
Energy Outlook in Asia and the Pacific – Preliminary Outlook Result

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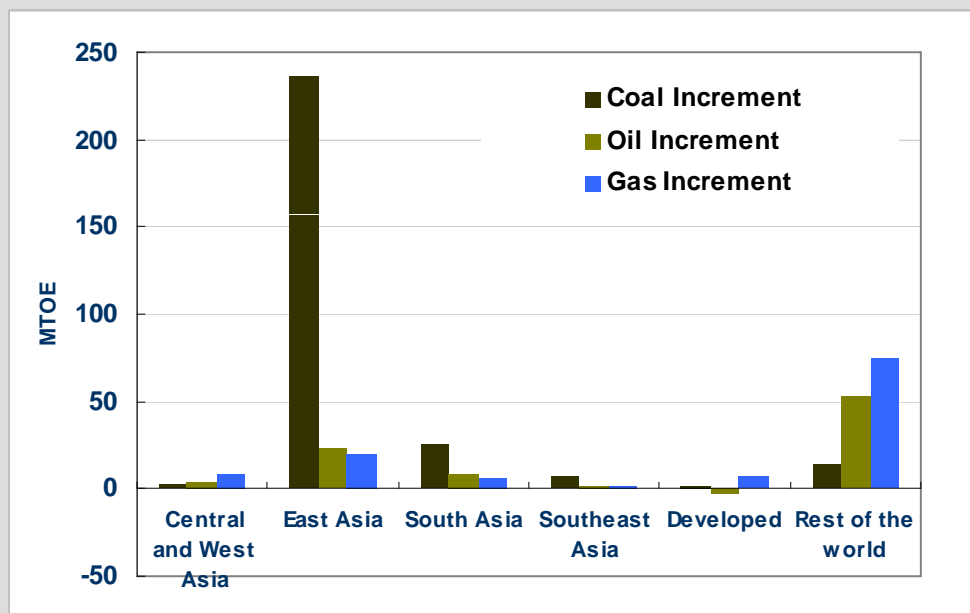
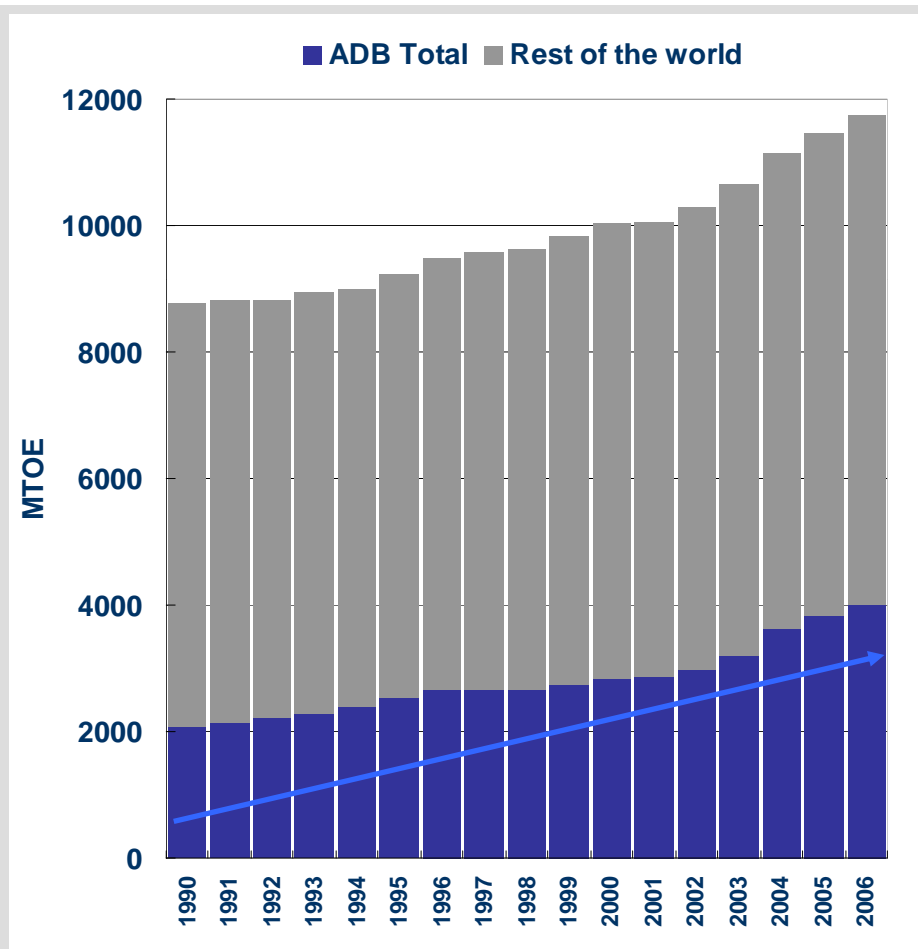
Outline

- **About the study**
 - Background
 - Objectives and scope
 - Model framework
- **Preliminary outlook result**
 - Major assumptions
 - Primary energy demand outlook
 - ADB and world
 - CO₂ emissions outlook
 - Oil import dependency in the selected Asian countries
 - Nuclear in Asia
- **Issues**
- **Implications**

Energy Demand in Asia/Pacific and the World

Total Primary Energy Demand: ADB and Rest of the World (1990-2006)

Energy Increments (2004-2006)



**24%
(1990)**

**34%
(2006)**

Expanding ADB countries' energy share to the world – led by East Asia, and South Asia

Objectives/Scope

- **Objectives**

- To project a 25-year energy demand for the ADB regional member countries
- To identify drivers for energy demand growth and constraints for energy supply
- To draw policy implications

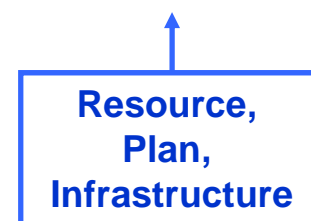
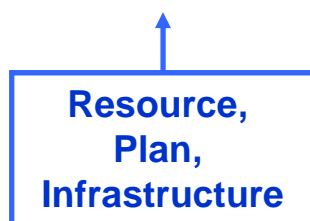
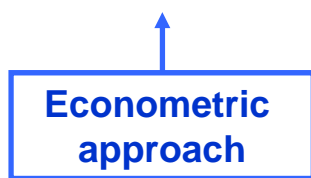
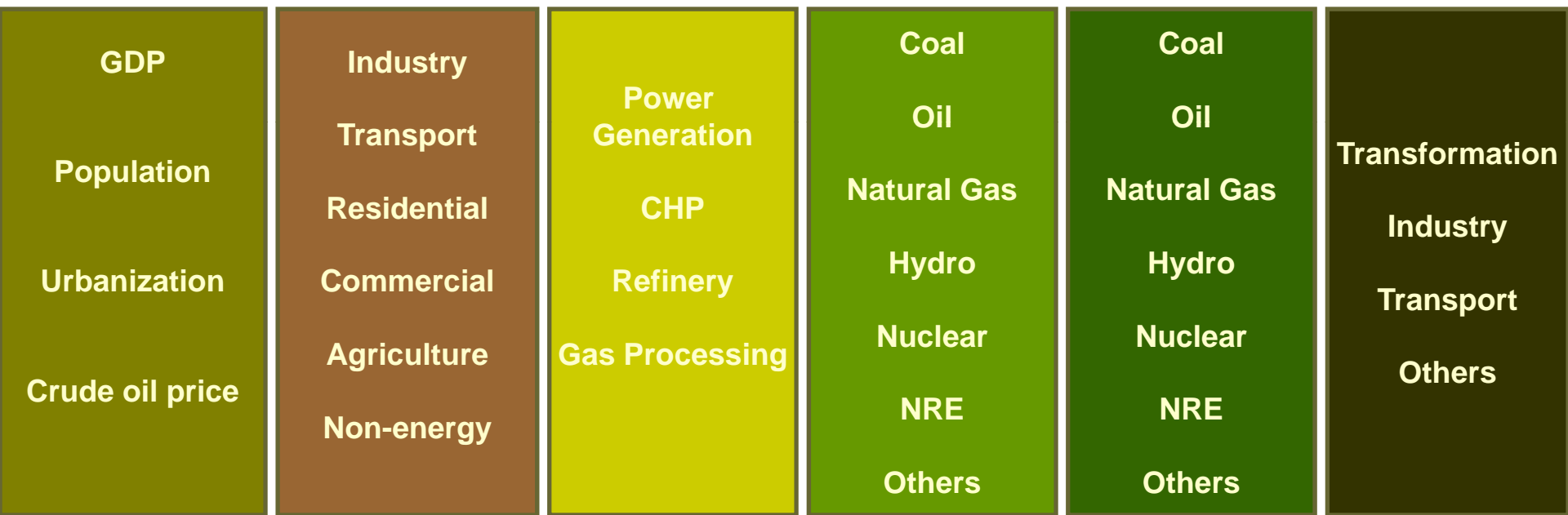
- **Scope**

- Energy demand/supply outlook by country and by energy type
- CO₂ emissions outlook
- Analysis of each country's energy outlook

Model Framework



Work Flow



Coverage (at the time of presentation)

- **Central and West Asia**

- Armenia; Azerbaijan; Georgia; Kazakhstan; Kyrgyz Republic; Pakistan and Uzbekistan

- **East Asia**

- Hong Kong, China; Korea; Mongolia; People's Republic of China and Taipei, China

- **Pacific**

- Papua New Guinea

- **South Asia**

- Bangladesh; India; Nepal and Sri Lanka

- **Southeast Asia**

- Brunei Darussalam; Cambodia; Indonesia; Laos; Malaysia; Myanmar; the Philippines; Singapore; Thailand and Viet Nam

- **Developed**

- Australia; Japan and New Zealand

The outlook results for Afghanistan, Bhutan, Maldives, and other Pacific countries are excluded from the presentation.

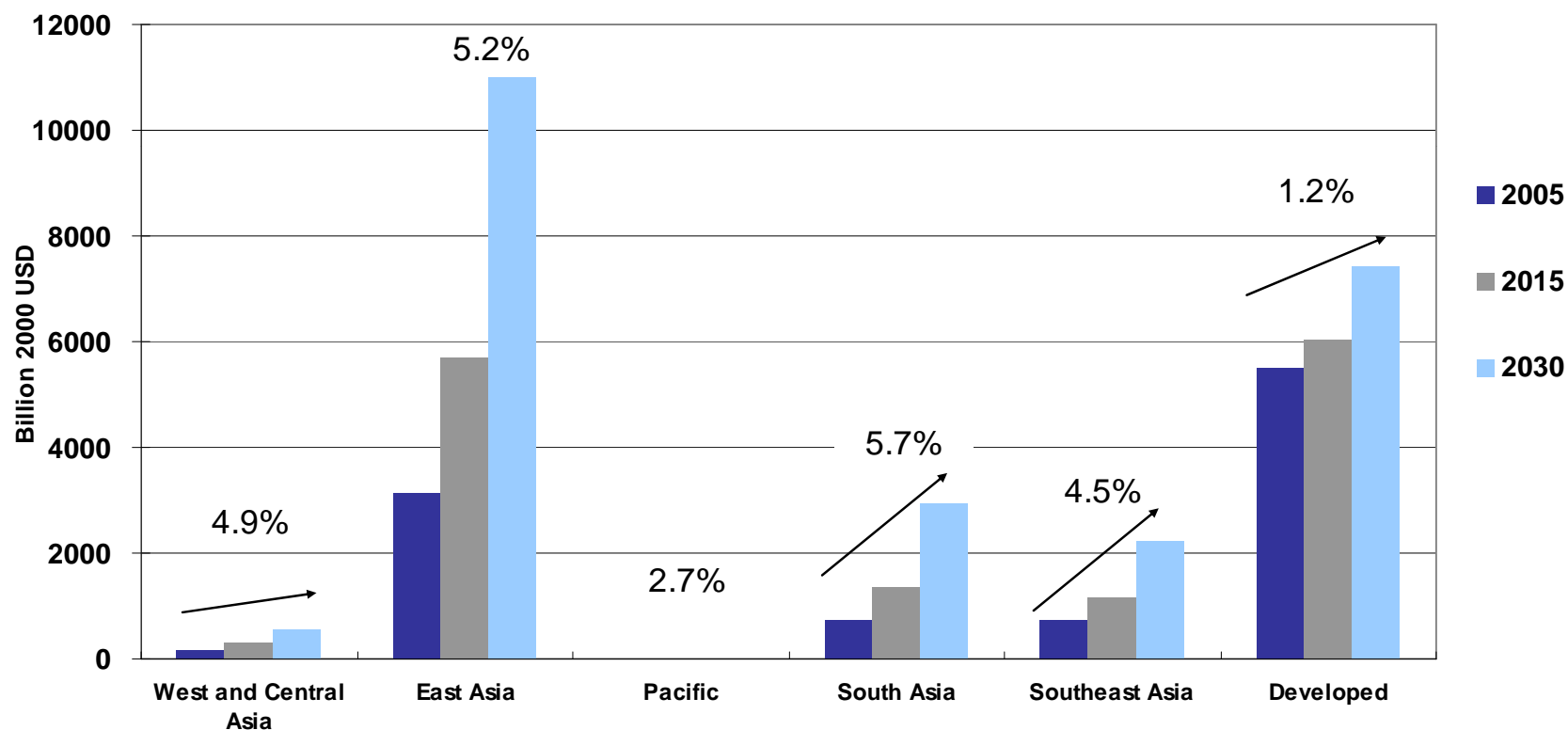
Project Milestone (Tentative)

- **The first week of July – The outlook results ready for comments**
- **The first week of August – First Draft Report sent to the ADB**
- **The end of September – Final Draft Report Completion**
- **November – Report Publication**

Preliminary Outlook Result

GDP

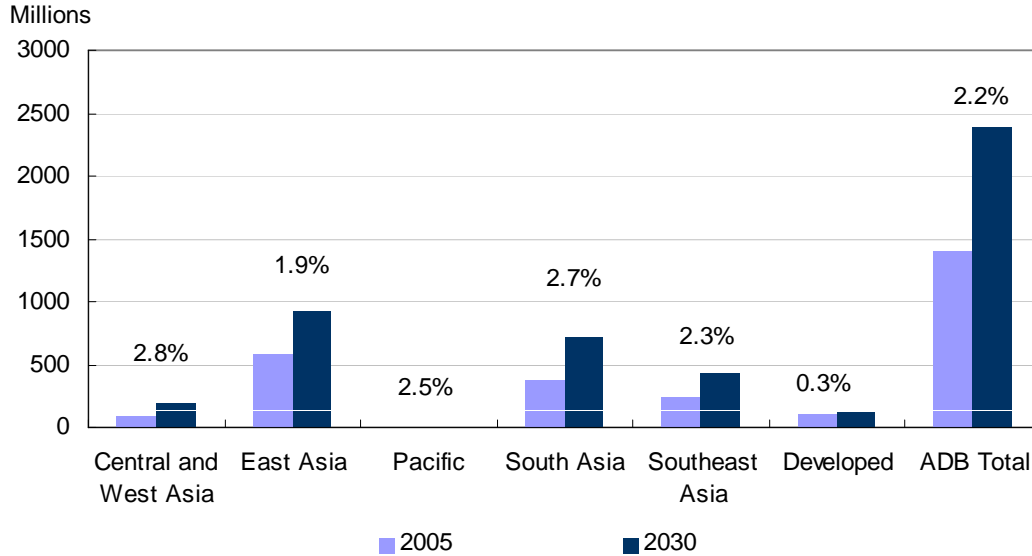
South Asia is expected to grow at the fastest annual rate, followed by East Asia, West/Central Asia. With the substantial growth, Asia and the Pacific may account for 30% of the world's GDP in 2030 – from 28% in 2005.



Source: Asian Development Bank and Asia Pacific Energy Research Centre.

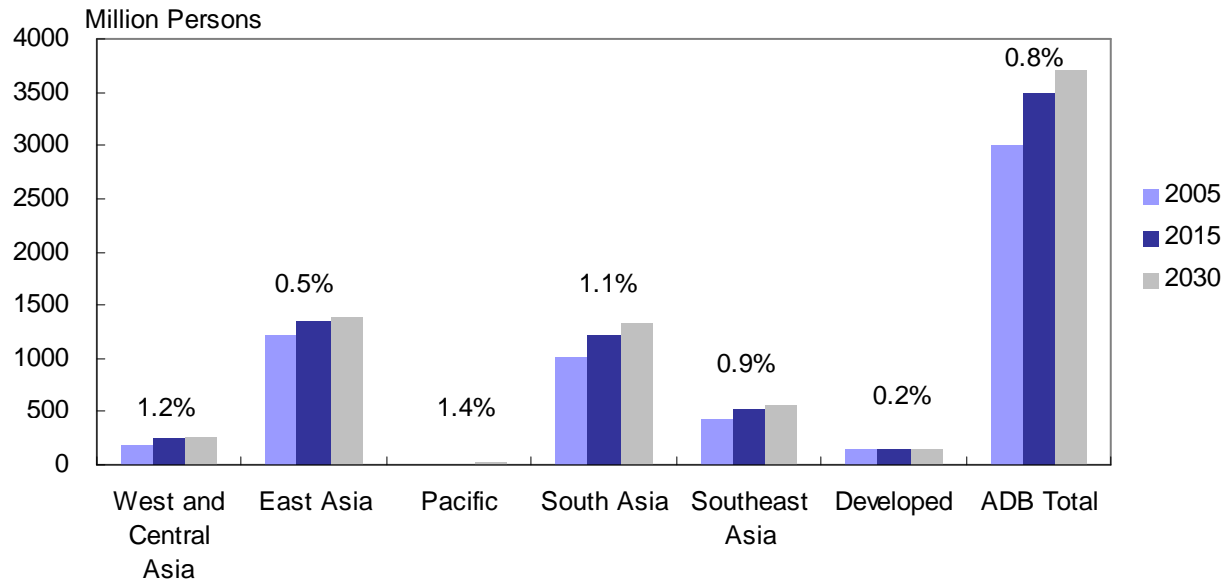
Population

Urban Population



Growing number of urban population may drive the growth in the use of commercial energy sources.

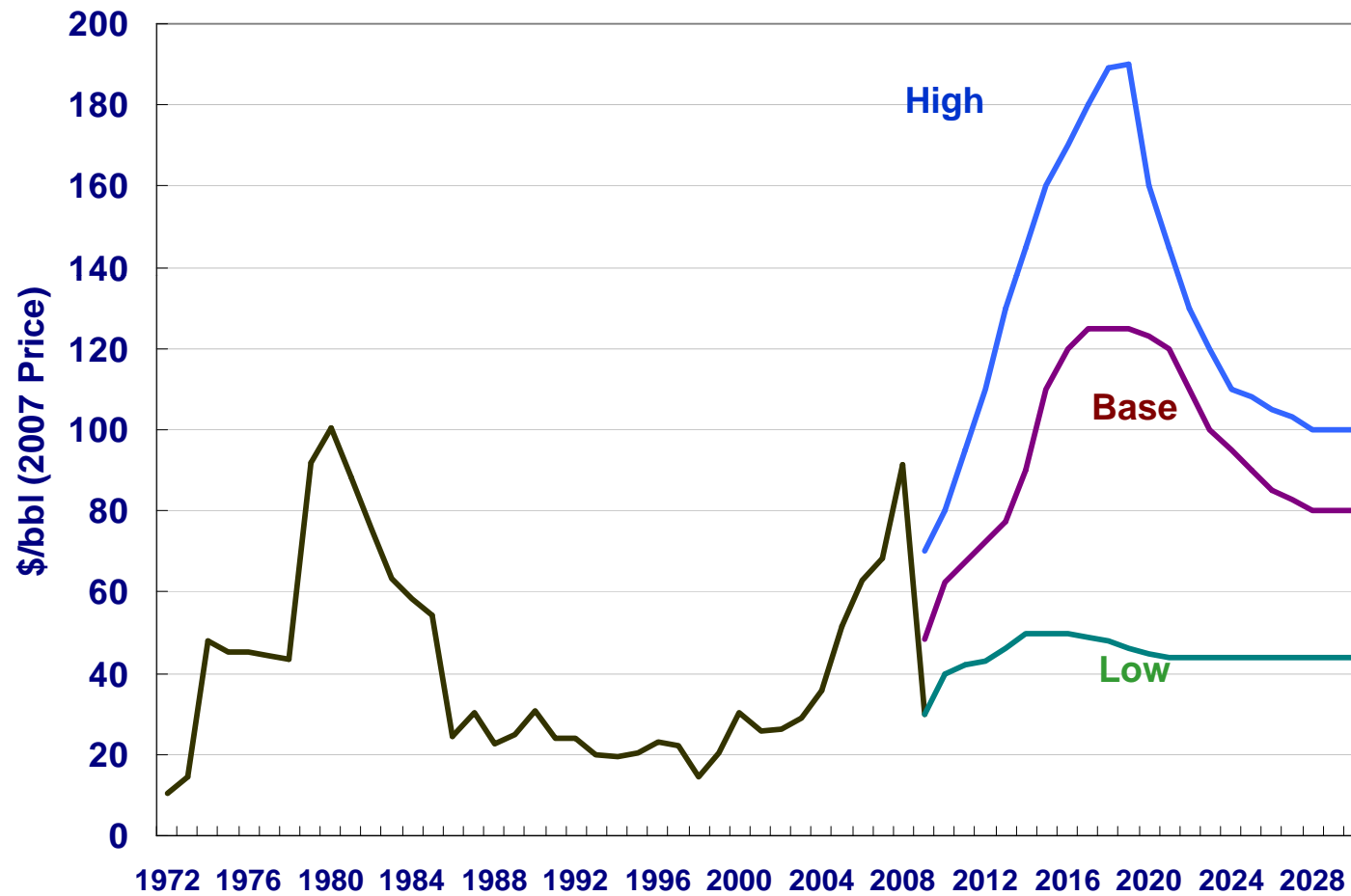
Total Population



Source: United Nations Population Prospects

Crude Oil Price

Continued higher crude oil price trends throughout the outlook period.



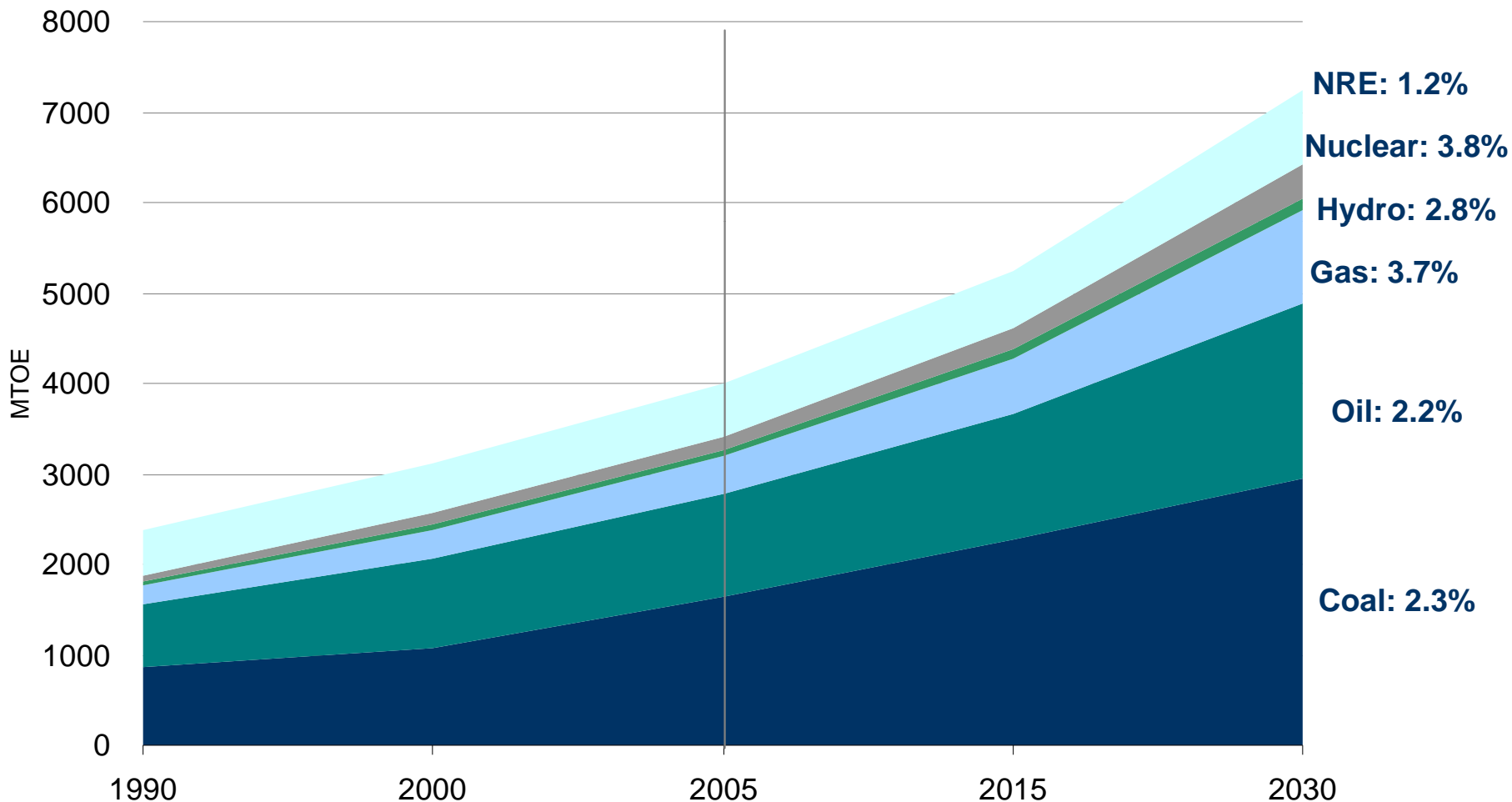
Source: Facts Global Energy Group, *Oil Price Outlook: Updated Analysis of Critical Factors Driving the Oil Market*, March 2009.

Total Primary Energy Demand by Energy Type

Energy demand of Asia and the Pacific to grow at 2.4% per year - a faster rate than the world average.

Annual growth rate (2005-2030)

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



NRE: 1.2%

Nuclear: 3.8%

Hydro: 2.8%

Gas: 3.7%

Oil: 2.2%

Coal: 2.3%

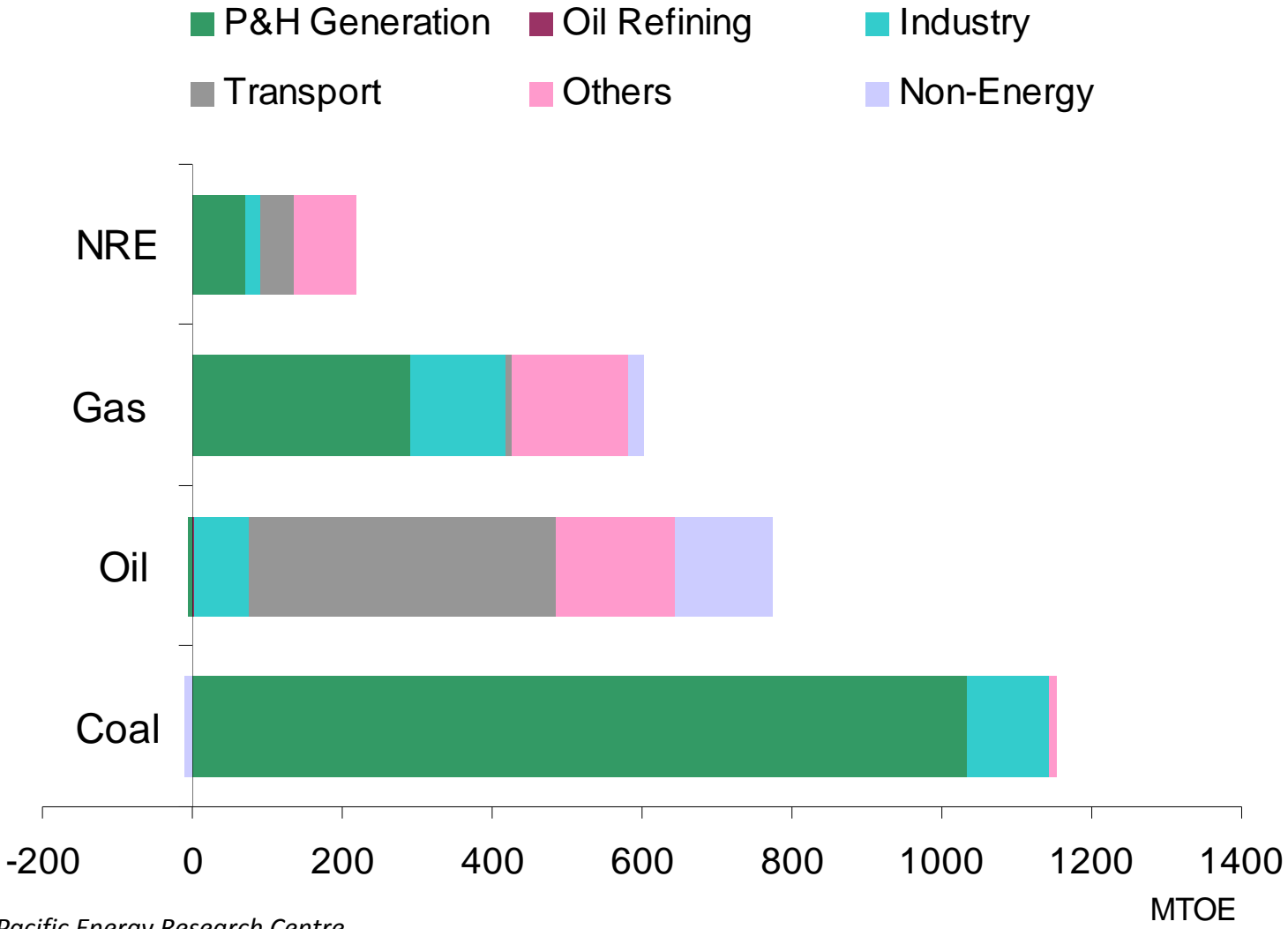
Source: Asia Pacific Energy Research Centre.

Note: The outlook represents a tentative result subject to change.

Incremental Growth by Energy Type and by Sector

(2005-2030)

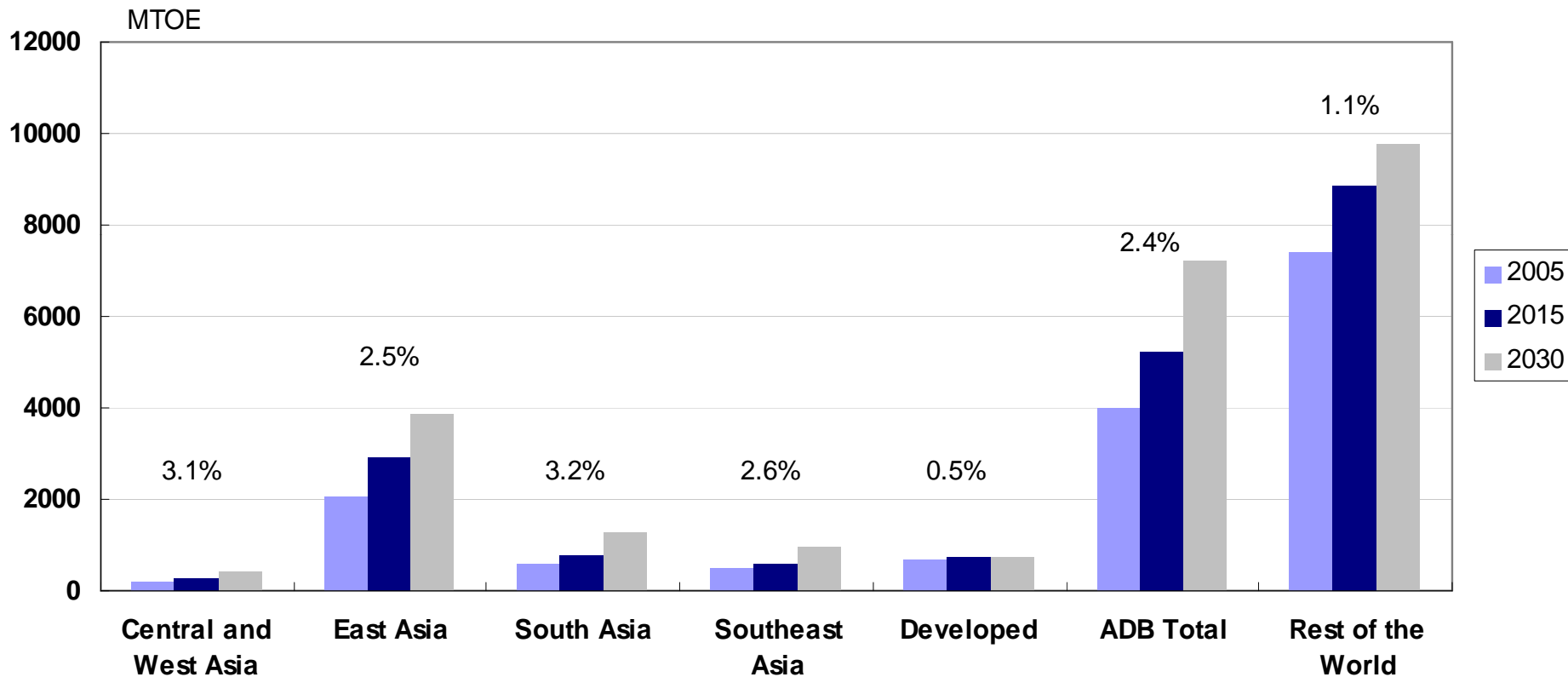
Coal to lead the overall demand growth, followed by oil and natural gas.



Source: Asia Pacific Energy Research Centre.
Note: The outlook represents a tentative result subject to change.

Total Primary Energy Demand by Subregion

Energy demand of Asia and the Pacific is expected to increase at a faster rate than the rest of the world.

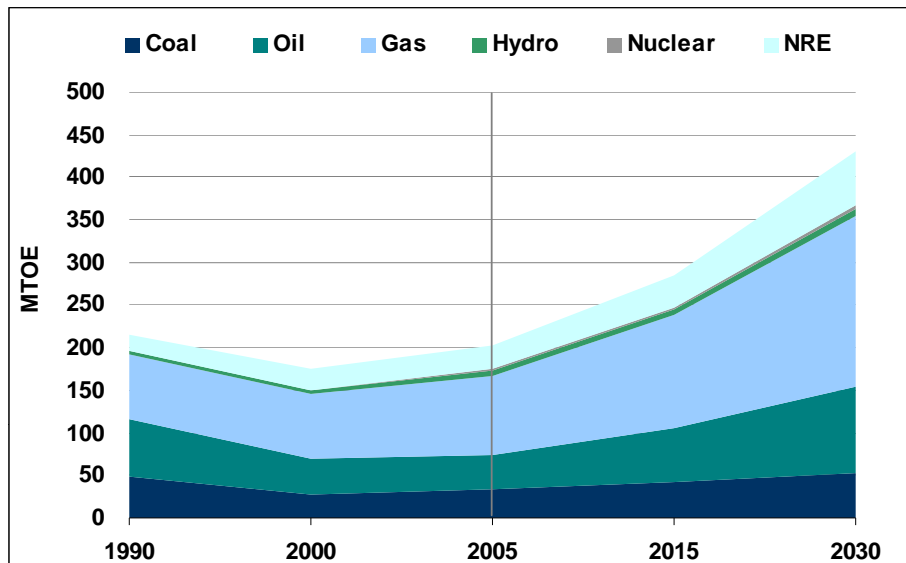


Source: Asia Pacific Energy Research Centre, and International Energy Agency (2008).

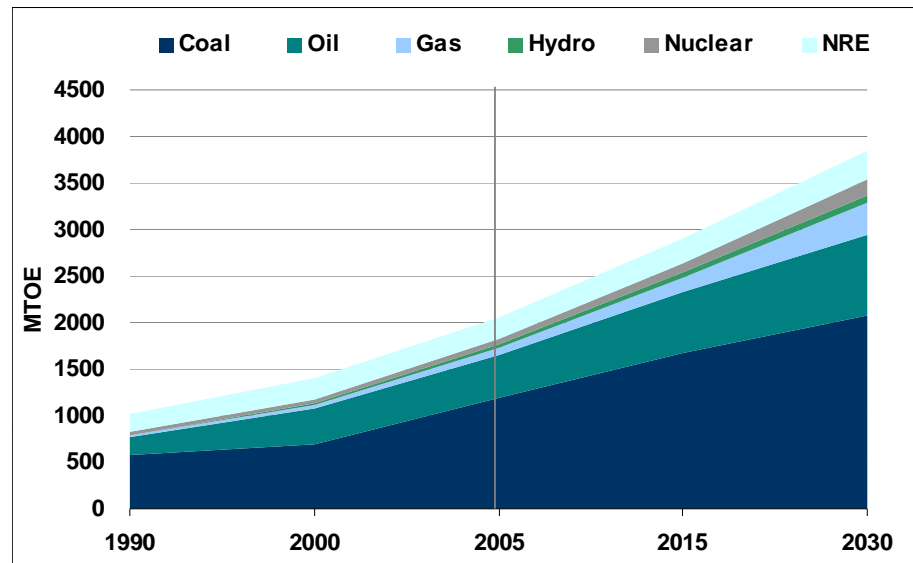
Note: The APERC outlook represents a tentative result subject to change.

Primary Energy Demand by Subregion

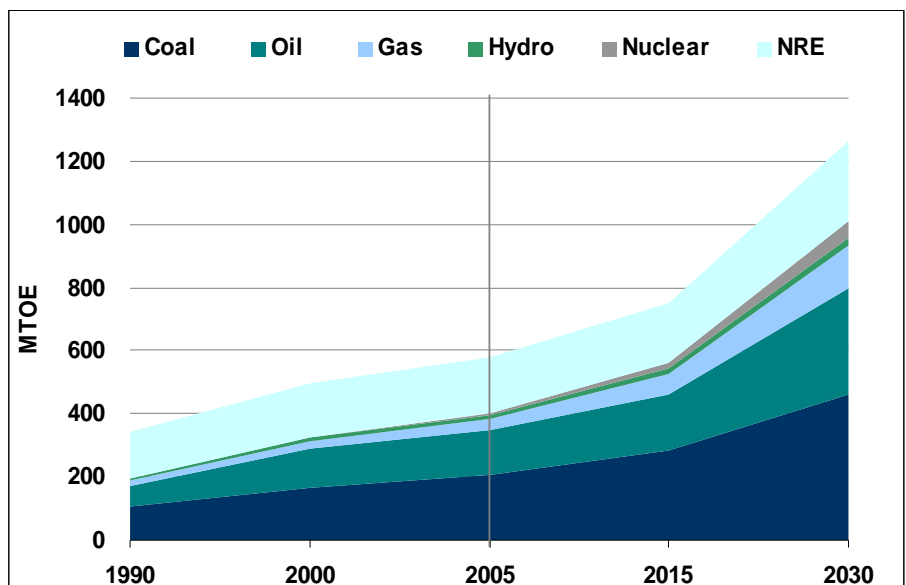
Central and West Asia



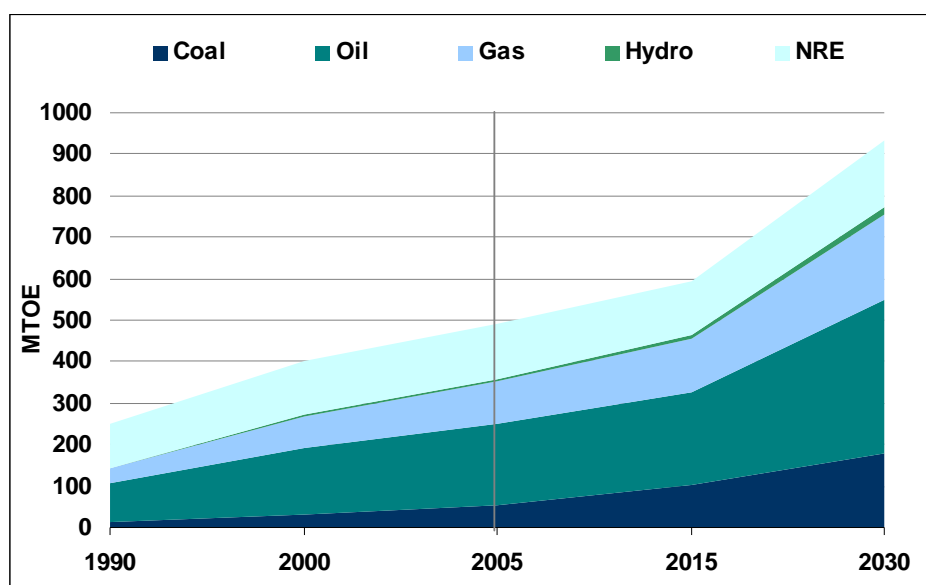
East Asia



South Asia

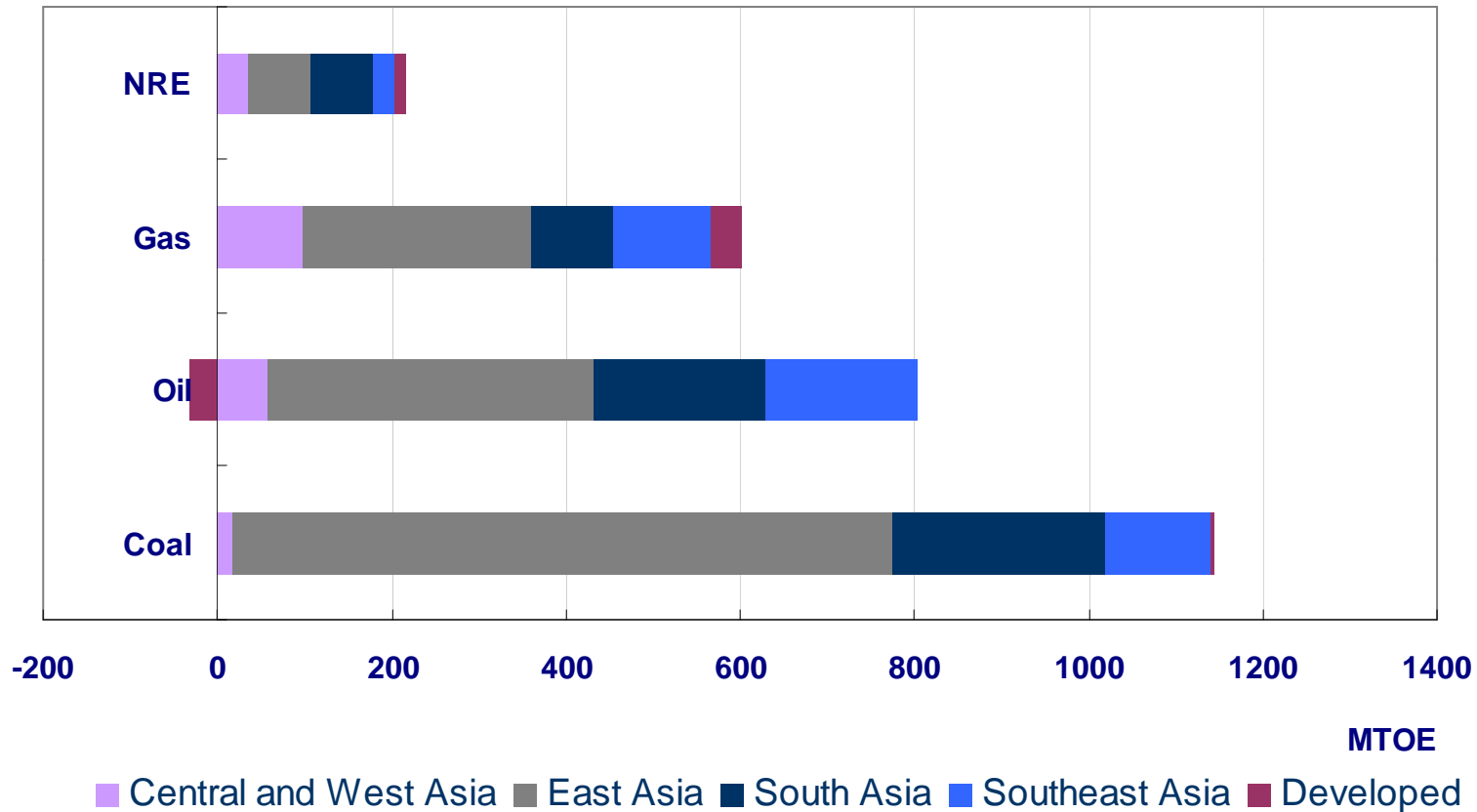


Southeast Asia



Incremental Growth by Energy Type and by Subregion

Different growth trends by subregion.

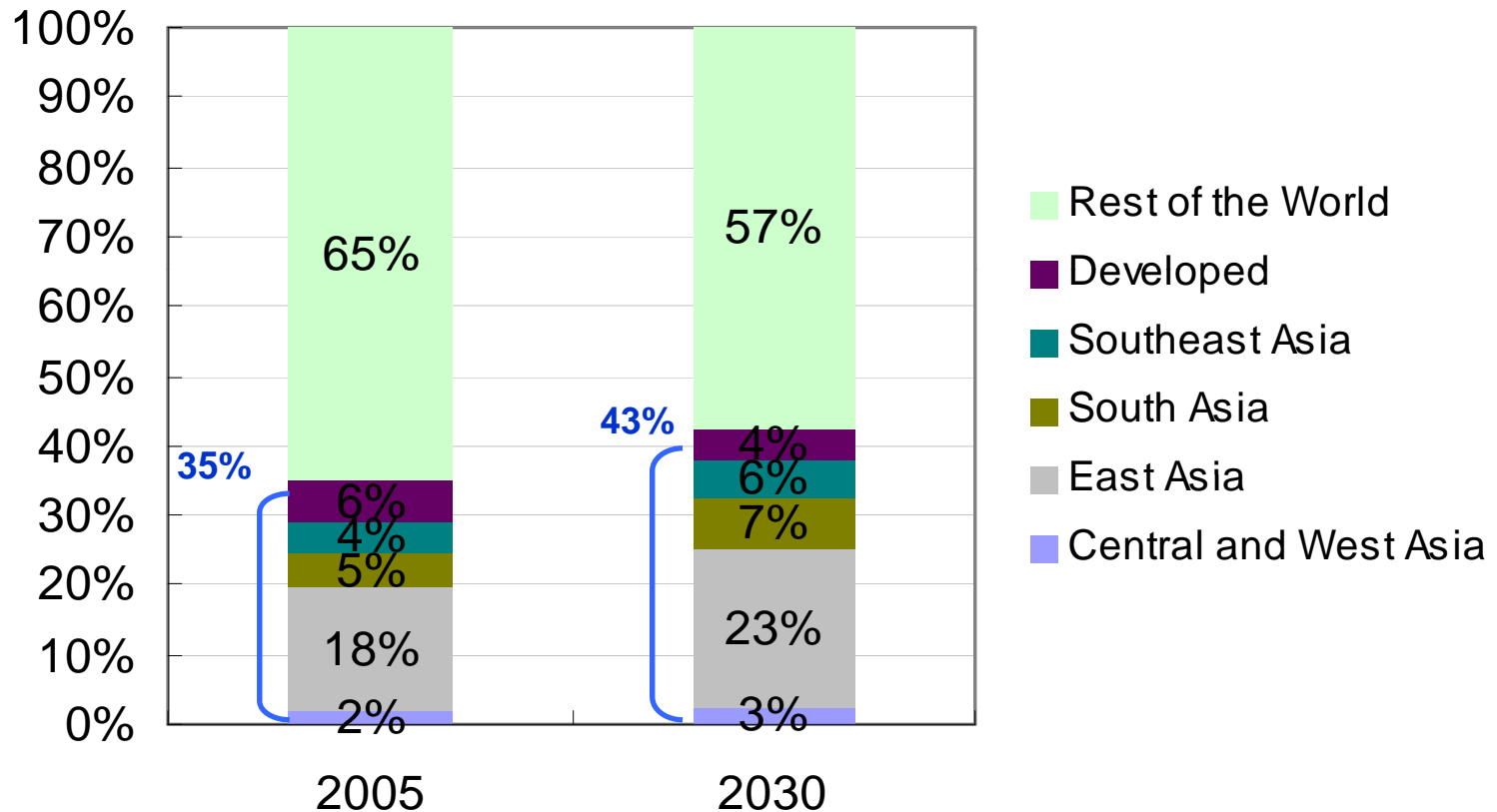


Source: Asia Pacific Energy Research Centre, and International Energy Agency (2008).

Note: The APERC outlook represents a tentative result subject to change.

Asia Pacific and the World – Total Primary Energy Demand

Asia and the Pacific's share to the world energy demand is expected to increase.

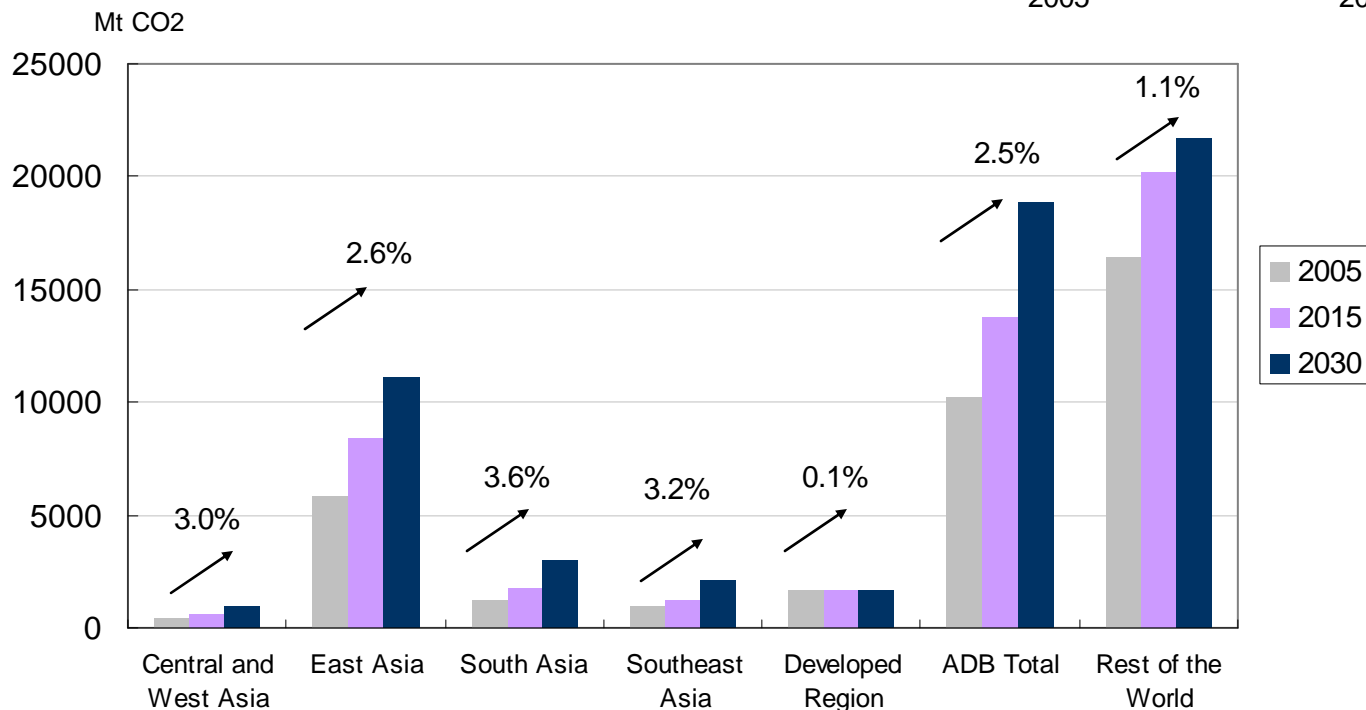
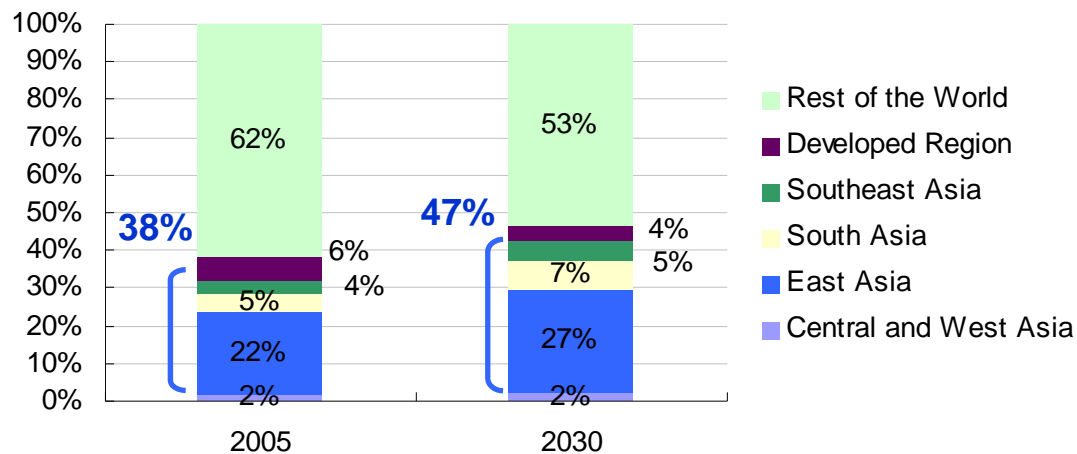


Source: Asia Pacific Energy Research Centre, and International Energy Agency (2008).

Note: The APERC outlook represents a tentative result subject to change.

CO₂ Emissions by Subregion

Increasing share of Asia and the Pacific to the world's CO₂ emissions.

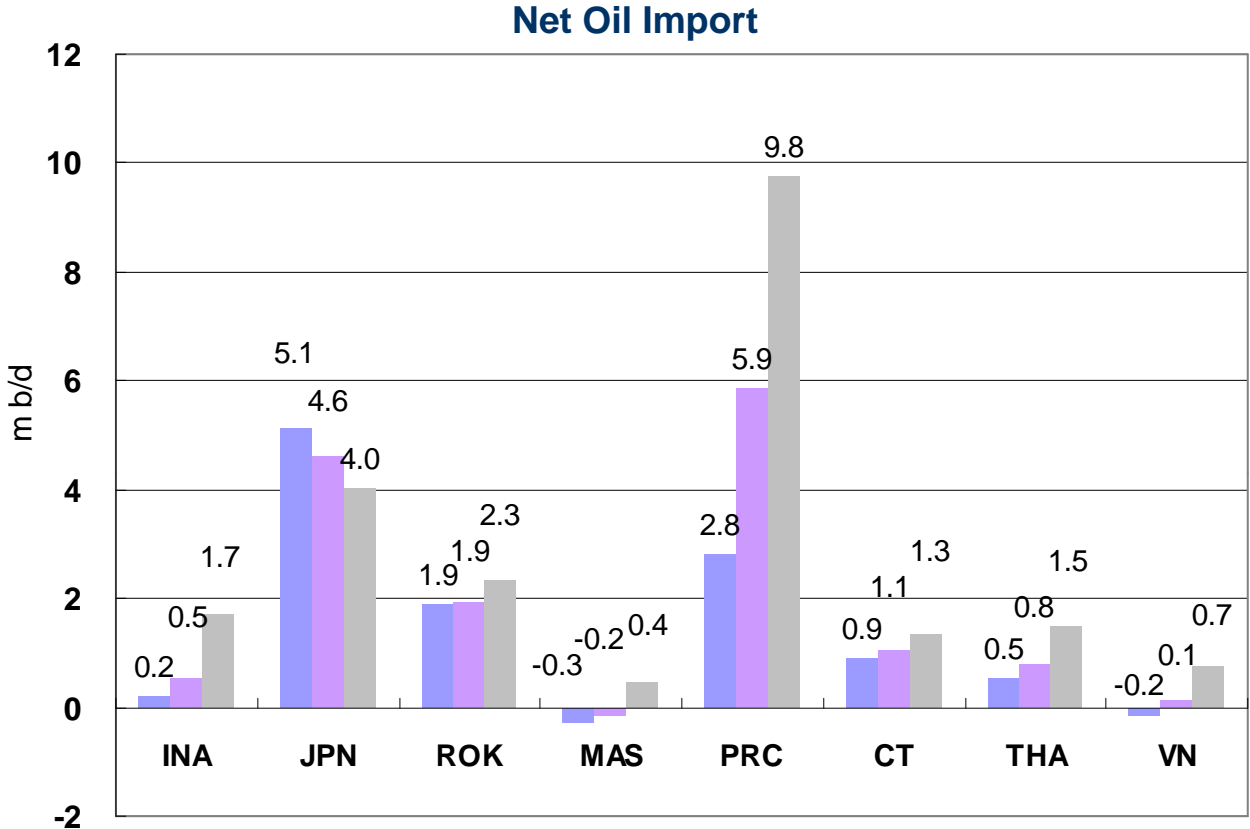


Source: Asia Pacific Energy Research Centre, and International Energy Agency (2008).

Note: The APERC outlook represents a tentative result subject

Oil Import Dependence – Selected Countries

Increasing oil import dependence in East Asia, and Southeast Asia.



Net Oil Import Dependence

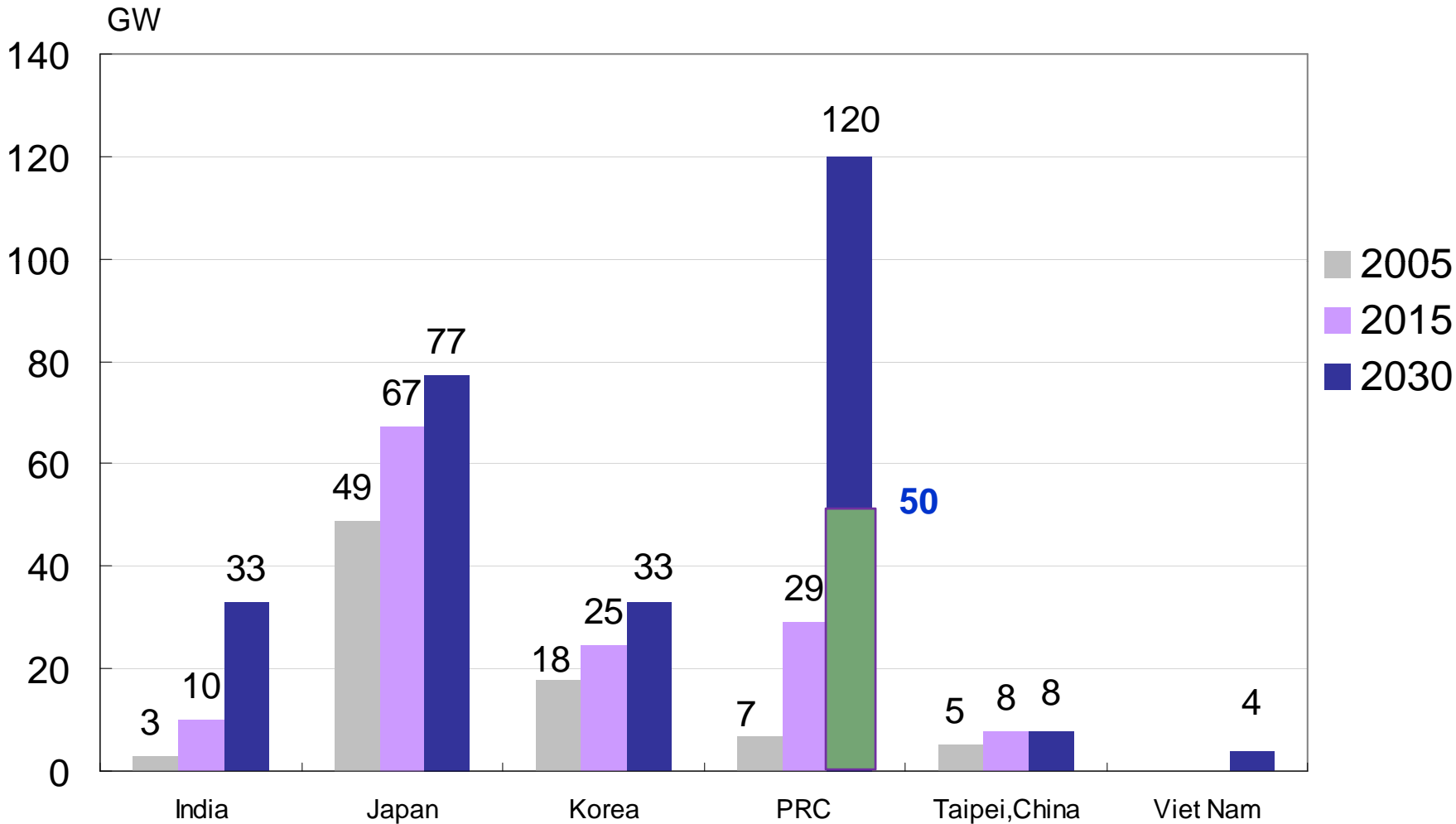
	1990	2000	2005	2015	2030
INA	-116%	-31%	17%	38%	76%
JPN	100%	100%	100%	100%	100%
ROK	100%	100%	100%	100%	100%
MAS	-148%	-55%	-48%	-28%	42%
PRC	-22%	34%	44%	60%	72%
CT	100%	100%	100%	100%	100%
THA	89%	79%	60%	87%	92%
VN		-99%	-60%	26%	74%

■ 2005 ■ 2015 ■ 2030

Source: Asia Pacific Energy Research Centre.
 Note: The outlook represents a tentative result subject to change.

Nuclear Power Generation in Asia – Installed Capacity

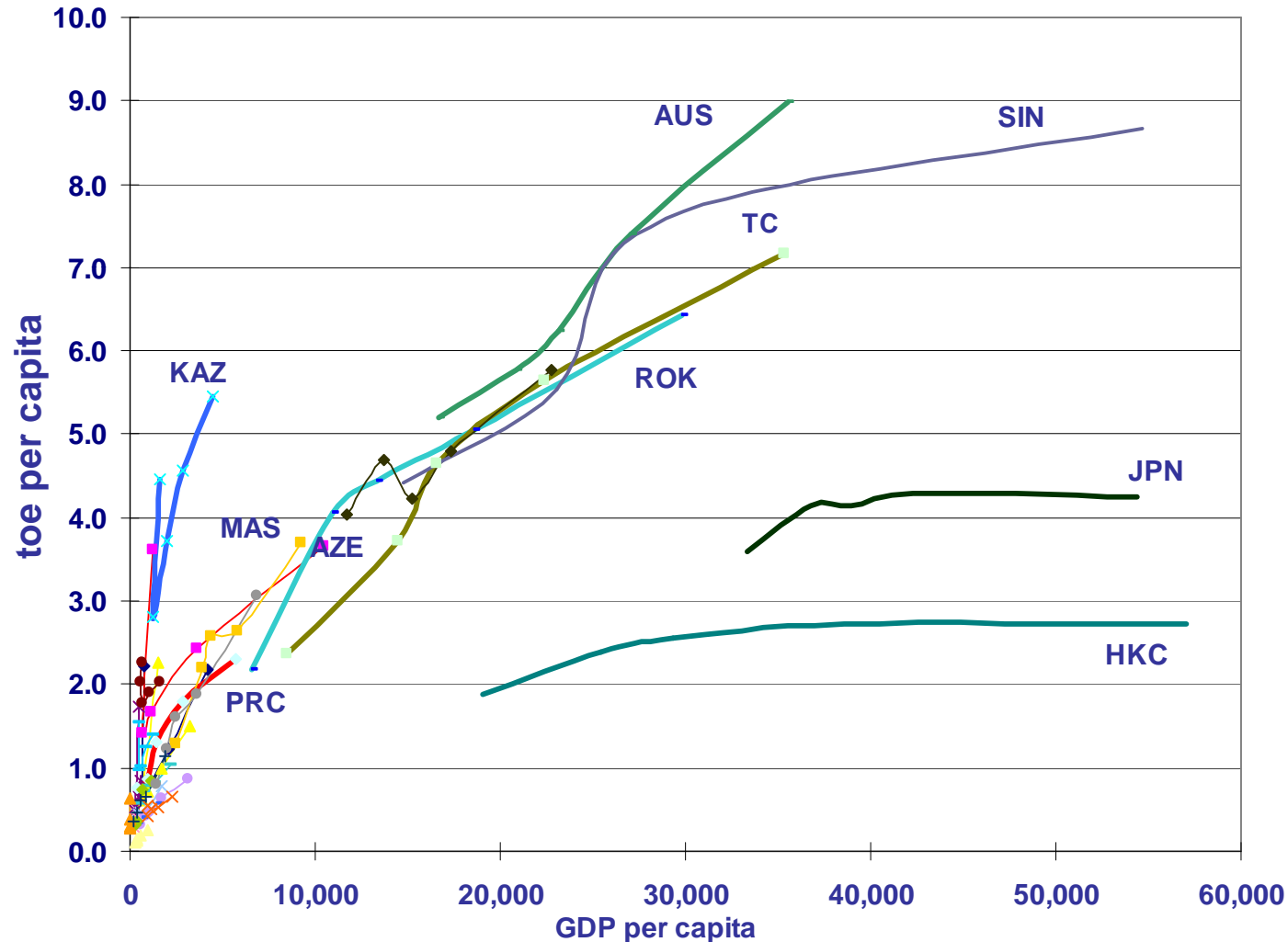
Nuclear power will serve as a means to enhance energy supply security in some countries.



Source: Asia Pacific Energy Research Centre.
Note: The outlook represents a tentative result subject to change.

Total Primary Energy Demand per capita (1990-2030)

Asia and the Pacific to lead the world's energy demand growth, while the per capita energy demand will remain relatively low for most of the DMCs.



Source: Asia Pacific Energy Research Centre.

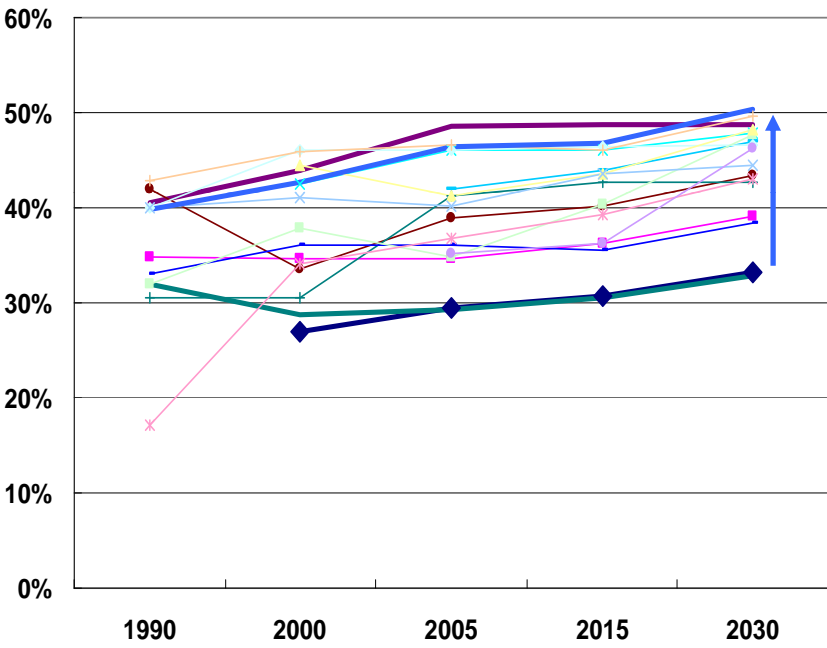
Note: The outlook represents a tentative result subject to change.

Issues

Potential for Energy Conservation – the Power Sector

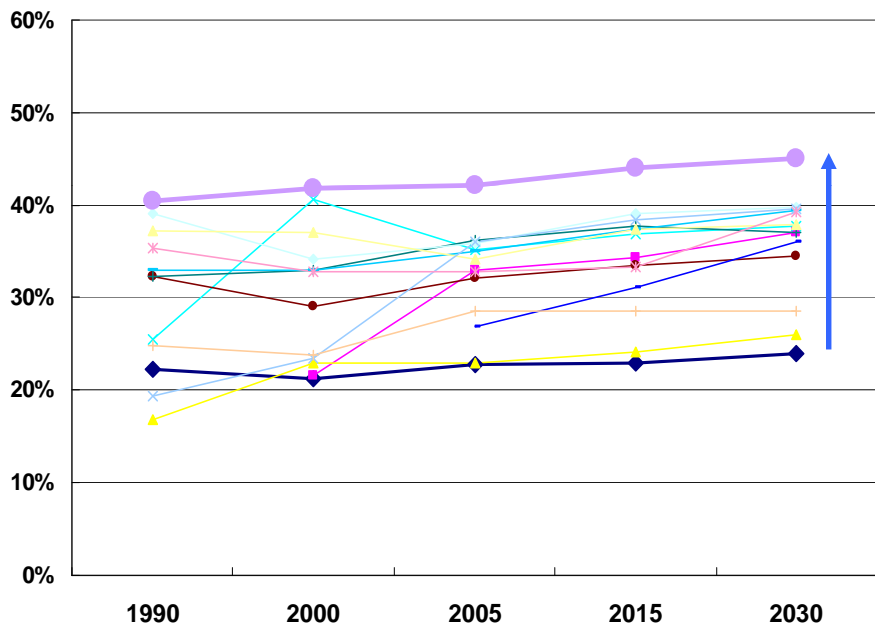
Countries in Asia and the Pacific may need to create conditions conducive to investment in the power sector.

Gas-fired Generation



- ◆ AZE ◆ KYZ ◆ UZH ◆ HKC ◆ ROK ◆ PRC
- ◆ CT ◆ BAN ◆ IND ◆ INA ◆ MAS ◆ SIN
- ◆ THA ◆ VN ◆ AUS ◆ JPN ◆ NZ

Coal-fired Generation



- ◆ KAZ ◆ KYZ ◆ UZH ◆ ROK ◆ PRC ◆ CT ◆ IND
- ◆ INA ◆ MAS ◆ THA ◆ VN ◆ AUS ◆ JPN ◆ NZ

Source: Asia Pacific Energy Research Centre.

Note: The thermal efficiency assumptions represent tentative ones subject to change.

China and Central/West Asia

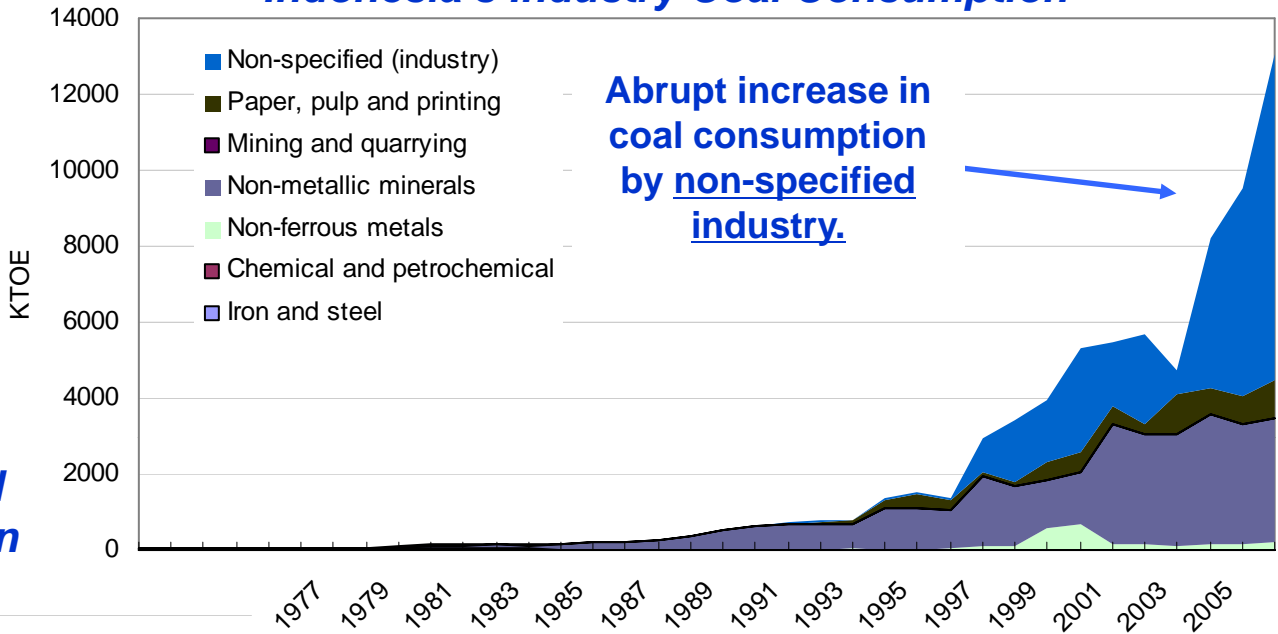
Regional inter-dependence may deepen for the energy supply security and mutual prosperity.

Country	Year	Sector	Project	Company	Investment
Kazakhstan	2003	Oil	North Buzachiy oil field development	CNPC	-
	2003	Oil	Development of Morskoe, Karatal, Dauletaly blocks	Sinopec	-
	2004	Oil	Acquisition of FIOC's asset in Kaz (6 blocks)	Sinopec	-
	2005	Oil	Acquisition of PetroKazakhstan, Canada	CNPC	\$4.18billion
	2006	Oil	Acquisition of Nations Energy Canada's asset in Kazakhstan	CITIC	\$1.9billion
	2006	Oil	Oil pipeline construction and supply (10million ton/year)	CNPC	\$3billion
	2007	Gas	Gas transit pipeline (may supply gas in the future)	CNPC	\$2.2billion
Azarbaijan	2002	Oil	Acquisition of Salyan Oil (Kursang-Karabagli oil field)	CNPC	\$52million
	2003	Oil	Kebibe oil field development (PSA)	CNPC	-
	2003	Oil	Acquisition of Commonwealth Gobusta from Rosco (62.8%)	CNPC	\$10.5million
	2003	Oil	Development of offshore Pirsage oil field	Sinopec	\$700million
Uzbekistan	2004	Oil	Agreement of oil&gas development	CNPC	\$100million
	2005	Oil	Development agreement of 23 blocks and etc	CNPC	\$910million
	2005	Oil	Establishment of JV (UzCNPC Petroleum)	CNPC	\$383million
	2005	Oil	Development of Andizhan oil field	Sinopec	\$160million
	2007	Gas	Gas transit pipeline	CNPC	-
Turkmenistan	2006	Gas	Gas development, pipeline construction and supply 30bcm/y)	CNPC	\$25million
Tajikistan	2007	Hydro	High voltage power line and hydro power plant (150MW)	SinoHydro	\$260million

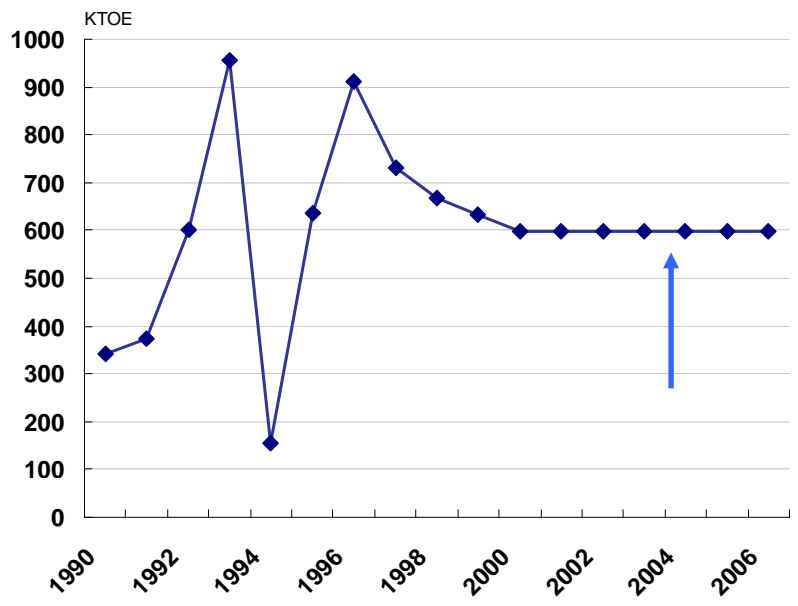
Source: Asia Pacific Energy Research Centre.

Data Quality

Indonesia's Industry Coal Consumption



Georgia's Residential Biomass Consumption



Georgia's residential biomass consumption is held constant between 2000 and 2006.

Source: International Energy Agency (2008), Energy Balance of Non-OECD Countries.

Implications

- **ADB regional member countries are expected to lead the world's energy demand and CO₂ emissions growth.**
 - **Industrialization**
 - **Urbanization**
 - **Motorization**
 - **Electrification**
- **How to ensure energy supply security will continue to be the key policy agenda across the region.**
 - **Energy infrastructure development**
 - **Energy diversification**
 - **Energy supply security**
- **Efforts are necessary to create conditions that can support investment to the energy efficient and low-carbon technologies.**
- **Regional cooperation will strengthen energy supply security and sustainable development, which will ultimately lead to mutual prosperity.**