



# The Role of Natural Gas in China's Energy Revolution

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# Content

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1. Current Situation of Natural Gas in China

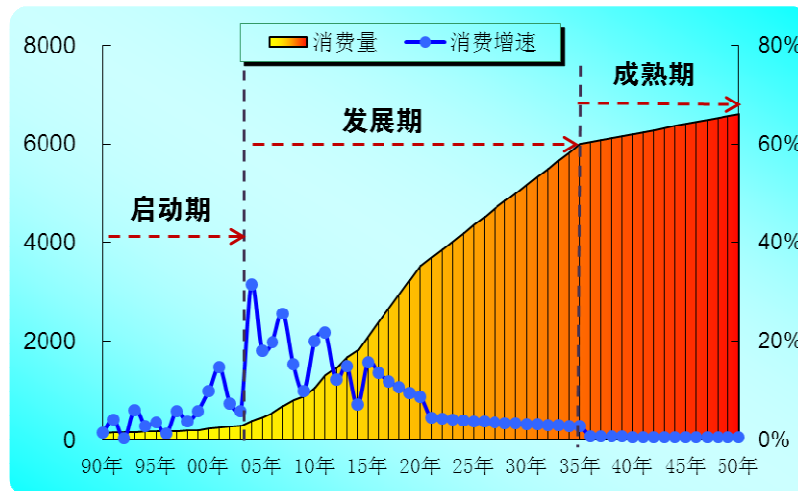
2. Problems and Challenges of Natural Gas in  
China

3. Utilization Direction and Outlook of  
Natural Gas

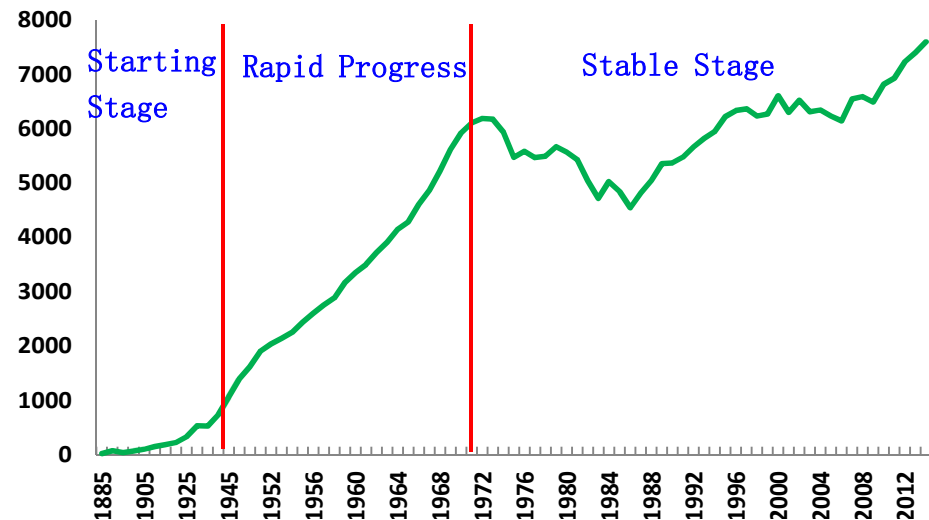
# 1. Current Situation of Natural Gas in China

## 1.1 Progress Stage:

- Start from the “Xiqidongshu” completed in 2004
- From 2005 to 2013, annual consumption increased 14.8 billion m<sup>3</sup>, and the grows rate was 17.1%
- From 2013 to 2016, annual consumption increased 11.7 billion m<sup>3</sup>, and the grows rate was 6.5%



Progress Stages of Natural Gas in  
China (100 Million m<sup>3</sup>)



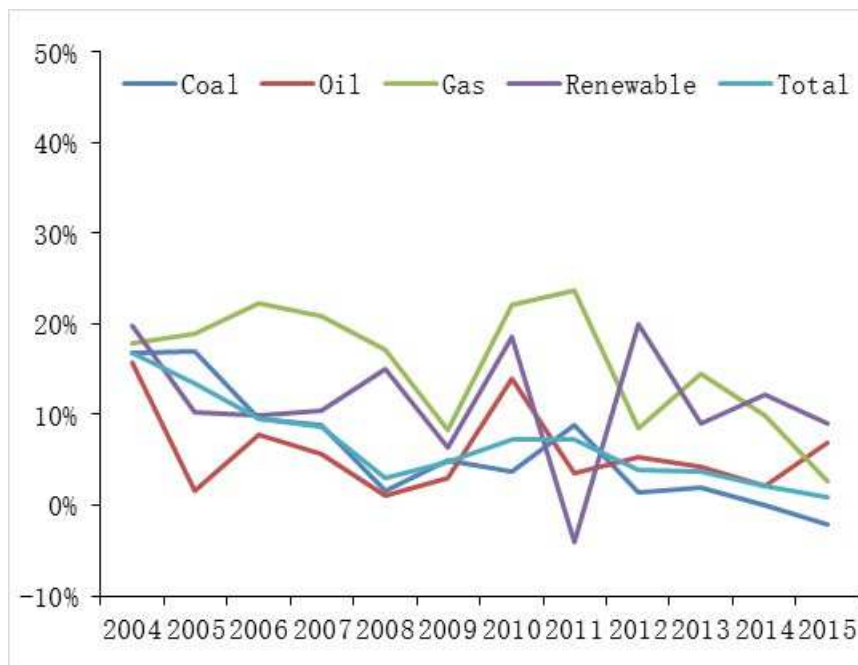
Progress Stages of Natural Gas in the USA  
(100 Million m<sup>3</sup>)



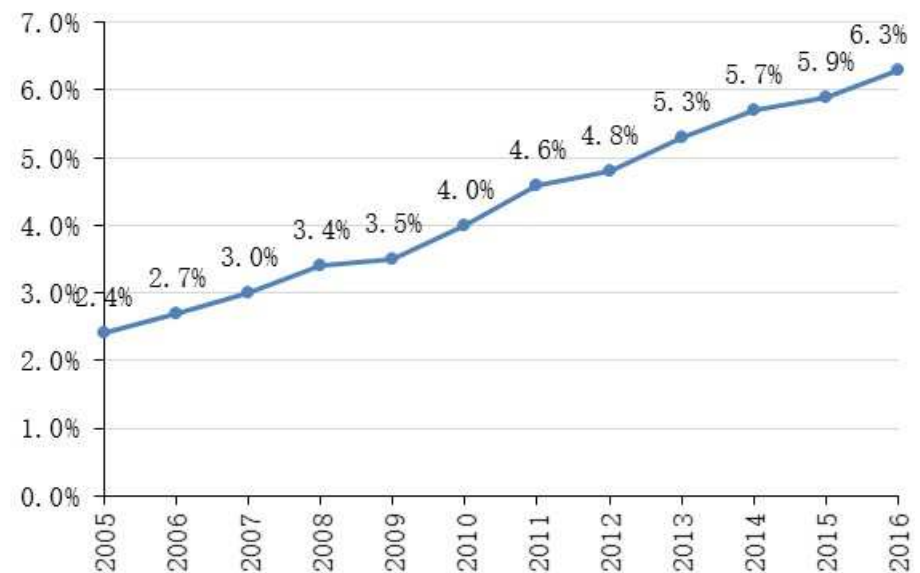
# 1. Current Situation of Natural Gas in China

## 1.2 Consumption: Increased Fast, But still low in Energy Mix

- From 2005 to 2015, annual growth rate of gas was 16.0%, 2 times more than the total energy consumption (5.1%)
- Gas in Energy Mix increased from 2.4% in 2005 to 6.3% in 2016, much lower than the world average (24%)



Energy Consumption Growth Rate in China



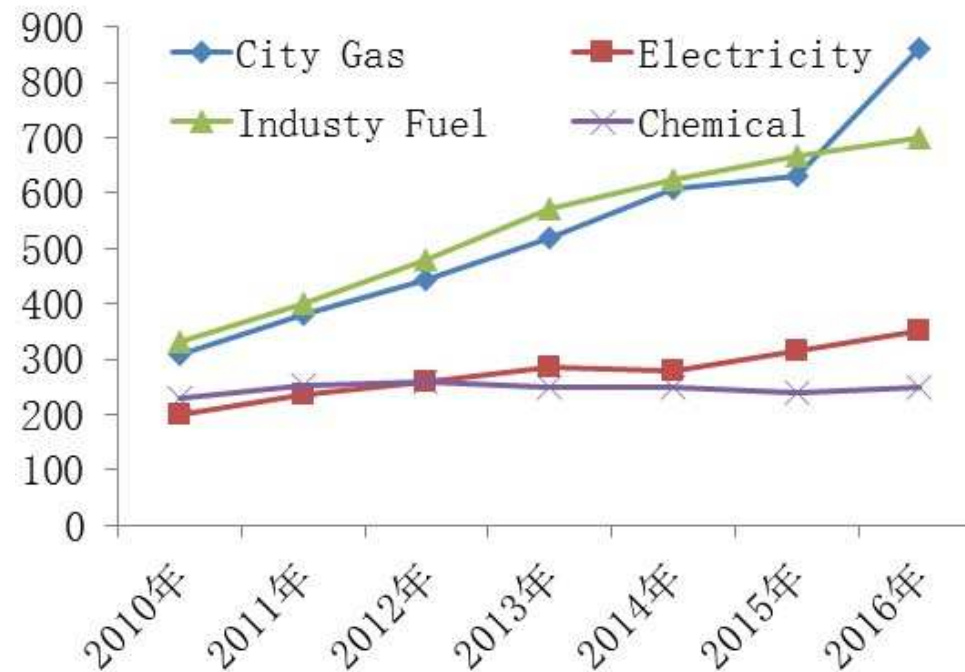
Natural Gas proportion In Energy Mix



# 1. Current Situation of Natural Gas in China

➤ Consumption Structure: 70% in Industry fuel and City gas

- In 2016, Industry fuel account 28.9%, City gas 41%, Electricity 17.4%, Chemical 12.8%



Natural Gas Consumption Structure

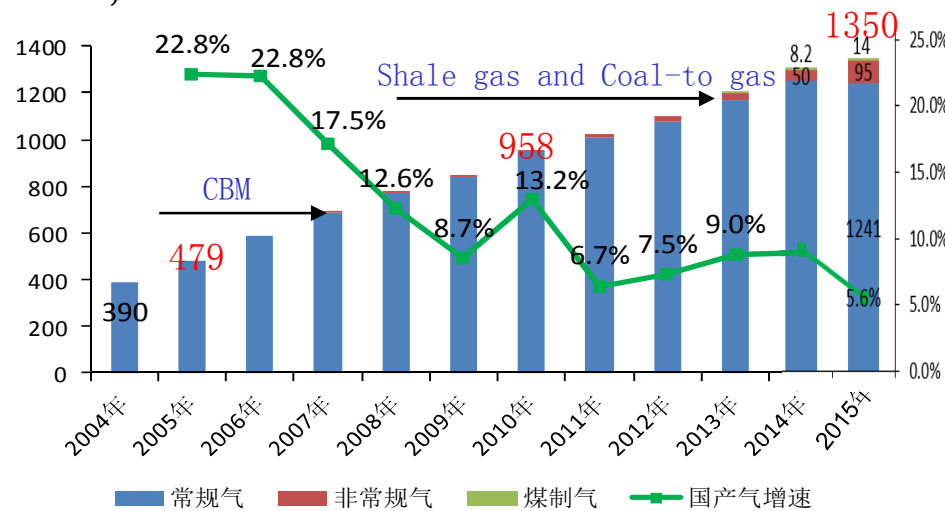
(100 Million m<sup>3</sup>)



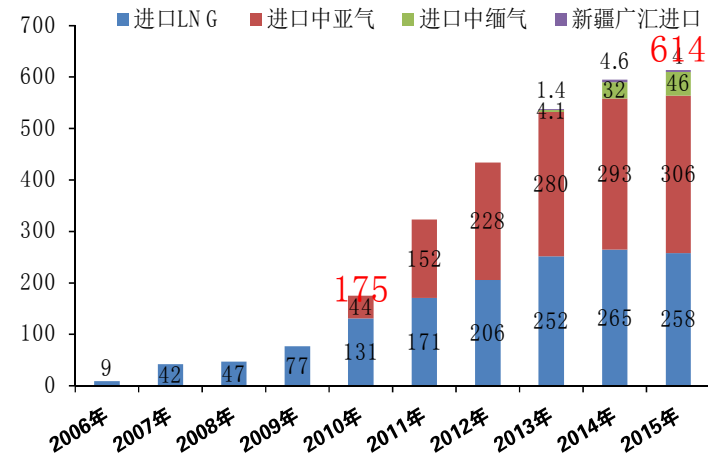
# 1. Current Situation of Natural Gas in China

## 1.3 Supply

- Domestic: Conventional, Unconventional (including shale gas and CBM), and Coal-to-gas. In 2015, Domestic gas was **135 billion m<sup>3</sup>**. The average growth rate from 2004 to 2015 was 12%.
- Import: include pipeline and LNG, from more than 10 countries. In 2015, the import gas was **61.4 billion m<sup>3</sup>**, in which pipeline 35.6 billion m<sup>3</sup>, and LNG 25.8 billion m<sup>3</sup>



Domestic Production(100 Million m<sup>3</sup>)



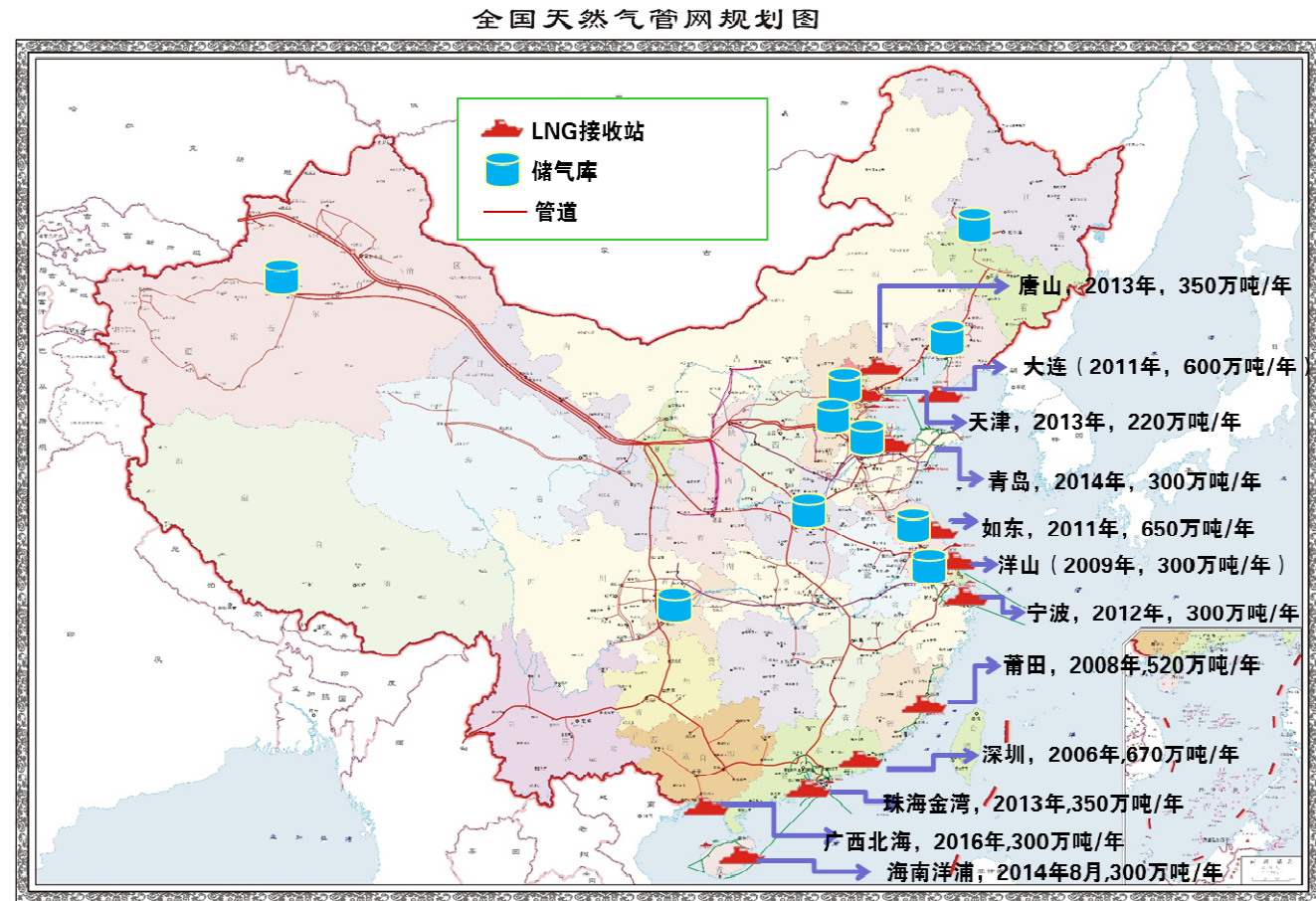
Import Volume(100 Million m<sup>3</sup>)



# 1. Current Situation of Natural Gas in China

## 1.4 Infrastructure

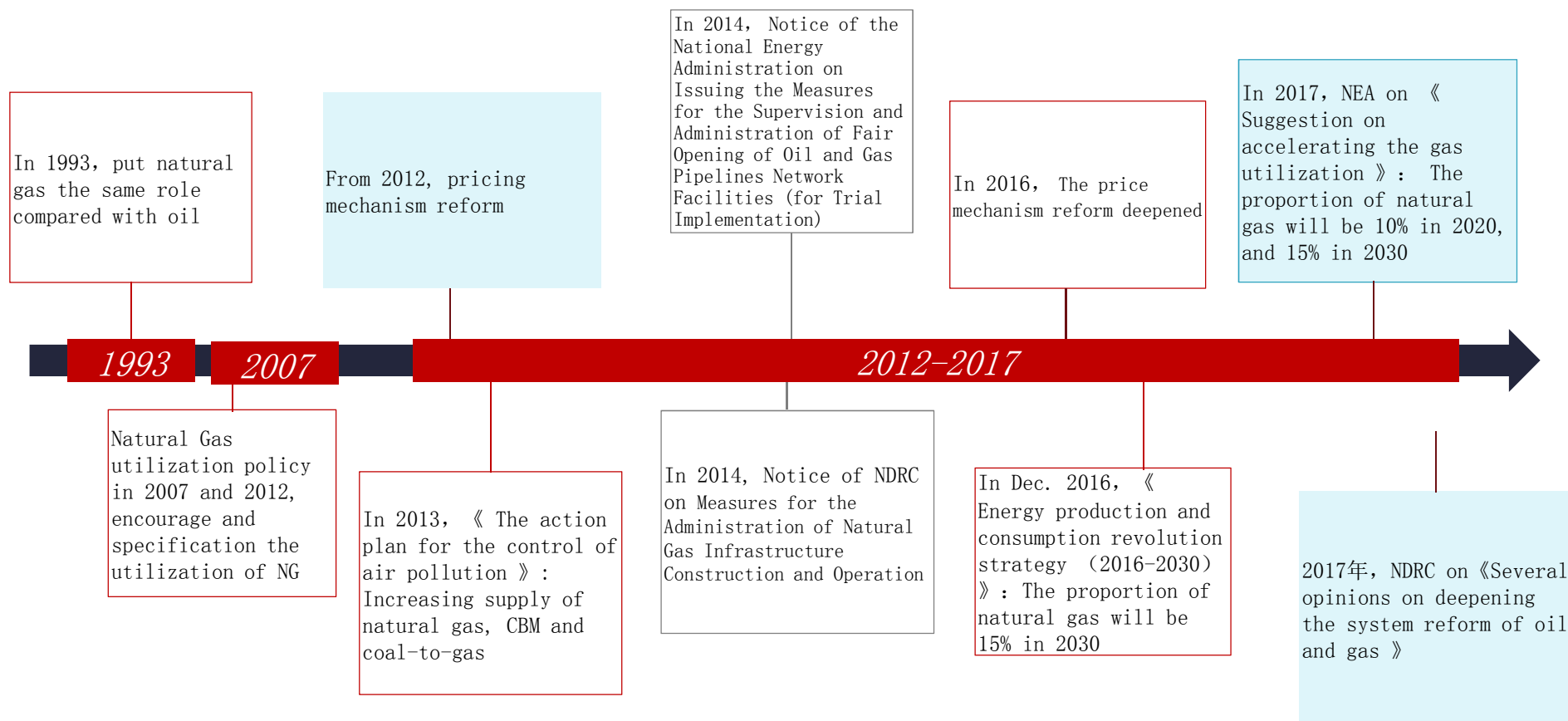
- Pipeline: Exceed 73 thousand km
- LNG: 12 terminals, 48.6 million ton
- Storage: 18, 6 billion m<sup>3</sup>





# 1. Current Situation of Natural Gas in China

## 1.5 Policy:







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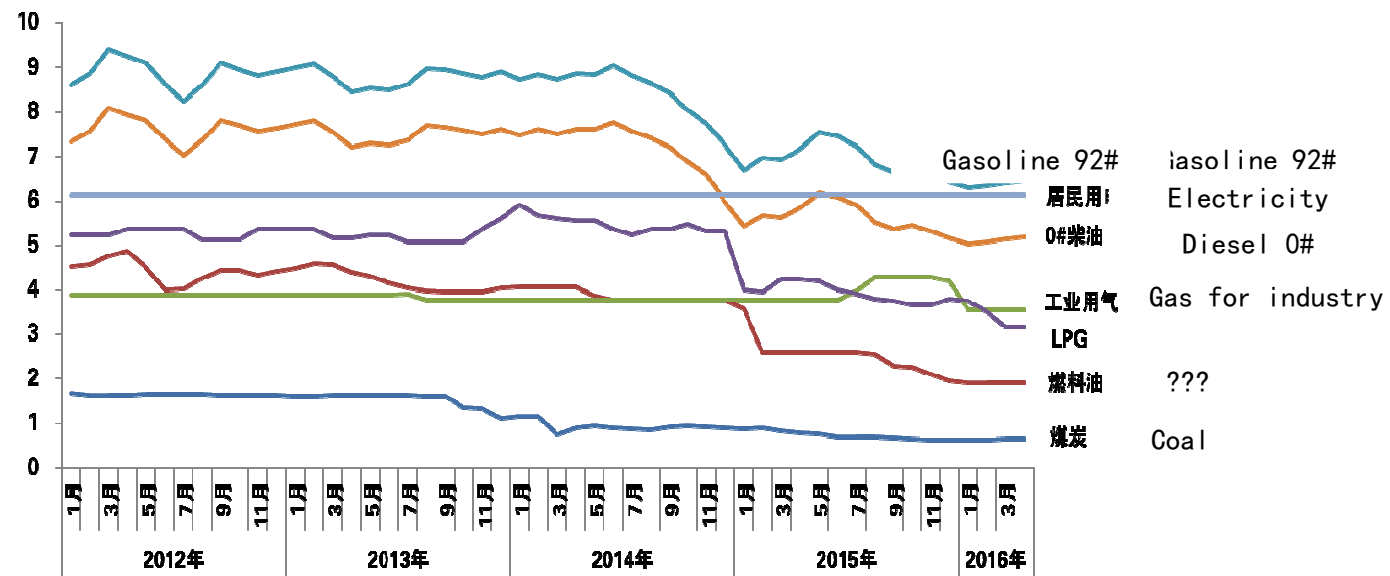
3. Utilization Direction and Outlook of  
Natural Gas



## 2. Problems and Challenges

2.1 Price was much higher than other energy, and price can not reflect the change of supply and demand

- Before 2012, Low price, and consumption increased fast.
- After 2014, Oil price declined, gas price seemed higher than oil, and the consumption growth rate was low.



Price comparison among gas and other energy in Shanghai  
(RMB/m<sup>3</sup>)



## 2. Problems and Challenges

### 2.2 Many middle links, resulting in high price

- Many middle links, resulting in high price
- Weak supervision in gas pricing
- Weak connection of final price and wellhead price in some districts

Pricing Chain ( RMB/m<sup>3</sup> )

	Province	wellhead price*	Long distance Transmission price	Gate Price	Transmission price in province	Transmission price in city and town	Final price
1	Guangdong	1.15	1.03	2.18	0.26	1.06	3.50
2	Jiangxi	1.15	0.81	1.96	0.35	0.89	3.20
3	Guangxi	1.15	0.86	2.01	0.36	0.85	3.22
4	Zhejiang	1.15	1.02	2.17	0.17	0.76	3.10

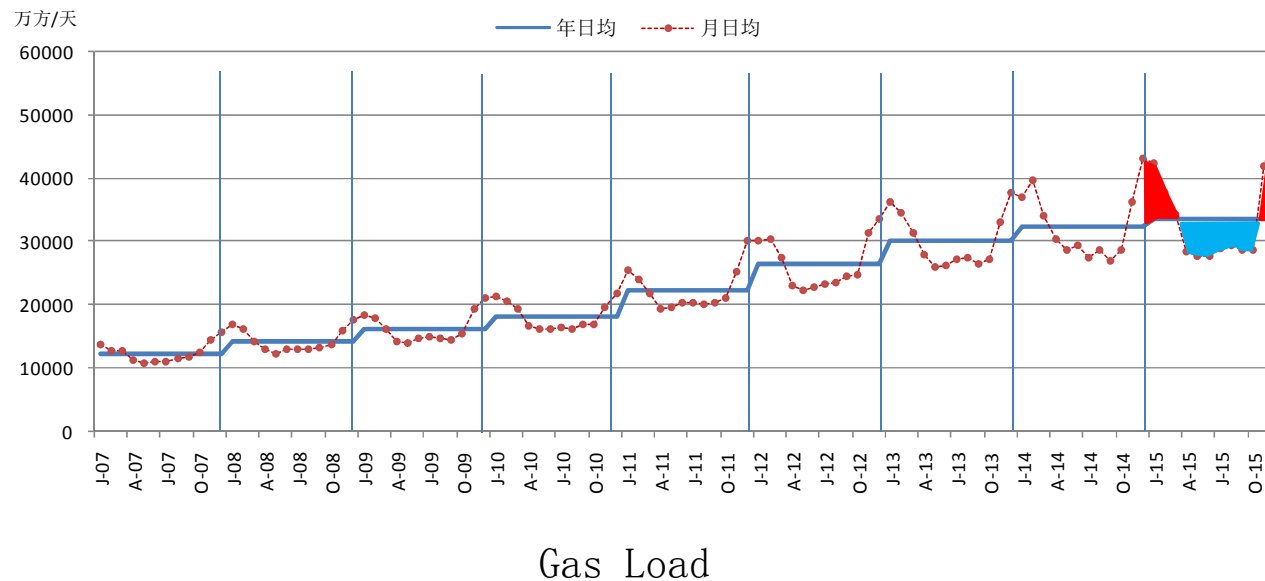
Notice: \*wellhead price refer to the price in Xinjiang



## 2. Problems and Challenges

### 2.3 Storage reservoir

- The higher gap between peak and valley year by year
- Construction of underground gas storage reservoir lags behind
- Some consumption was controlled, especially gas used for power and industry fuel





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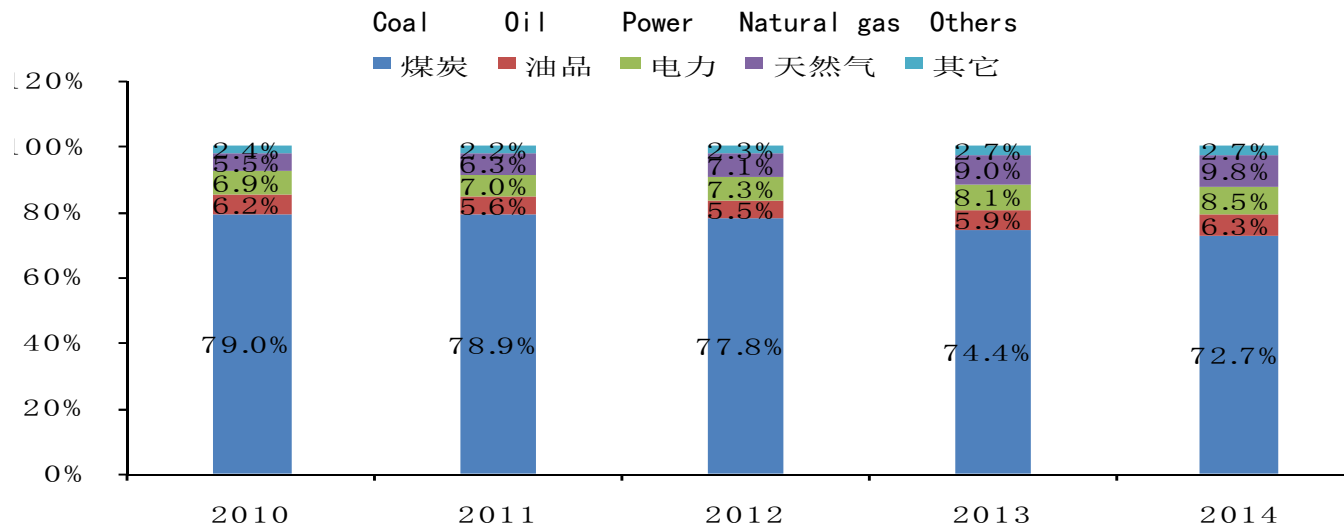
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## 3.1 Industry Fuel

### 3.1.1 Industry fuel status in China

➤ In 2014, Coal account for 72.7%, gas was only 9.8%

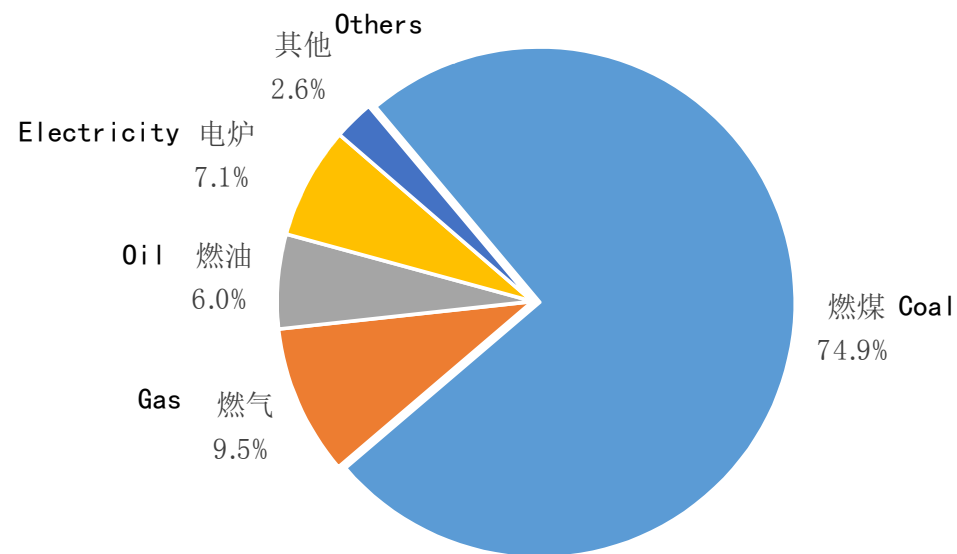


Industry fuel in energy mix in China

## 3.1 Industry Fuel

➤ Industrial Boiler/Furnace were typical examples.

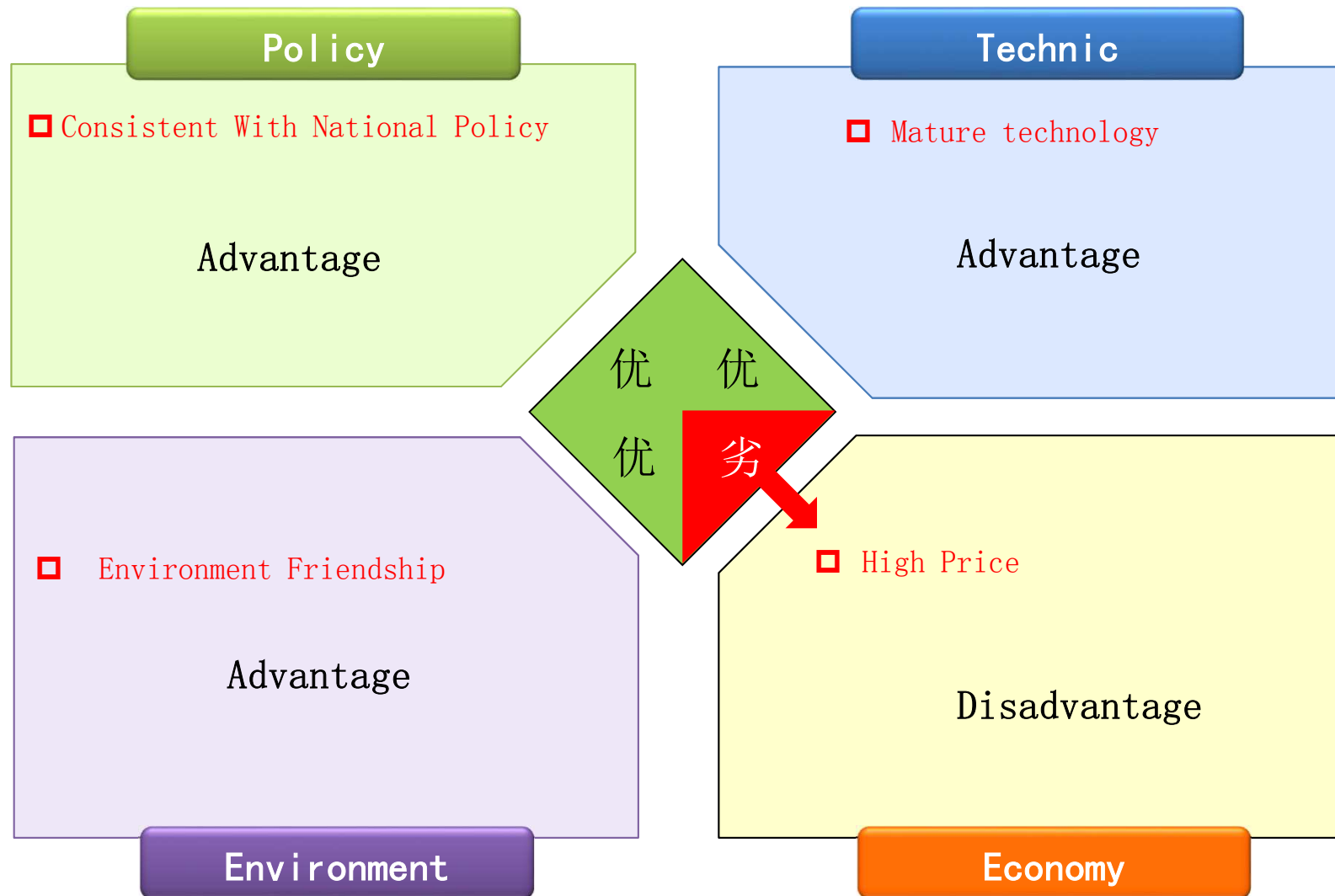
- Coal account for 75% of the total boiler fuels.



Fuel structure of Industrial Boiler/Furnace in China

## 3.1 Industry Fuel

### 3.1.2 Feasibility

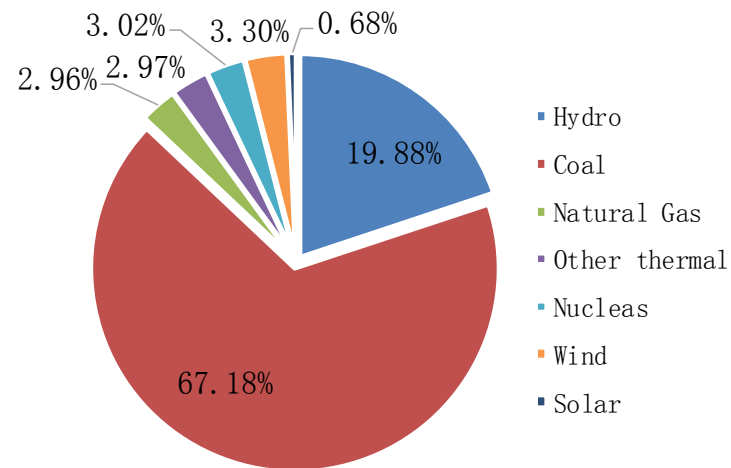




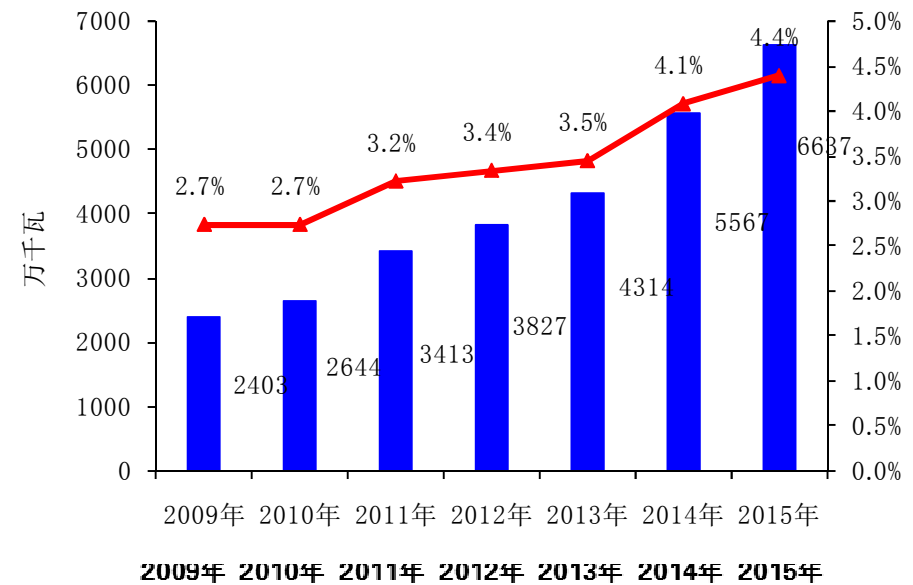
## 3.2 Electricity

### 3.2.1 Electricity status in China

- The scale of power development is at the forefront of the world, the ratio of gas power is far below the world average



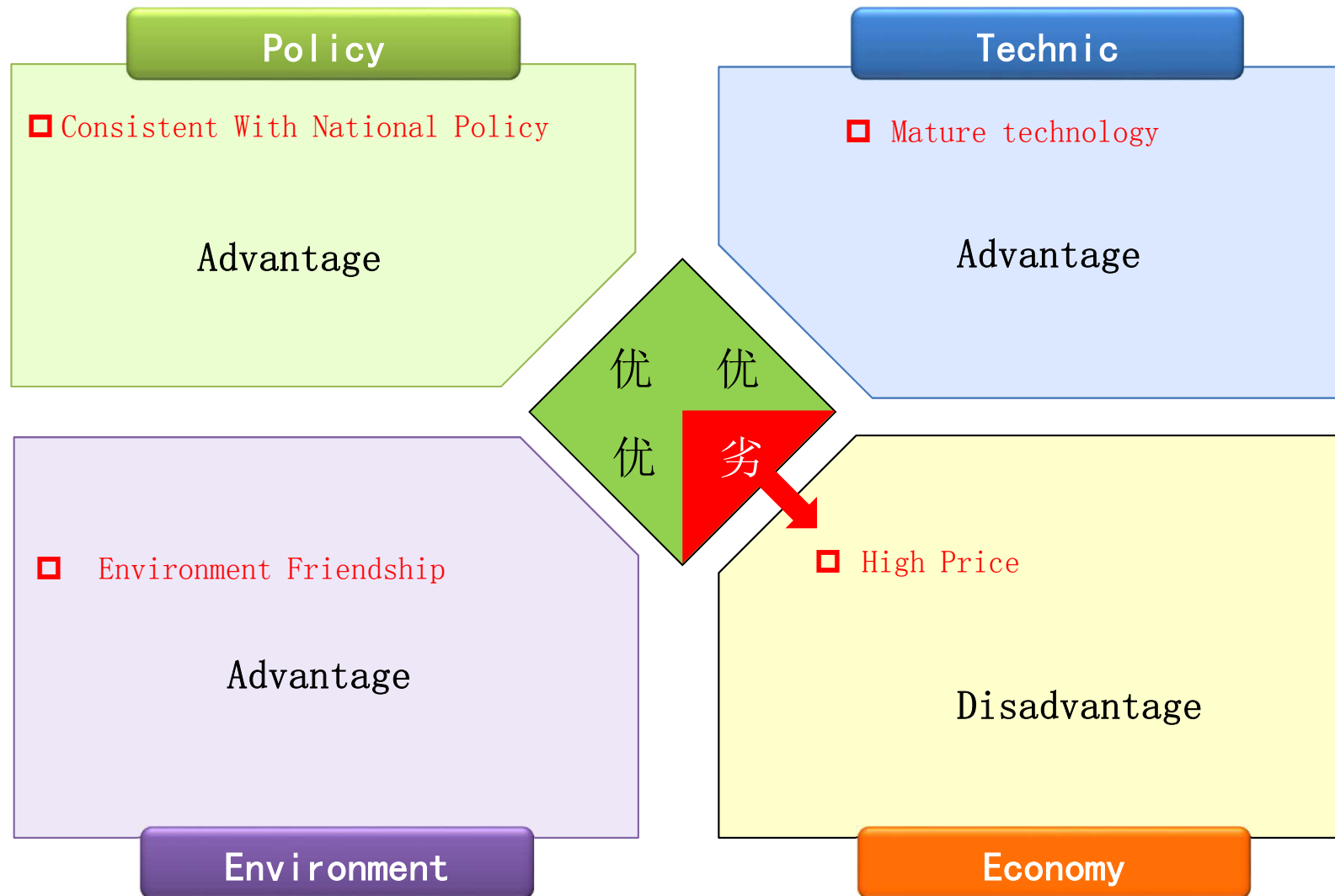
Electricity Generation in 2015



Gas Capacity

## 3.2 Electricity

### 3.2.2 Feasibility



## 3.2 Electricity

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- Peak shaving
- Environment friendship
- Economy: **Lack of competitive advantage**
- Outlook:
  - Policy: Air quality improvement, and energy consumption control
  - Direction: New projects, Coal plant replacement, Peak shaving for renewables



### 3.3 Transport

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In the traffic direction, Natural gas mainly used in the field of urban public transport, inter-city passenger cars, trucks and ships, replace gasoline and diesel

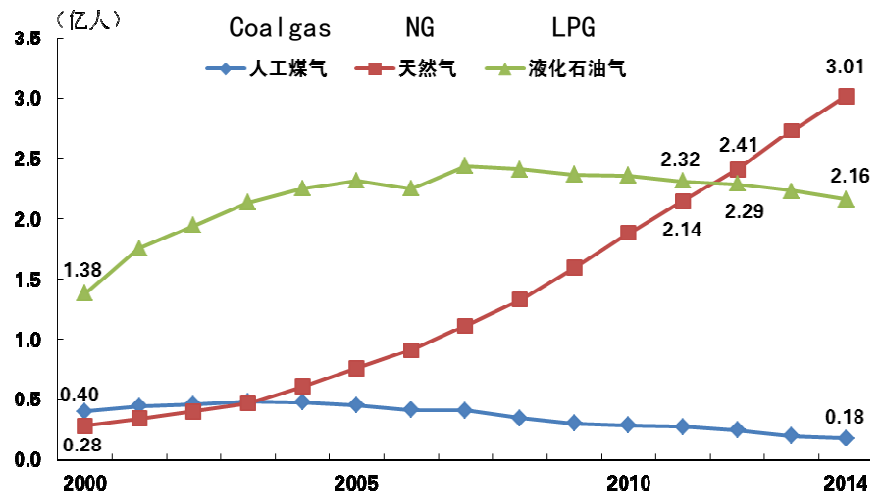
- inter-city passenger cars and trucks: LNG
- Ship: Mainly used in inland river recently, gradually extended to coastal and ocean-going vessels



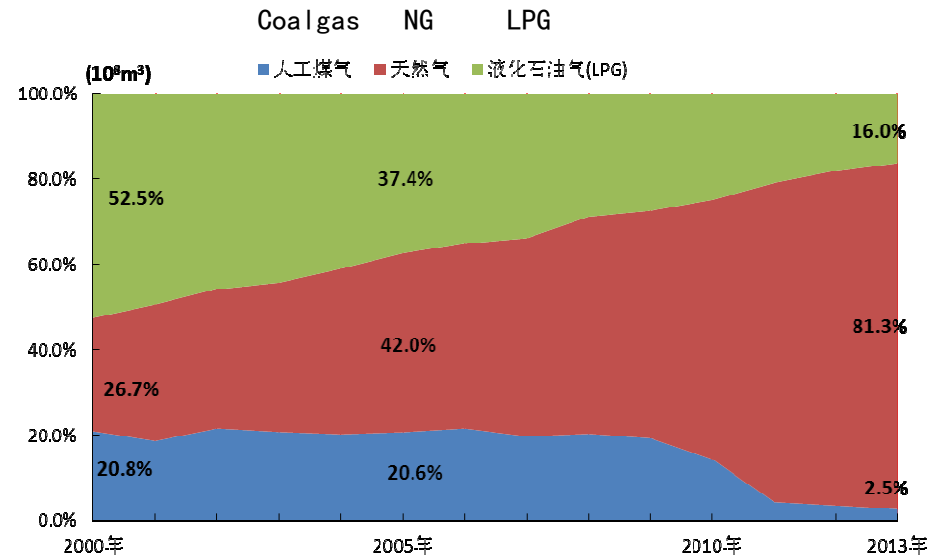
## 3.4 City Gas

1、Status: Consumption exceed 20 billion m<sup>3</sup>, more than LPG and coalgas

- Urban Gasification Rate : U.S.A. 90%, U.K. 85%, Japan 90%, China 40%
- Consumption per : U.S.A. 428 m<sup>3</sup>, U.K. 752 m<sup>3</sup>, China 23 m<sup>3</sup>



Populations using gas  
(100 million person)



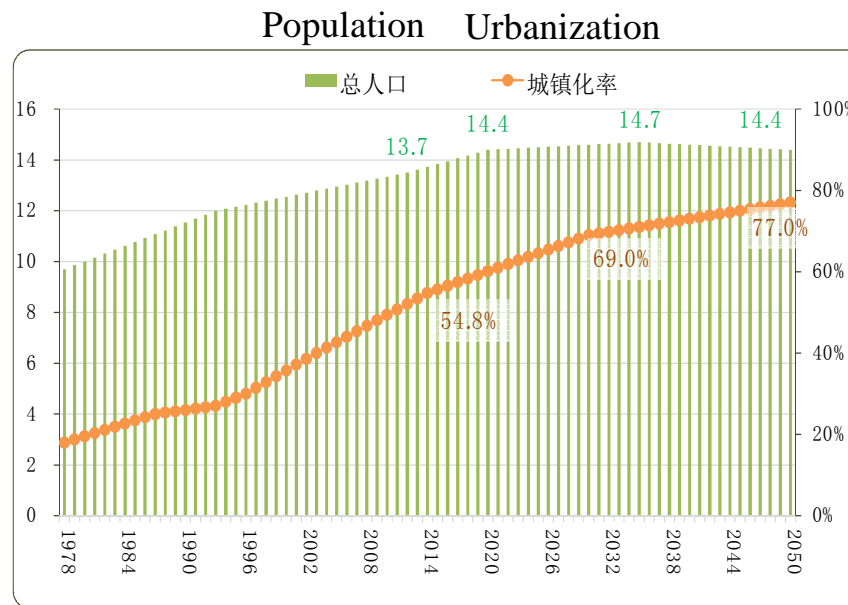
Gas Consumption



## 3.4 City Gas

### 2、Demand : Urbanization

- Gasification Rate : Urban Gasification Rate will be 53% (460 million) in 2020, and 70% (720 million) in 2030, compared with 40% in 2014.
- Heating area : Substantial growth



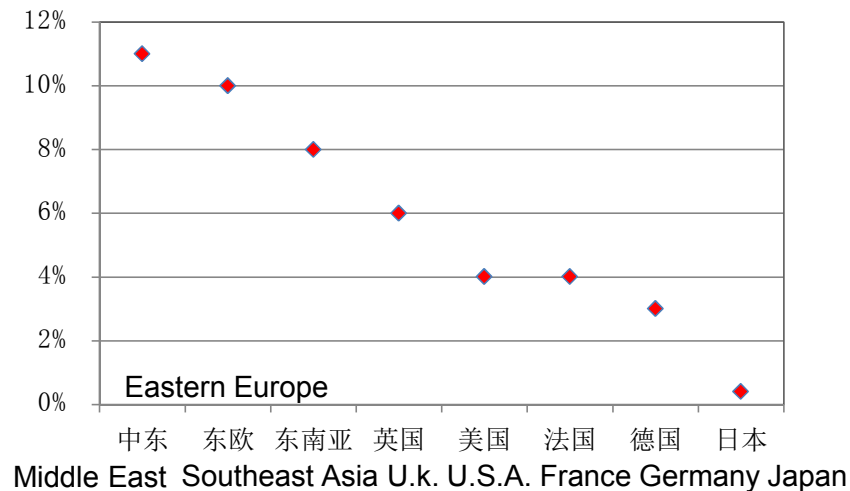
China`s Population (100 million)



## 3.5 Chemical

China's natural gas chemical industry market is shrinking

- Fertilizer and methyl alcohol: shrink for the high price of NG
- hydrogen production in refinery: Economic benefit is good, still has growth potential



The proportion of natural gas used for chemical in typical countries



## 3.6 Total demand

- 5 departments: Industry, Power, City Gas, Transport and Chemical
- Focus on Industry and Power

	2014	2020	2030
City Gas	423	690	1500
Transport	185	470	650
Power	280	940	1820
Industry	625	1250	1500
Chemical	248	250	230
Total	1761	3600	5700

Source: CNPC





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**Thanks for your attention!**