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# *Summary of APEC Workshop on Best Practices for Strategic Stockpiling*

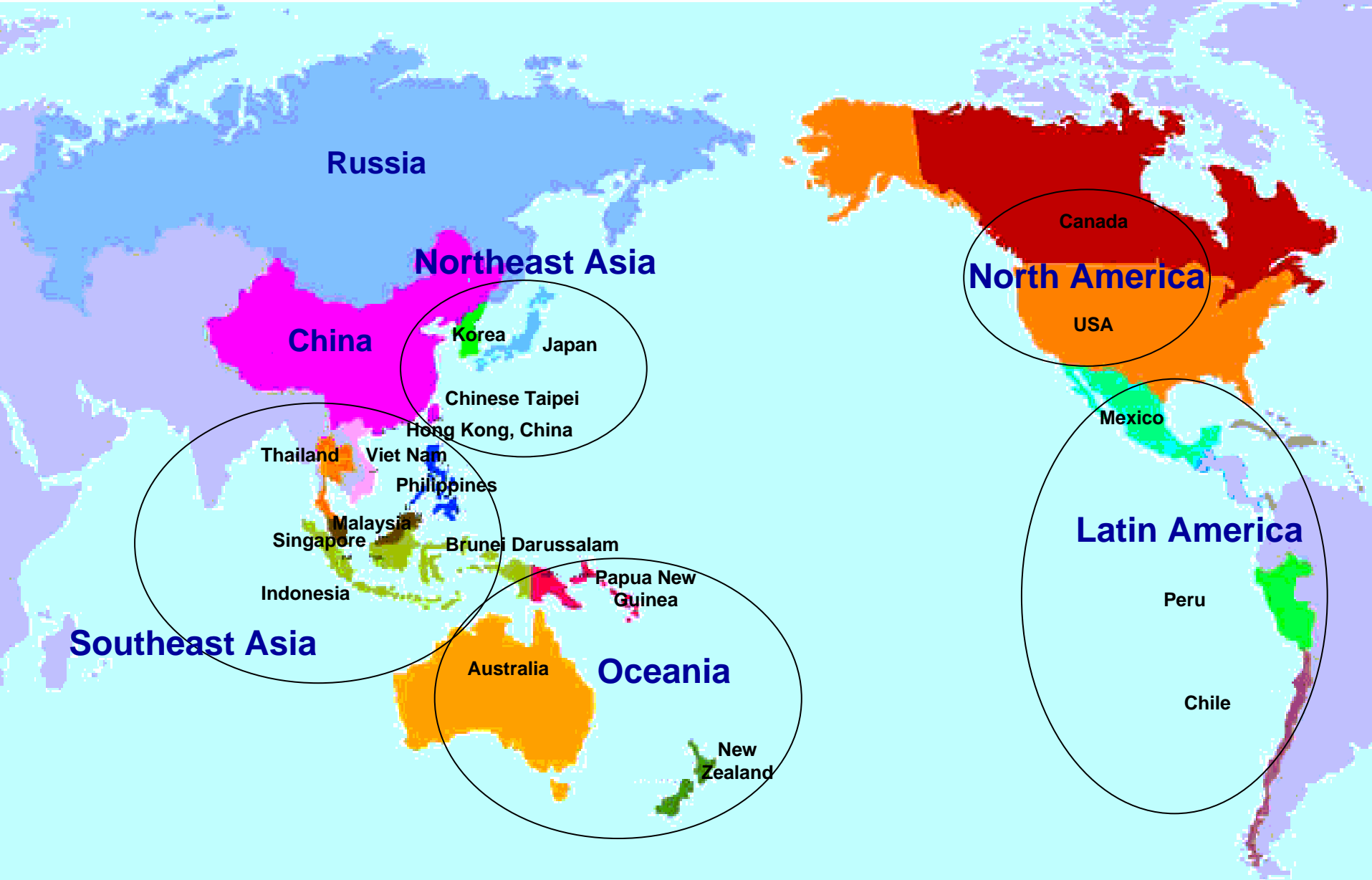
*Petrostocks 2007: New Perspectives*  
*Wyndham Hotel, New Orleans, LA USA*  
*29-31 January 2007*

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Vice President  
Asia Pacific Energy Research Centre



Asia-Pacific  
Economic Cooperation

# APEC Member Economies



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# *Oil in APEC*

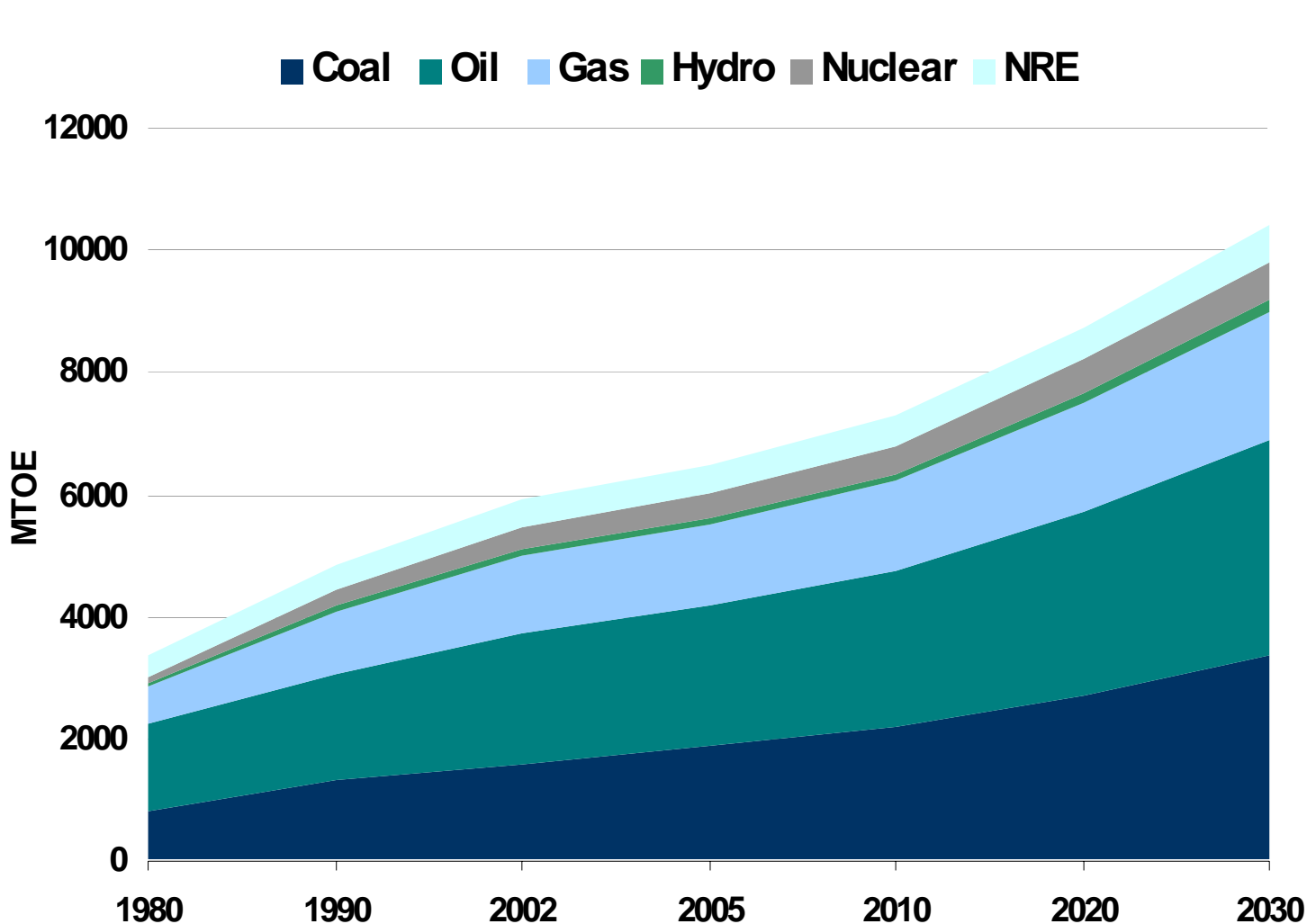
# APEC Energy Demand Outlook (2002-2030)

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

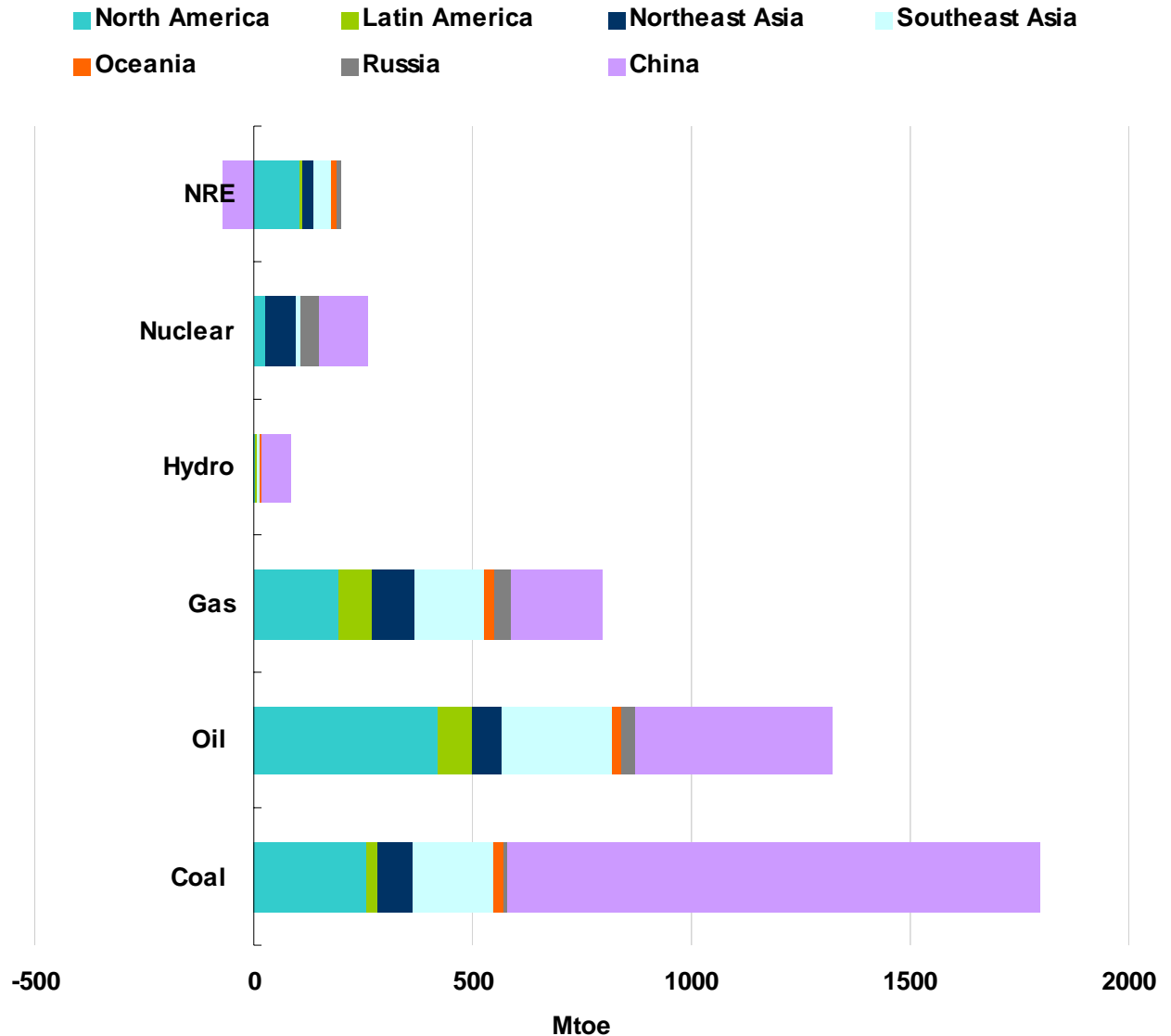


# Incremental Growth by Source and by Region (2002-2030)

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



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

# Robust Oil Demand: now and the future

## Income Growth

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

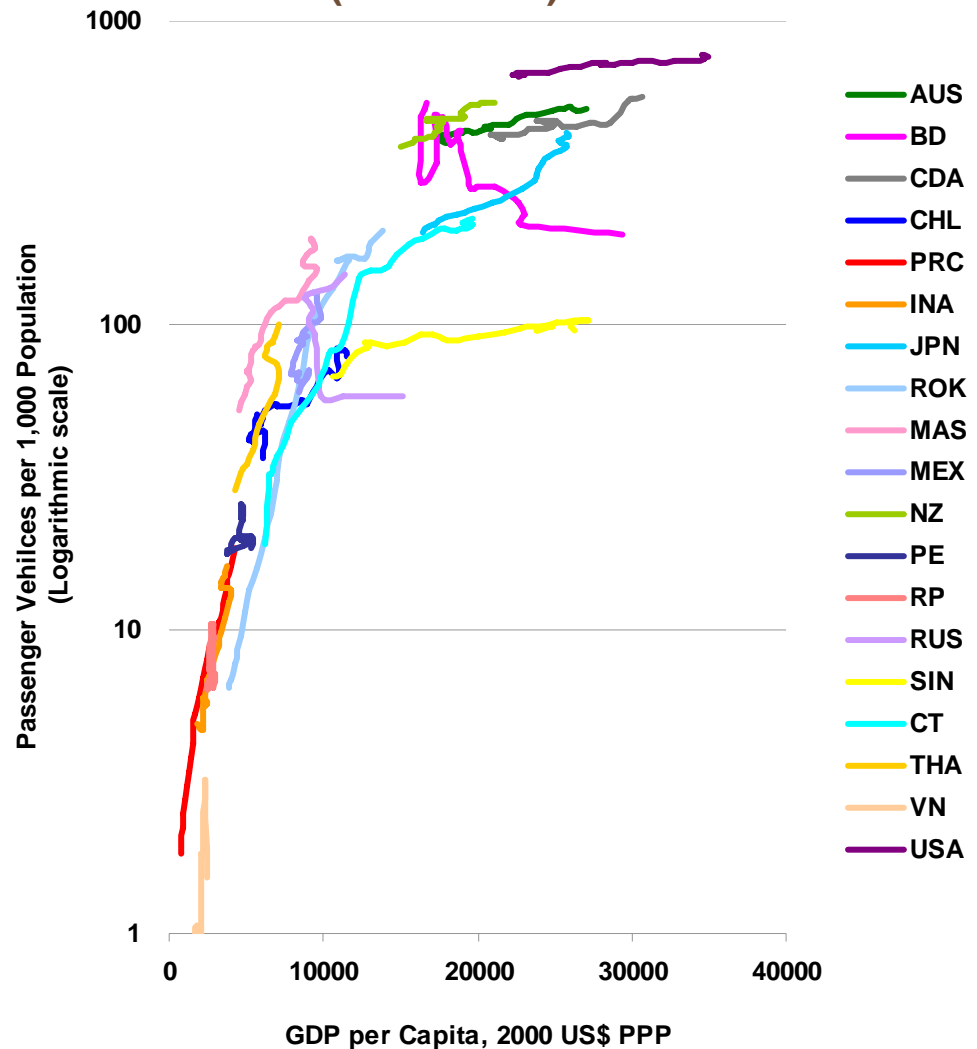
## Urbanisation

- 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.

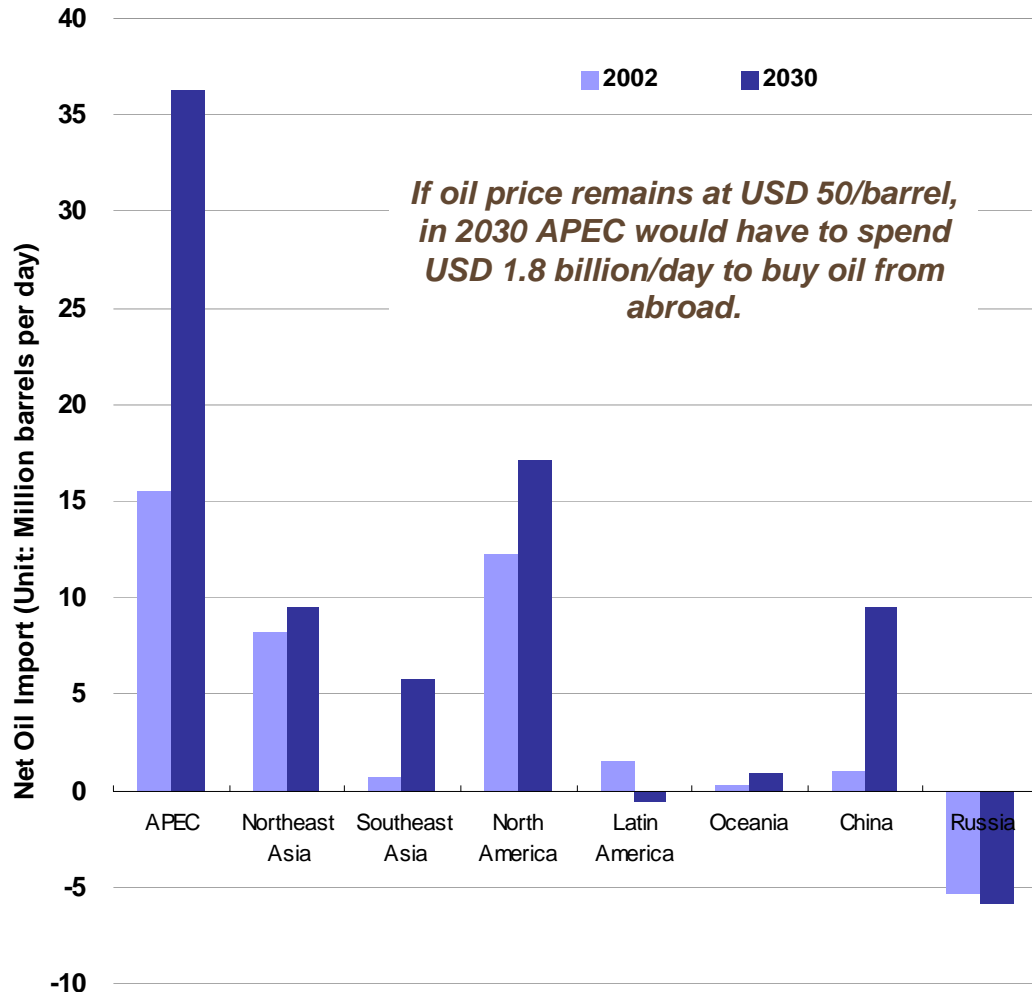
## Passenger Vehicles per 1,000 Population (1980-2030)



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

# 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
<b>2002</b>	36%	100%	19%	55%	26%	22%
<b>2005</b>	37%	100%	27%	53%	29%	34%
<b>2010</b>	38%	100%	35%	49%	42%	44%
<b>2015</b>	41%	100%	44%	51%	50%	46%
<b>2020</b>	44%	100%	56%	50%	55%	57%
<b>2025</b>	50%	100%	63%	53%	59%	65%
<b>2030</b>	52%	100%	69%	56%	62%	70%

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



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# *An Overview of Oil Stockpiling in APEC*

# *Characterizing oil stockpiling in APEC*

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## ■ **Growing need for strategic stocks**

- Oil import dependency in developing Asia to grow from 43% in 2002 to 78% by 2030.
- Vulnerability to disruption to grow as well: flows through Straits of Hormuz from 20% of world demand in 2003 to 36% in 2030, flows through Malacca from 14 to 20%.
- Emergency oil stocks must increase to maintain preparedness against disruptions.

## ■ **Shift towards more government ownership and control of stocks**

- Japan: government share of stocks has grown from zero before first oil crisis in 1973 to 38% during Gulf War to 53% now.
- Korea: government share has grown from 42% in 2001 to 51% in 2005, may grow to 68% by 2008 if private stocks are flat.
- Chinese Taipei: government share 33%.
- USA: government share 41% end of 2004.

## ■ **Increasing crude stocks**

- USA: Entire strategic stock is crude; 58% of all public and private stocks .
- Japan: Entire government strategic stock is crude; 77% of overall stocks
- Korea: 85% of government's stockpiling capacity is for storing crude.
- Chinese Taipei: 57% of stocks are crude.

## *Oil Stockpiling in APEC: IEA Members*

	Days of stockpile	Actual or Plan	Time	Note
<b>Australia</b>	45-55 days of products consumption (Industry)	Actual	2004	Government does not hold any stocks excluding military purpose. Stocks are held by the petroleum industry under no mandatory rule.
<b>Canada</b>	70 days of products consumption (Industry)	Actual	2003	Canada does not have stockholding obligations as it is a net oil exporter.
<b>Japan</b>	92 days of net import (Government) 85 days of net import (Industry)	Actual Actual	Nov. 2006 Nov. 2006	
<b>Korea</b>	56 days of net import (Government) 50 days of net import (Industry)	Actual Actual	Apr. 2005 Apr. 2005	KNOC plans to increase total oil stockpile from 92.7 million barrels in June 2006 to 141 barrels in 2008.
<b>New Zealand</b>	80 days of forward demand (Industry)	Actual	Sep. 1999	New Zealand does not hold emergency stocks. Stocks are held by the petroleum industry following Petroleum Demand Restraint Act of 1981.
<b>USA</b>	56 days of net import (Government) 62 days of net import (Industry)	Actual Actual	2006 2006	President Bush plans to double the current capacity of SPR to 1.5 billion barrels by 2027.

# Oil Stockpiling in APEC: Non-IEA Members

	Days of stockpile	Actual or Plan	Time	Note
<b>Chile</b>	25 days of products consumption (Industry)	Actual	2002	Government does not hold emergency oil stocks.
<b>China</b>	7 days of crude oil import (Government)	Actual	2006	Currently China holds 20 million barrels of emergency oil stocks in Zhenhai base. Additional 3 bases are under construction to hold total 100 million barrels of emergency oil stocks by 2008.
<b>Indonesia</b>	20 days if products consumption (Industry)	Actual		Government requires Pertamina to hold working stock.
<b>The Philippines</b>	Two stock facilities are planned to be built. (Industry)	Plan		Two storage facilities are planned to be constructed.
<b>Singapore</b>	50 days of consumption (Industry)	Actual		Government requires electricity generators to hold oil stocks, while oil companies are not required to hold oil stocks.
<b>Chinese Taipei</b>	30 days of products consumption (Government)	Actual	2006	In 2006, Chinese Taipei started operation of emergency stocks.
	60 days of products consumption (Industry)	Actual	2006	
<b>Thailand</b>	22 days of consumption (Industry)	Actual	2002	Government considers to hold emergency oil stocks.
<b>Viet Nam</b>	15 days of consumption (Industry)	Actual	2004	Plan by 2010: 30 days of net import (Government) and 30 days of net import (Industry)

## *Recent Developments*

- **China: Phase I of National Oil Reserve Program officially started in March 2004.**
  - 3 sites (Dalian, Huangdao, and Zhoushan) are under construction and 1 site (Zenhai) has completed its construction.
  - Capacity at Zenhai base has reached 20 million barrels. By 2008, China aims to hold total 100 million barrels of emergency oil stocks.
- **Korea: State-run Korea National Oil Corporation has signed a deal with the Kuwait Petroleum Corporation to create a joint oil stockpile of 2 million barrels.**
- **USA: President Bush plans to strengthen energy security through doubling the current capacity of SPR to 1.5 billion barrels by 2027.**



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# *Some Findings from APEC Workshop on Best Practices for Strategic Stockpiling*

# *Two Workshop Themes*

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## ■ **Implementing Best Practices**

- Best Practice Principles for Strategic Oil Stocks Adopted by EMM-6 in Manila in 2004
- Focus on Japan, Korea, Chinese Taipei, USA
- Stocks for Emergencies
- Operational Readiness is Key
- Other principles

## ■ **Facilitating New Commitments**

- New stockpiling efforts in China and India
- Prospective efforts in Philippines, Thailand (possibly Indonesia, Singapore, Vietnam)



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# *Implementing Best Practices*

# *Best Practice Principles on Physical Location of Oil Stocks*

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- **Use the most economical storage method.**
- **Underground salt caverns offer low costs, high safety, few risks to the environment.**
- **Good to be close to refining centers (to convert crude to product in emergencies)**
- **Marine distribution provides flexibility.**
- **Large, centralized facilities enjoy economies of scale.**



## *Oil Stock Location in Practice*

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- **USA:** Underground salt domes, close to refining centers and marine distribution.
- **Japan:** About half of storage in above-ground tanks (few underground sites are sufficiently stable), a quarter in floating tanks (costly but earthquake-resistant), all near coastline for easy marine distribution.
- **Korea:** Crude stored near coast, 3/5 of product stored inland for easy refining.



# *Strategic Stocks are for Emergencies, Not Price Mitigation*

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- But price may be a factor to consider in deciding whether a supply disruption is sufficiently severe to warrant a coordinated release of oil stocks.
- And some emergencies are local, such as hurricanes that disrupt shipping channels and thereby impede normal oil deliveries.



# *Operational Readiness is Key*

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- Regular reviews of functions and systems
- Physical testing of equipment and systems
- Computer-based and performance training
- Simulations that match drawdown to seasonal product demand (Japan: distillate for vehicles in summer, residual heating oil for buildings in winter)

## *Further Strategic Stock Principles*

- Coordination, cooperation, communication during emergencies, including stockdraw (such as coordination by Japan, Korea and USA under IEA auspices).
- Joint stockpiles to obtain economies of scale and facilitate coordination (KNOC lease of storage to Statoil with right to buy oil in emergencies, keeping market liquid and limiting potential market disruptions).

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# *New Commitment by Some APEC Economics*

# *Costs of Oil Supply Disruptions in Southeast Asian APEC Economies*

- IMF: Oil price rise of \$10/barrel, as in a supply disruption, would lower GDP 1.6% in the Philippines and 1.8% in Thailand.
- METI study: Commercial reserves in Thailand would fall 6.5 months short of covering a one-year, 14.4% shortfall like the world shortfall during Iraq-Kuwait war of 1991, inducing 9%-10% fuel shortfalls.



# *Benefits of Strategic Reserves in Southeast Asian APEC Economies*

- **ASEAN/METI cost-benefit study found:**
  - For Thailand, net benefits of \$791 million with stocks covering 24 days of imports today would rise to \$932 million with stocks expanded to cover 82 days of imports.
  - For Philippines, net benefits of \$109 million with stocks covering 20 days of imports today would rise to \$171 million with stocks expanded to cover 47 days of imports.



# *Cost Burden of Strategic Reserves in Southeast Asian Economies*

- **In the case of the Philippines,**
  - METI found it would cost \$1.8 billion to build a stockpile covering 47 days of imports.
  - USDOE found that for a stockpile covering 90 days of imports, it would cost \$600-700 million for storage tanks, \$50-90 million for a storage cavern, and \$2-3 per barrel per year to lease commercial storage – on top of the \$1.8 billion it would cost to buy the oil at \$60 per barrel.



## *Meeting the Financial Challenge*

- **China** will finance strategic stockpiles, initially building 252 million barrels of crude storage facilities, through a levy of 0.04 yuan per liter (\$0.02 per gallon).
- **India** will finance planned reserves with 37 million barrels of initial storage capacity through government allocations and existing levies; there could also be a special levy on consumers if necessary.



# Thank you!

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