



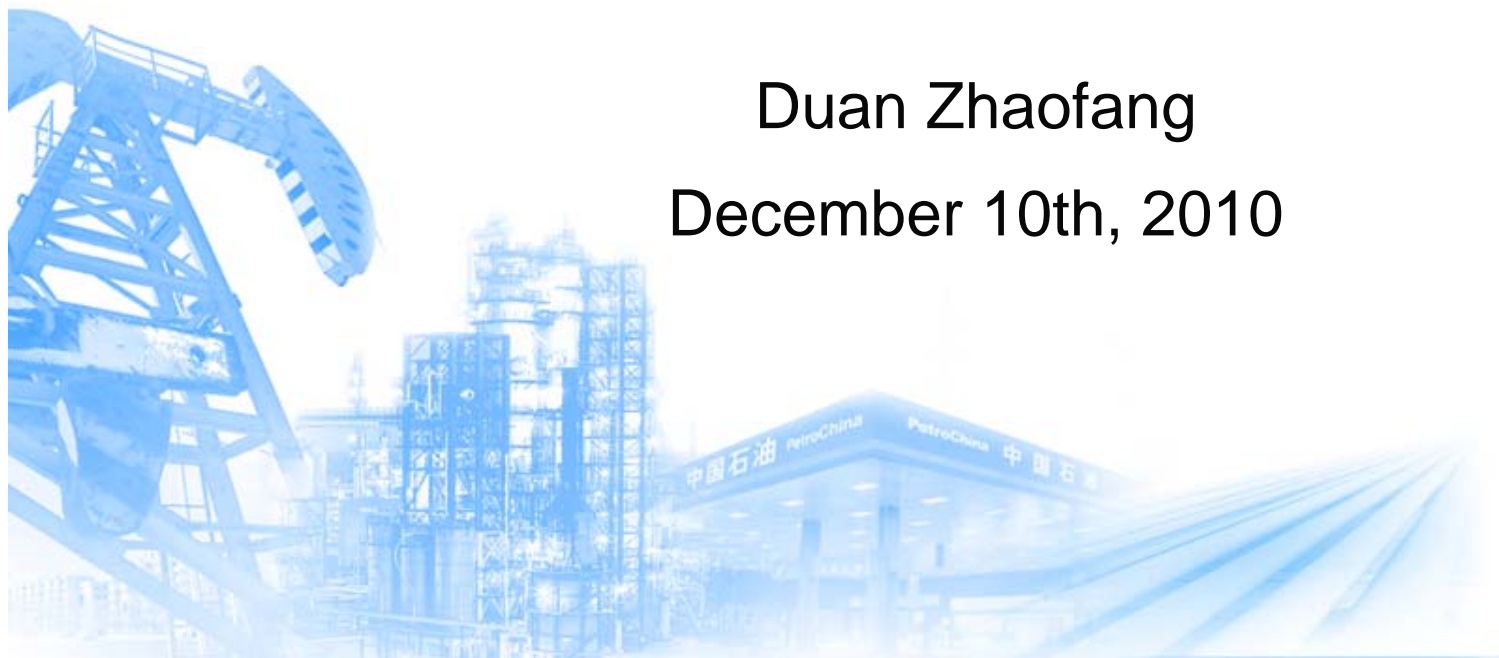
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Market Research

China's Natural Gas Market Outlook

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Outline



I The Important Role of China's Natural Gas

II The Current Status of China's Natural Gas industry

III Outlook for China's Natural Gas Demand

IV Outlook for China's Natural Gas Supply

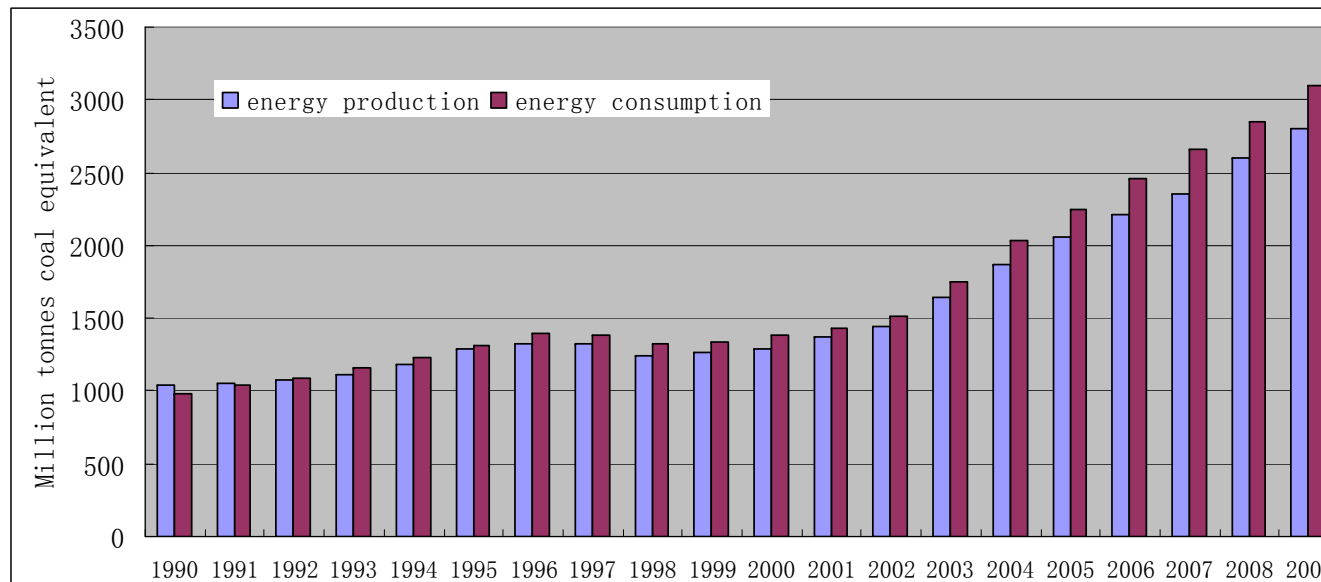
V Conclusions



I The Important Role of China's Natural Gas

1-1 Energy demand will maintain a rapid growth

- China is a country with huge energy production and consumption. In 2009, the total energy production amounted to 2.8 billion tce and consumption amounted to 3.1 billion tce. Nearly 10% of the energy consumption relied on import.
- In the following 10 years, energy demand will continue increasing. It is estimated that the energy consumption will exceed 4 billion tce by 2020 .



Energy consumption and production during 1990-2009 in China

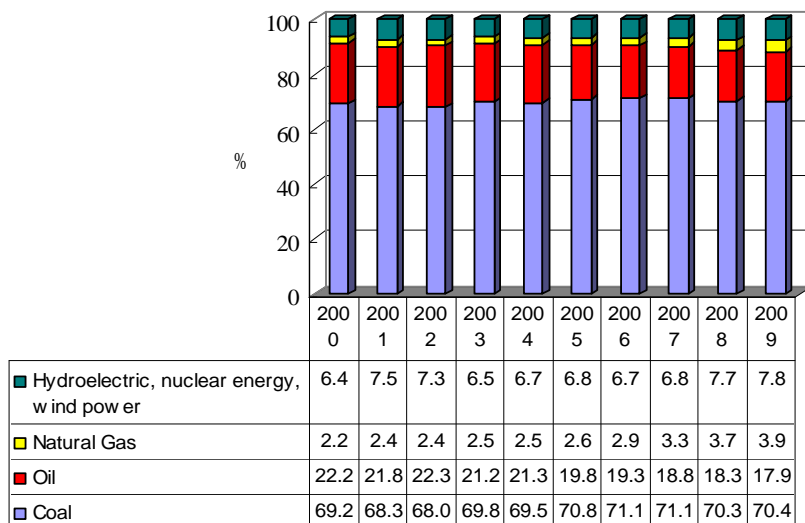


I The Important Role of China's Natural Gas

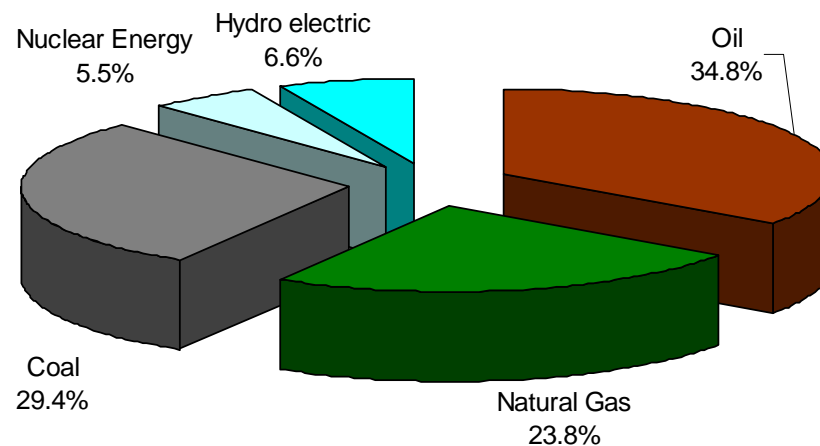
1-2 Coal dominated energy mix bring some pressure on the environment

➤ China's energy consumption mix has been dominated by coal. In 2009, the proportion of coal, oil, natural gas and hydropower, nuclear energy and wind power are 70.4%, 17.9%, 3.9% and 7.8% respectively.

➤ The developed countries have entered into the third energy revolution period of low-carbon, coal only accounts for 21% of the primary energy consumption. In addition, the average level of coal is 29.4% in the world.



China's energy consumption mix during 2000-2009



World primary energy consumption mix in 2009

I The Important Role of China's Natural Gas



1-3 It is an Inevitable choice to develop clean energy

➤ China attaches great importance to the development of clean energy. The new energy strategy is gradually using green diverse and low-carbon energy instead of coal.

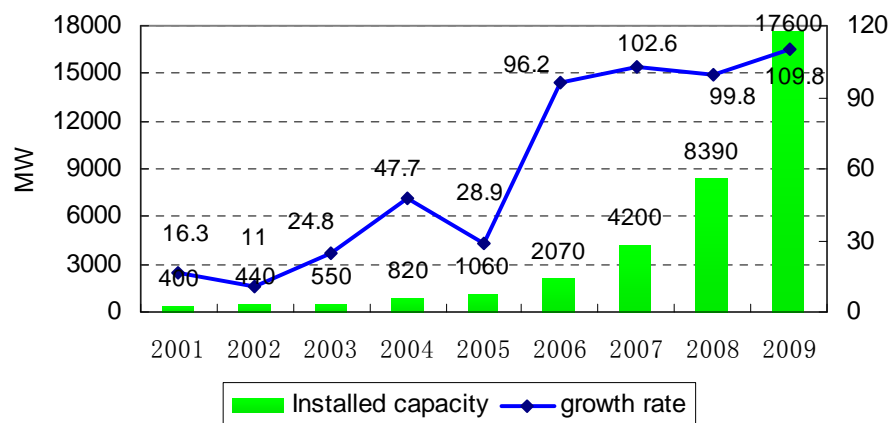
➤ China proposed the goal that non-fossil energy sources account for 15% of total primary energy consumption by 2020. In the Copenhagen meeting, China promised to cut carbon dioxide emissions per unit of GDP by 40% -45% from 2005 levels by 2020.



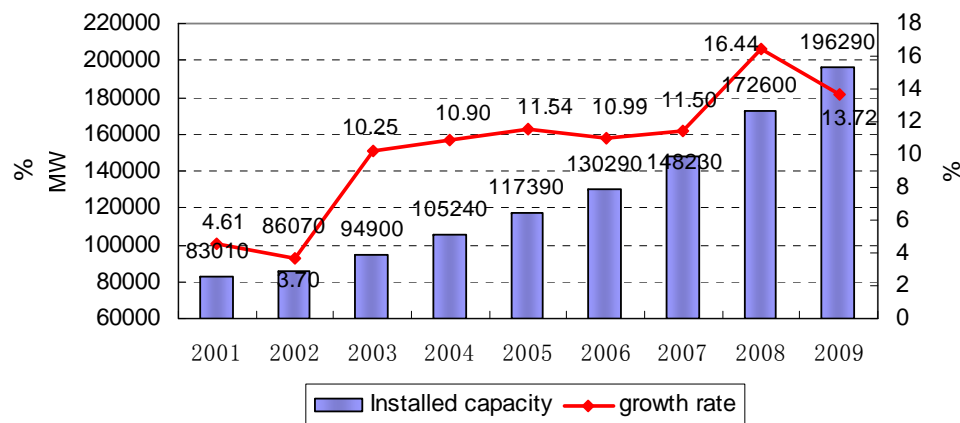
I The Important Role of China's Natural Gas

1-3 It is an Inevitable choice to develop clean energy

- China is energetically developing wind, hydropower, nuclear and other new and renewable energy. At the end of 2009, the capacity of grid-connected wind power is 17.6 million kilowatts, growing by 109.82%. Hydropower installed capacity is achieved to 196.29 million kilowatts, growing by 13.7%.
- In the 12th Five-year of energy planning draft, Chinese government states clearly to accelerate the development of natural gas.



Grid-connected wind power installed capacity in China during 2001-2009



Hydroelectric installed capacity in China during 2001-2009



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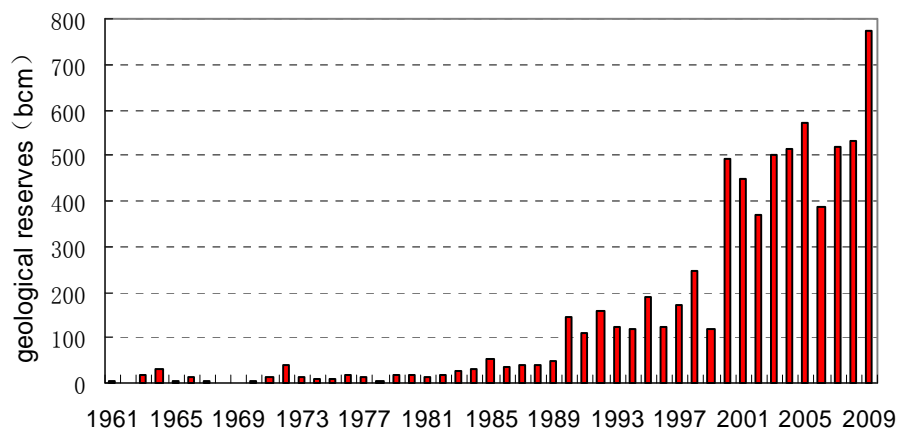
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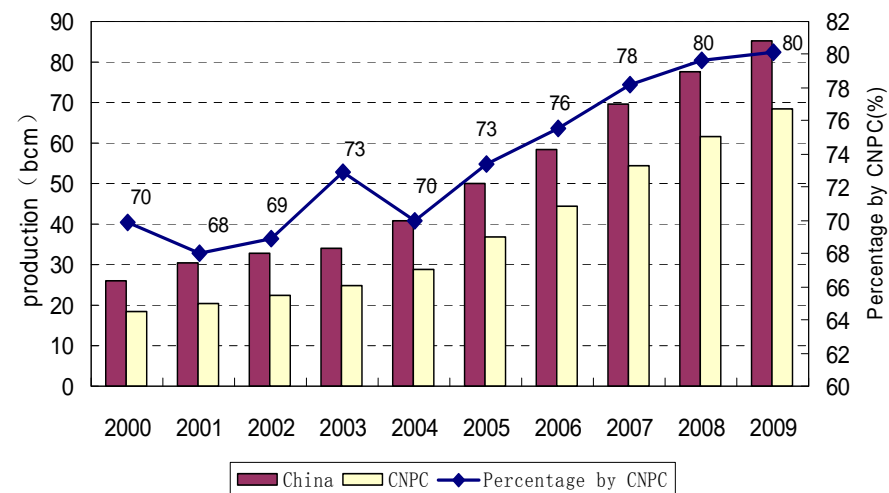
II The Current Status of China's Natural Gas industry

2-1 Proved gas reserves and production expand rapidly

- Since 2000, proved gas reserves have entered a peak growth period in China. Remaining recoverable reserves grew from 940.5bcm in 1998 to 3.8tcm in 2008, with annual growth of 257bcm. The reserve/production ratio has kept at a high level of 45, indicating a good reserve foundation for gas production growth.
- Since 2000, gas production in China has continued a rapid growth rate of 14% on average per year, which was 85.2bcm in 2009.



Annual new proved geological reserves During 1961-2009



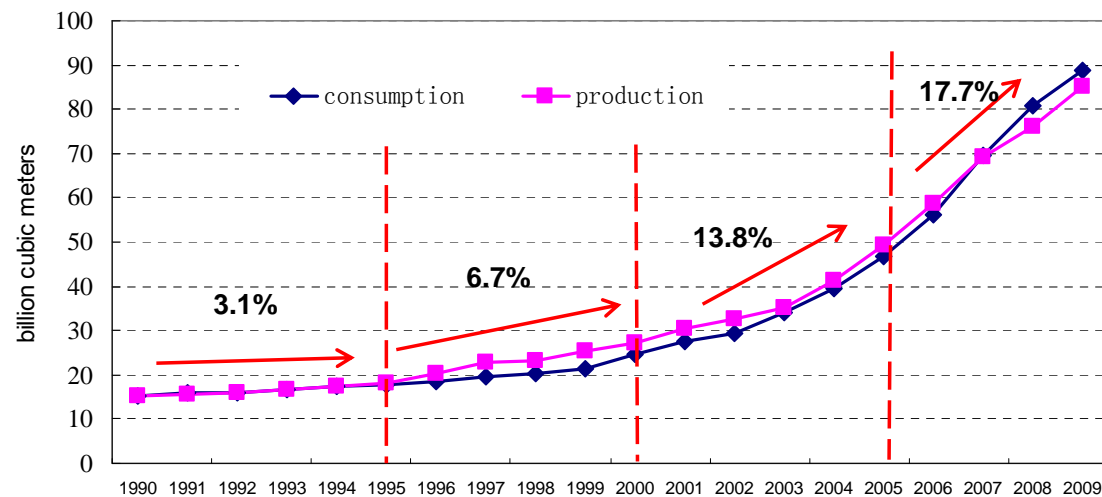
Natural gas production during 2000-2009



II The Current Status of China's Natural Gas industry

2-2 Consumption maintains a rapid growth

- In 2000-2009, China's natural gas consumption increased from 24.5 bcm to 88.7bcm, with annual growth rate of 15.4%. Annual average growth was 4.5bcm in 2000-2005, and 10.5bcm in 2005-2009.
- The share of natural gas in China's energy consumption mix increased from 2.4 % in 2000 to 3.8 % in 2009. Far lower than the average level of 23.8% worldwide, and lower than that of 27% and 11% in America and Asia.



Natural gas consumption growth during 1990-2009



II The Current Status of China's Natural Gas industry

2-3 Natural gas consumption by region

- Since 2000, Chinese gas consumption market has shifted from peripheral areas of gasfields to eastern economic developed areas.
- Natural gas consumption expands all provinces but Tibet. It is estimated that Qinghai oil field will supply LNG to Tibet in 2011.

Natural Gas Consumption by Region during 2000-2008 in China

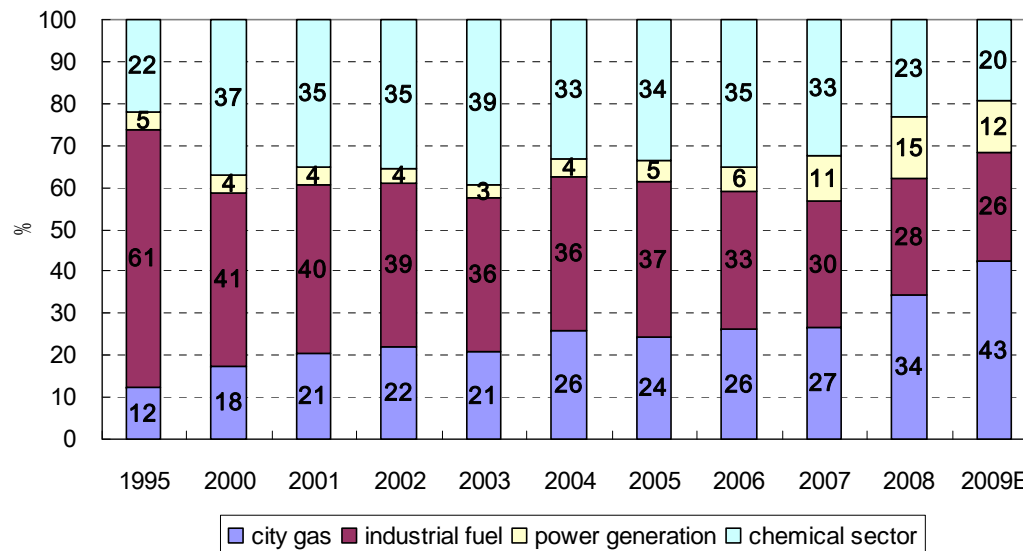
	1990	1995	2000	2005	2006	2007	2008
Yangtze River Delta	0.2%	0.1%	1.2%	7.4%	11.7%	12.7%	13.5%
Southeast Coast	0.0%	0.6%	2.9%	5.4%	6.9%	9.9%	10.1%
Central South	7.4%	5.7%	5.2%	6.8%	7.5%	7.4%	8.8%
Bohai Area	15.6%	14.0%	12.1%	14.7%	13.2%	13.5%	15.8%
Southwest	43.8%	44.3%	43.7%	29.4%	26.7%	23.3%	20.5%
Northwest	3.7%	7.2%	12.0%	19.0%	17.0%	14.4%	12.8%
Midwest	0.5%	0.6%	3.4%	7.5%	9.7%	11.7%	12.2%
Northeast	28.8%	27.5%	19.6%	9.8%	7.4%	7.2%	6.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

II The Current Status of China's Natural Gas industry



2-4 Consumption mix shifts toward diversification

- Before 2000, Chinese gas consumption is dominated by industrial fuel and chemical sector use.
- As the long-distance pipelines such as West-East Gas Pipeline are completed, the gas consumption mix changes greatly by 2009. City gas was up from 18% to 43%, industrial fuel was down from 41% to 26%, chemical sector use was down from 37% to 20%, power generation was up from 4% to 12%.



Natural gas consumption mix during 1995-2009



II The Current Status of China's Natural Gas industry

2-5 Construction of natural gas pipelines achieves great progress

- By the end of 2009, about 38,000km gas pipelines have been built in China, and the total transmission capacity is nearly 90bcm/year.
- In the coming 10 years, Newly-built pipelines are expected to be over 25,000km, forming the backbone of nationwide pipeline network.

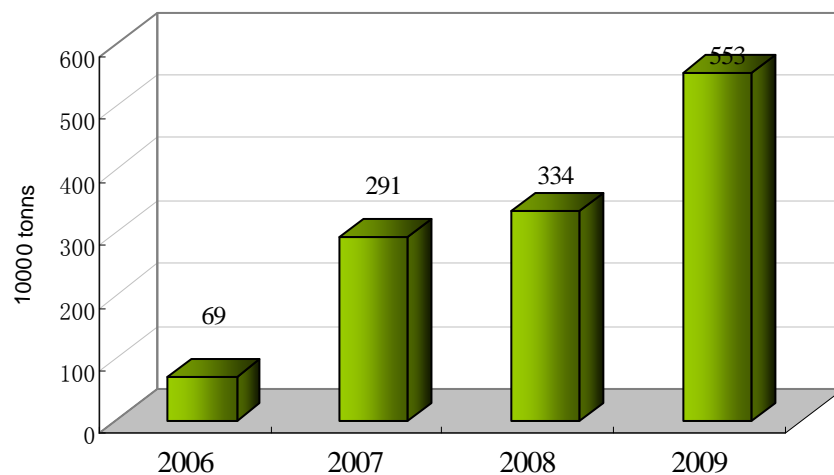




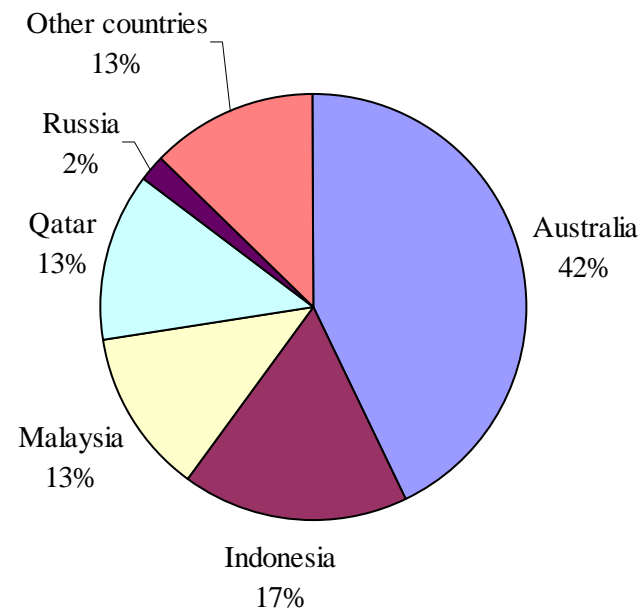
II The Current Status of China's Natural Gas industry

2-6 China is gradually accelerating its use of imported natural gas

- In 2006, China began to import LNG. In 2009, the imported natural gas amounted to 553MT, accounting for 8.3% of total consumption. It is estimated that the total import volume will exceed 900 MT in 2010.
- At the end of 2009, China began to import Central Asian gas and expected to import 4.8bcm in 2010. The scale of overseas natural gas is expected to reach 90bcm by 2020.



Imported LNG during 2006-2009 in China



Importing countries during January-October 2010 in China

II The Current Status of China's Natural Gas industry



2-7 China's Natural Gas industry has entered a high speed development period

- Natural gas industry has been paid much attention
- Proved gas reserves and production expand rapidly
- Great changes have taken place in Chinese Natural Gas market
 - ✓ From start-up period to expansion period
 - ✓ Natural gas demand grows substantially
 - ✓ Natural Gas consumption mix shifts toward diversification
- The source of gas supply is in the period toward diversification
- Gas pipeline and Storage Facilities have been into the peak of building period. Regional pipeline network is forming.



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III Outlook for China's Natural Gas Demand

3-1 Scenario planning

- Natural gas demand will be affected by multiple factors such as economic growth, social development, resources, infrastructure and national policy. Based on Input-Output Model, China's natural gas demand is predicted with three scenarios, i.e., Reference, high growth, low growth.

Scenario	Description
Reference Scenario	<ul style="list-style-type: none"> ✓ Policy for natural gas utilization is relaxed ✓ Price mechanism of natural gas is improved gradually ✓ Other policies and implementation strength remain unchanged
high growth Scenario (Low-carbon)	<ul style="list-style-type: none"> ✓ With increasing pressure on emission reduction, government adopts strong policies and measures to promote clean and low-carbon development ✓ The share of energy intensive industry drops rapidly ✓ High-efficient and clean energy technology is developed more rapidly, energy utilization structure and mode are changed more quickly, and gas-fired generation and distributed energy system are applied more widely
Low growth Scenario (extensive growth)	<ul style="list-style-type: none"> ✓ The problems of economic structure are accumulated and development mode is not changed efficiently ✓ New emission reduction policies are not implemented, and the implementation strength of current policies is insufficient, which is reflected in slow decline of the share of carbon intensive sectors, and slow growth of the share of clean energy



III Outlook for China's Natural Gas Demand

3-2 Main input variables

Variable	scenario	2010	2015	2020	2030	
Economic growth	high growth	7%			6.5%	
	Reference	8%			6%	
	Low growth	9.5%			5%	
Population	Three scenarios	13.6	14	14.35	14.7	
urbanization rate	high growth	47.7%	54.0%	60.0%	67.0%	
	Reference	47.7%	53.0%	58.0%	64.0%	
	Low growth	47.7%	52.0%	56.0%	61.0%	
Industry structure	High growth	Primary industry (%)	10.7	9	7.5	5.7
		Secondary industry (%)	47	48	47.2	41.3
		tertiary industry (%)	42.3	43	45.3	53
	Reference	Primary industry (%)	10.7	9	7.5	4.8
		Secondary industry (%)	47	48	47.5	42.9
		tertiary industry (%)	42.3	43	45	52.3
	Low growth	Primary industry (%)	10.7	9	7.5	4
		Secondary industry (%)	47	48.9	49.5	44.5
		tertiary industry (%)	42.3	42.1	43	51.4

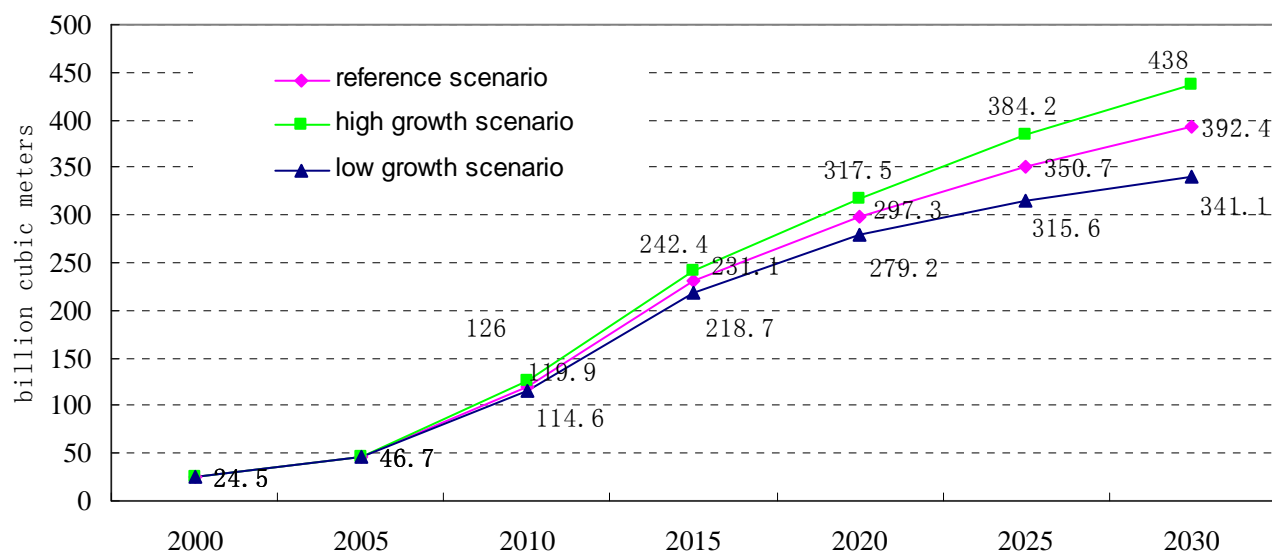


III Outlook for China's Natural Gas Demand

3-3 Forecast results Analysis

1. China's Natural Gas Demand will keep a rapid growth by 2030

- 2010-2030, the rates of China's Natural Gas Demand are 6.1%, 6.4% and 5.6%.
- In the Reference Scenario, Natural Gas Demand accounts for 9.2% of the primary energy consumption in 2020 and 10% in 2030. In the following 10 to 15 years, China will form completed Natural Gas industry system.



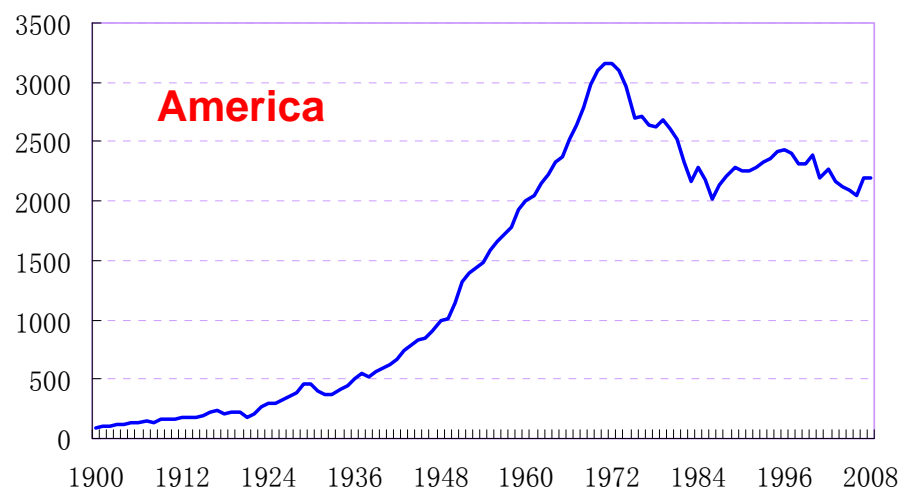
Outlook for natural gas demand by 2030



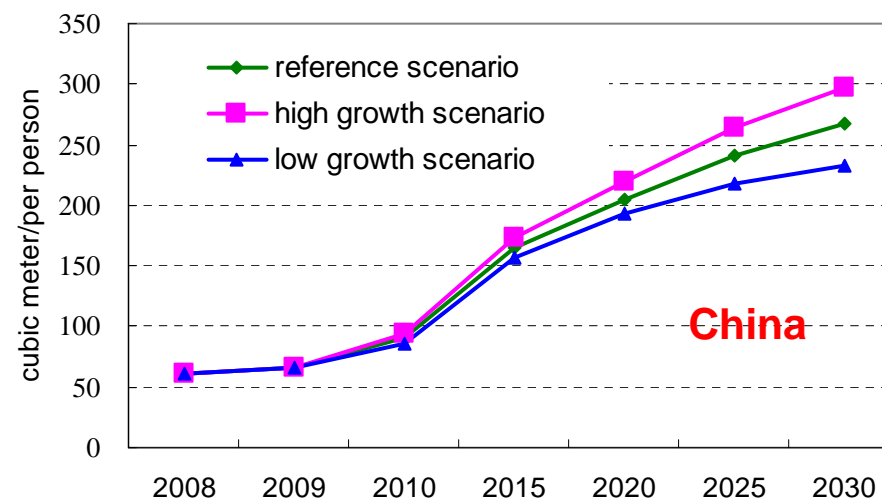
III Outlook for China's Natural Gas Demand

2. Natural gas demand per capita will grow rapidly by 2030, but will be still far lower than the level of developed countries

- In 2009, China's consumption was 66.5m³/per capita, The USA's consumption was 2,106m³/per capita, while the world's consumption was 434m³/per capita.
- In reference scenario, China's consumption will amount to 207m³/per capita by 2020, and will amount to 267m³/per capita by 2030.



Natural gas consumption per capita in America(cubic metre/ per capita)



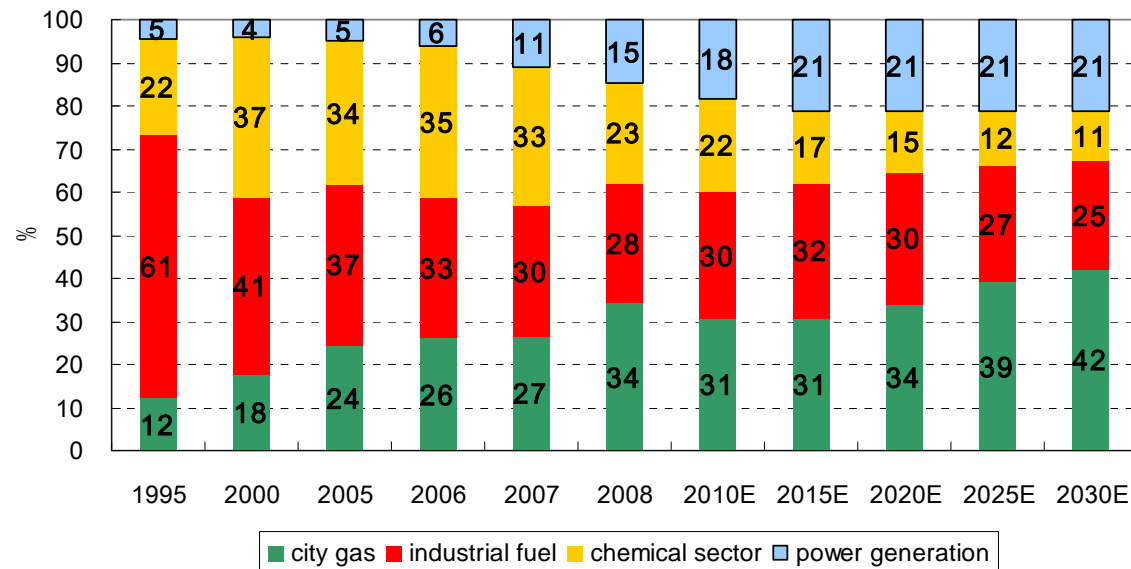
Natural gas consumption per capita in China



III Outlook for China's Natural Gas Demand

3. The share of city gas and gas for power generation will grow, while the share of gas for chemical industry will decline

- By 2030, city gas will represent about 42%, and residential gas consumption will represent 63.6%. With increase of city gas, the daily and seasonal peak-shaving pressure will continue to rise; and for stable gas supply, it is necessary to develop interruptible users and storage capacity.



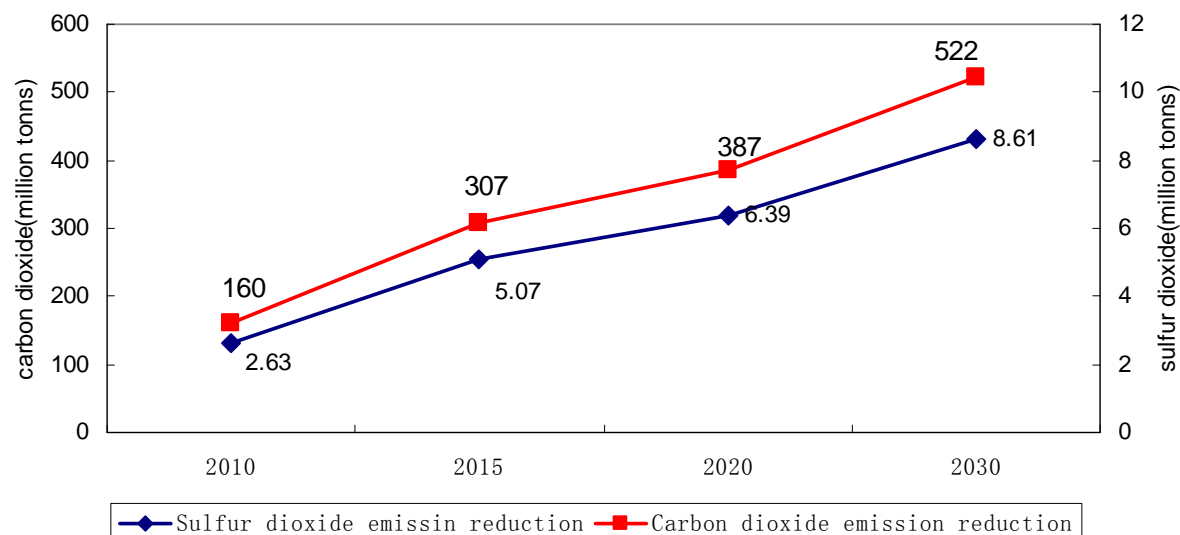
Natural gas consumption mix during 1995-2030 in China



III Outlook for China's Natural Gas Demand

4. As a high-quality clean energy, natural gas will play an important role in promoting energy saving and emission reduction

- During 2010-2020, cumulative natural gas consumption will reach 2.39 tcm. Assuming that all the gases are used to replace coal, cumulative CO₂ reduction will amount to 3.37 billion tons, and SO₂ reduction will amount to 52.42 million tons.



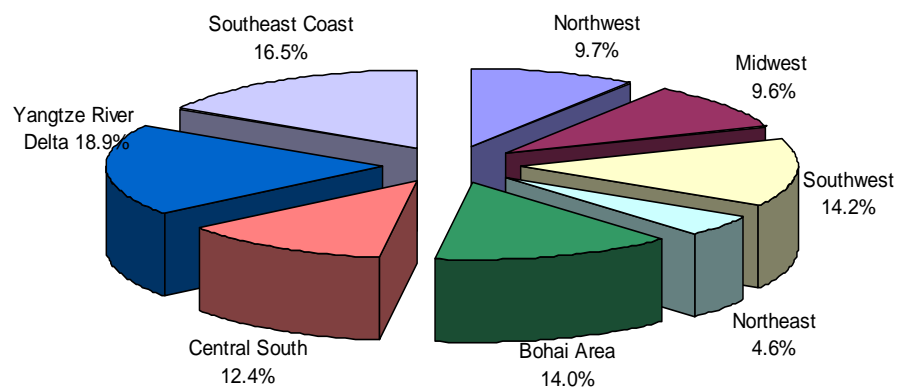
Carbon dioxide and Sulfur dioxide emission reduction by 2030



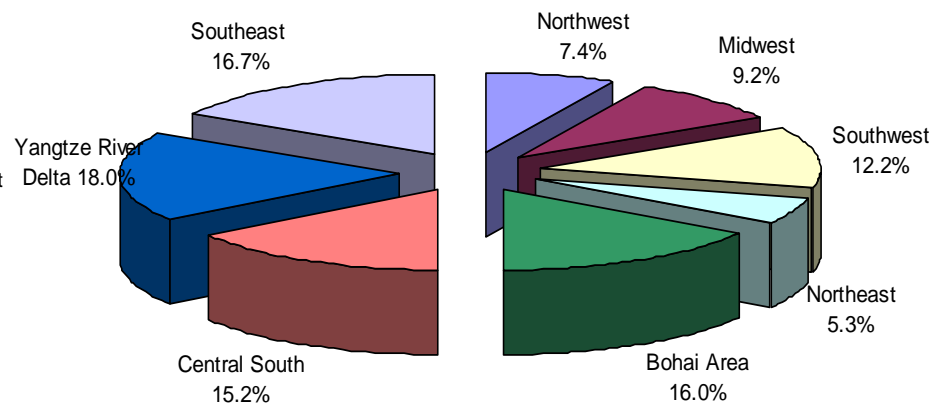
III Outlook for China's Natural Gas Demand

3-4 Demand Forecast by region

- In the future, China's natural gas demand will show terraced distribution. By 2030, Yangtze River Delta, Southeast Coast, Bohai Area, and Central South will be the main demand areas, which account for 66% of total demand.
- The Central South Area will have the fastest growth of natural gas demand from 5.2 bcm in 2007 to 57.6 bcm in 2030, with annual average growth of 11%.



Natural gas demand by region in 2015

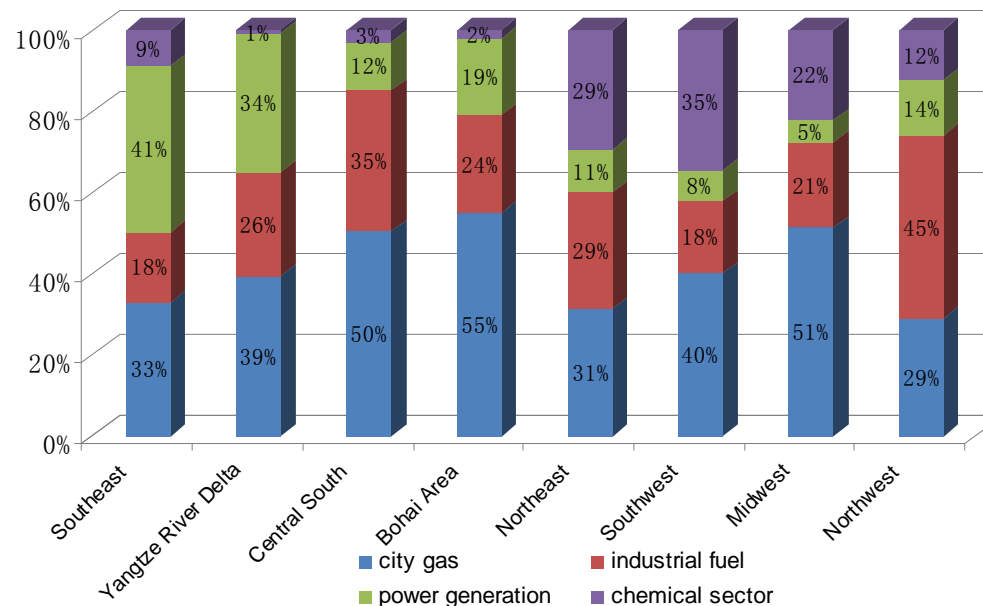


Natural gas demand by region in 2030



III Outlook for China's Natural Gas Demand

➤ By 2030, Bohai Area, MidWest and Central South will form consumption market dominated by city gas; Northwest will form the industry-oriented market; the Southeast Coast and Yangtze River Delta will form the diversified urban clean market; and the resources areas such as Southwest, Northeast and Central West areas will have a big share of gas for chemical industry.



Natural gas consumption mix by region in 2030

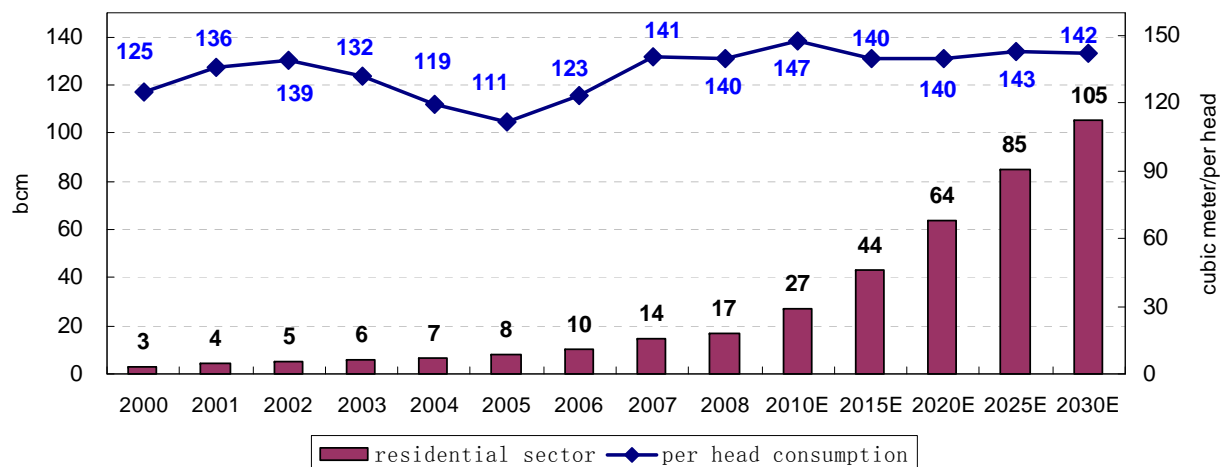


III Outlook for China's Natural Gas Demand

3-5 Demand Analysis for Key Gas Consumption Sectors

1. Residential gas consumption grows rapidly, and the per capita gas consumption is stable

- The total residential gas consumption grows from 3.2 bcm in 2000 to 13.3bcm in 2007, with annual average growth rate of 22%.
- In the future, residential gas consumption will grow rapidly to reach 64bcm and 105.4bcm by 2020 and 2030 respectively. Per capita consumption will keep at about 14bcm in 2020 and 2030.



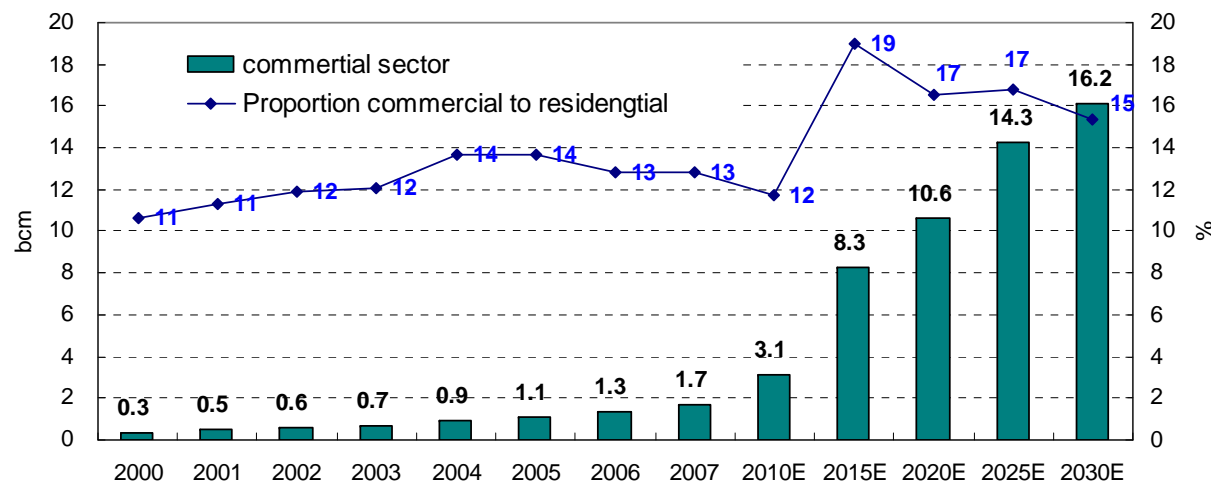
Residential natural gas consumption during 2000-2030



III Outlook for China's Natural Gas Demand

2. Commercial gas consumption grows simultaneously with residential gas

- In 2000-2007, commercial gas consumption grew from 0.34bcm to 1.71bcm, with annual average growth of 25.8%.
- With popularization of city gas network and promotion of gasification rate, the commercial gas consumption keeps a rapid growth rate, to reach 16.2bcm by 2030, and the ratio between commercial gas consumption and residential gas consumption rises to about 17%.



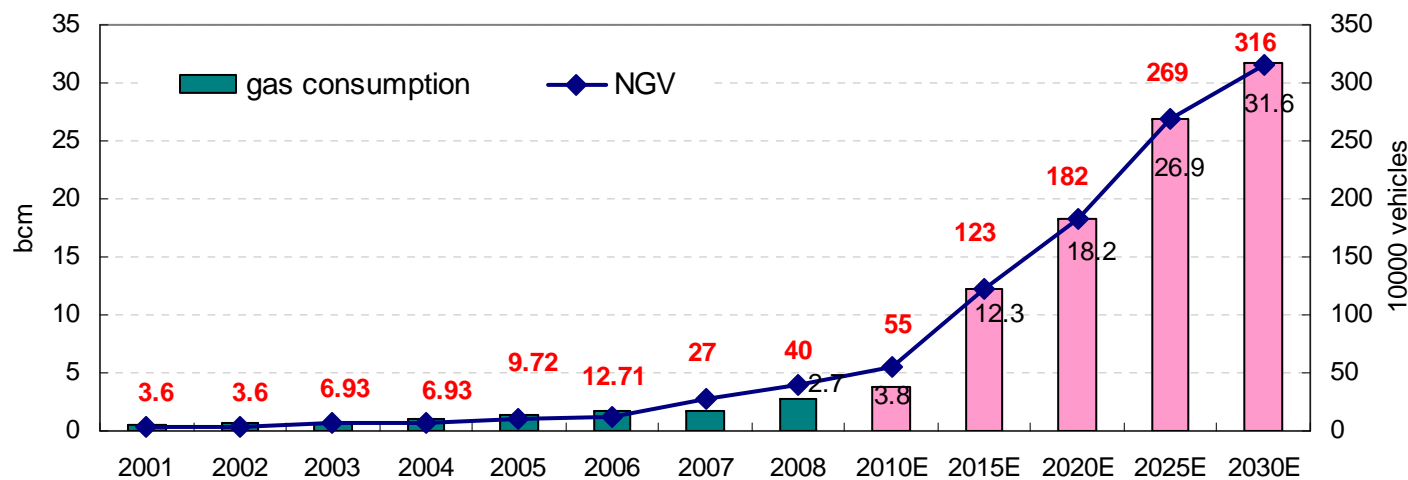
Commercial natural gas consumption during 2000-2030



III Outlook for China's Natural Gas Demand

3. Natural gas for transportation sector grows rapidly

- By 2008, China had about 400,000 NGV vehicles. From 2000 to 2008, gas consumption rose from 0.58bcm to 2.7bcm, with annual average growth of 21%. The main reason is that gas price has a strong advantage over oil price.
- In the future, with the growth of domestic gas production and import of natural gas resources, natural gas for transportation will grow rapidly to reach 31.6bcm by 2030, representing 8% of national total natural gas consumption.



transportation sector natural gas consumption during 2000-2030

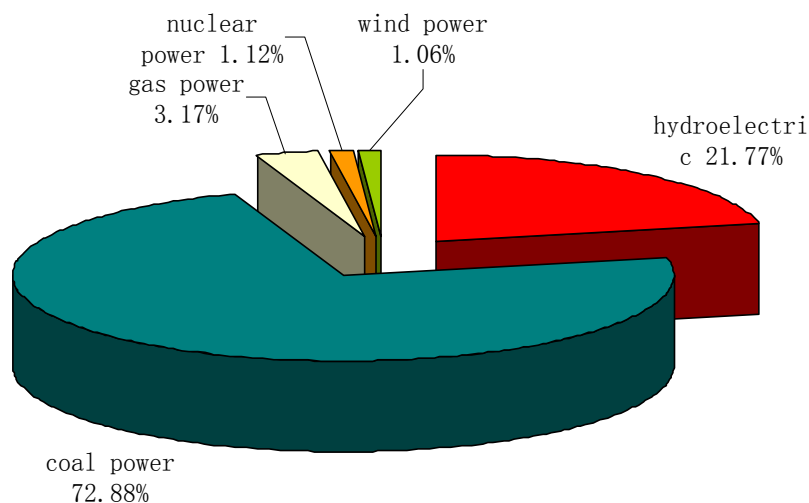


III Outlook for China's Natural Gas Demand

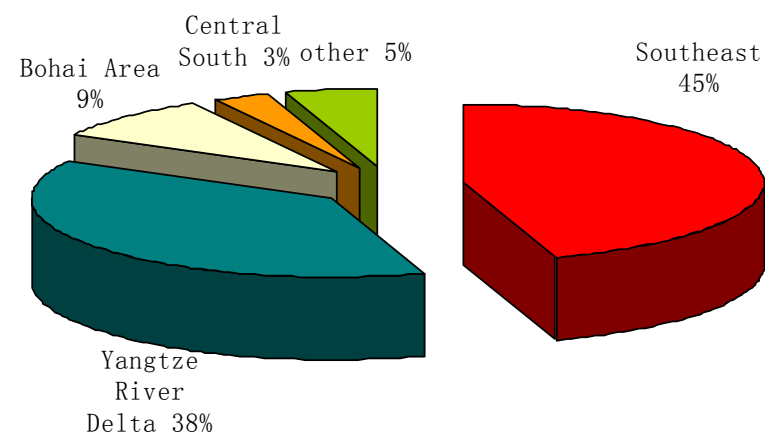
4. Gas-fired Power Generation

➤ During 2000-2008, China's installed power capacity has grown rapidly amounting to 792,930MW, with annual average growth rate of 12%. Gas-fired unit was 25,140MW, accounting for 3.2% of total.

➤ Bohai Area, Central South, Yangtze River Delta and Southeast are key areas for gas-fired generation in China.



Power installed capacity structure in 2008 in China

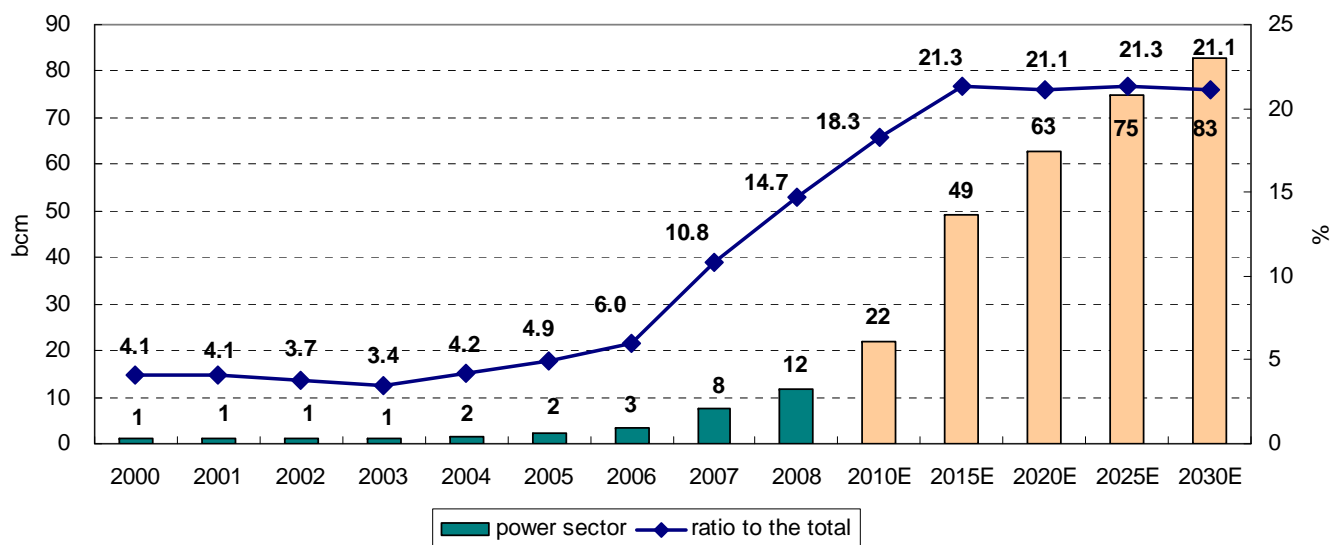


Gas Power installed capacity by region in 2008



III Outlook for China's Natural Gas Demand

- The gas consumption for power generation grew rapidly to 11.9bcm in 2008, accounting for 14.7% of national total gas consumption.
- In the future, gas consumption for power generation will accelerate by 2015, with its share in national total consumption up to 21%. After 2015, the gas consumption for power generation will grow stably, with its share in national total consumption keeping at about 21%.



Natural gas consumption for power sector during 2000-2030

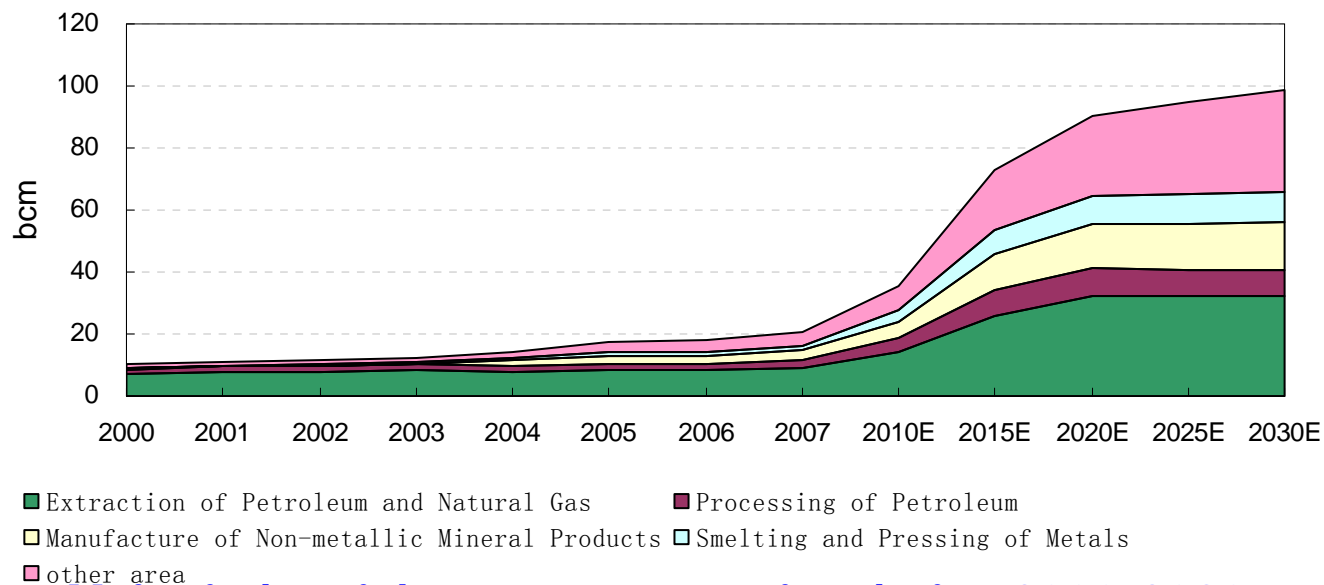


III Outlook for China's Natural Gas Demand

5. Industrial Fuel

➤ Since 2000, gas consumption for industrial fuel has grown from 10.1bcm to 20.8bcm in 2007. The consumption of industrial fuel is concentrated in the four sectors of oil & gas production, petrochemical industry, construction materials and metallurgy.

➤ In the future, gas consumption for industrial fuel will grow rapidly to 99bcm by 2030, and the application will be extended to multiple sectors.



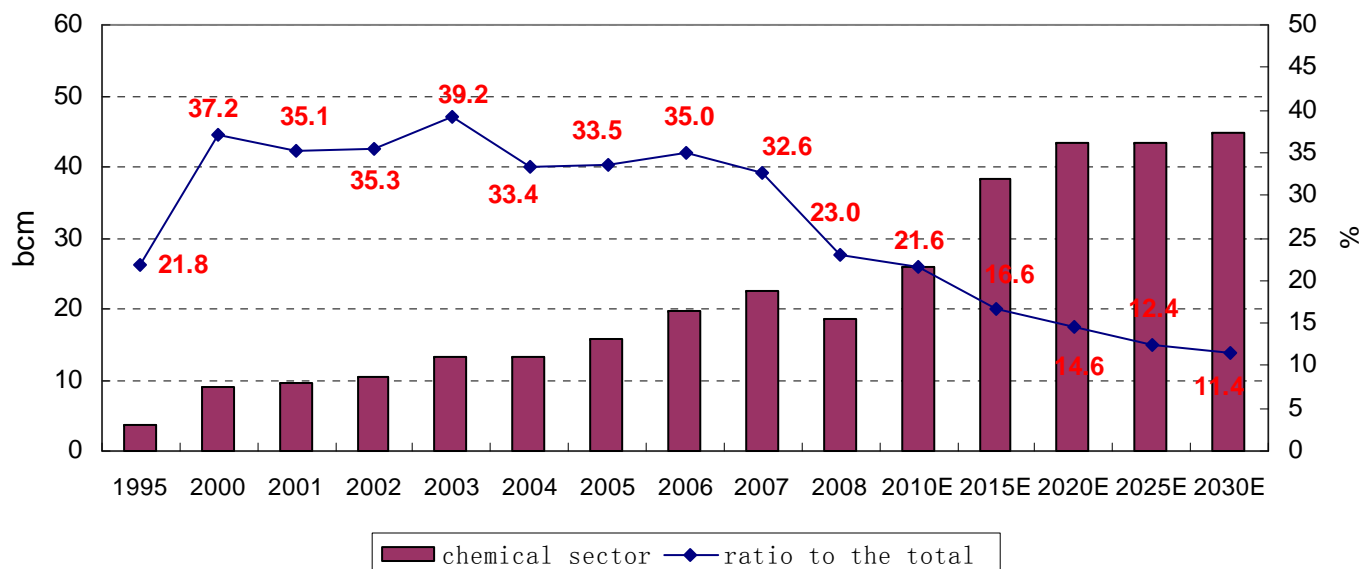
Major industrial sector consumption during 2000-2030



III Outlook for China's Natural Gas Demand

6. Natural Gas for Chemical Industry

- In the recent years, China's synthetic ammonia and methanol output with natural gas as the raw materials has continued to grow. Natural gas consumption for chemical industry has increased from 9.1bcm in 2000 to 18.6bcm in 2008.
- In the future, gas consumption for chemical industry will grow stably and will keep a stable level after 2020, and its share in national total gas consumption will decline to 11.4% in 2030.



Natural gas for chemical industry during 2000-2030



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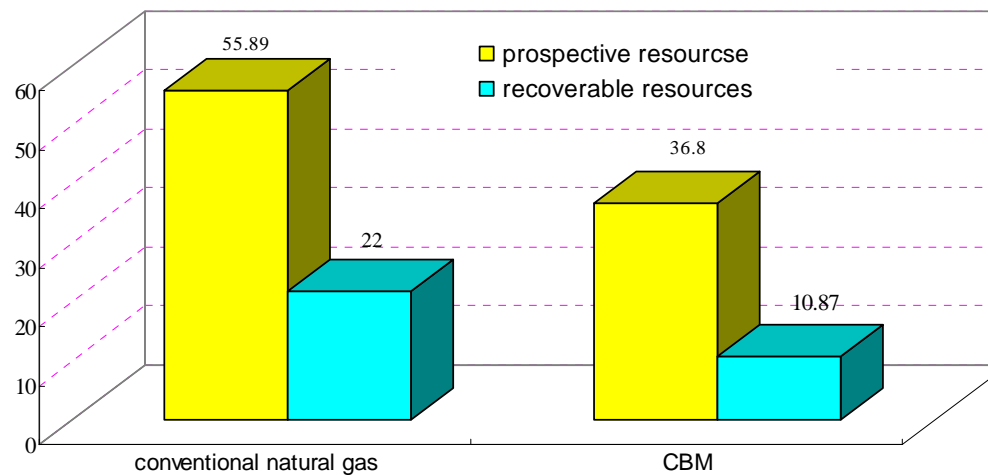
V Conclusions



IV Outlook for China's Natural Gas Supply

4-1 China has abundant natural gas resources

- The prospective resources and recoverable resources of conventional gas are 56 tcm and 22 tcm respectively, and the proved rate is 19.3%.
- China has abundant non-conventional natural gas resources, among which, the prospective resources of CBM is 36.8tcm, the resources of shale gas is 30.7tcm. Resources of water-soluble gas and gas hydrate is estimated to reach 72tcm.



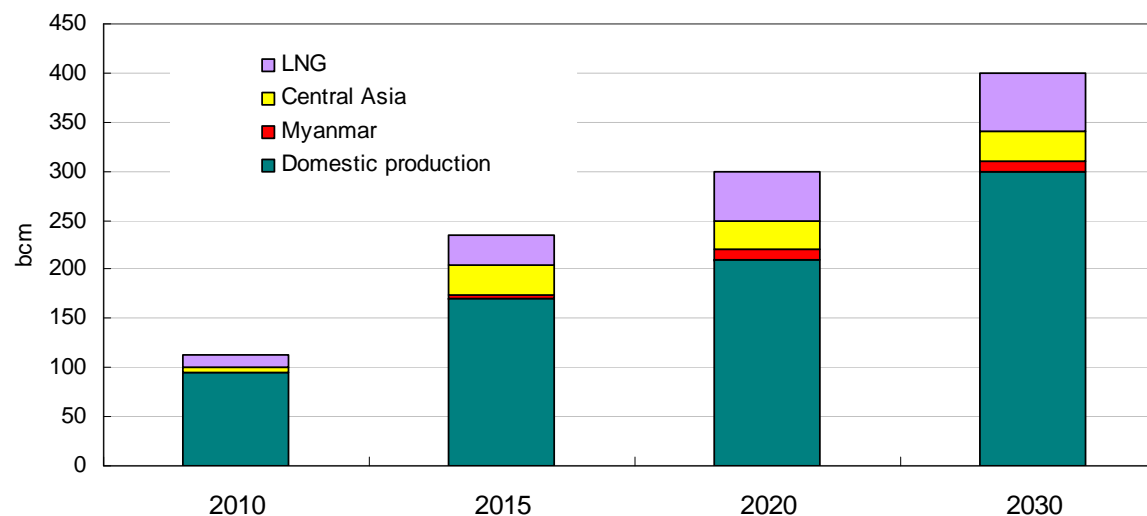
Natural gas resources in China



IV Outlook for China's Natural Gas Supply

4-2 The domestic-dominated gas supply pattern takes shape

- China's natural gas supply will amount to about 300bcm By 2020, among which domestic natural gas production will amount to 210bcm; the import volume will reach 90bcm, and play an important role in China's diversified gas supply mix. By 2030, the potential supply volume will reach 400bcm.



Outlook for natural gas supply in China



Conclusions

- Since 2000, China's natural gas industry has entered a fast growth period. China's natural gas industry will keep a fast growth by 2030; natural gas demand is estimated to reach 300bcm by 2020, and 400bcm by 2030.
- China's natural gas consumption mix will be further improved. City gas and power generation consumption will grow rapidly, while the share of natural gas for chemical sector will decline greatly. China's natural gas demand will show terraced distribution.
- China has the resources foundation to support fast growth of natural gas industry. National gas production will amount to 95bcm, 210bcm and 300bcm by 2010, 2020 and 2030 respectively. In the future, China will form a natural gas supply pattern dominated by domestic natural gas.

Thank you

