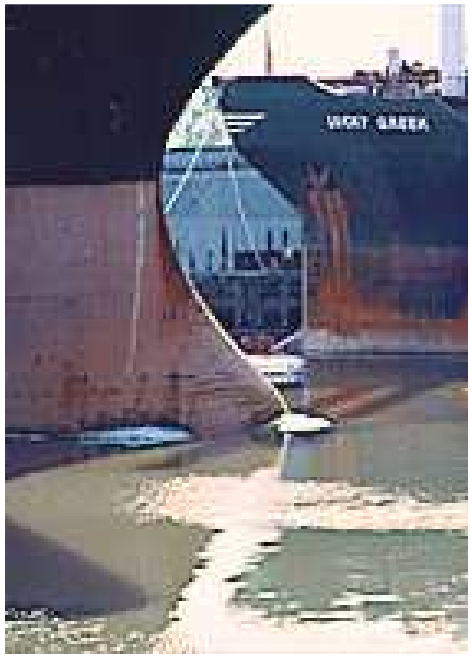
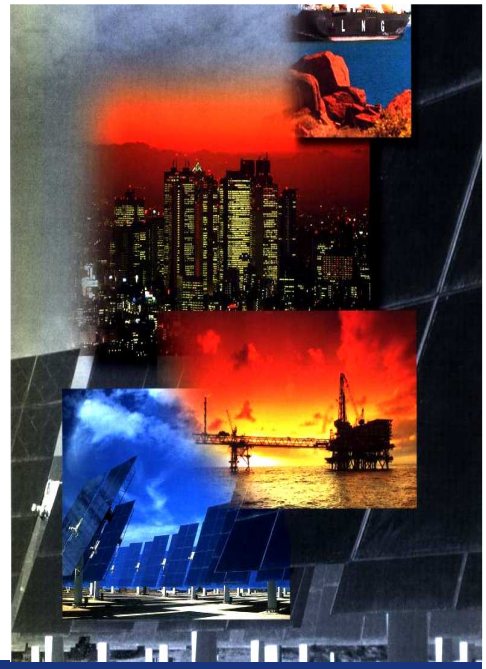
Asia-Pacific
Economic Cooperation

Asia Pacific Energy Research Centre





China's Natural Gas Demand Outlook

World Gas Conference 2006
Amsterdam, the Netherlands
5-9 June 2006

Asia Pacific Energy Research Centre
Vice President
Yonghun JUNG Ph.D.



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- Energy Demand and Supply Outlook for China
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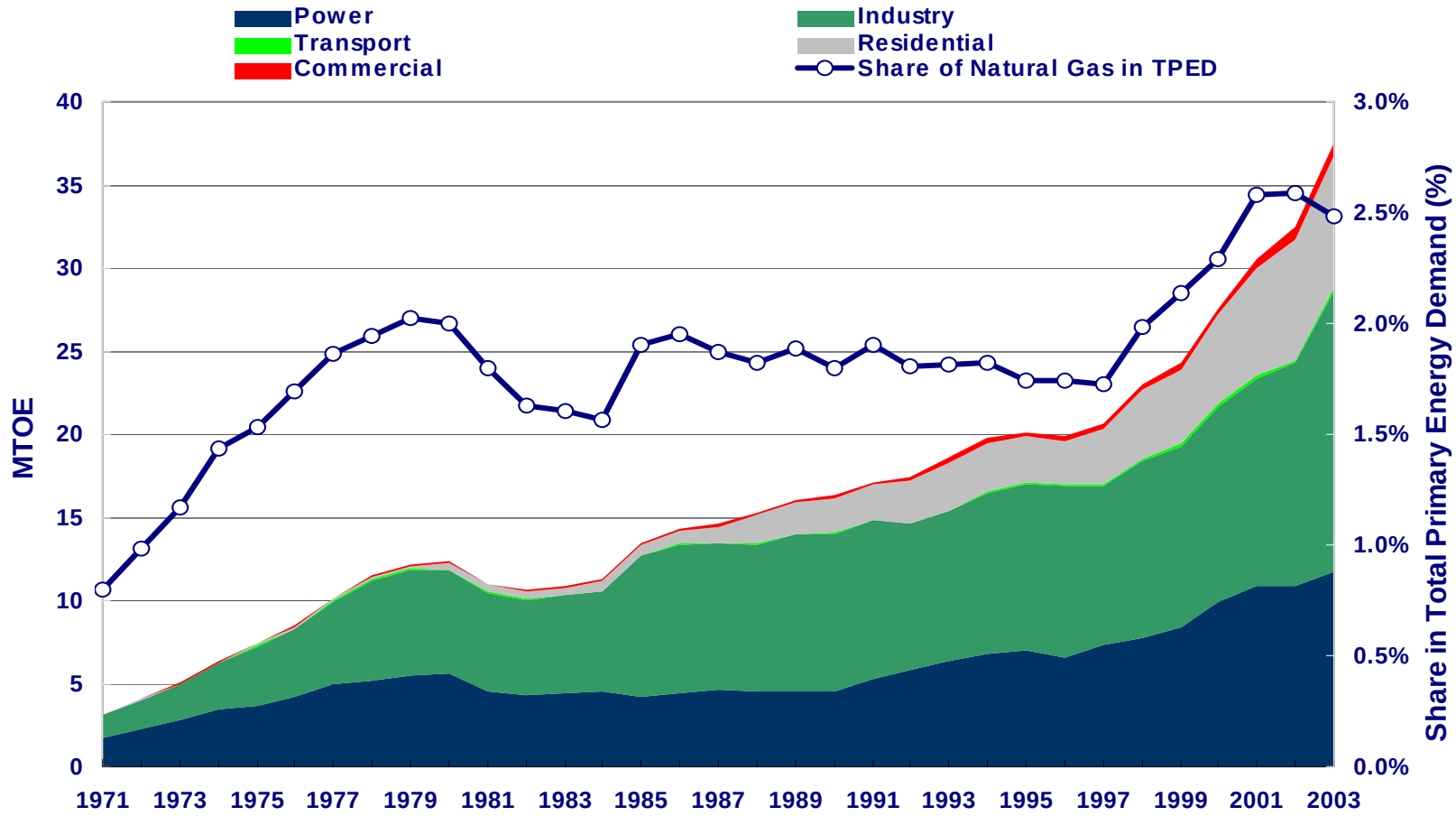
Historical Trend for China's Gas Consumption

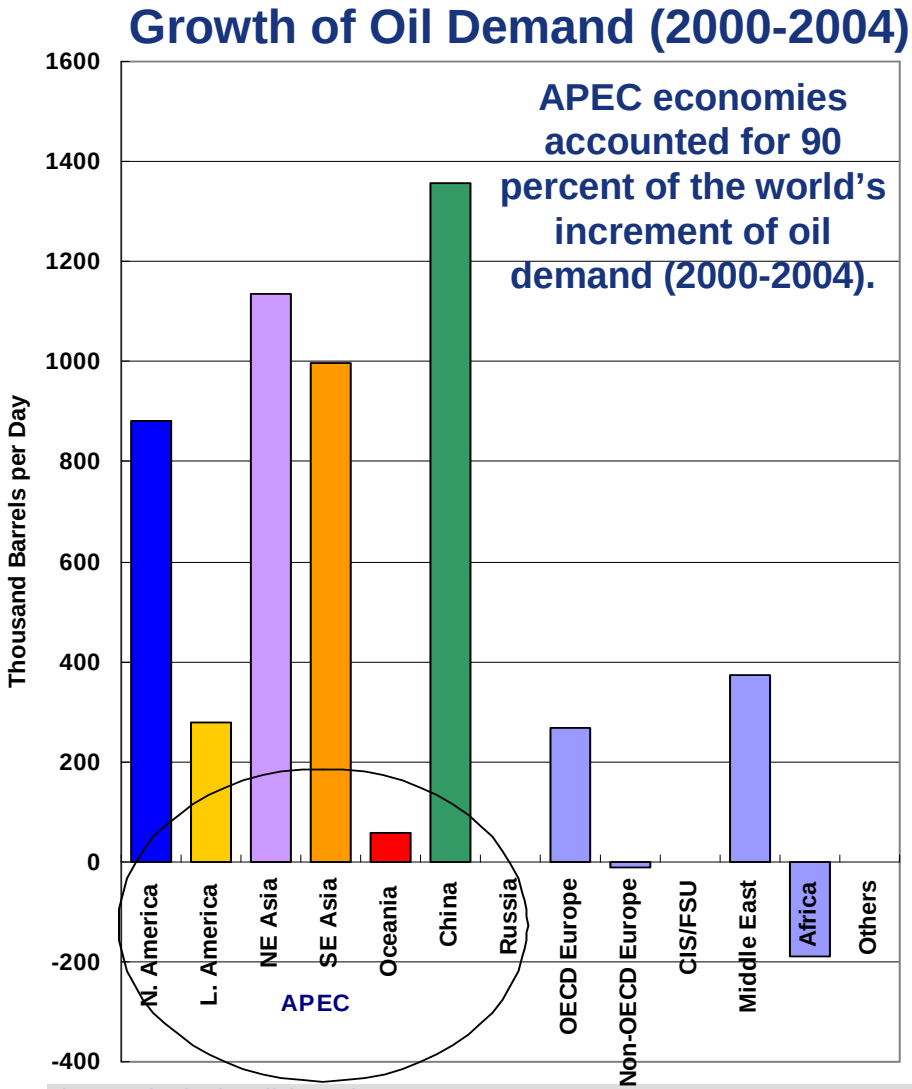
Despite the rapid growth in recent years, natural gas accounted for only about 2.5 % in total primary energy demand in 2003.



(Source) IEA (2005), "Energy Balances of Non-OECD Countries", OECD/Paris.



Drivers for the APEC Energy Demand



(Source) Blackwell (2005)

- **Income Growth**
  - GDP per capita will grow at a n annual rate of 3.5 percent.
- **Urbanisation**
  - By 2030, share of urban popul ation will reach 68 percent of t he total from 52 percent in 20 03.
    - 26 million people per year will move from rural to urb an cities.
- **Industrialisation**
  - Industry value added will grow by 4.8 percent per year, while GDP will grow by 4.1 percent per year.



Evolution of Energy Policy in China

- **The 10th Five Year Plan on Energy**
  - Investment to the western region
  - Diversification of energy sources
  - Ensuring energy security
  - Improvement of energy efficiency
  - Improvement of environment

- **The 11th Five Year Plan on Energy**
  - Promotion of energy conservation
    - Improvement of energy intensity by 20 percent by 2010 compared with that of 2005.
  - Development of domestic energy source
    - Coal, oil, gas, hydro and nuclear
  - Diversification of energy sources
  - Establishment of stable, economically viable, clean and safe energy supply system



New Regulation on Emissions Fee

In July 2003, China tightened its regulation on SO_2, Dust, CO , Mercury, Soot. This was followed by tightening regulation on its emissions on NOx in July 2004.

	Fee per Unit Pollutant Standard Equivalent	Kg Pollutant per Pollutant Standard Equivalent	Fee per Kilogramme of Pollutant
Sulphur Dioxide (SO_2)	0.6 yuan/PSE	0.95 kg SO_2/PSE	0.632 yuan/ kg SO_2
Nitrogen Oxides (Nox)	0.6 yuan/PSE	0.95 kg Nox/PSE	0.632 yuan/kg Nox
Dust	0.6 yuan/PSE	4.0 kg Dust/PSE	0.150 yuan/kg Dust
Carbon Monoxide (CO)	0.6 yuan/PSE	16.7 kg CO/PSE	0.036 yuan/kg CO
Mercury (Hg)	0.6 yuan/PSE	0.0001 kg Hg/PSE	6,000 yuan/kg Hg
Soot	0.6 yuan/PSE	2.18 kg Soot/PSE	0.275 yuan/kg Soot

(Source) China State Environmental Bureau (2003)



Impact of Emissions Fee on Electricity Price

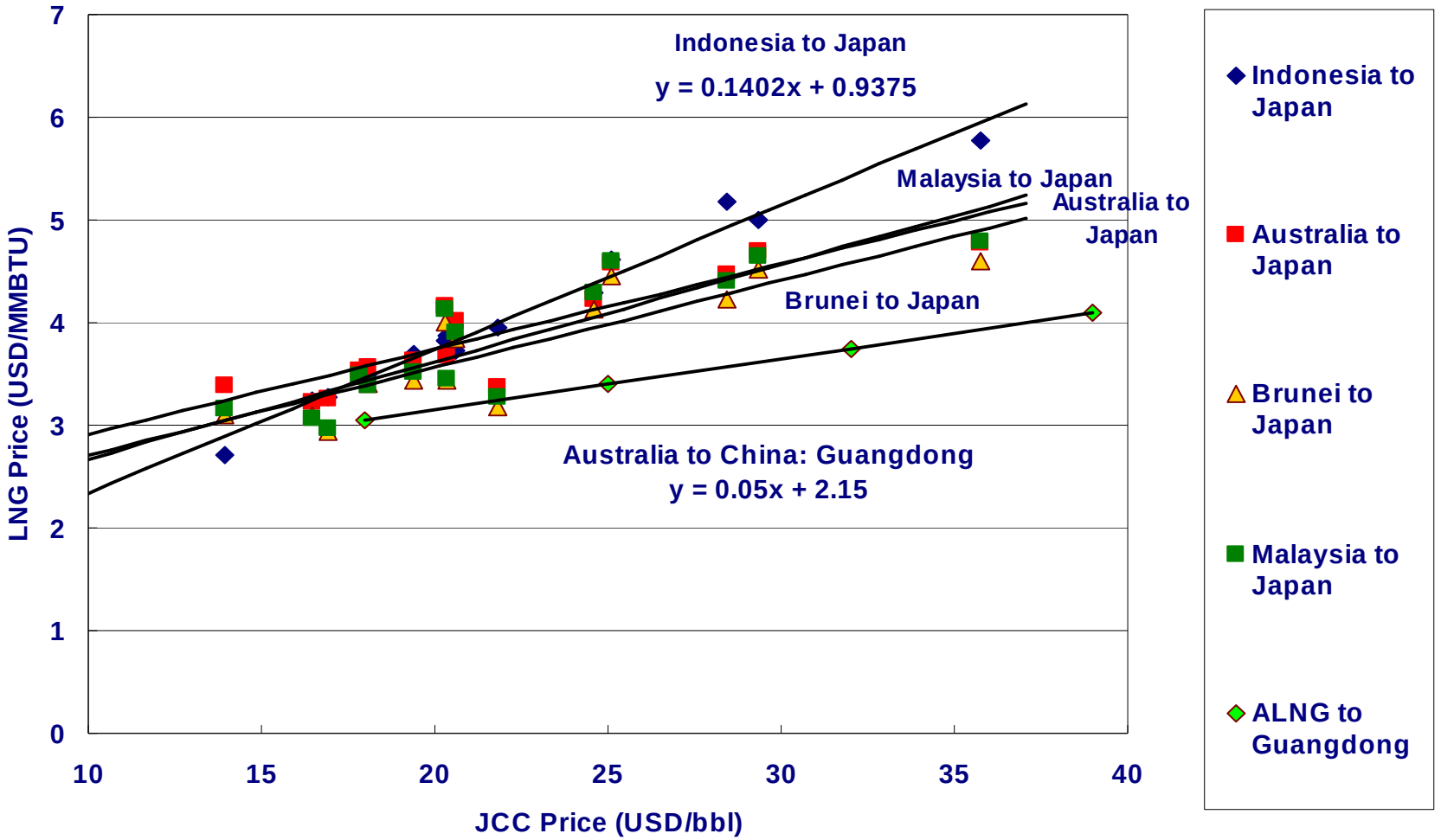
Assuming that wholesale electricity price would be at 4.5 cents/kWh, a study found out that share of emissions fee in electricity price is estimated at 6.9% for coal-fired power generation, while that of natural gas fired power generation is estimated at 0.2%.

	Emissions, Kilogrammes per kilowatt-Hour	Emissions Charge per Kilogramme	Emissions Charge per Kilowatt-Hour
SOx Charge, Coal Plant	0.01737 kg/kWh	$0.07609/kg	$0.001322/kWh
NO Charge, Coal Plant	0.00030 kg/kWh	$0.07609/kg	$0.000228/kWh
NO Charge, Gas Plant	0.00005 kg/kWh	$0.07609/kg	$0.000038/kWh
Dust Charge, Coal Plant	0.00005 kg/kWh	$0.01807/kg	$0.000004/kWh
Dust Charge, Gas Plant	0.00020 kg/kWh	$0.01807/kg	$0.000001/kWh
Total Charge, Coal Plant	0.00005 kg/kWh		$0.001554/kWh
Total Charge, Gas Plant			$0.000039/kWh

(Source) Logan (1999), Liu (2003)



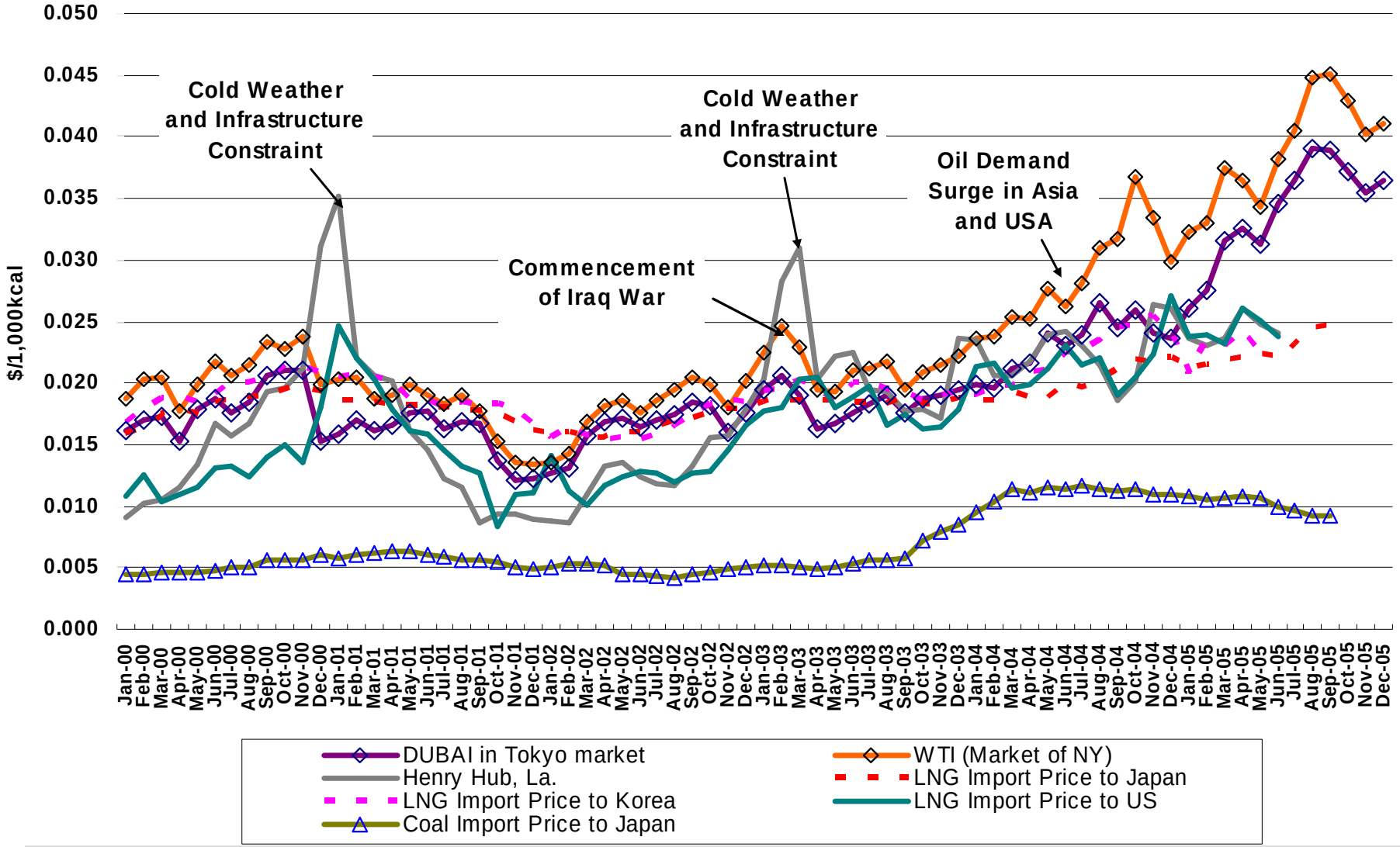
LNG Prices to Japan and China



(Source) APERC Analysis (2006)



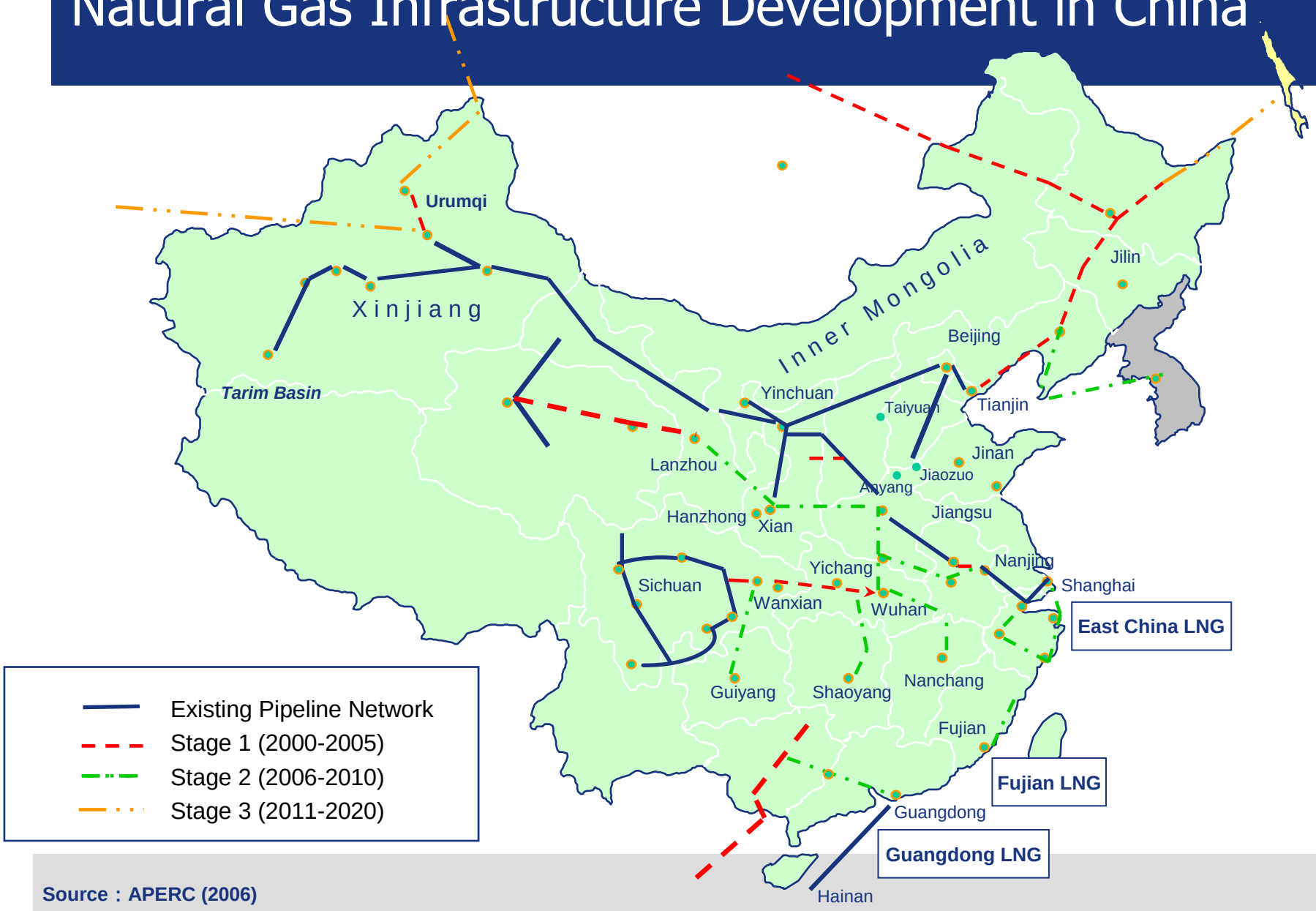
Rising Energy Prices (2000-2005)



Source : APERC (2006)



Natural Gas Infrastructure Development in China



Source : APERC (2006)

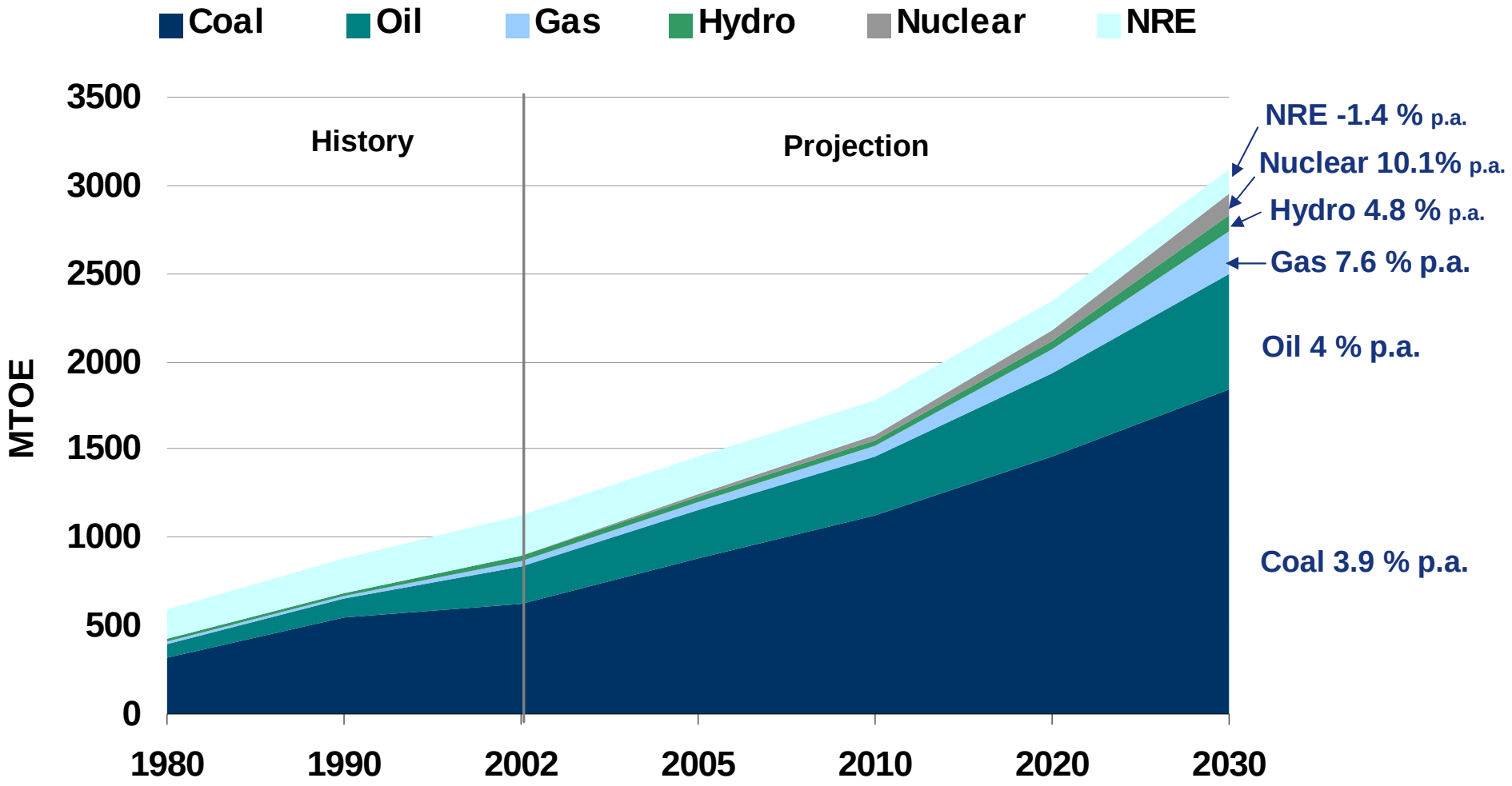


China's Natural Gas Infrastructure Development

- **West-East Project**
  - High cost project.
- **LNG Terminal Development**
  - Foreseeable high risks associated with LNG price and electricity tariff.
- **Gas Distribution Network Development**
  - More investment is needed from diverse investors
  - Rising world interest rate could increase financing cost substantially



Energy Demand and Supply Outlook for China

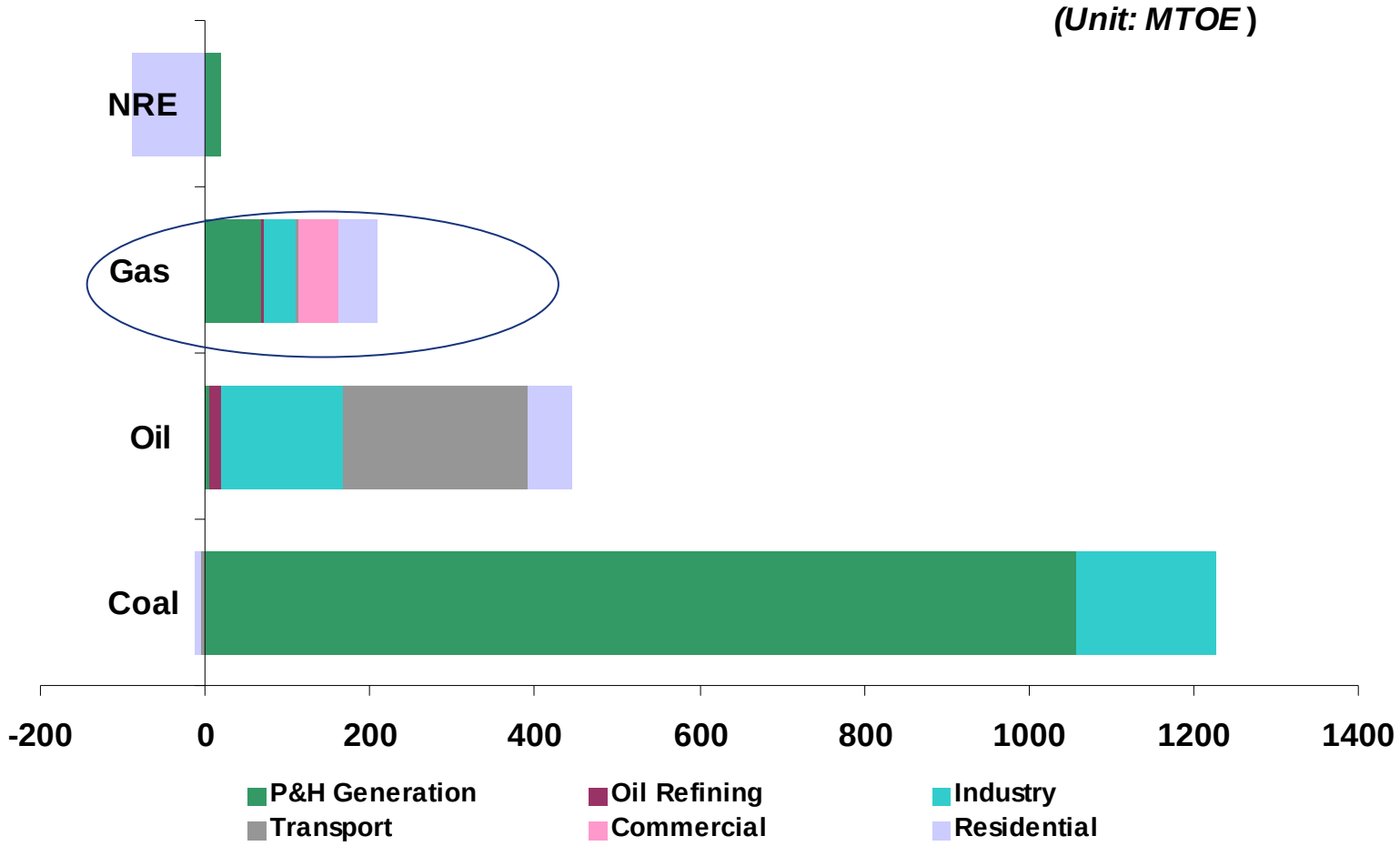


(Source) Asia Pacific Energy Research Centre (2006), "APEC Energy Demand and Supply Outlook", Forthcoming



Incremental Growth of Energy by Source (2002-2030)

Gas demand will be driven by electricity, industry and res/com sectors.



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



Implications

- **China gas market is at the crossroad**
  - Competition with coal – fears of pro-longed high oil price
  - Environment consideration taking a back seat due to energy security concerns
- **Prospect of uneven development of gas distribution network: urban vs. rural**
  - Connection fee
  - Need capital for the market development
- **Ultimately Chinese gas market development will be depending upon the economic growth**