

The 8th IEEJ/CNPC Research Meeting



中国石油

Status and Prospects of China's Natural Gas Market

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III. Uncertainty

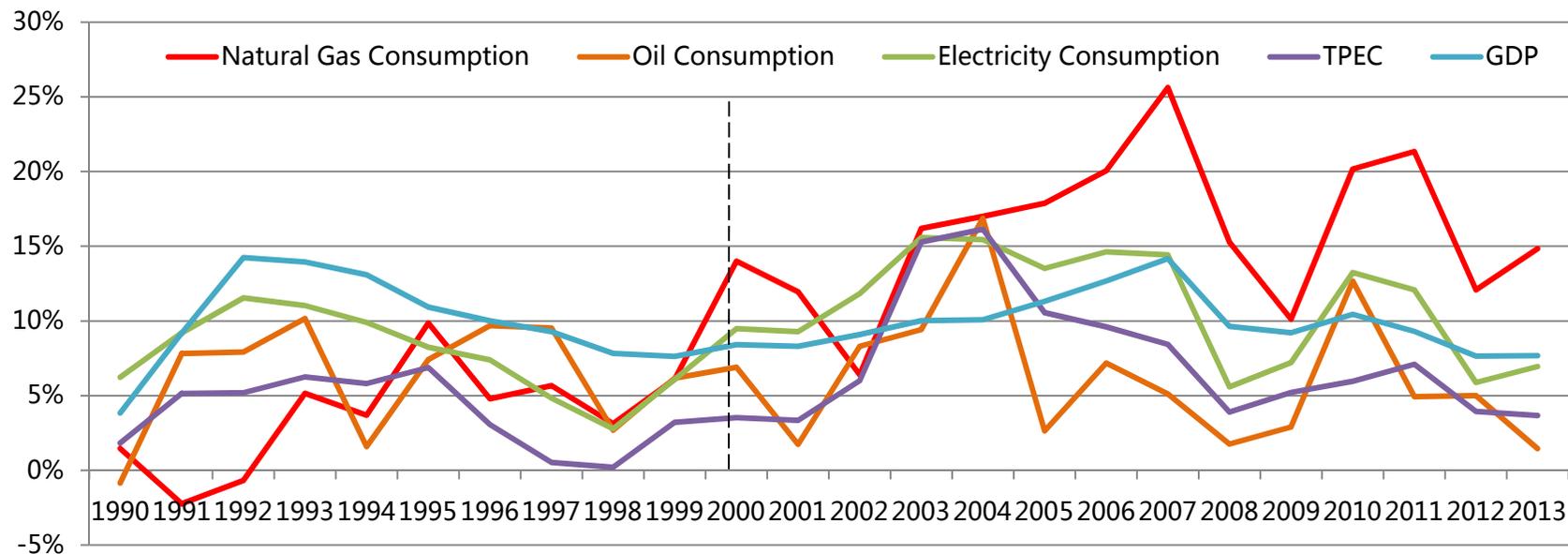
IV. Conclusions



1.1 Fast growth of natural gas consumption

- China is replacing Iran to be the world's third largest gas consumption country, which increased from 24.5 bcm in 2000 to 168 bcm in 2013. The annual growth rate is 16%, which is much higher than other types of energy.
- Major driving force of natural gas market: Economic growth, increasing supply capacity, price advantage, pipeline network, environmental pressure.

Growth Rate of GDP and Energy Consumption 1990-2013

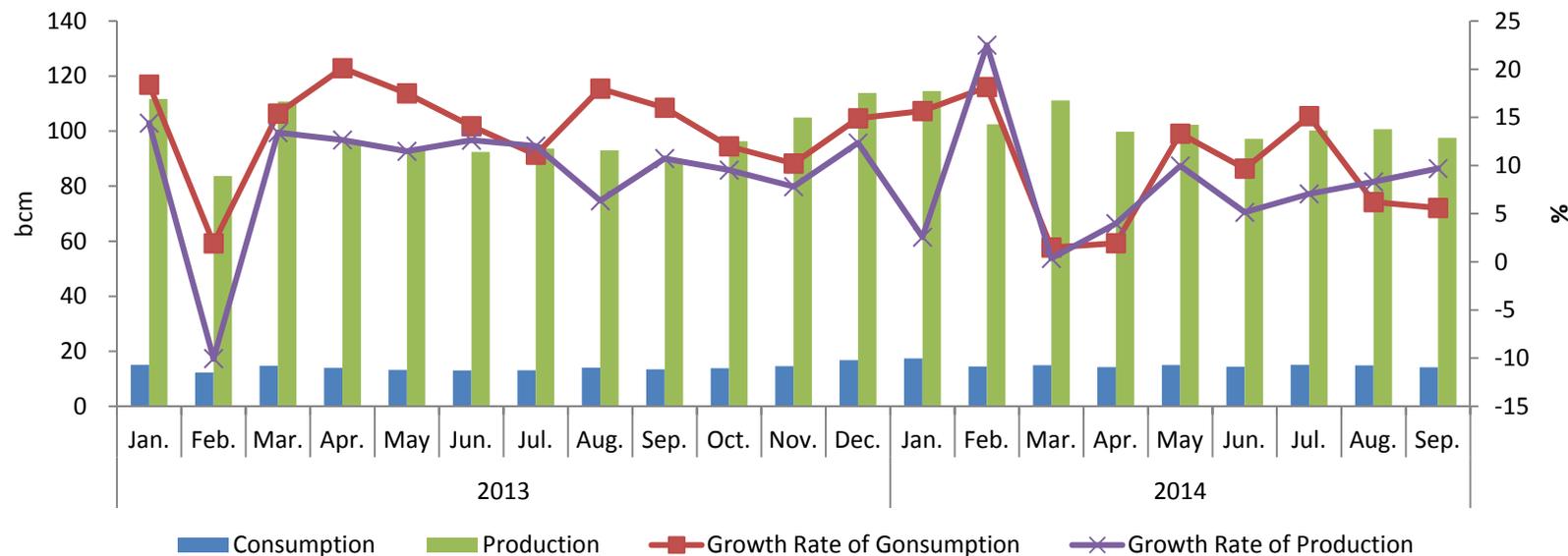




1.2 The growth rate reached the lowest in 10 years

- GDP growth rate of China is 7.4% in the first 3 quarters of 2014, which is the lowest in the last 5 year, while growth rate of oil, electricity and natural gas demand are 2.8%, 3.9% and 9.3% respectively.
- In the same period, china's natural gas consumption is 133 bcm. It is predicted that the annual consumption will be less than 184 bcm, and the growth rate will be less than 10%, which is the lowest since 2002.

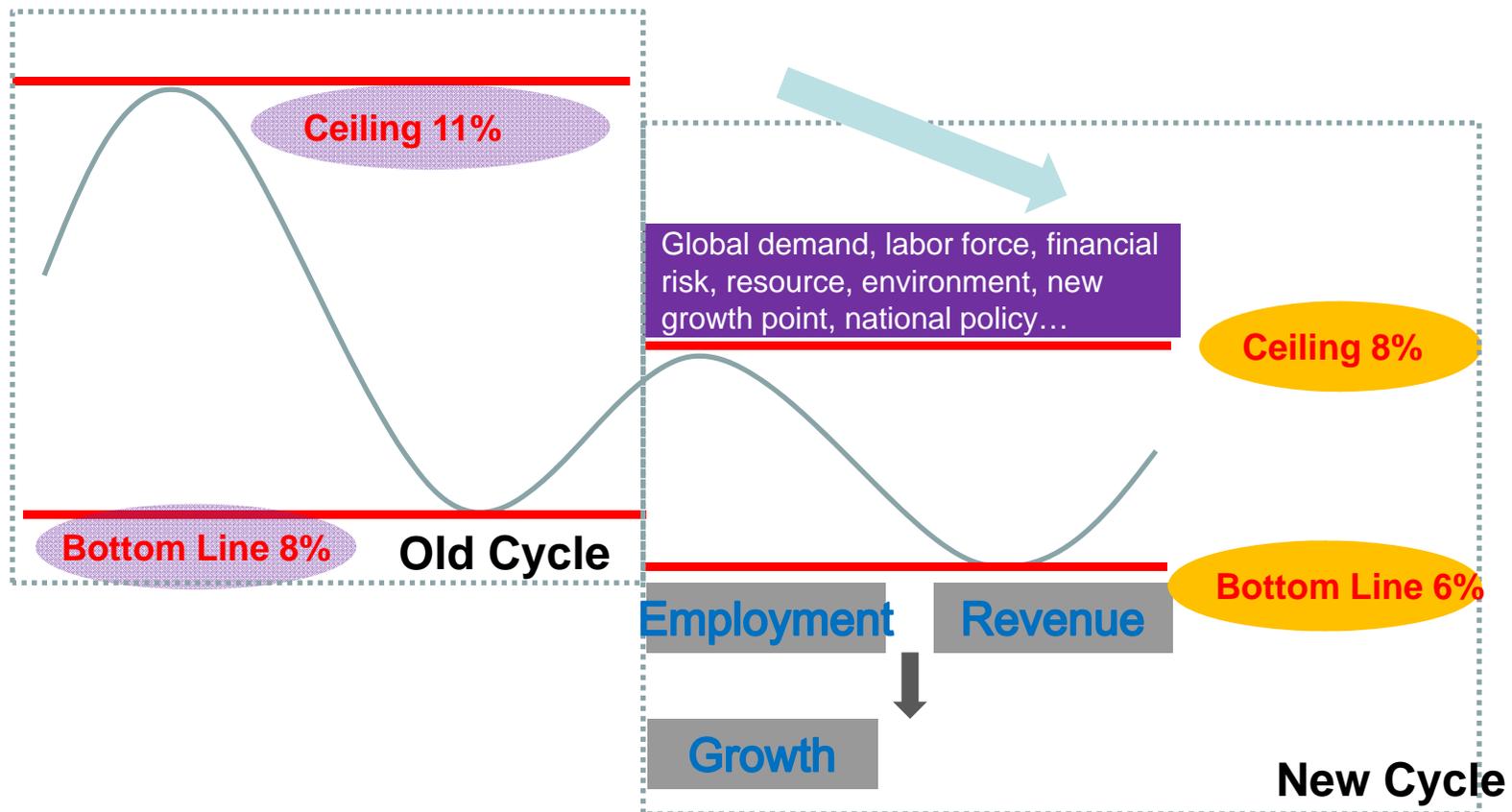
Monthly Natural Gas Production and Consumption of China





1.3 Domestic economic downturn

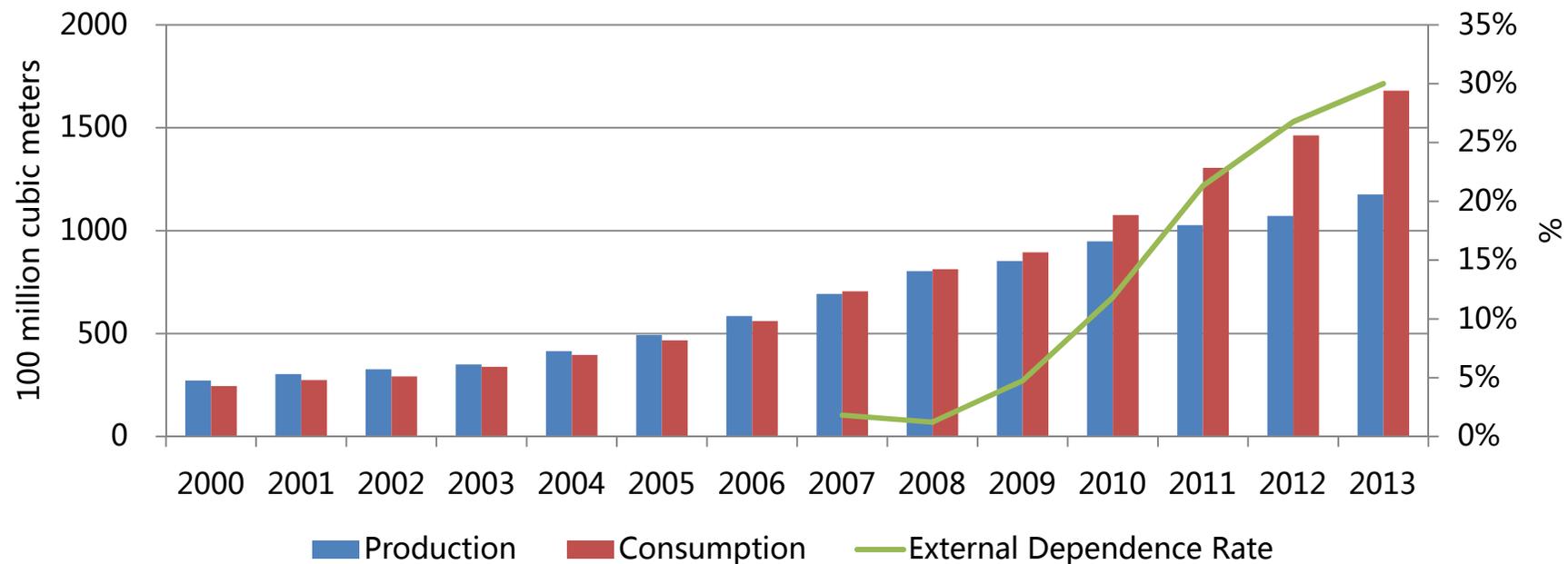
- China is facing the challenge of weak external demand, unsustainable investment mode, rising labor costs, changing population structure and financial risks, and its GDP growth rate will fall to 6%-7% in the next 10 years.





1.4 Rising external dependence rate

- China's natural gas output increased 27.2 bcm in 2000 to 117.6 bcm in 2013 by 11.9% per year, which still can't meet the faster demand growth.
- China started to import LNG in 2006 and import pipeline gas in 2009, then the external dependence rate exceeded 10% in 2010 and 30% in 2013.
- In 2003, China imported 27.9 bcm of pipeline gas and 25 bcm of LNG.





1.5 Inversion of import price leads to huge losses

- The price of most import resources in China is much higher than local gate price except Indonesia and Malaysia LNG imported by CNOOC.
- If the stock gas price and increment gas price merge in 2015, and the increment gas price remain unchanged, then import pipeline gas could break even, and import LNG will still be loss-making.

Import Gas Price and Gate Price in the First 3 Quarters of 2014

	Port	Cumulative Imports	accumulative amount	Average price	Gate Price (RMB Yuan per cubic meter)	
		million tons	million dollars	RMB Yuan per cubic meter	Stock Gas	Increment Gas
LNG	Liaoning	1.10	1032	4.11	2.64	3.12
	Shanghai	2.17	892	1.80	2.84	3.32
	Jiangsu	1.72	1558	3.96	2.82	3.30
	Zhejiang	1.14	1048	4.02	2.83	3.31
	Fujian	2.56	1117	1.91	—	—
	Guangdong	4.74	2203	2.03	2.86	3.32
	Hebei	1.10	999	3.94	2.64	3.12
	Hainan	0.09	1032	4.11	2.32	2.78
	Subtotal	14.70	9006	2.67	—	—
Pipeline	Xinjiang	15.67	7801	2.17	1.81	2.29
	Yunnan	1.12	675	2.62	2.37	2.85
Total	31.49	17482	2.42	—	—	

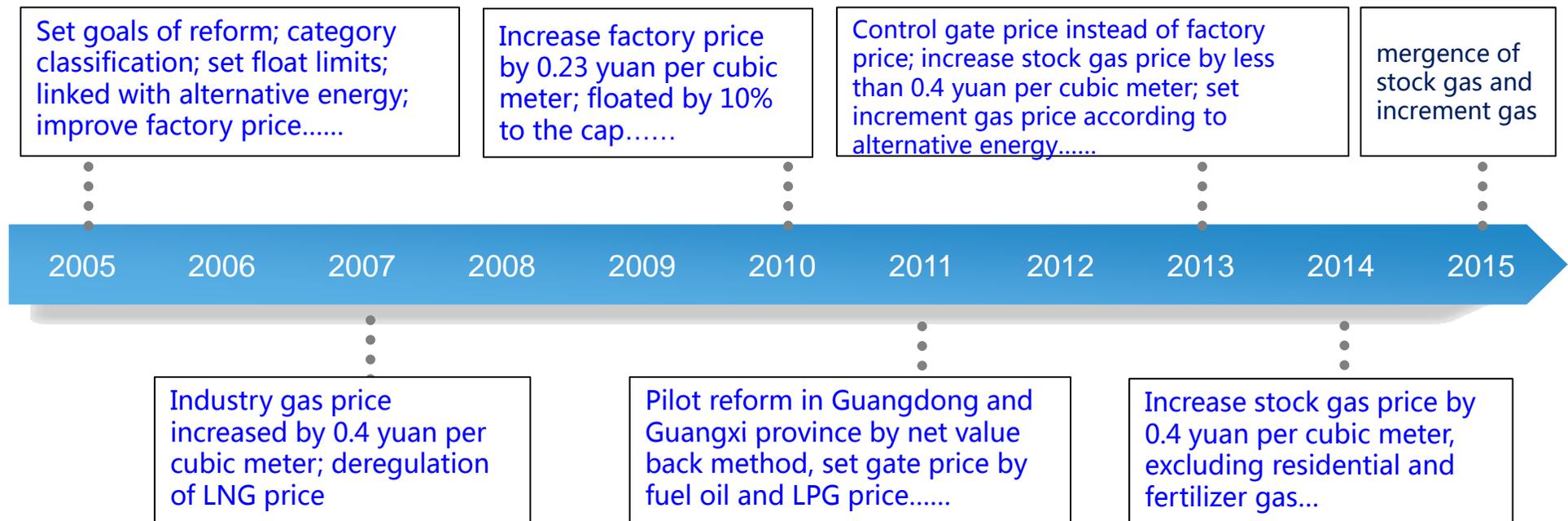
Notes: gate price is in Aug. 2014, import price is pre tax CIF.



1.6 Market oriented reform is in progress

- In Jul. 2013, the NDRC started a new round of natural gas pricing mechanism reform.
- In Feb. 2014, the NEA released ‘Regulation on Fair Open of Oil and Natural Gas Pipeline Facilities’.

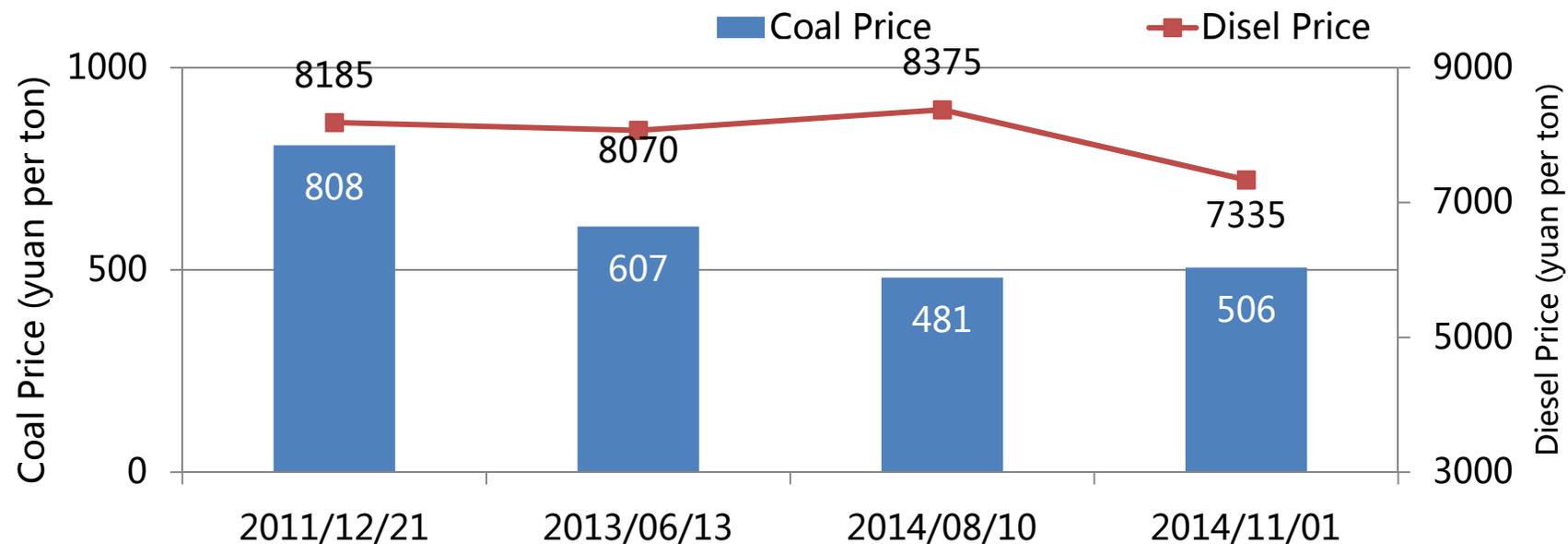
Reform History of China’s Natural Gas Pricing Mechanism





1.7 Weakening economic advantage

- Since Nov. 2011, the average coal price in Bohai Area has reduced from 808 yuan per ton to 506 yuan per ton; while the ceiling diesel retail price in Hebei province also reduce from 8185 yuan per ton to 7335 yuan per ton.
- However, the stock gas price in Hebei province rose from 2.24 yuan per cubic meter in 2013 to 2.64 yuan per cubic meter in 2014, which equals to 3.3 times of coal price; and the increment gas price is 3.12 yuan per cubic meters, equals to 4 times of coal price.





1.8 Environmental protection became an important driving force

- China's energy mix is based on coal, which caused serious environmental problems. Improving the proportion of natural gas is an important solution.



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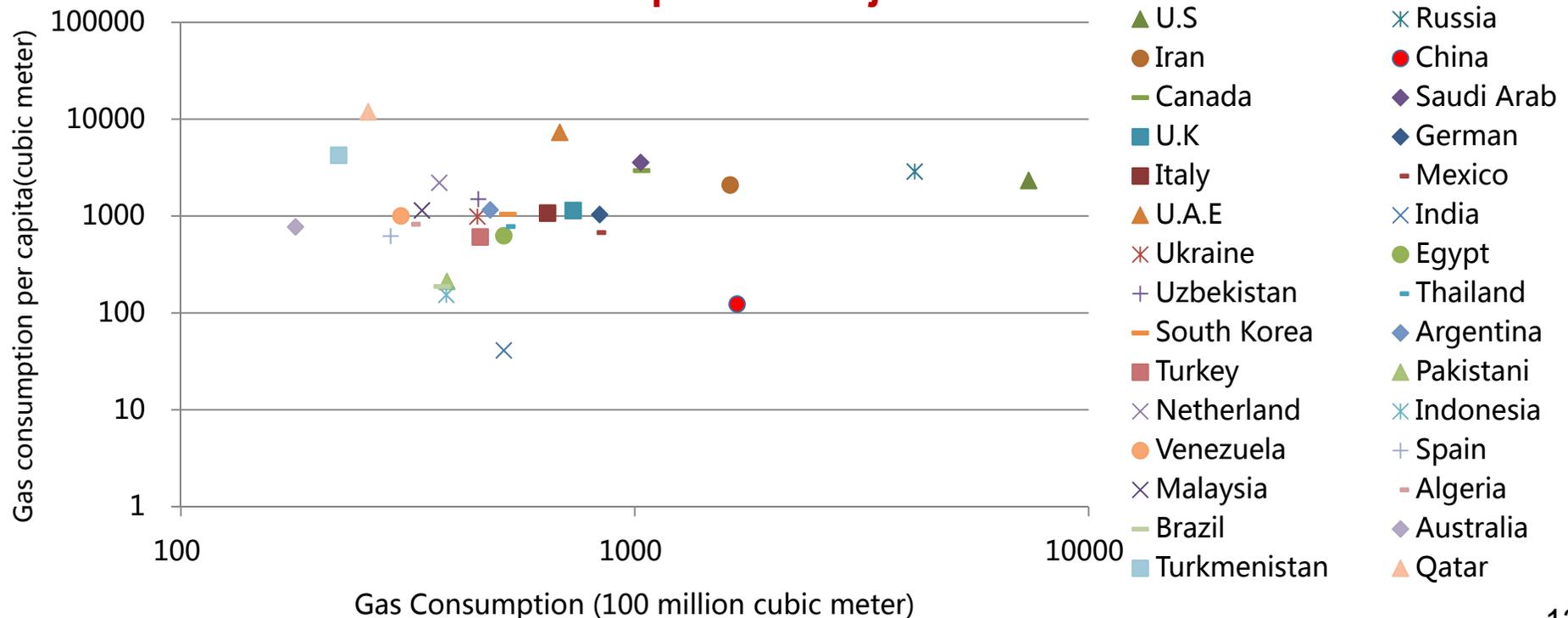
IV. Conclusions



2.1 Natural gas market will keep develop

- The individual natural gas consumption of China is only 123 cubic meters per capita, which is much lower than the world's average level (452 cubic meters).
- The share of natural gas in China's energy mix rose from 2.2% in 2000 to 5.8% in 2013, which is still lower than the average level of World (23.7%) and Asia (11.2%).

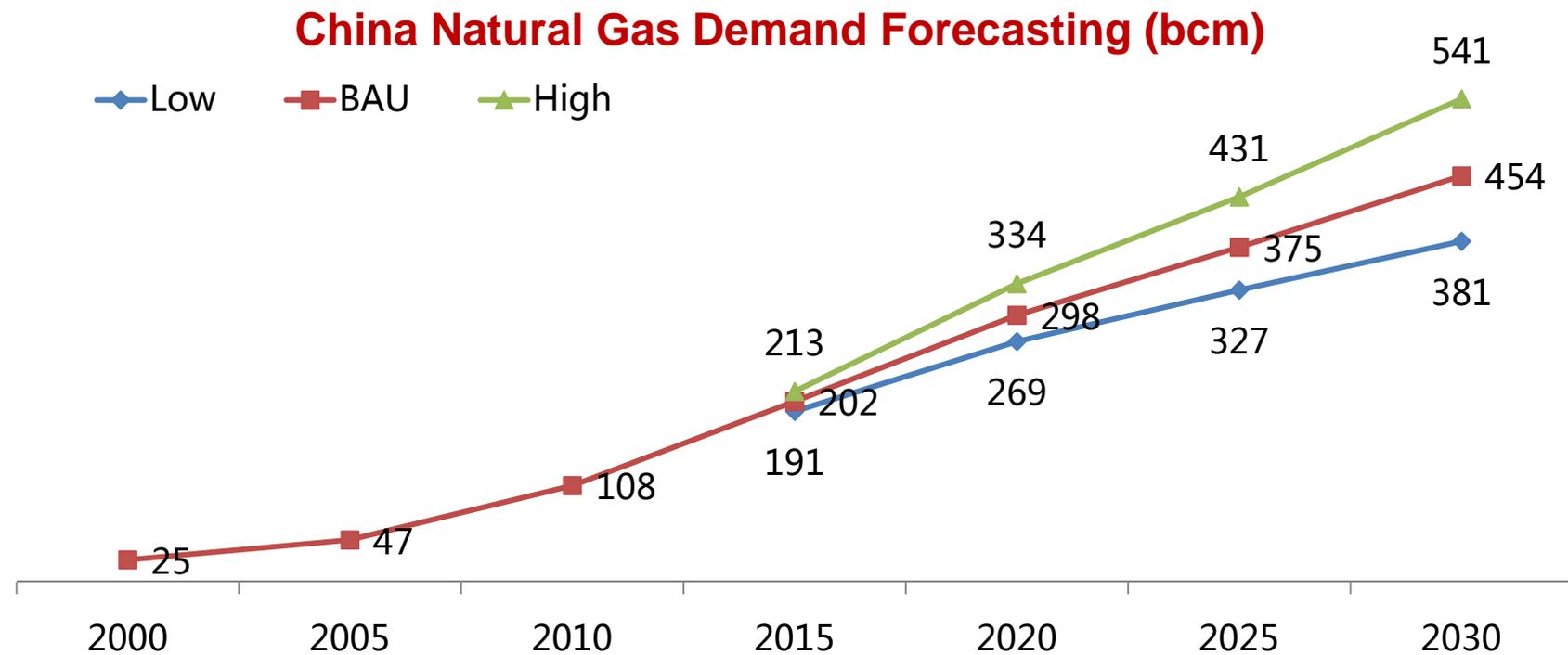
Natural Gas Consumption of Major Countries 2014





2.2 Demand growth will slow down

- On the BAU scenario, China's natural gas demand will be 202 bcm in 2015, 299 bcm in 2020 and 454 bcm in 2030.
- The average annual growth rate will be 6.5%, which will still be higher than GDP growth rate.

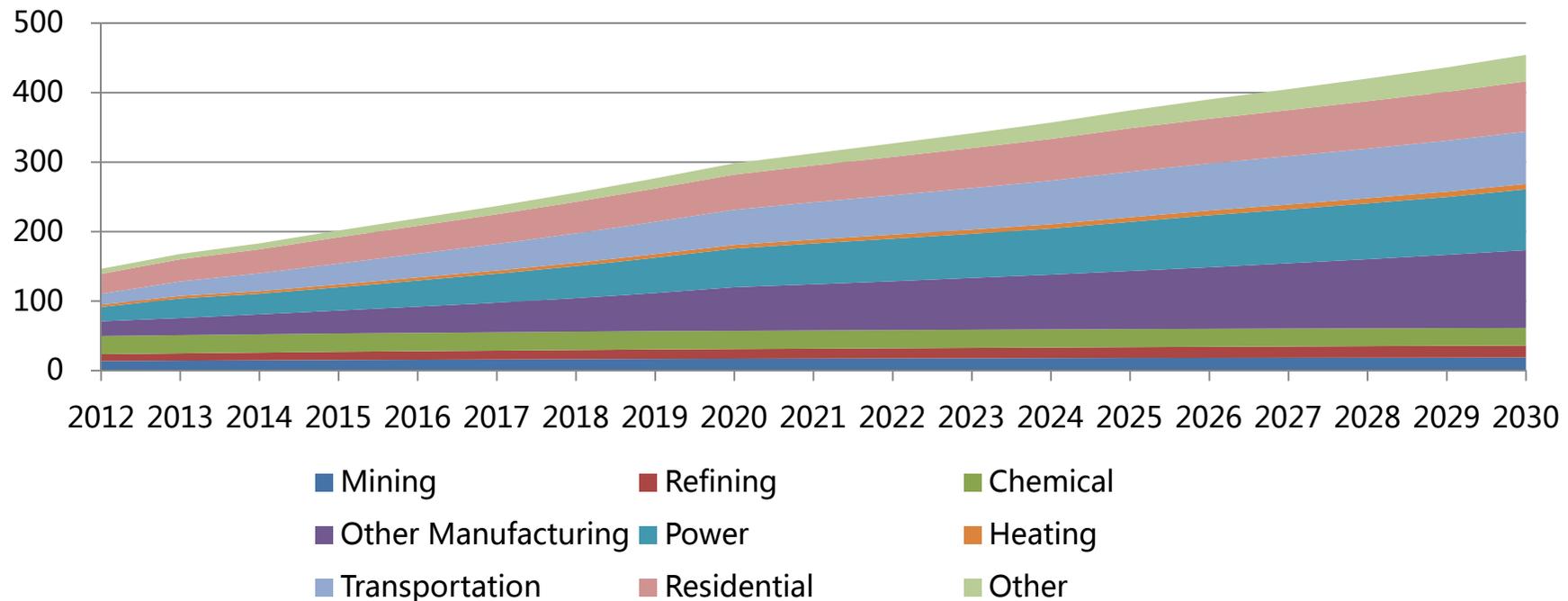




2.3 Industry will still be the main sector of demand growth

- On the BAU scenario, industry will take more than 60% of total gas demand.
- During 2012-2030, 56% of gas demand growth will come from industry.
- Manufacturing industry, power industry, transportation and residential sector will be the main consumer of natural gas.

Sectoral Natural Gas Demand 2012-2030 (bcm)

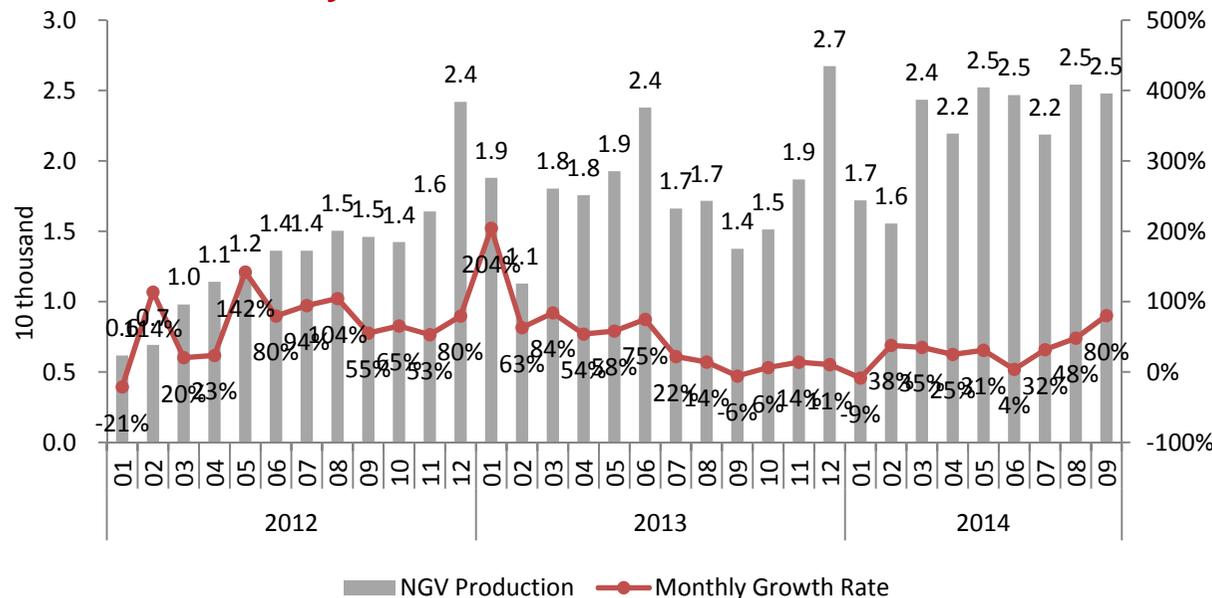




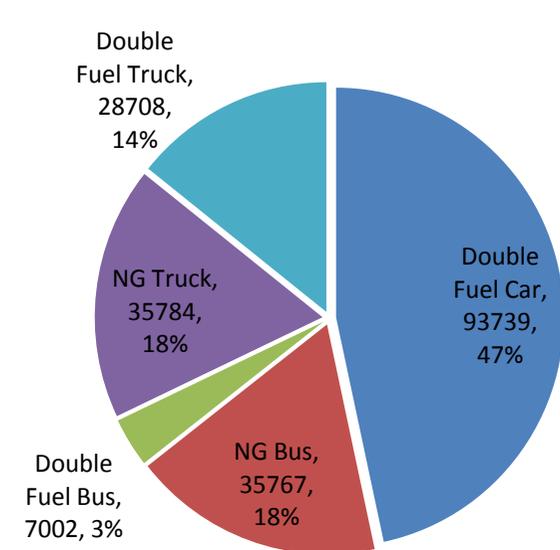
2.4 Natural gas vehicles forms industry

- After decades of development, China has formed perfect industry chain of natural gas vehicles, which is of economic, environmental and policy advantage compared with oil vehicles.
- China's NGV production has exceeded 200 thousand in 2013, and is supposed to be 3 million in 2020 and 40 million in 2030, while gas demand is 50.6 bcm and 75.2 bcm.

Monthly Production and Growth Rate of NGV



NGV Production in the first 3 quarters of 2014

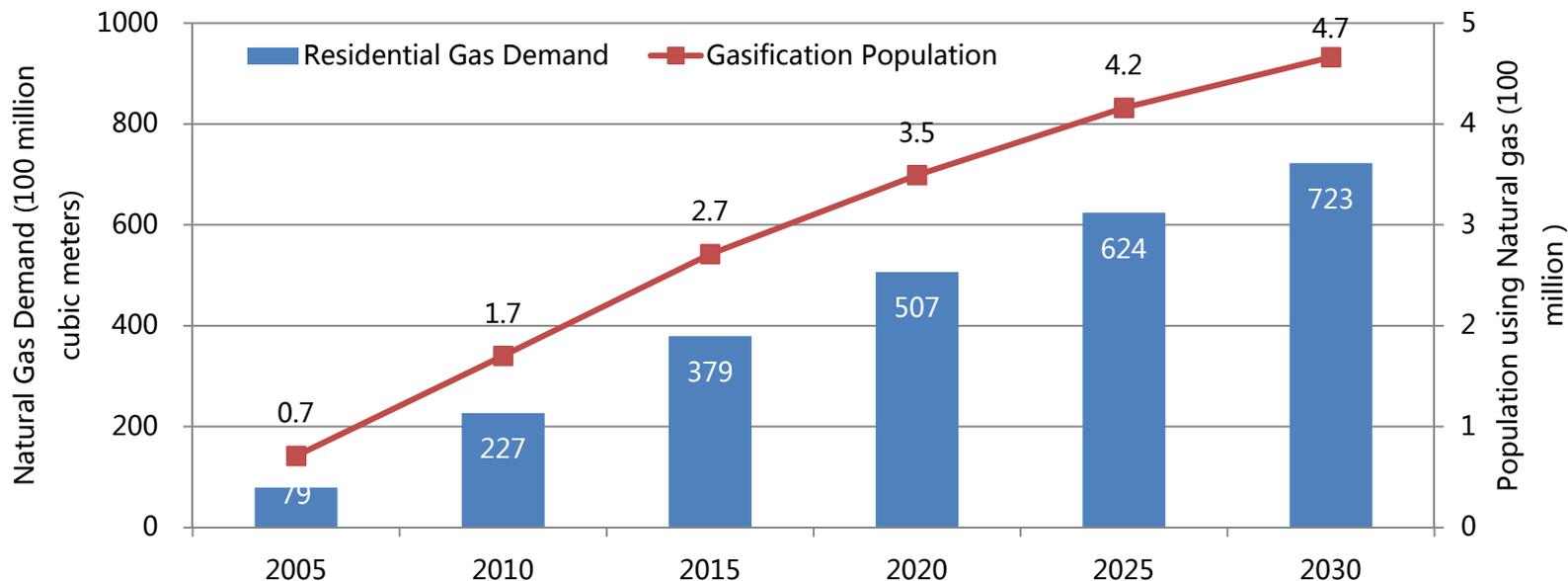




2.5 Residential gas demand will increase steadily

- The average residential natural gas consumption of China's urban resident is 135 cubic meters per year, and its average expenses is 362 yuan in Beijing, less than 0.9% of income and 1.4% of per capita expenditure.
- China's residential natural gas consumption is 32 bcm in 2013, which is expected to be 51 bcm in 2020 and 72 bcm in 2030.

Residential Natural Gas Demand in BAU Scenario





2.6 Resources supply will be safeguarded

- According to the plan of Chinese government, supply capacity of natural gas will be 250 bcm in 2015 and 400 bcm in 2020.
- The supply capacity is larger than our demand forecasting results.

Plan on Natural Gas Supply Capacity by Chinese Government

File Name	Released Time	Targets
Development Plan of Shale Gas (2011-2015)	Mar., 2012	Shale gas production reaches 6.5 bcm in 2015 and 60-100 bcm in 2020.
The 12 th Five Year Plan of Coal Bed Methane Development and Utilization	Dec., 2011	CBM production reaches 30 bcm in 2015, including 16 bcm of ground development (totally utilized) and 14 bcm of underground pumping (utilization rate exceeds 60%).
The 12 th Five Year Plan of Natural Gas Development	Oct., 2012	Supply capacity of domestic gas reaches 176 bcm in 2015, including 138.5 bcm of conventional gas, 15-18 bcm of SNG, 16 bcm of ground CBM.
Suggestions on the Establishment of Long-term Mechanism for Securing Stable Gas Supply	Apr., 2014	Supply capacity of natural gas reaches 400-420 bcm in 2020.
Strengthen the Work Plan for Prevention and Control of Atmospheric Pollution in Energy Industry	May, 2014	Supply capacity of natural gas reaches 250 bcm in 2015 and 330 bcm in 2017.



➤ Import pipeline capacity will double and redouble

- The line C of Central Asian gas pipeline was put into operation in mid of 2014, then the total import capacity of pipeline is 67 bcm per year.
- The line D of Central Asian gas pipeline and Eastern Sino-Russia gas pipeline will be completed in 2016 and 2018 respectively, then the capacity will reach 135 bcm per year.

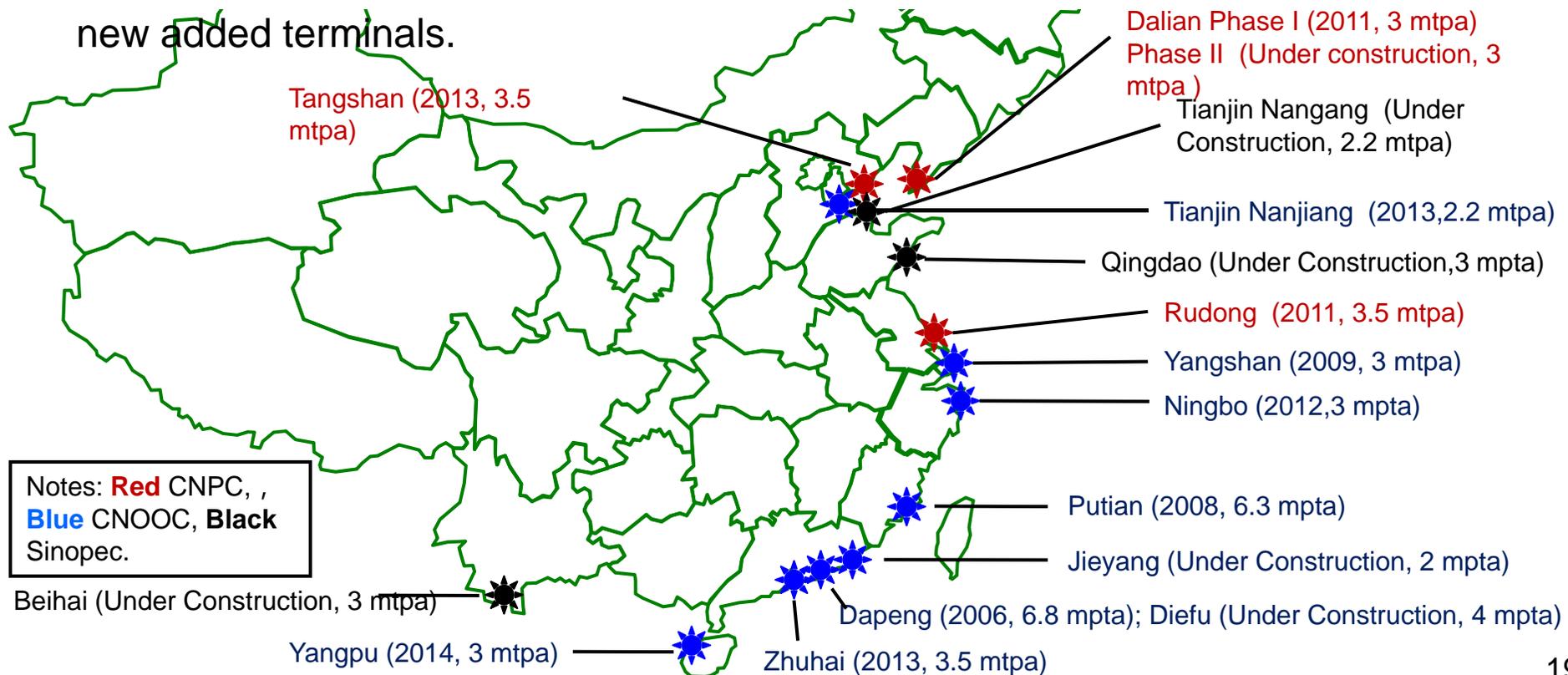
Import Natural Gas Pipeline of China

	Star Date	Commissioning Date	Length (km)	Capacity (bcm per year)	Route
Central Asia A	Aug., 2007	Dec., 2009	1833	30	G Daim-Uzbekistan-Turkmenistan-Horgos
Central Asia B	Aug., 2007	Oct., 2010	Uzbekistan529 Turkmenistan130		
Central Asia C	Dec., 2011	Jun., 2014	0		
Central Asia D	2014	2016	China4		
China Myanmar Gas Pipeline	Jun., 2010	Oct., 2013	2520 Myanmar793 China1727	12	Rakhine-Ruili-Guizhou/Guangxi/Chongqing
The Sino Russian Gas Pipeline	2014	2018	4000	38	Kovyktinskoye/C hayandinskoye-Heihe/Daqing



➤ Capacity of LNG terminals is in surplus

- China import 18 million tons of LNG in 2013, and the amount of signed long term contract has exceeded 40 million tons.
- There are 10 LNG terminals under operation with total capacity of 37.8 million tons per year, which will increase to 55 million tons in the next few years with 5 new added terminals.



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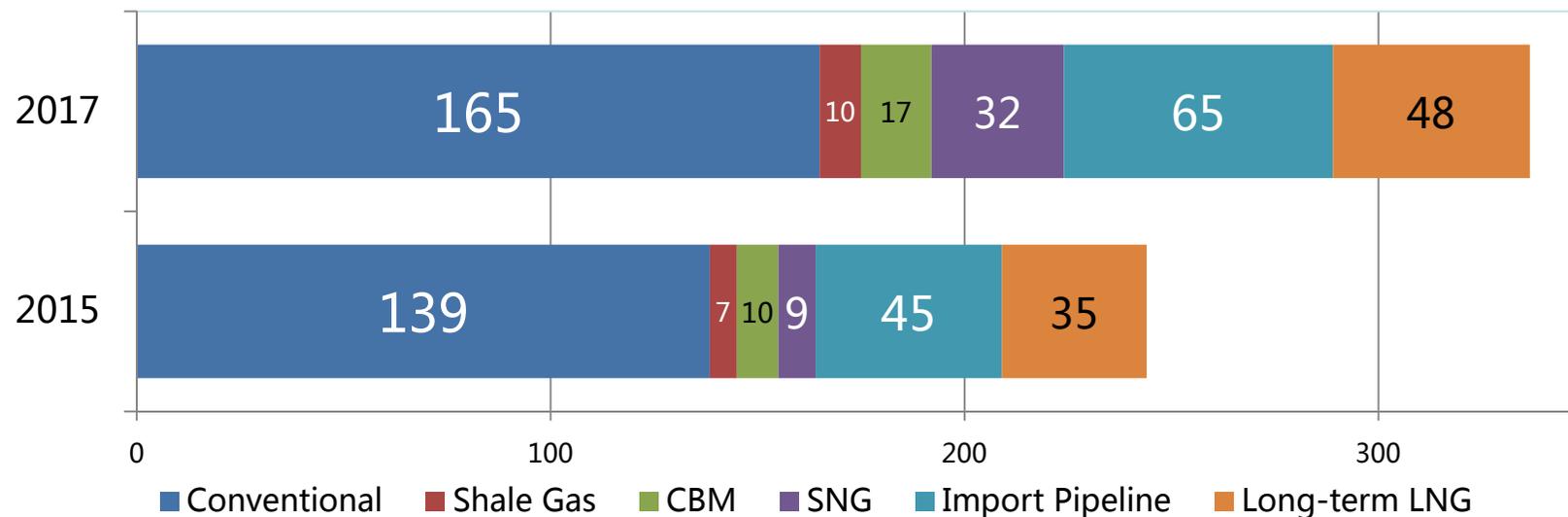
IV. Conclusions



3.1 Supply side

- The Chinese government proposed that natural gas supply capacity will be 250 bcm in 2015, 330 bcm in 2017, and 400-420 in 2020.
- Since the conventional gas output is difficult to increase sharply, to achieve the goal we need more increase of unconventional gas, SNG and import resources.

Plan of Natural Gas Production by Chinese Government (bcm)

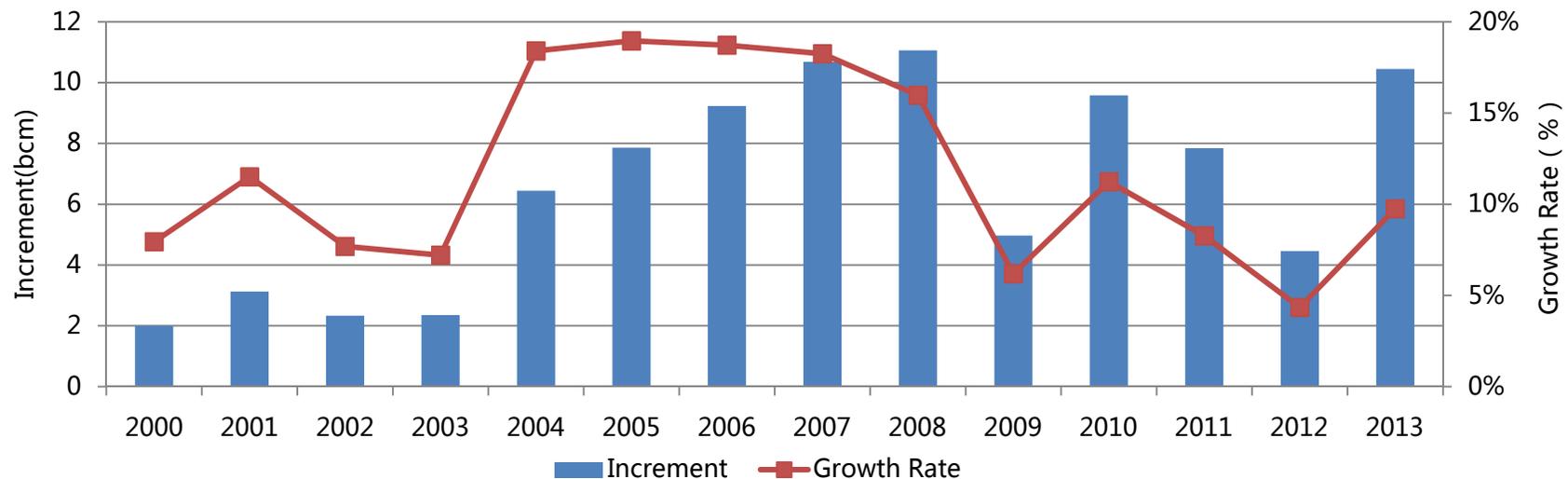




➤ Conventional gas

- According to the plan, conventional gas output will be 13.5 bcm in 2015 and 165 bcm in 2017, which means the annual increment exceeds 10 bcm.
- China's natural gas production increase from 27 bcm in 2000 to 118 bcm in 2013, and the annual increment is about 7 bcm, most of which is conventional resources.

Increase of Natural Gas Production in China 2000-2013





➤ Shale gas

- The original target of shale gas production is 6.5 bcm in 2015 and 60-100 bcm in 2020, which was changed into 30 bcm in 2020 in Jan. 2014 by NEA.
- The development of shale gas in China is still facing problems of economy, technology, infrastructure and business mode. The shale gas output was close to 200 mcm in 2013, and is expected to be 1-1.5 bcm in 2014.

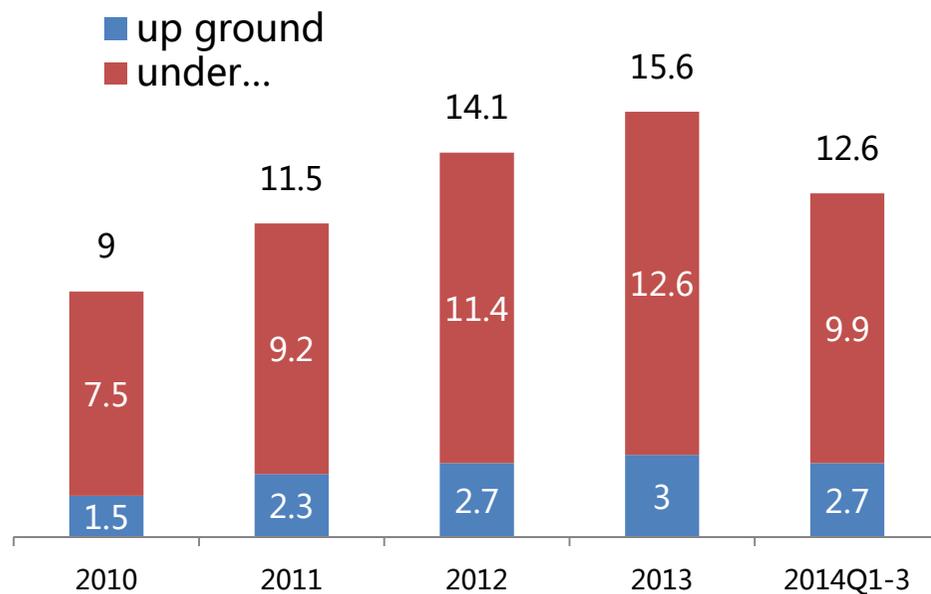




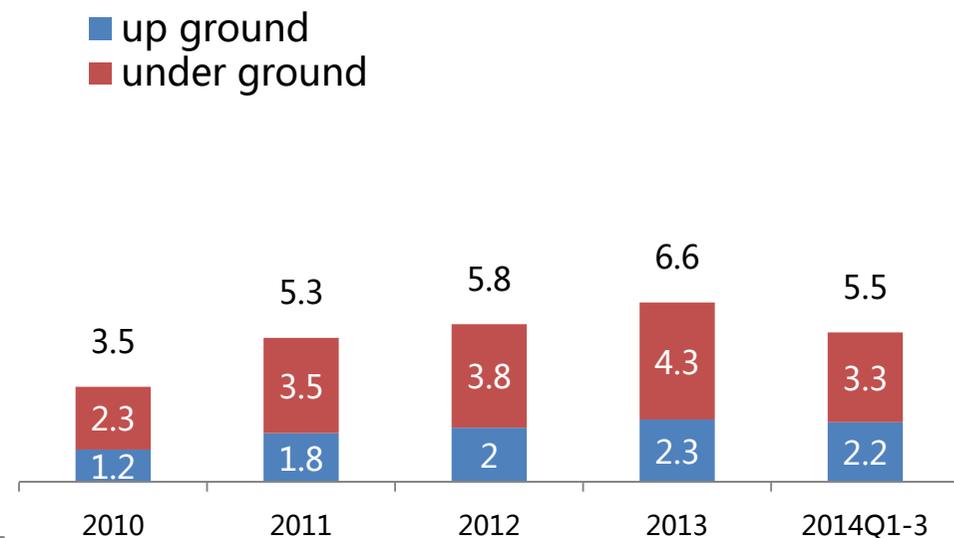
➤ Coal bed methane

- The target of CBM production in 2015 is 30 bcm, including 16 bcm of ground development and 14 bcm of underground extraction.
- The CBM output is 15.6 bcm in 2013, and the utilization quantity is 6.6 bcm; it is supposed that output in 2014 will be 17 bcm in 2014, and the utilization quantity will be 7.5 bcm.

Output of CBM (bcm)



Utilization Amount of CBM (bcm)





➤ Synthetic natural gas

- There are 4 SNG projects approved in 2009 and 2010, with total capacity of 15 bcm per year. The NEA once proposed the target of 50 bcm in 2020.
- However, huge investment of SNG projects are full of uncertainty, and the technology of SNG is still not mature, considering water resource and environmental factors, its future development is unclear.
- In July 2014, the NEA issued a notice about regulation on SNG and CTL; in August 20th, the NDRC published 'Catalogue of encouraged industries in Western Regions', SNG technology is only encouraged in Ningxia.

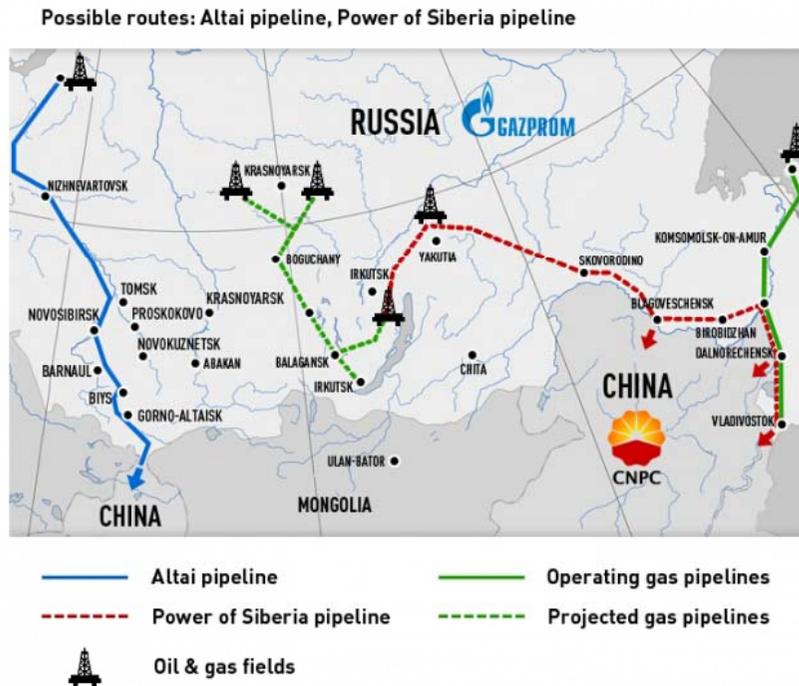
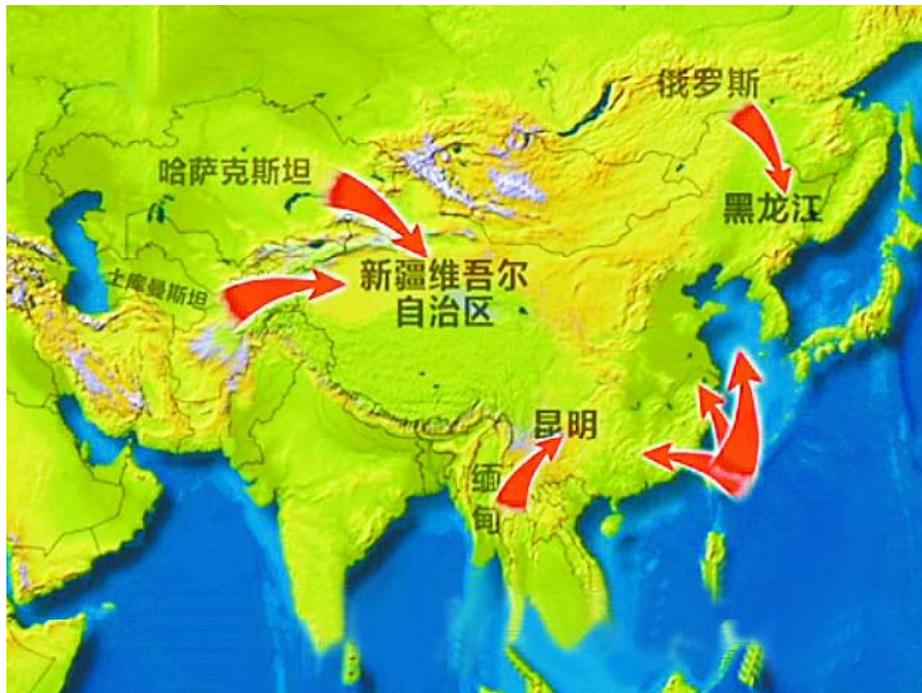
Approved SNG Projects in China

Company	Capacity(bcm)	Location	Approved Time	Status
Datang	4.0	Neimenggu Chifeng Keqi	Aug. 2009	Phase 1(1.33 bcm)
Datang	4.0	Liaoning Fuxin	Mar. 2010	Under Construction
Huineng	1.6	Neimenggu Erdos	Dec. 2009	Under Construction
Qinghua	5.5	Xinjiang Yili	Jun. 2010	Phase 1 (1.375bcm)



➤ Import resources

- Import LNG: postpone of Australian LNG, Mozambique LNG by CNOOC (2 mtpa), Canada Pacific Northwest LNG by Sinopec/Huadian (4.2+0.6 mtpa).
- Import pipeline: Sino-Russia Eastern Pipeline, Western Pipeline (30 bcm per year); upstream resources.

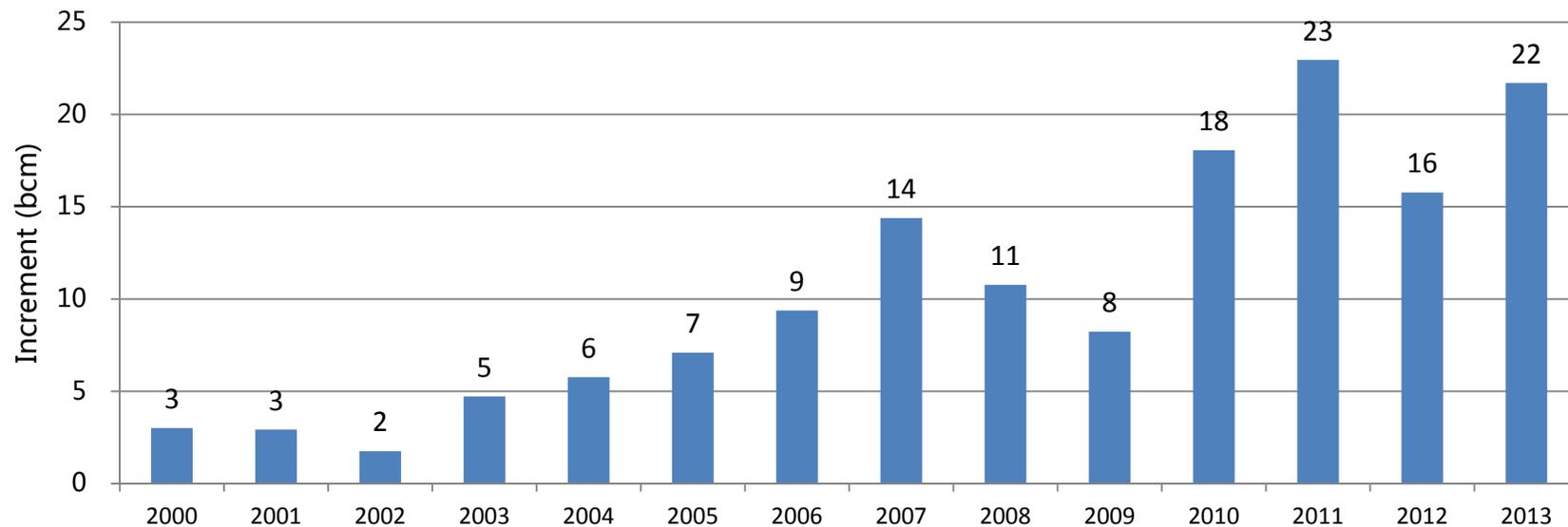




3.2 Demand side

- The target of natural gas demand is 230 bcm in 2015 and 360 bcm in 2020, which means annual increment should be 30 bcm around, however this quantity has never been reached in history.

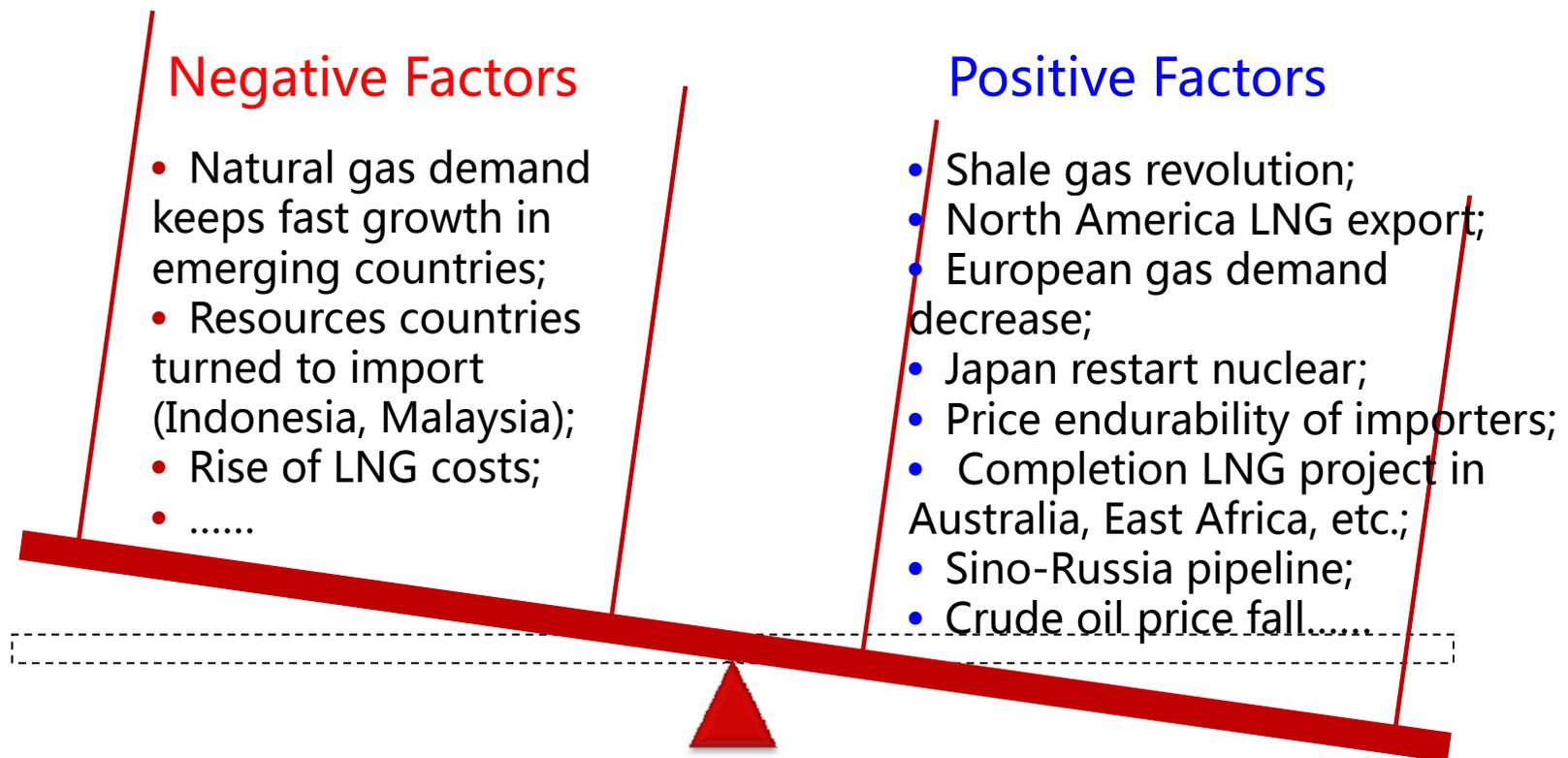
Annual Increment of Natural Gas Consumption in China 2000-2013





3.3.1 International price

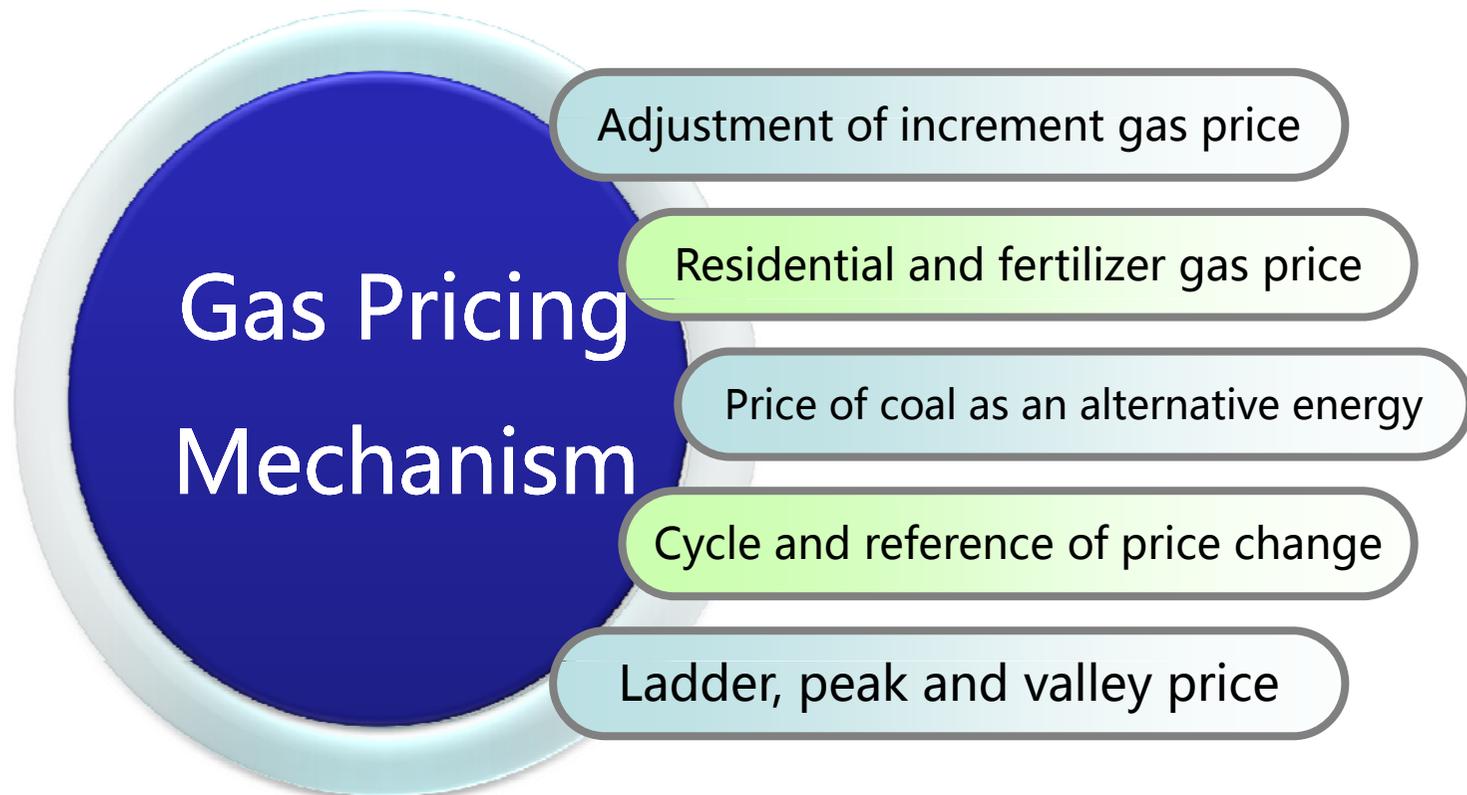
- The fundamentals of global natural gas market is changing, and Asian natural gas price is going down. The international natural gas price will be linked with HH and NBP, while regional price gas will be reduced.





3.3.2 Domestic price

- In 2015, the new natural gas pricing mechanism should consider many issues besides mergence of stock gas and increment gas.

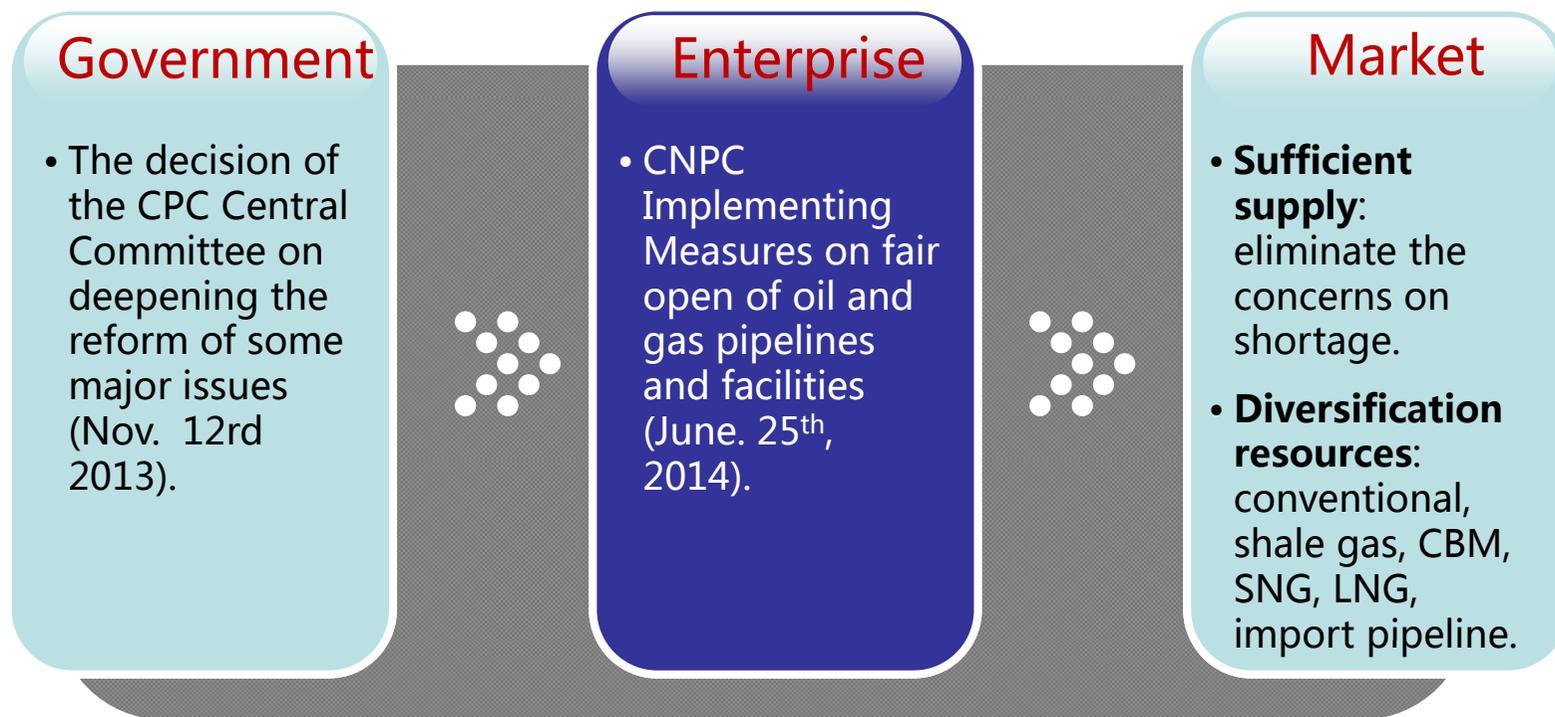


- Tax reform will also influence the price of natural gas in China, especially for excise tax, environmental tax and resource tax.



3.4 Policy and business mode

- It is a rare opportunity for China to deepen market reform and build regional gas trading hub.
- The process of new market mechanism is twisty, which will cause great challenge to market, enterprise and consumers.



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4.1 Conclusions

1

China's natural gas market will keep development

2

The supply capacity is enough, and the government's plan is positive

3

There are huge uncertainty in supply, demand, price and policy

4

Opportunity for market reform and building regional trading hub



4.2 Suggestions

- The next few years provides opportunity both for China and Japan, as well as other Asian countries, which needs us to work together for the development and improvement of Asian natural gas market.





Many Thanks !