



China Natural Gas Market Status and Outlook

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Outline

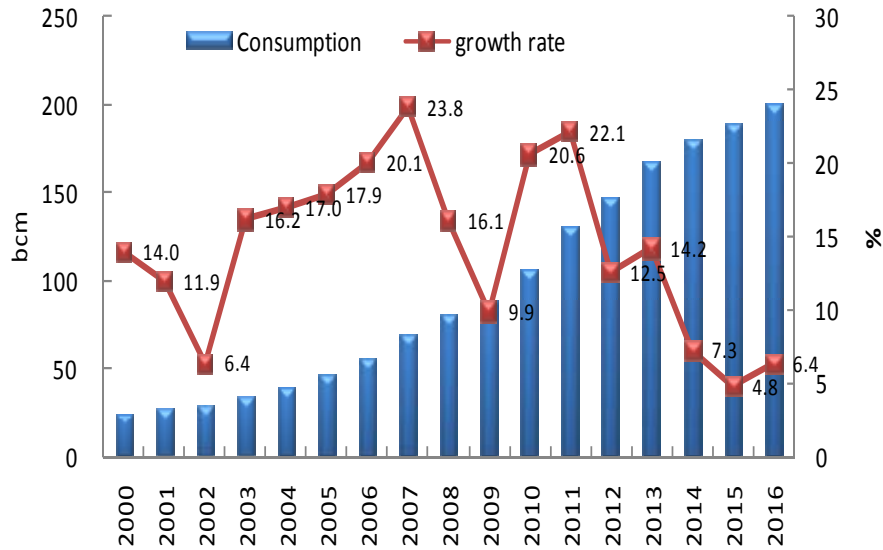
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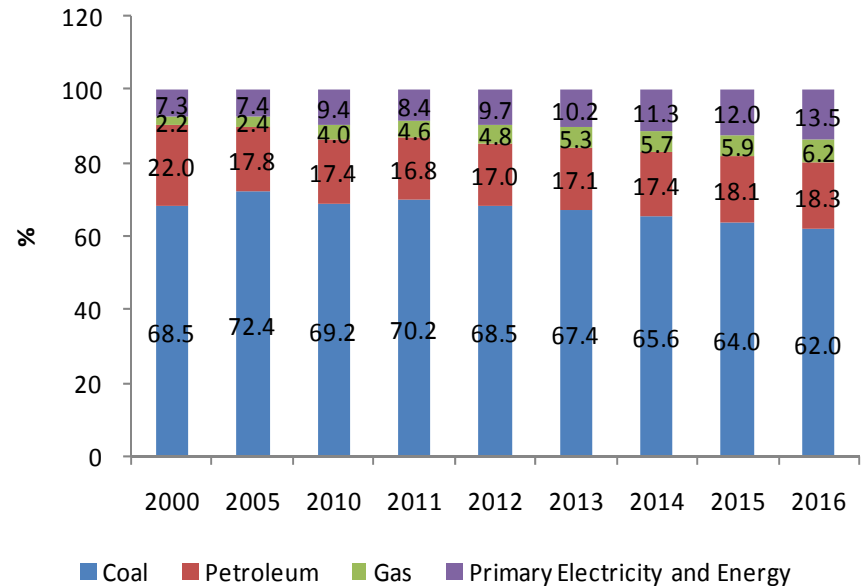


China gas demand grew rapidly in 2017

- During 2000-2013, China gas consumption increased to 168 bcm, with annual growth rate of 16%. In 2015 and 2016, y-o-y gas growth declined to 4.8% and 6.4%.
- Gas share in total primary energy mix had increased from 2.2% in 2000 to 6.2% in 2016, which was still much lower than the world average.



China Gas Consumption 2000-2016



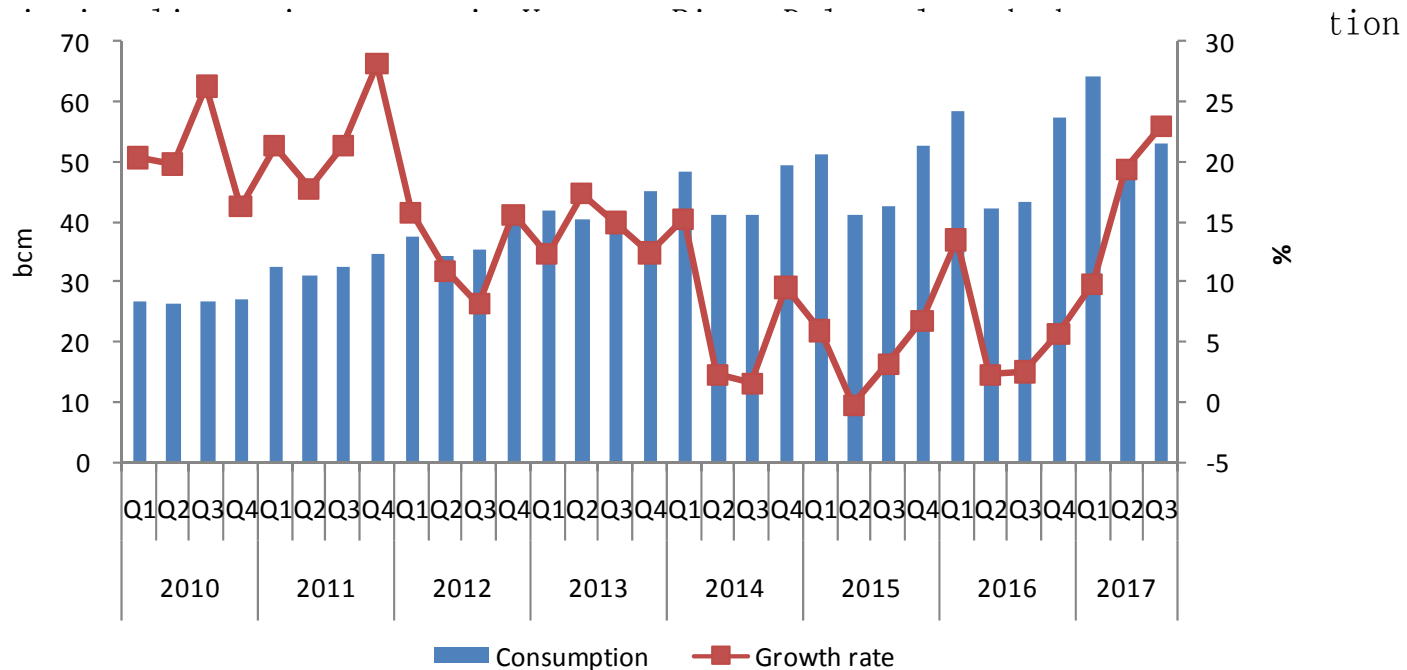
China primary energy mix 2000-2016



China gas demand grew rapidly in 2017

➤ China gas consumption has increased by 17% y-o-y for the first 9 months of 2017.

- Economic development: GDP grew by 6.9% y-o-y for Q1&Q2, 6.8% for Q3
Gas consuming industries' (Steel, glass, chemical) markets improved.
- Policy: Coal-to-gas projects surged driven by environmental policies
- Price: Alternative fuels prices increased
- Trade

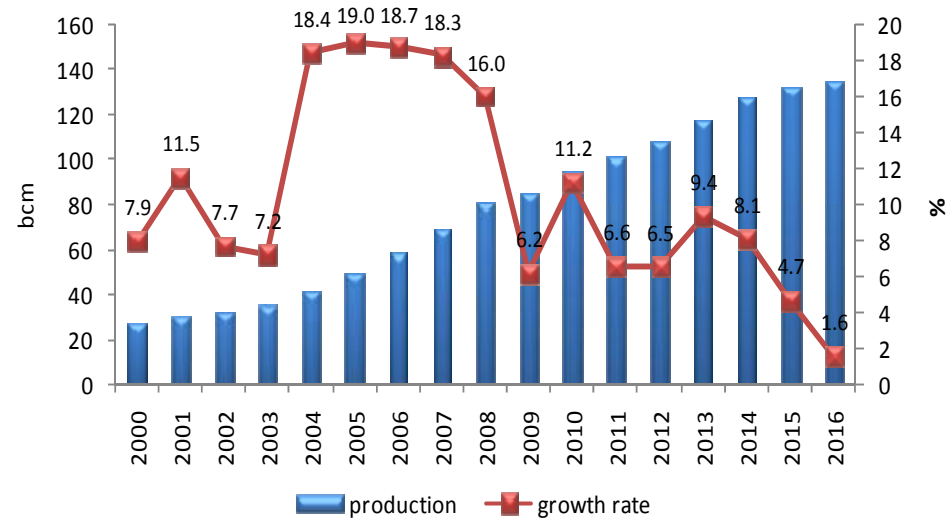




Domestic gas supply capacity kept growing

- During 2000-2015, domestic gas production increased from 27 bcm to 132 bcm, with average annual growth rate of 11%.
- In 2016, domestic gas production grew by 1.6% y-o-y.
 - Total shale gas output raised to 7.9 bcm.
 - CBM production was 4.5 bcm.
 - Coal-based synthetic gas production was 1.6 bcm.

➤ Domestic gas production and total gas supply (including coal-based synthetic gas) grew by 10.9% and 10.8% y-o-y for the first 9 months of 2017.

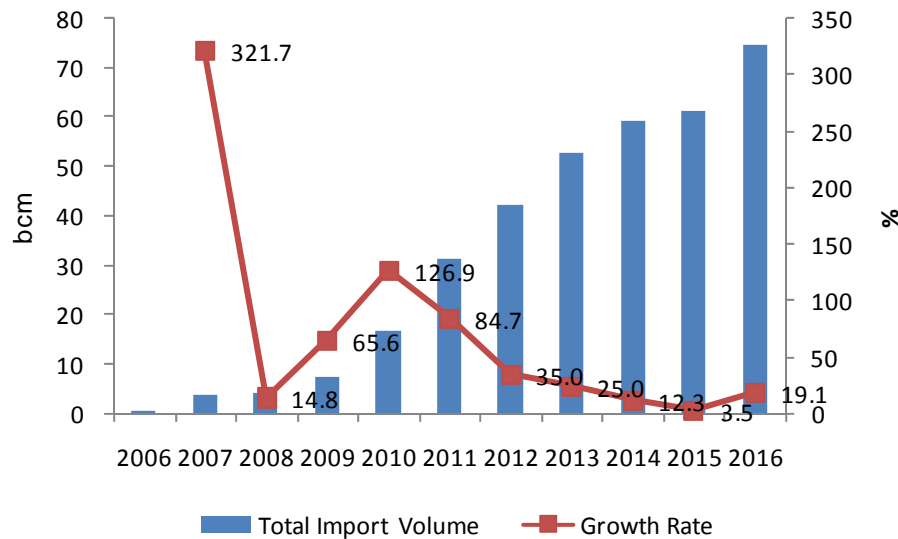


China gas production 2000~2016

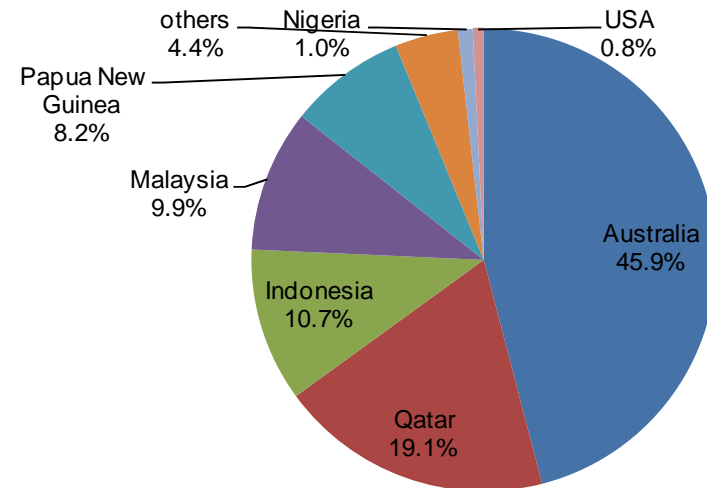


Gas import growth rebounded greatly

- Driven by lower import prices and delivery of new contracts, gas imports increased by 19.1% y-o-y in 2016, with foreign dependence rate reaching 37%.
 - ✓ PNG imports: 38.4 bcm, grew by 13.3% y-o-y
 - ✓ LNG imports: 26.06 MT(27.3 bcm), grew by 32.6% y-o-y
- China gas imports reached 57.6 bcm for the first 9 months of 2017, increased by 21% y-o-y
 - ✓ PNG 31.5 bcm, grew by 7.7% y-o-y
 - ✓ LNG 33.3 bcm, grew by 35% y-o-y



China gas import growth rate 2006~2016

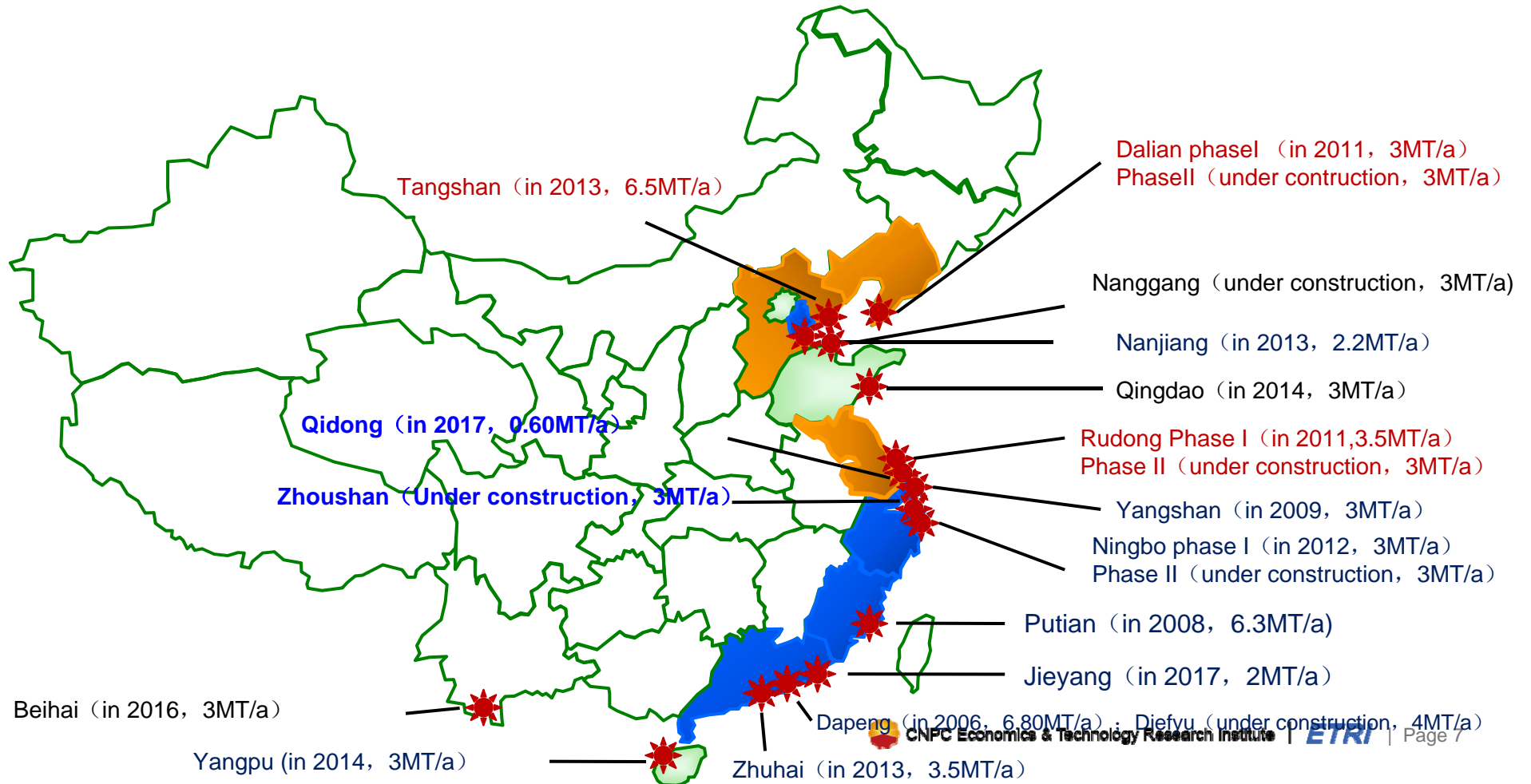


China LNG import sources in 2016



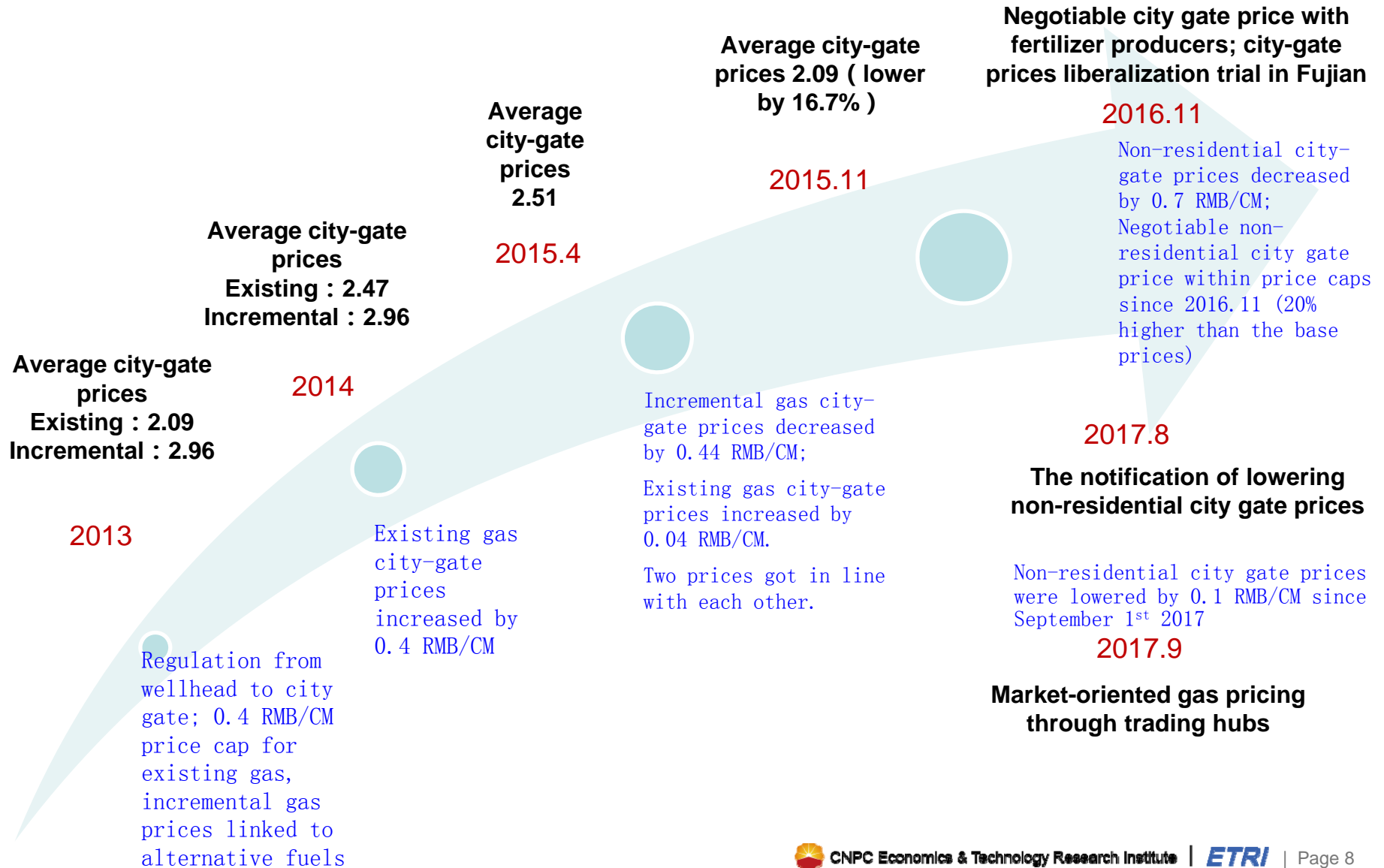
Infrastructure construction is moving forward steadily

- **Pipeline:** natural gas trunk pipelines totaled over 70000 km
- **LNG terminals:** 12 in operation, current import capacity 52.8 MTA by 2016.
3 new terminals under construction, + 1 for extension, total capacity will exceed 68 MTA





Gas market reform accelerated —gas price liberalization

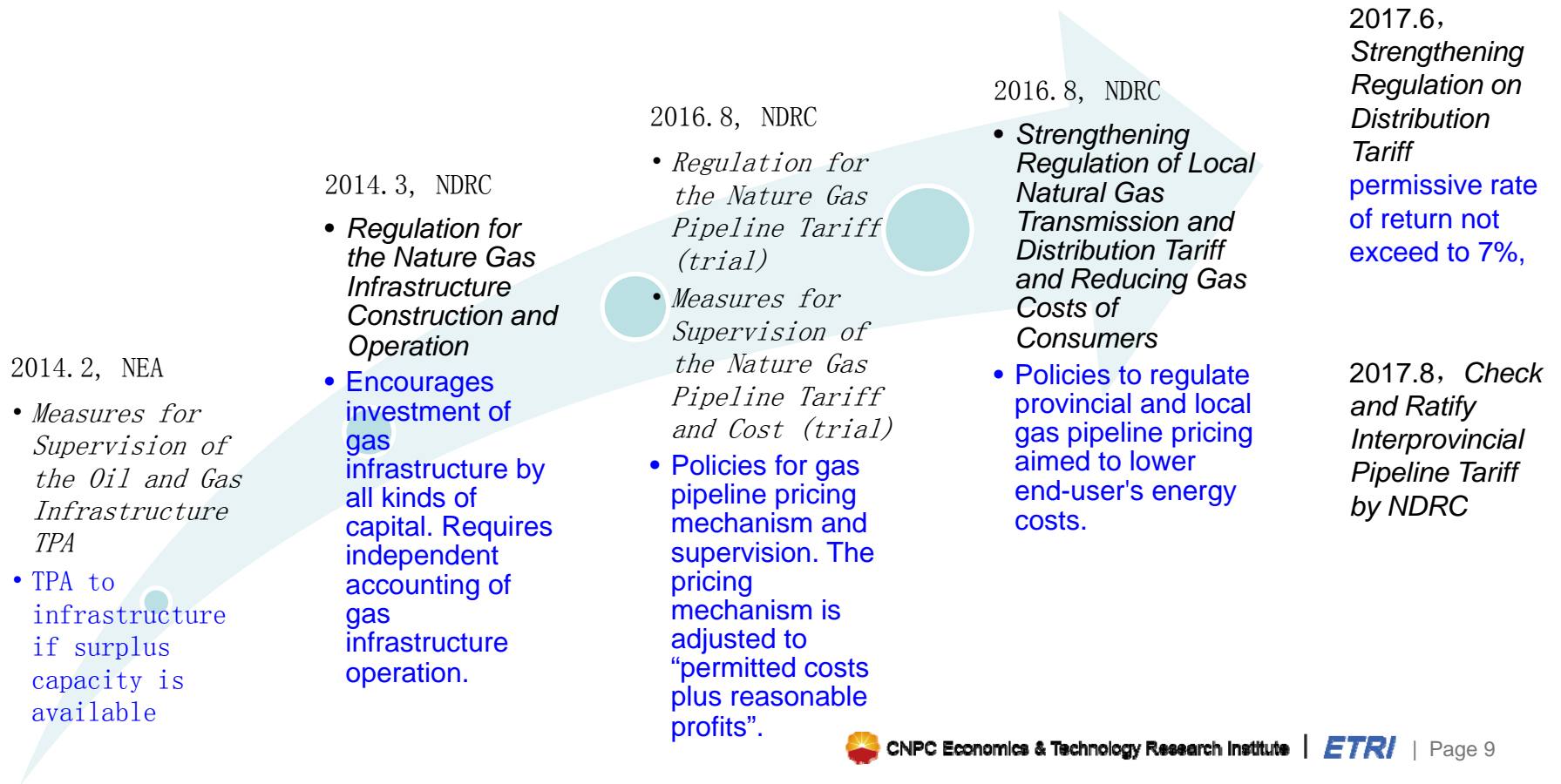




Gas market reform accelerated

—gas pipeline reform

- Gas pipeline reforms accelerated through requiring independent accounting, promoting third-party access to gas infrastructure, and reinforcing regulation and supervision on gas pipeline tariff (national and regional)
- 2016.9-10, NEA released two notifications on pipeline TPA and storage facilities pricing.





Gas market reform accelerated

—establishment of gas trading exchange

- Shanghai Petroleum and Gas Exchange formally started operation in November 2016
- Trading volumes in 2016 reached 30.5 bcm (bilateral), PNG 27.9 bcm, LNG 1.75 MT
- LNG and PNG bidding started in July and September of 2017
- More gas trading hubs are emerging in Chongqing, Xinjiang etc.

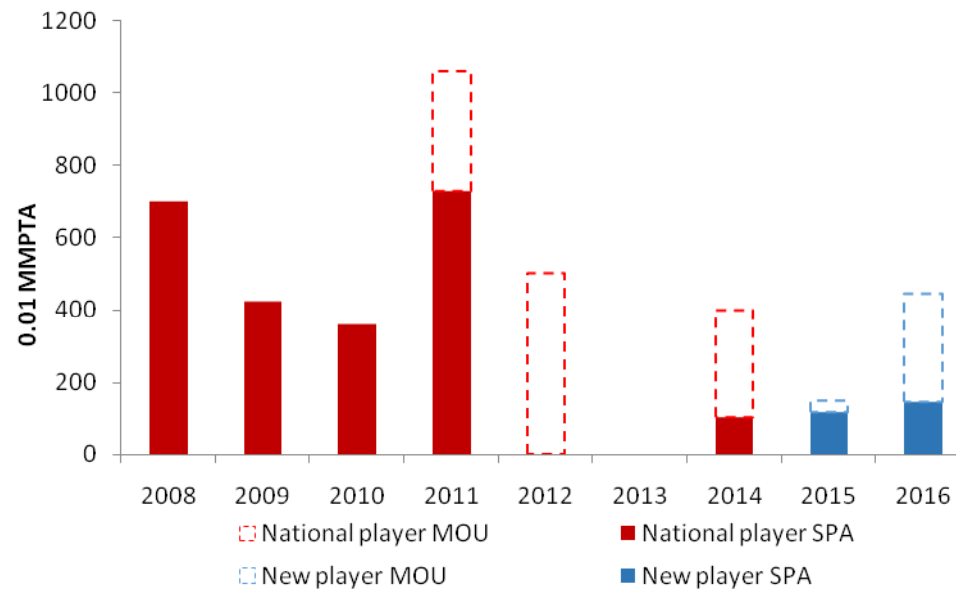




Gas market reform accelerated

— increasing number of new players

- Private companies including Guanghai, ENN etc are participating into LNG business.
- Huadian, ENN, Beijing Gas, Guanghai have signed LNG importing contracts; ENN showed interests to take 11.7% stakes of Santos, making it the largest shareholder of the Australian company; Beijing Gas purchased 20% stakes of Rosneft in VChNG.



LNG importing contracts signed by Chinese buyers 2008-2016



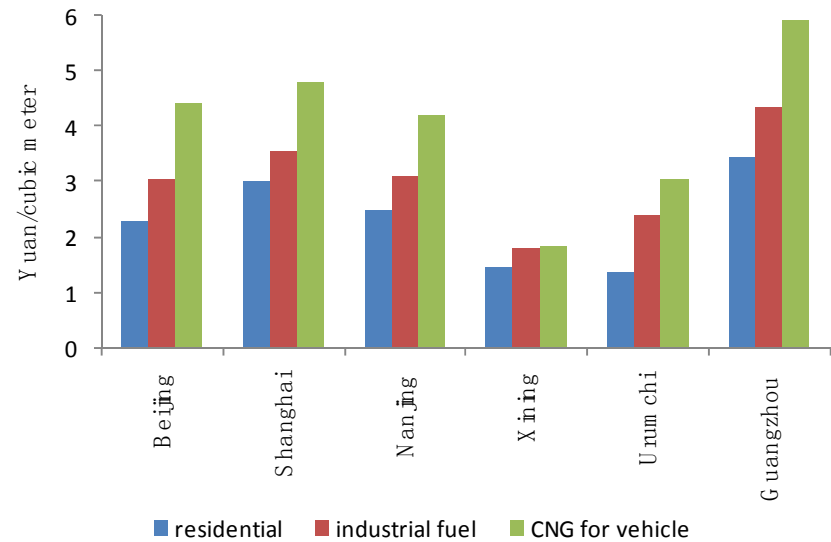
Challenges met by China gas market

➤ Responsibility and emergency system for gas peak shaving are called for. As coal to gas switching drives gas consumption peak-valley difference bigger, inadequate gas peak shaving capacity is becoming a prominent problem. China has 18 underground gas storages by 2016, with working gas 6.1 Bcm, accounting for 3% of gas consumption.

➤ Price regulation confines gas supply capacity.

Foreign countries underground gas storage facilities

Country	Number of storages	Working gas Bcm	Maximum withdrawal volumes Bcm/d	Gas consumption Bcm	% of gas consumption
US	400	133.7	3.34	759.4	17.6
Russia	24	69.6	0.74	409.2	17.0
Ukraine	13	32.2	0.29	38.4	83.9
Germany	53	24.6	0.64	70.9	34.7
Canada	61	23.2	0.36	104.2	22.3
Italy	12	17	0.33	56.8	29.9
France	13	12.2	0.27	35.9	34.0
Netherlands	5	10.2	0.22	32.1	31.8
Austria	9	8.2	0.09	7.8	105.1
Australia	7	6.4	0.02	29.2	21.9



End user gas prices by major city



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Policies to promote China's gas industry

➤ Central government

✓ **Plan:** *Natural Gas 13th Five Year plan, Energy 13th Five Year Plan, Long Term Oil and Gas Pipeline Network Planning*

✓ **Price:** *Notifications on Strengthening Regulation on Distribution Tariff, Lowering Non-residential City Gate Prices, etc*

✓ **Environment:** *Air Pollution Control Action Plan for Beijing-Tianjin-Hebei Area 2017-2018 etc.*

✓ **Utilization:** *Suggestion of Promoting Gas Utilization, etc.*

✓ **Others:** *Some Suggestions on Deepening Oil and Gas Industry Reform, etc.*

➤ Local government

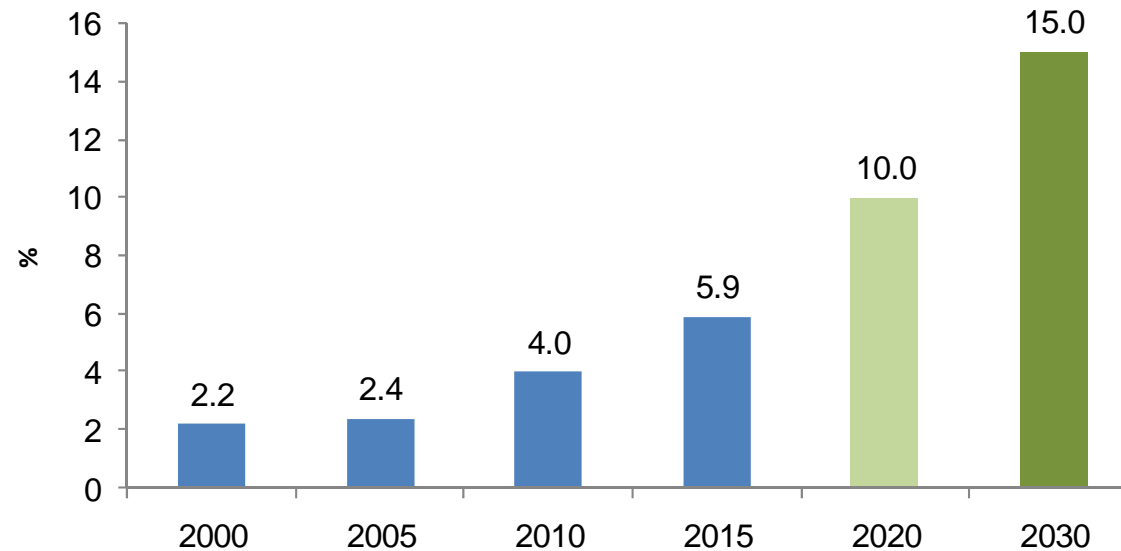
Actively carried out planning, policies on prices and utilizations.



Huge potential market

➤ *Strategic Action Plan for Energy Development, Natural Gas 13th Five Year Plan, Energy 13th Five Year Plan, Suggestion of Promoting Gas Utilization* targeted 10% by 2020 and 15% by 2030 for gas share in primary energy consumption.

➤ It is estimated that gas consumption will be 400 bcm by 2020 and 600 bcm by 2030.

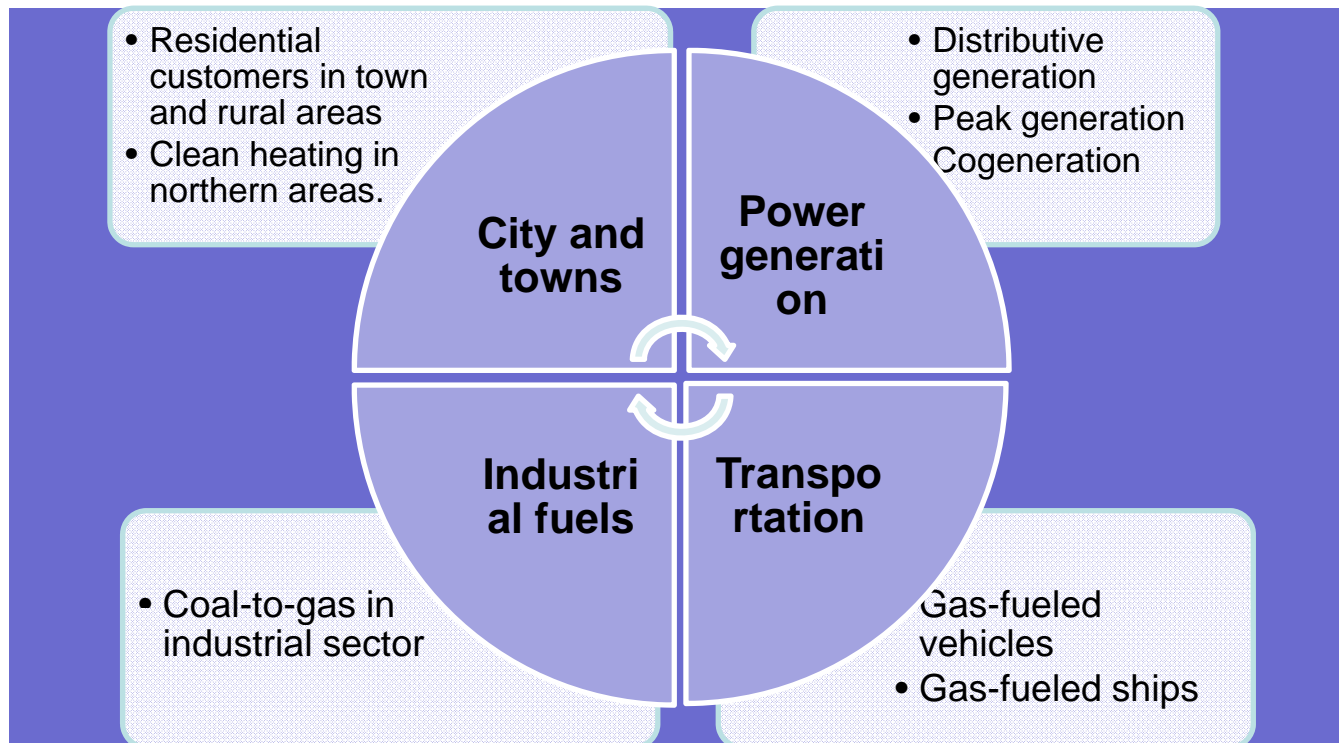


Share of gas in primary energy mix – planned goals by 2020 and 2030



Key orientation of China gas demand

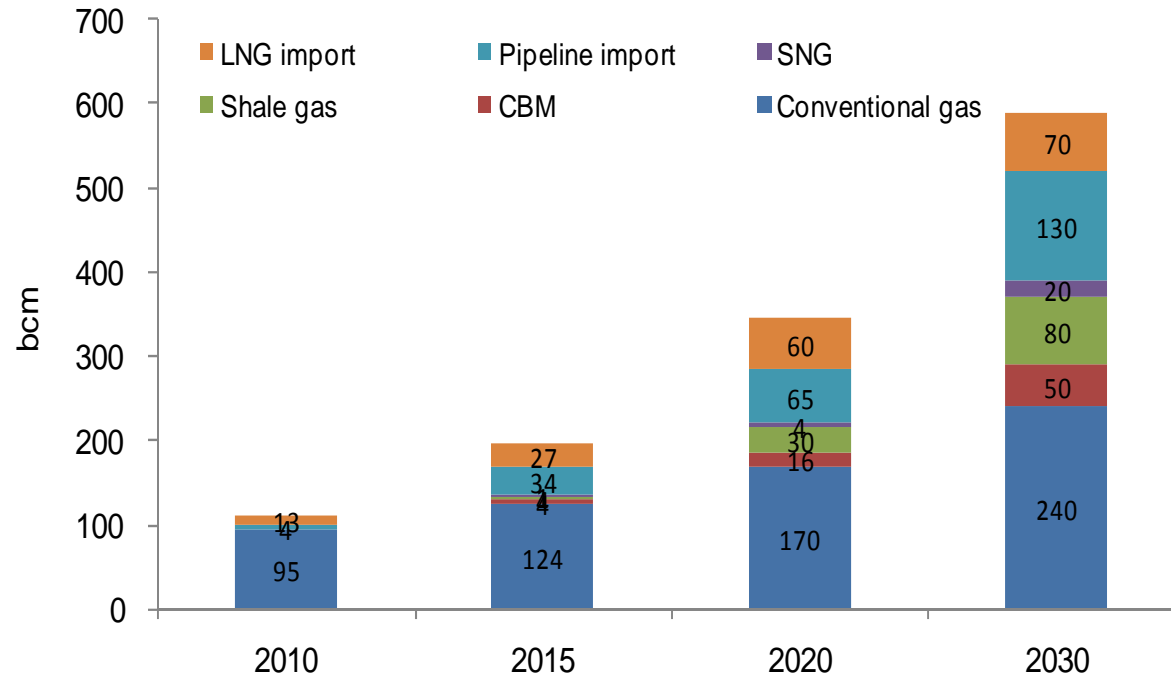
- The major gas consuming sectors in China are city gas (40%), industrial (30%), power generation (15%) and chemical (15%)
- *Suggestion of Promoting Gas Utilization* distributed by 13 national departments pointed out four key utilization areas for gas: cities and towns, power generation, industrial fuels and transportation.





Gas supply capacity will increase steadily

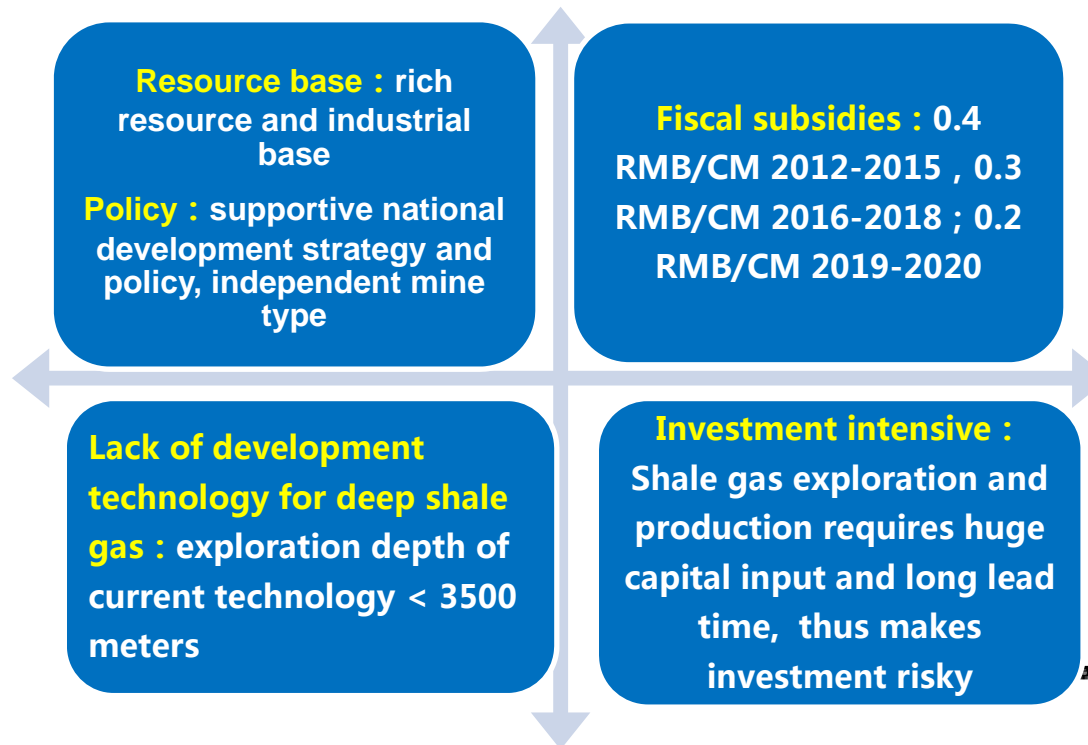
- It is expected that the supply capacity will be **340 bcm** in 2020, with **220** bcm domestic gas, and 120 bcm imported gas.
- Supply capacity will be as much as **590 bcm** in 2030, with domestic production of **390** bcm and 200 bcm imported gas.





Gas supply capacity will increase steadily

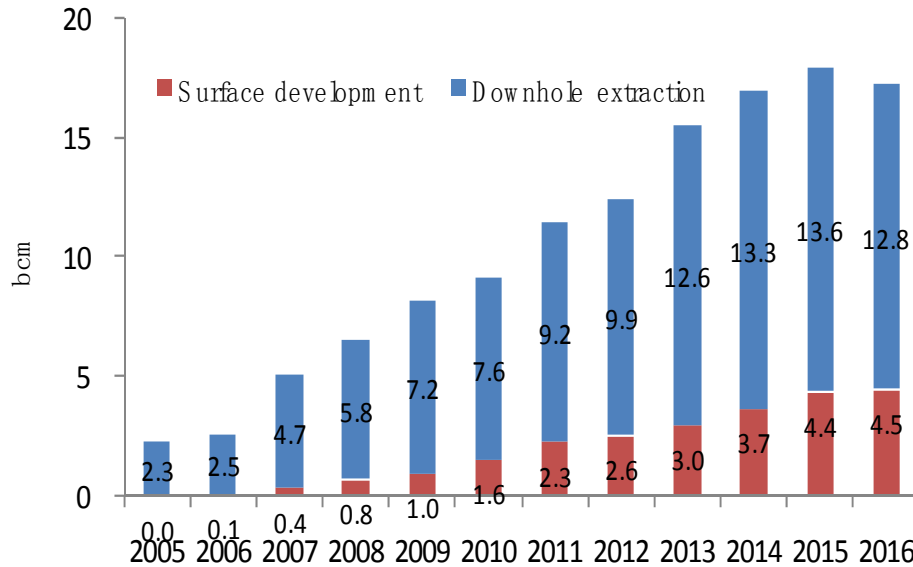
- Shale gas technically recoverable resources totaled at 21.8 Tcm by 2015, according to Ministry of Land and Resources.
- Major exploration and production companies include Sinopec, CNPC, Yanchang Petroleum Group.
- NEA's Shale Gas Planning (2016–2020) targets shale gas production to reach 30 Bcm by 2020 and 80–100 Bcm by 2030.





Gas supply capacity will increase steadily

- CBM has been developed steadily with surface production reaching 4.5 Bcm in 2016;
- Surface production will lead future CBM growth as a result of increasing coal mines closing down.
- CBM production is expected to mount 24 Bcm by 2020, with surface production reaching 10 Bcm (utilization rate > 90%) and coal mine methane production reaching 140 Bcm (utilization rate > 50%).



Favorable condition:

Supportive policy: subsidy standard raises from 0.2 RMB/CM to 0.3 RMB/CM during 13th Five-year Plan period.

Restraining factors:

Mine rights, geological conditions, technology and equipments, reform process.

China CBM production 2005-2016

Thank You



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