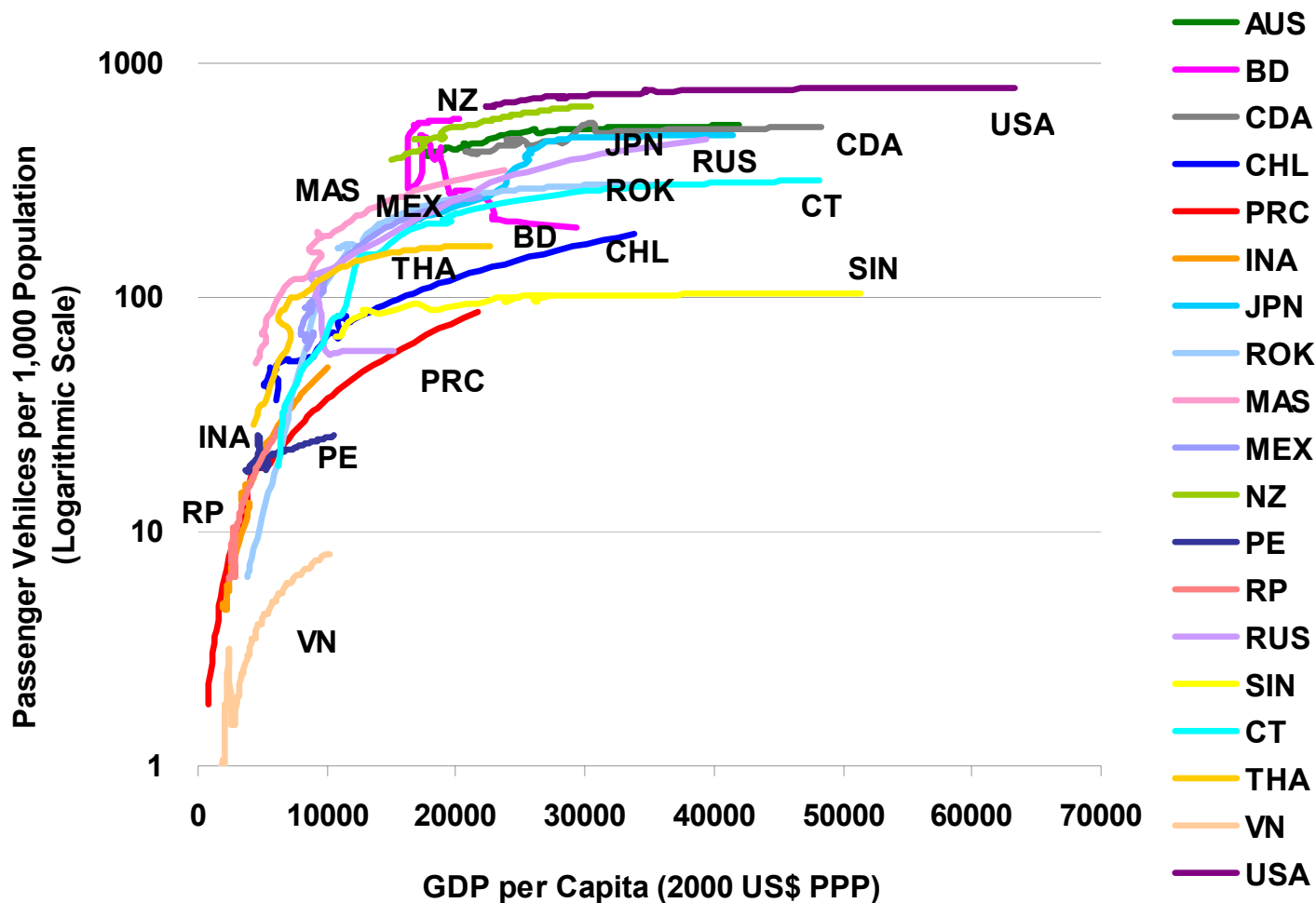
- By 2030, share of urban population will reach 68 percent of the total from 52 percent in 2003.
 - 26 million people per year will move from rural to urban cities.

Industrialisation

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



Income Growth and Fast Pace of Motorisation: Passenger Vehicle per 1,000 Population (1980-2030)



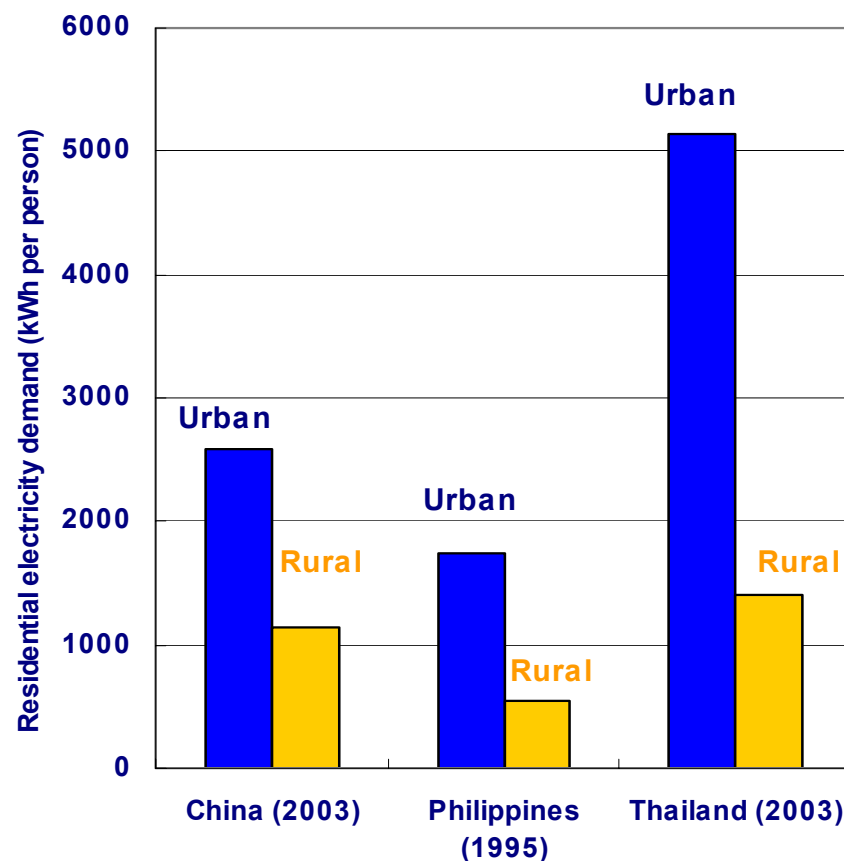


Urbanisation and Residential Energy Demand in the Selected APEC Economies

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%

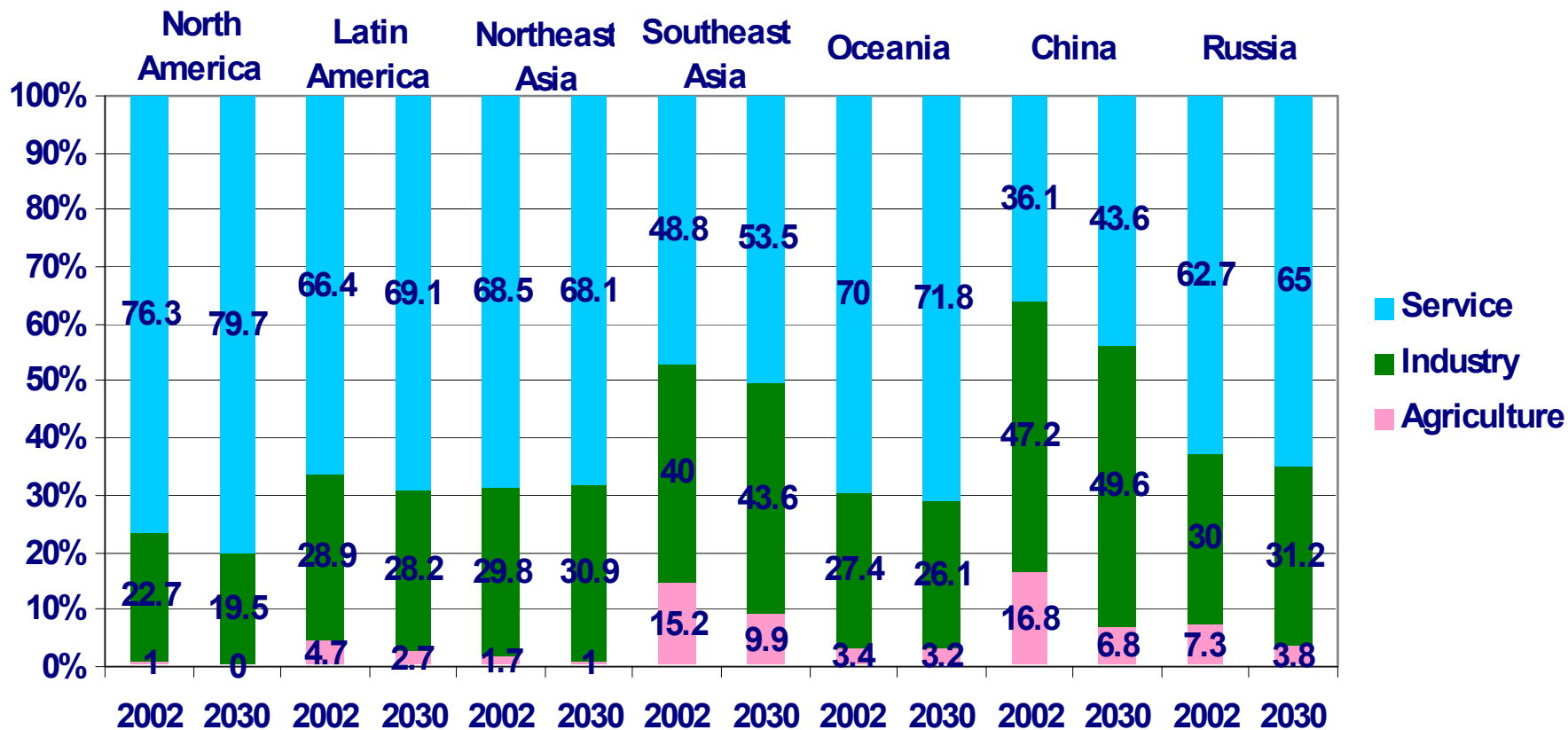
Urban and Rural Residential Electricity Demand Per Person





Share of Sectoral Value Added by Region (2002 and 2030)

Increasing Share of Service Sector across the Region



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



APEC Sectoral Energy Demand Outlook (2002-2030)

Commercial sector to grow at the fastest pace.

	Absolute Level (Unit: Mtoe)				Annual Growth Rate			
	2002	2010	2020	2030	2002-2010	2010-2020	2020-2030	2002-2030
Industry	1,407	1,842	2,289	2,769	3.4%	2.2%	1.9%	2.4%
Transport	1,092	1,342	1,651	1,999	2.6%	2.1%	1.9%	2.2%
Commercial	382	470	608	770	2.6%	2.6%	2.4%	2.5%
Residential	938	1,008	1,101	1,221	0.9%	0.9%	1.0%	0.9%
Total	3,819	4,661	5,648	6,759	2.5%	1.9%	1.8%	2.1%

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

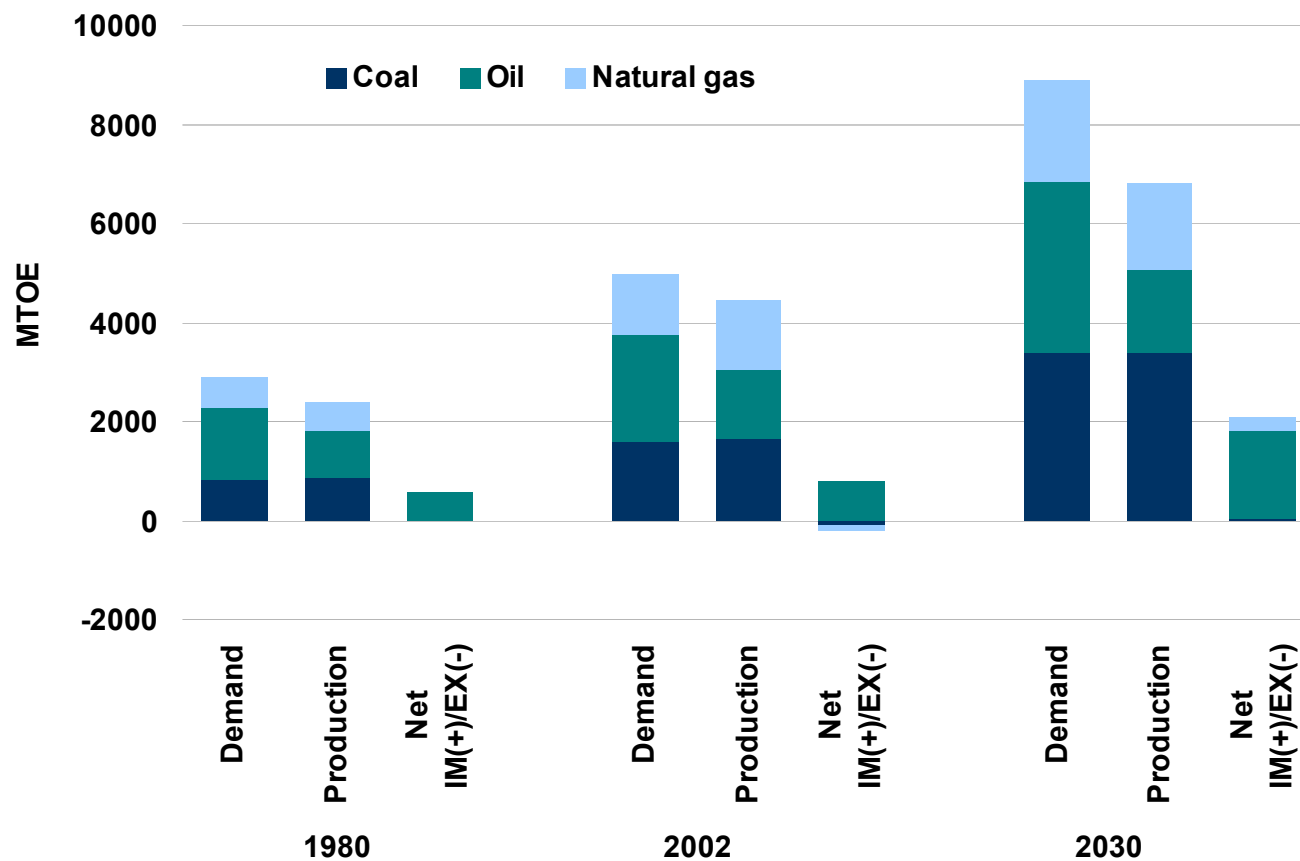
(Note) Residential demand includes demand for electricity, gas, oil products, heat and biomass.



Demand and Production of Oil, Coal and Natural Gas (1980, 2002 and 2030)

Increasing Import Dependence for Oil and Natural Gas

Projected Tight Balance between Coal Demand and its Production by 2030





Rising Oil Import Dependency

Rising Oil Import Dependency across the Region

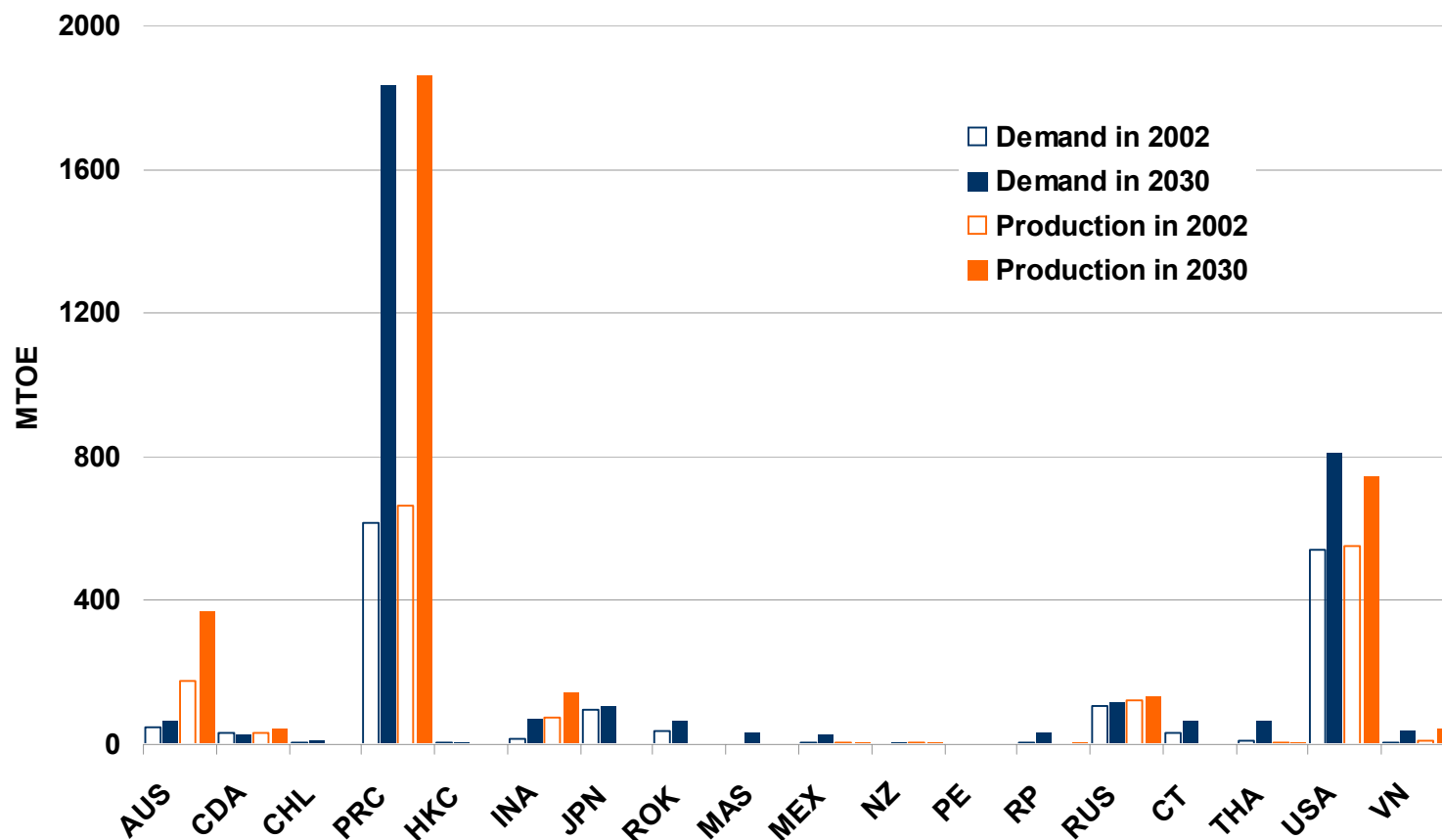
	APEC	Northeast Asia	Southeast Asia	North America	Oceania	China
2002	36%	100%	19%	55%	26%	22%
2005	37%	100%	27%	53%	29%	34%
2010	38%	100%	35%	49%	42%	44%
2015	41%	100%	44%	51%	50%	46%
2020	44%	100%	56%	50%	55%	57%
2025	50%	100%	63%	53%	59%	65%
2030	52%	100%	69%	56%	62%	70%

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



Coal Demand and Production by 2030 (2002 and 2030)

*Renewed Interest in Coal due to Price Competitiveness
Tight Balance between Demand and Production in 2030*





LNG Demand Outlook (Unit: Million LNG Tonnes)

Increasing LNG Imports for Existing Importers
Emergence of New LNG Importers

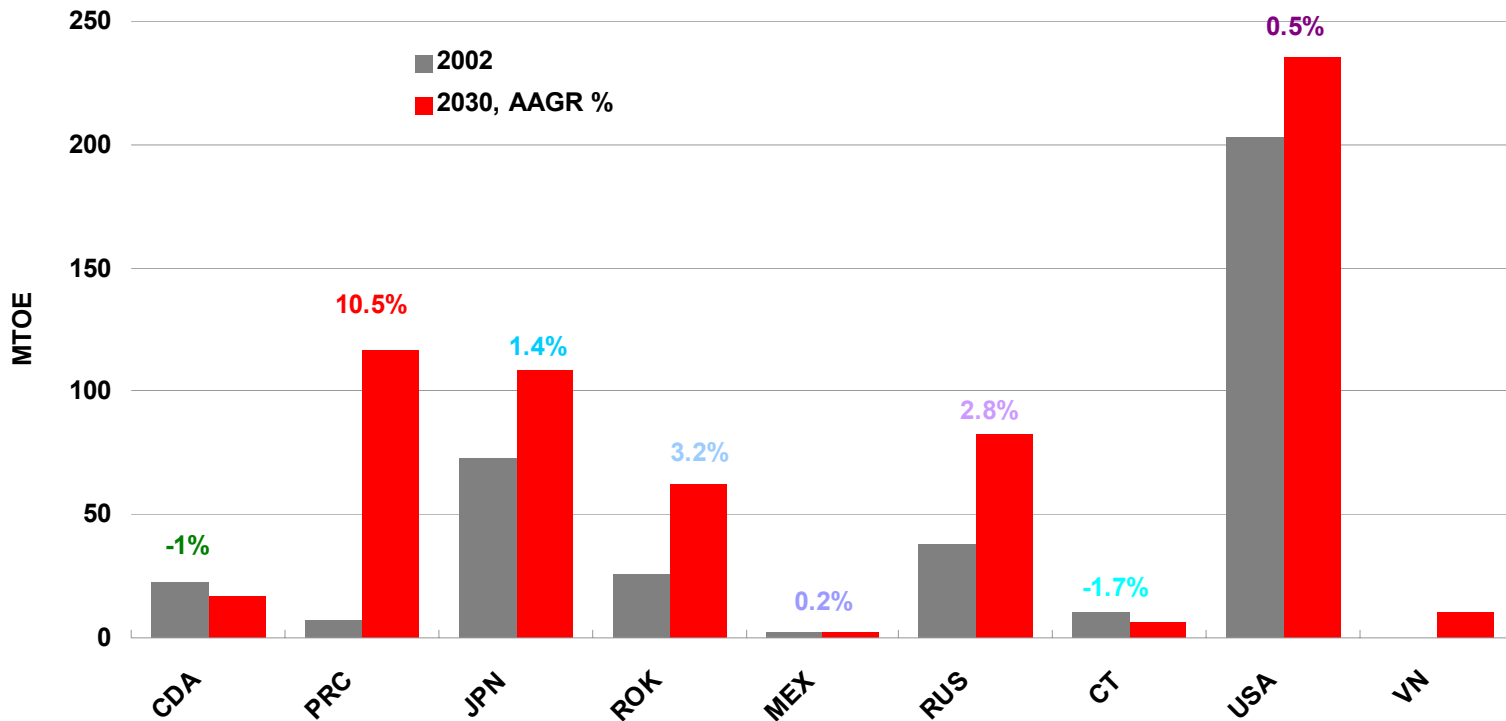
	NEA				SEA		NA		LA	
	China	Japan	Korea	CT	SIN	RP	Canada	USA	Chile	Mexico
2004		59.3	22.3	6.8				13.5		
2010	6.6	60.7	35	11	0.309	0.929	7.8	45.8	1.06	14.3
2020	26.2	74.1	48.4	14.8	3.5	0.929	25.8	80.2	5.01	26.2
2030	52	81.2	58.7	19.7	6.6	0.929	31.8	93.6	11.4	33.2

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



Outlook of Nuclear Energy Production

Expansion of Nuclear for the Enhancement of Energy Security

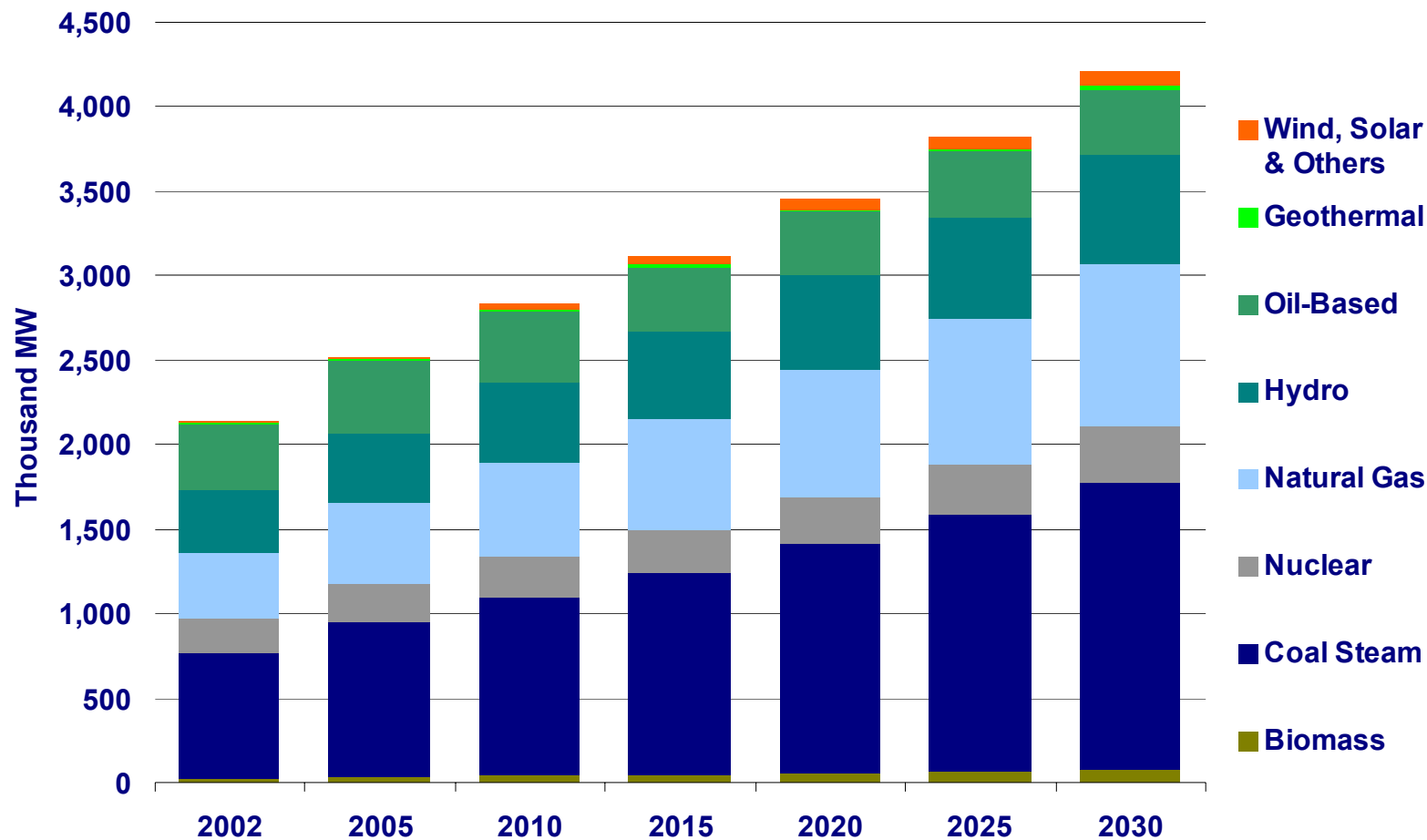


(Source) Asia Pacific Energy Research Centre (2006), "APEC Energy Demand and Supply Outlook"



Required Capacity for Electricity Generation (2002-2030)

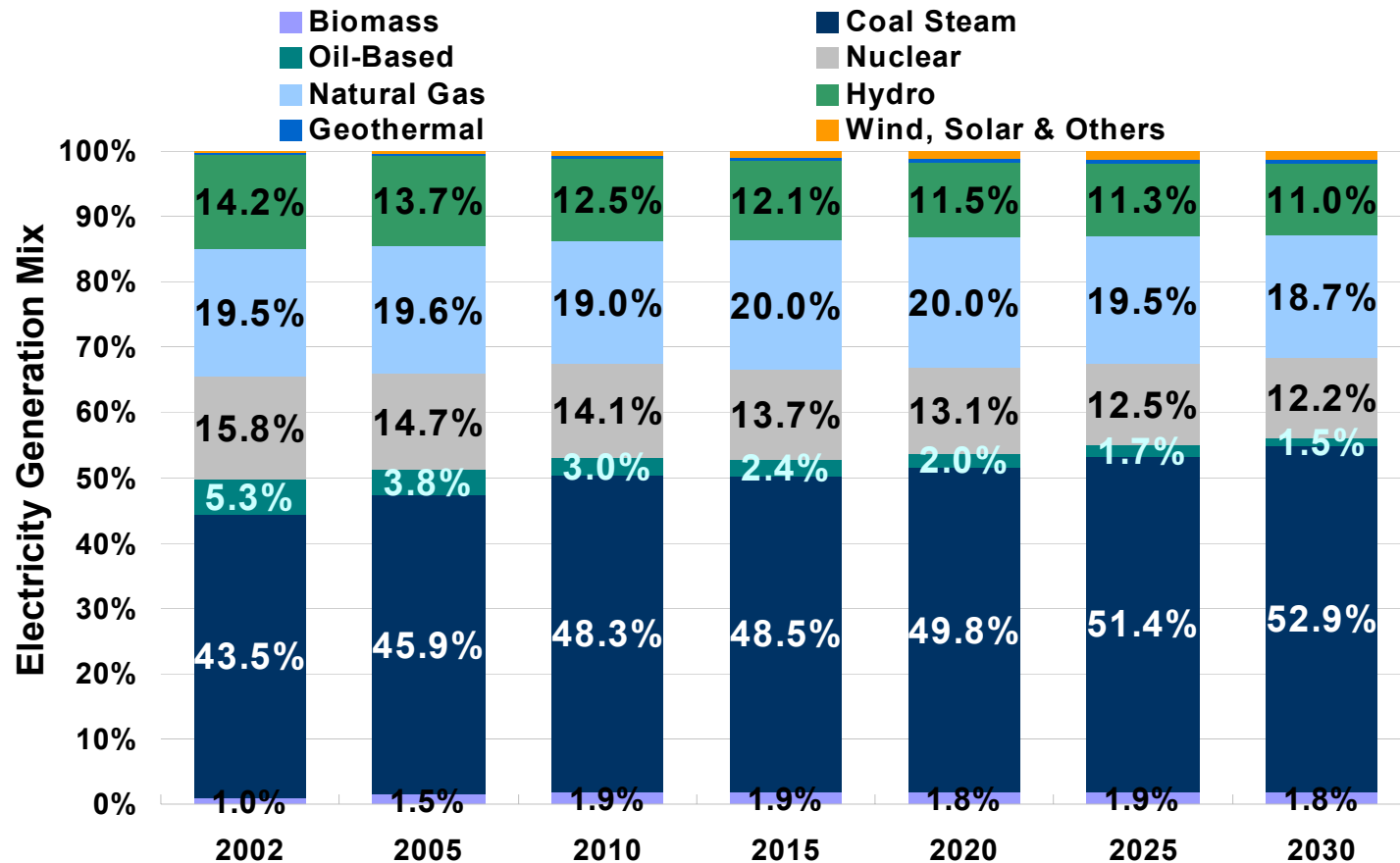
APEC electricity generation would require annual additions of 74GW.





Power Generation Mix in APEC

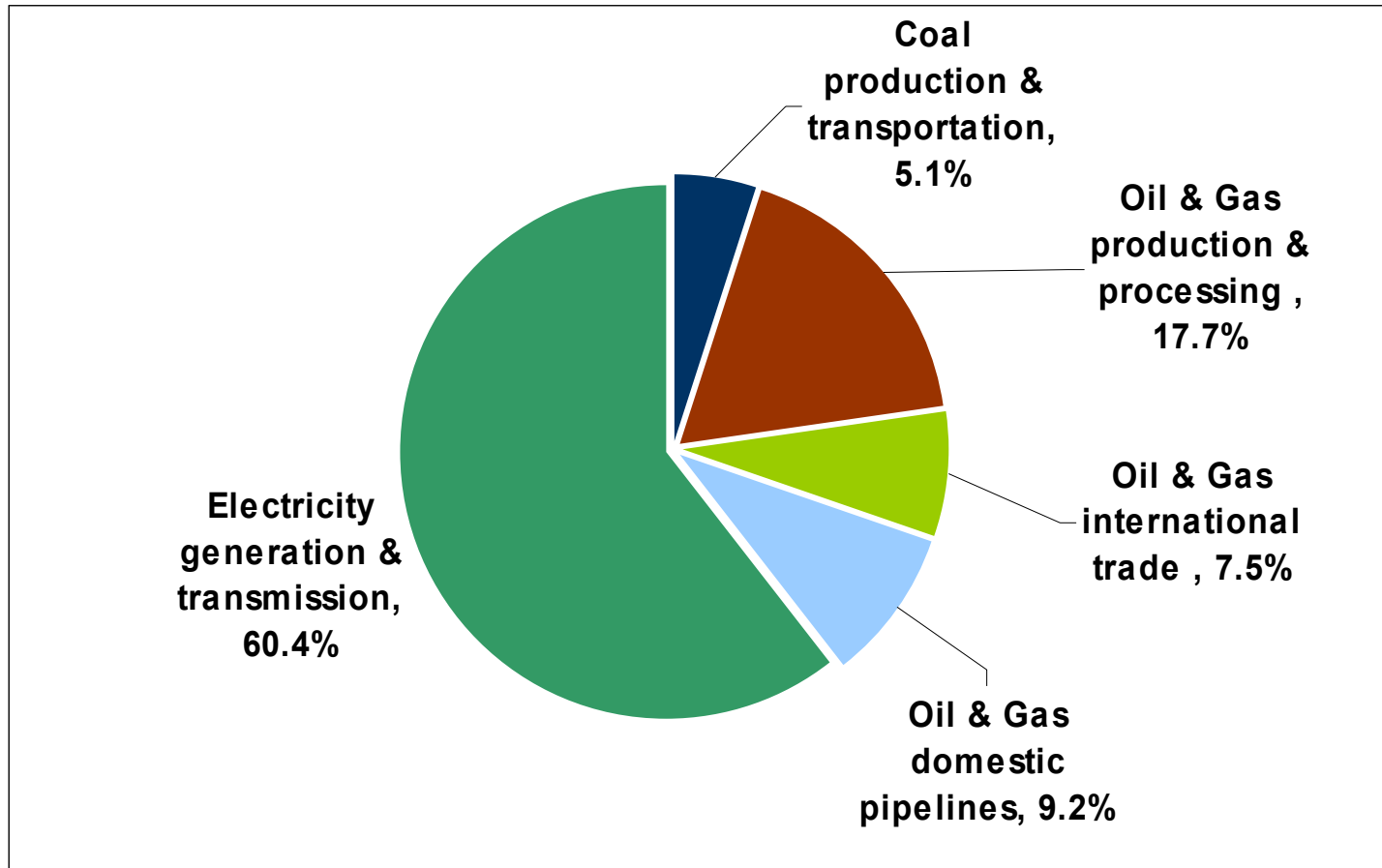
Increasing share of coal in power generation mix





Total Energy Investment Requirements 2003 – 2030

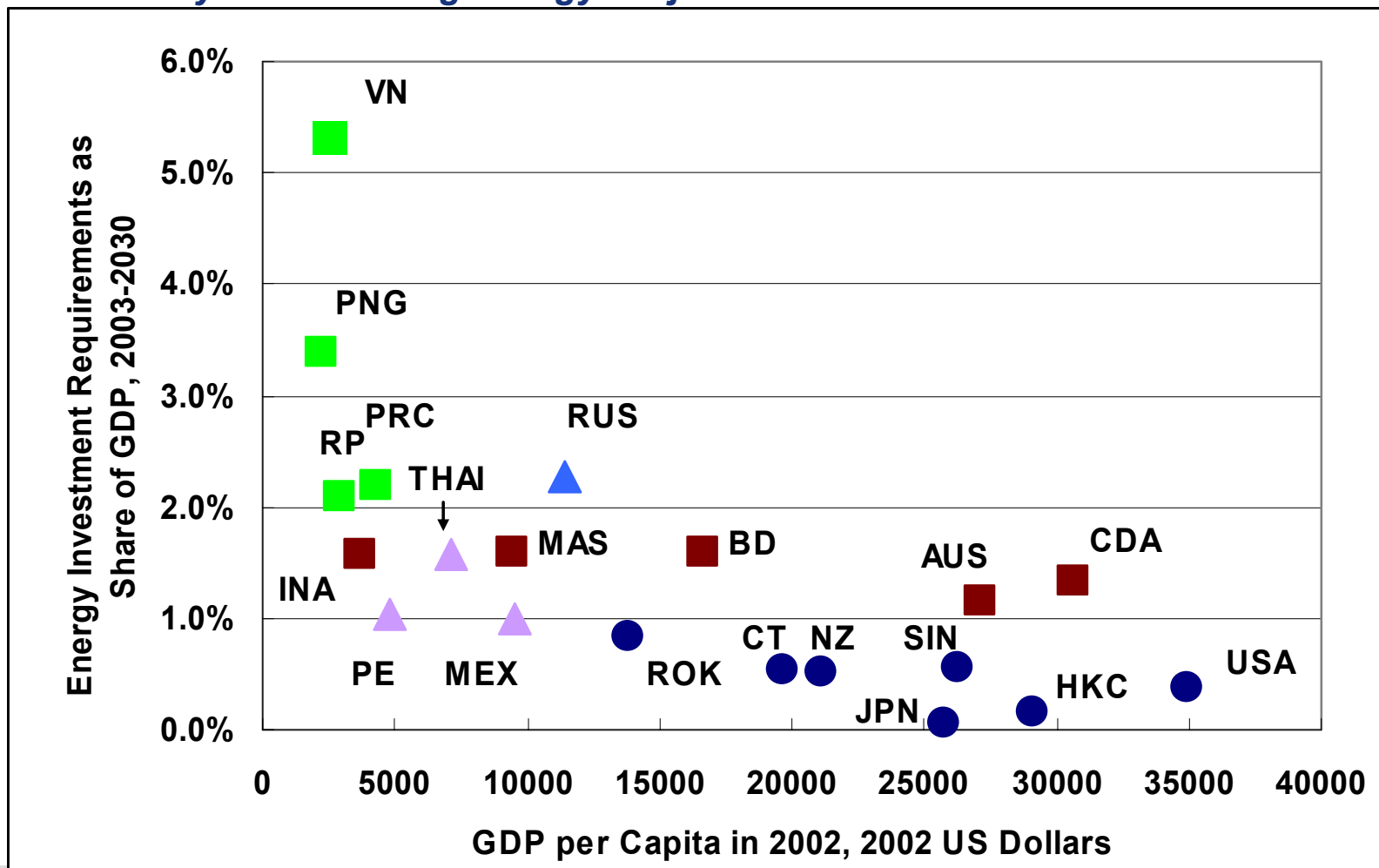
Between 5.95 trillion USD to 7.55 trillion USD





Energy Investment Requirements as Share of GDP (2002-2030)

Difficulty for Financing Energy Projects in Some Economies of APEC.

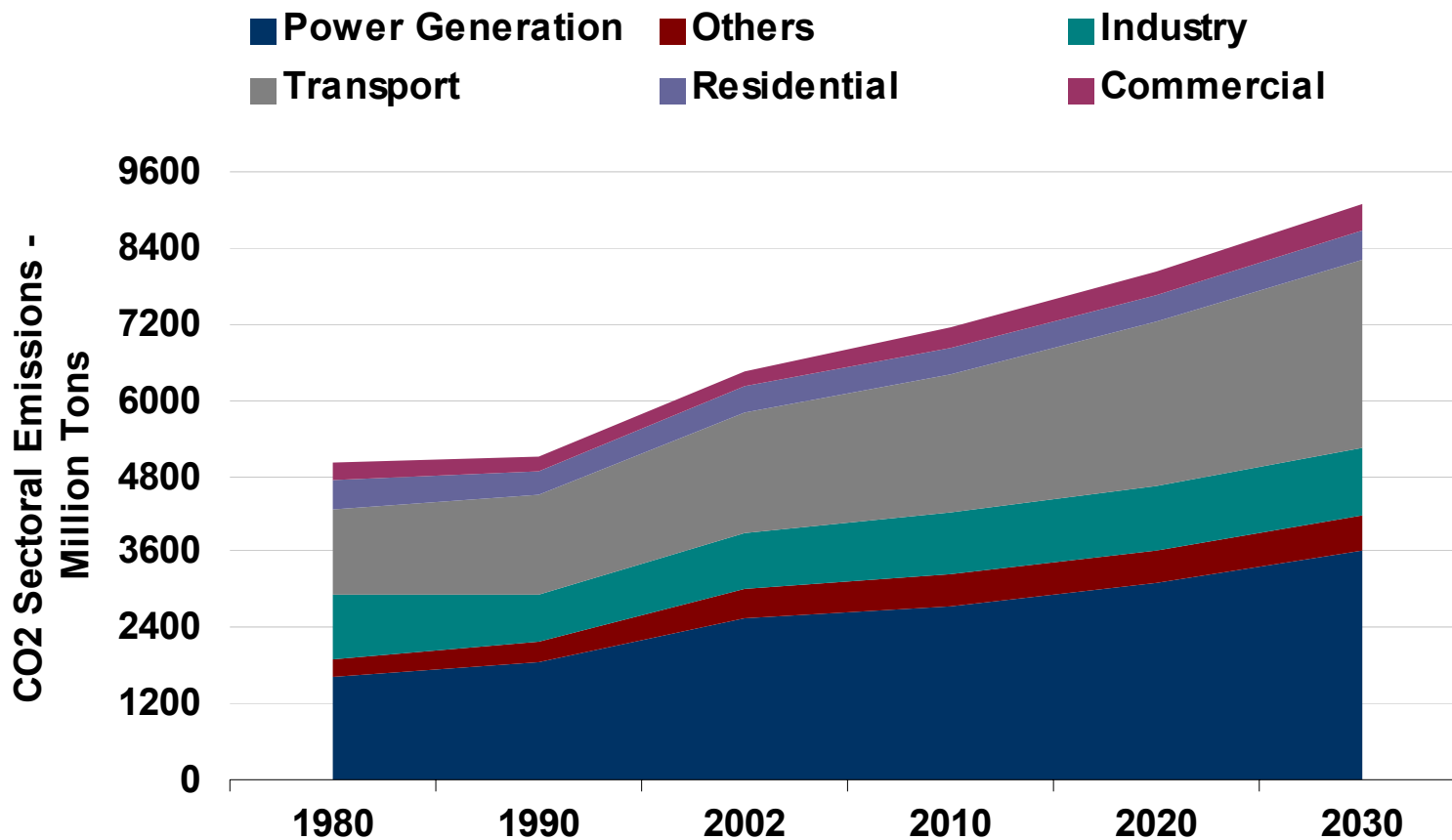


(Source) Asia Pacific Energy Research Centre (2006), "APEC Energy Demand and Supply Outlook"



Outlook of CO2 Emissions (2002-2030)

The Power Sector and Transport Sector to Lead CO2 Emissions.





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