



Status and Outlook of China Natural Gas Market

CNPC ETRI

————— 2018.11.13·Tokyo —————



Outline

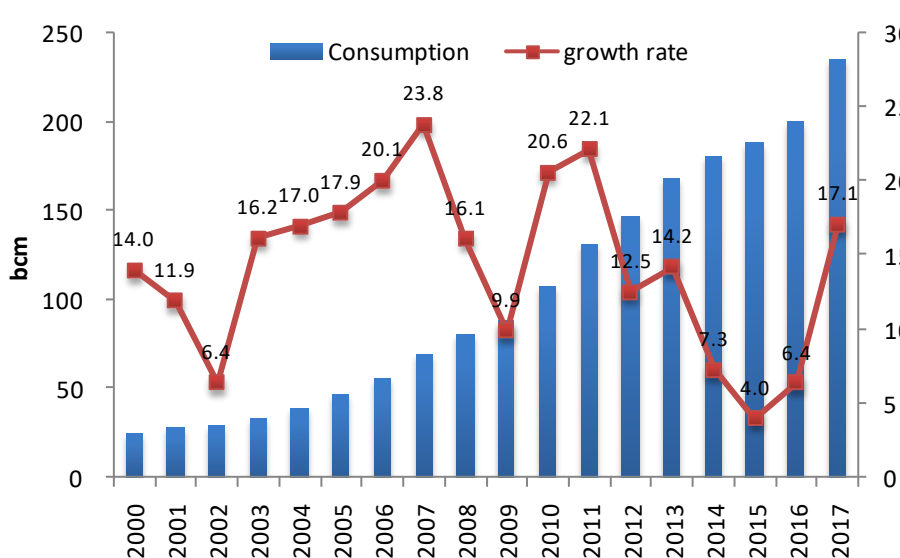
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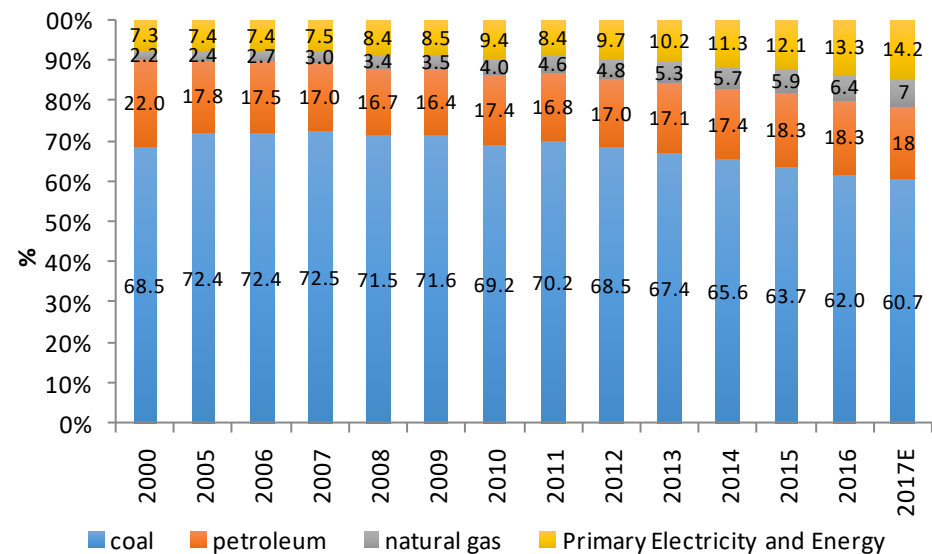


China gas demand grew rapidly in 2017

- 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 4.0% and 6.4%.
- Gas share in total primary energy mix had increased from 2.2% in 2000 to 7.0% in 2017, which was still much lower than the world average.



China Gas Consumption 2000-2017



China primary energy mix 2000-2017





China gas demand grew rapidly in 2017

- In 2017, China gas consumption has increased to 235 bcm, with annual growth rate of 17%.
 - Economic development: GDP grew by 6.9% y-o-y
 - Gas consuming industries markets improved
 - Policy: Coal-to-gas projects surged driven by environmental policies
 - Price: Alternative fuels prices increased
 - Transmission line maintenance in Yangtze River Delta; less hydropower generation





China gas demand grew rapidly in 2017

➤ Gas consumption have increased significantly in various industries, including industrial and power generation the biggest increase in gas consumption.

- City gas: Residents, heating and traffic growth rapid

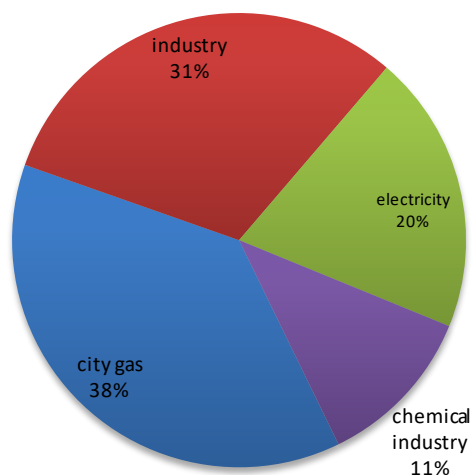
Gas consumption is 89 bcm, grew by 14% y-o-y

- Industry: Environmental policies, downstream product prices, alternative fuel prices

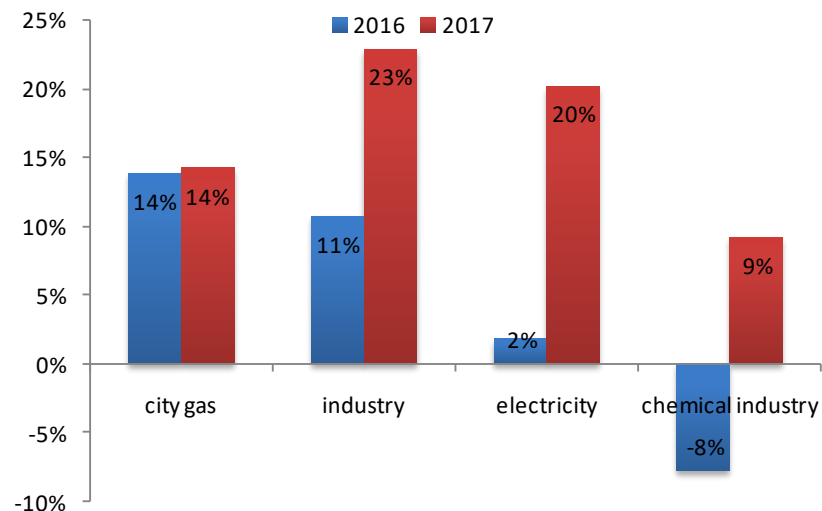
Gas consumption is 73 bcm, grew by 20% y-o-y

- Electricity: Gas consumption is 47 bcm, grew by 23% y-o-y

- Chemical industry: Gas consumption is 27 bcm, grew by 9% y-o-y



China gas utilization mix in 2017

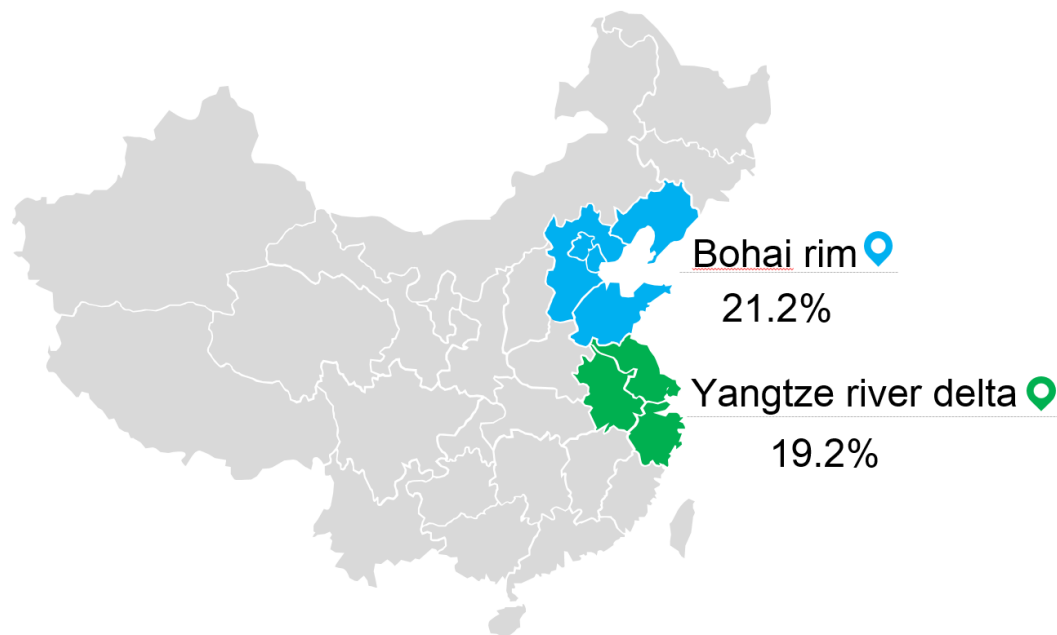


The growth rate of natural gas consumption by various departments 2016-2017



China gas demand grew rapidly in 2017

- Bohai rim and Yangtze river delta are the top 2 demand growth regions. China's western region is relatively slow.
 - Bohai rim: Growth rate of gas consumption is 21.2%, driven by “coal-to-gas”
 - Yangtze river delta : Growth rate of gas consumption is 19.2%, driven by gas-fired electricity



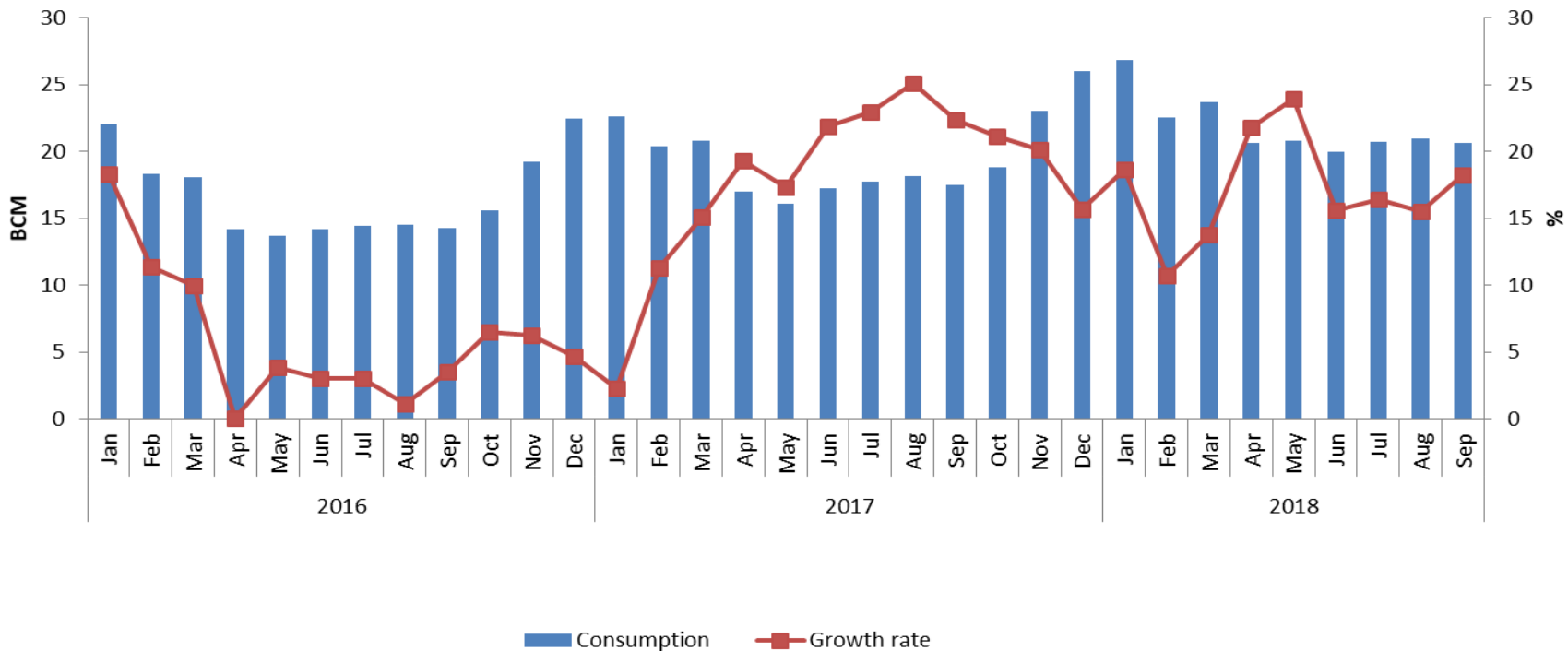
Top 2 nature gas demand growth regions in 2017





China gas demand grew rapidly in 2018

- From January to September 2018, national natural gas consumption reached 197 bcm with an y-o-y growth of 17.6%, which is higher than 15.7% of last year
- In 2018, Annual natural gas consumption is expected to reach 270 billion cubic meters with a high growth rate of 14% upon previous year.



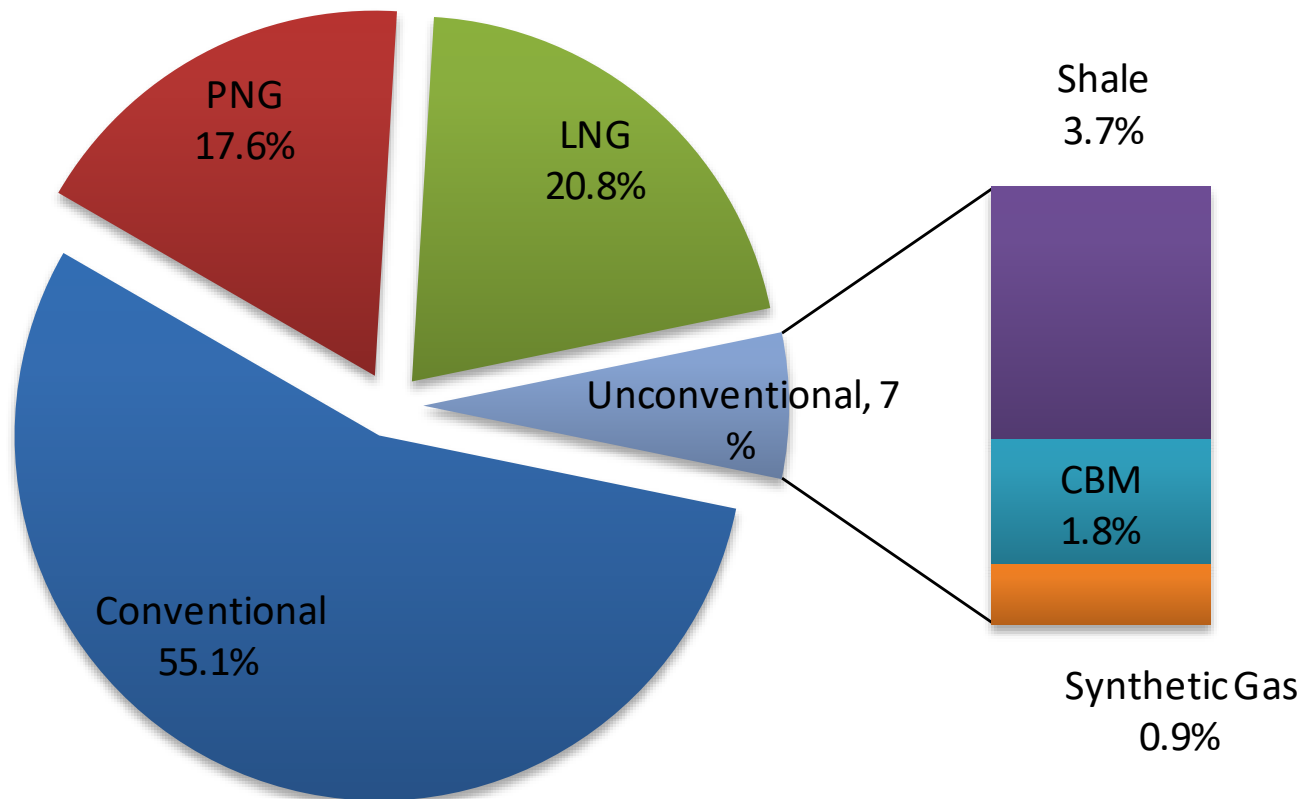
China's monthly natural gas consumption, 2016-2018

Source: CNPC ETRI



A diversified gas supply system is established

- In 2017 total natural gas supply is 241.4 bcm, with annual growth rate of 14%.
- The share of imported gas was nearly 39%.

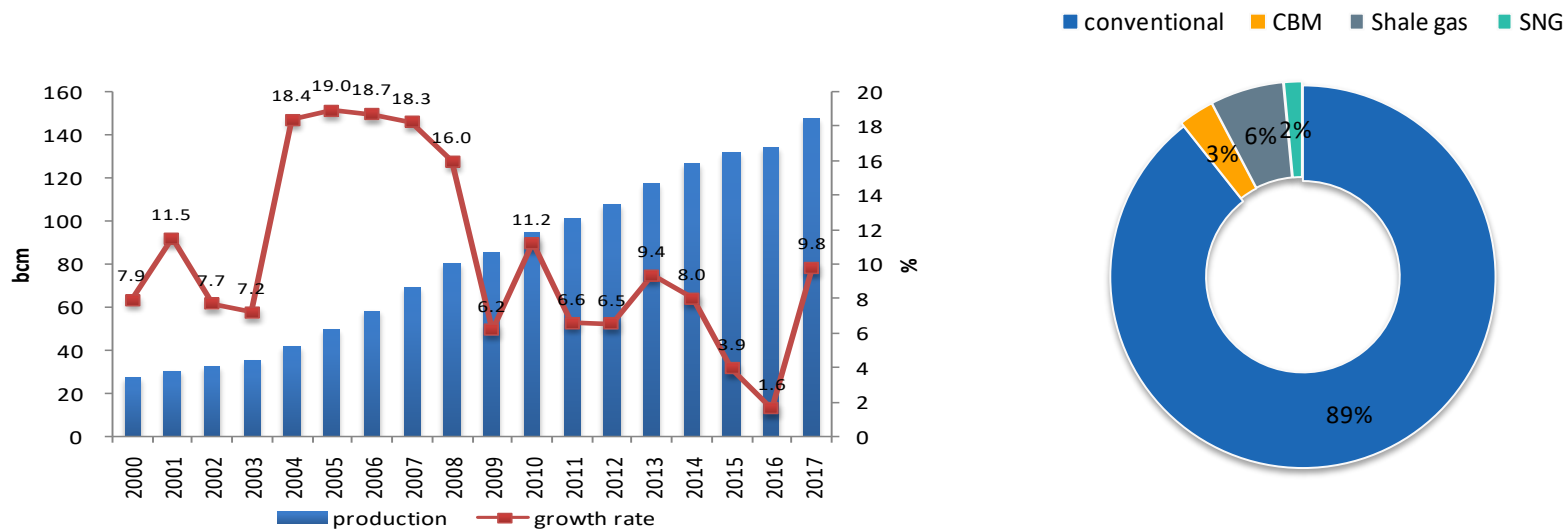


China gas production mix in 2017



A diversified gas supply system is established

- During 2000-2016, domestic gas production increased from 27 bcm to 134 bcm, with average annual growth rate of 10%.
- In 2017, domestic gas production was 147.5 bcm, grew by 9.8% y-o-y.
 - Total shale gas output raised to 9.0 bcm.
 - CBM production was 4.4 bcm.
 - Coal-based synthetic gas production was 2.2 bcm.



China gas production 2000~2017

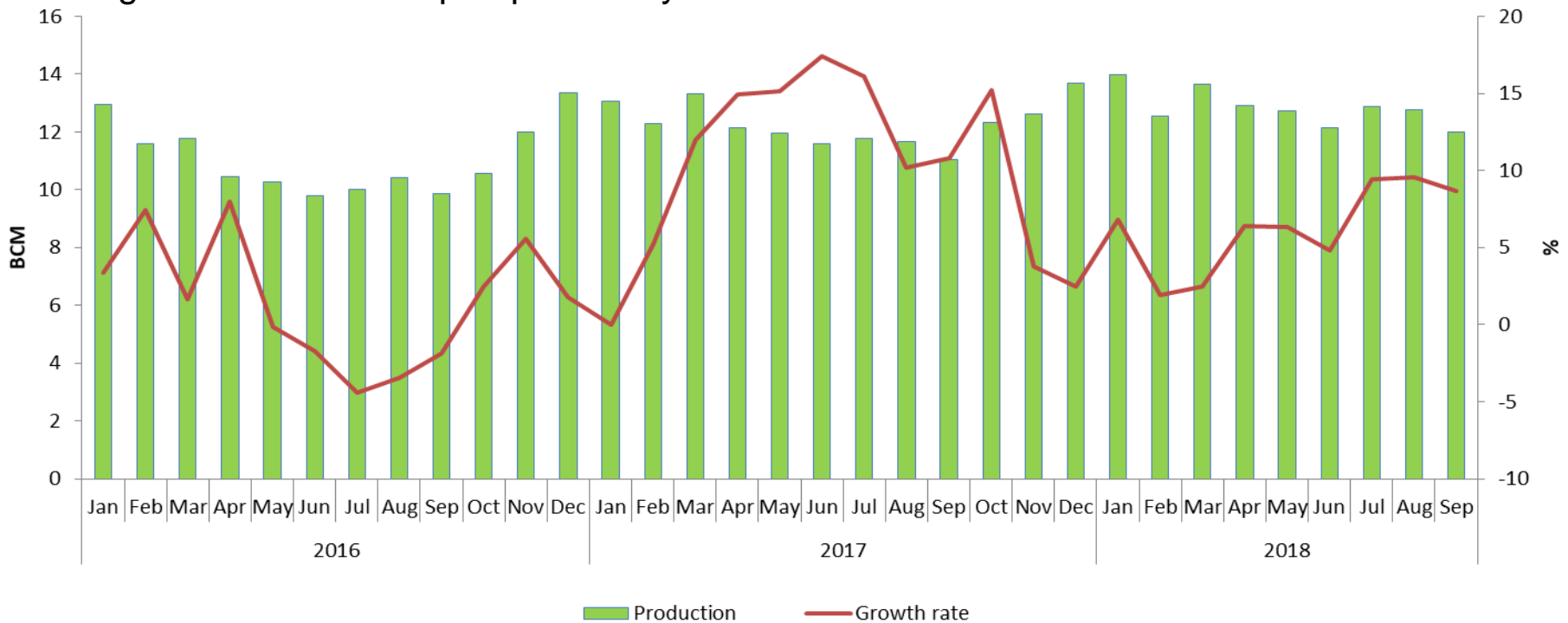
China's domestic gas production, 2017

Source: CNPC ETRI



A diversified gas supply system is established

- From January to September 2018, national natural gas production reached 115 bcm with an y-o-y growth of 6%, which is much lower than the consumption growth.
- In 2018, Annual natural gas production is expected to reach 155 billion cubic meters with a growth rate of 6% upon previous year.



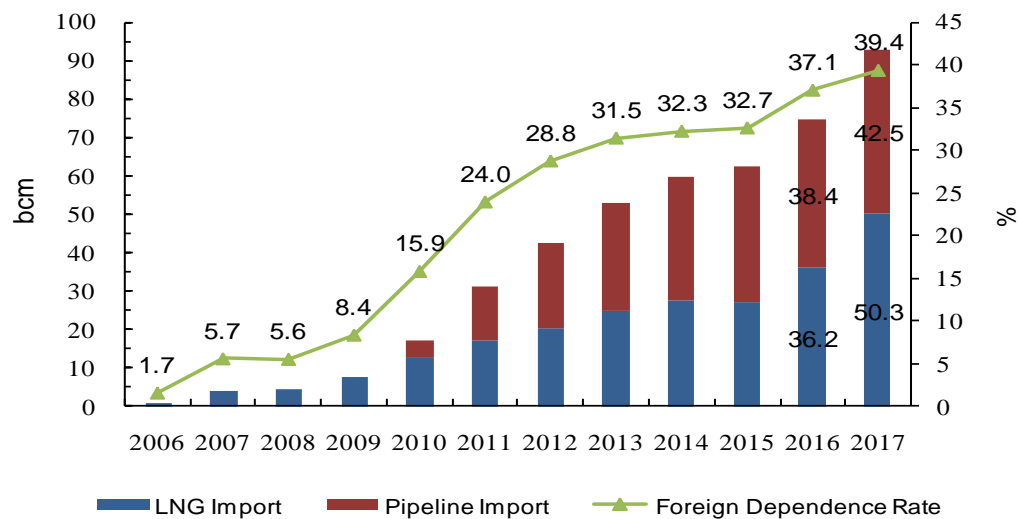
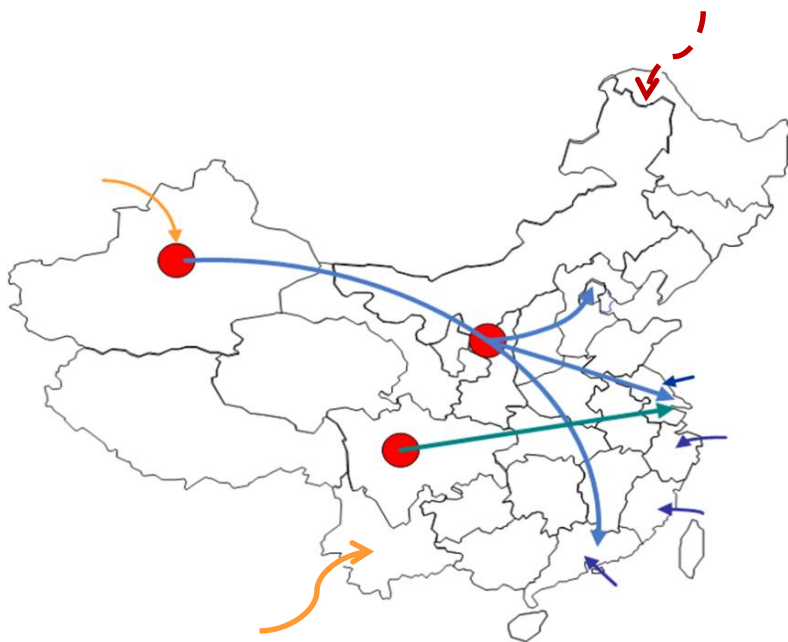
China's monthly natural gas production, 2016-2018

Source: NDRC



A diversified gas supply system is established

- China gas imports reached 92.8 bcm in 2017, increased by 25% y-o-y. Nature gas foreign degree of dependency increase from 37.1% to 39.4%
 - ✓ LNG 50.3 bcm, grew by 39.9% y-o-y
 - ✓ PNG 42.5 bcm, grew by 10.6% y-o-y



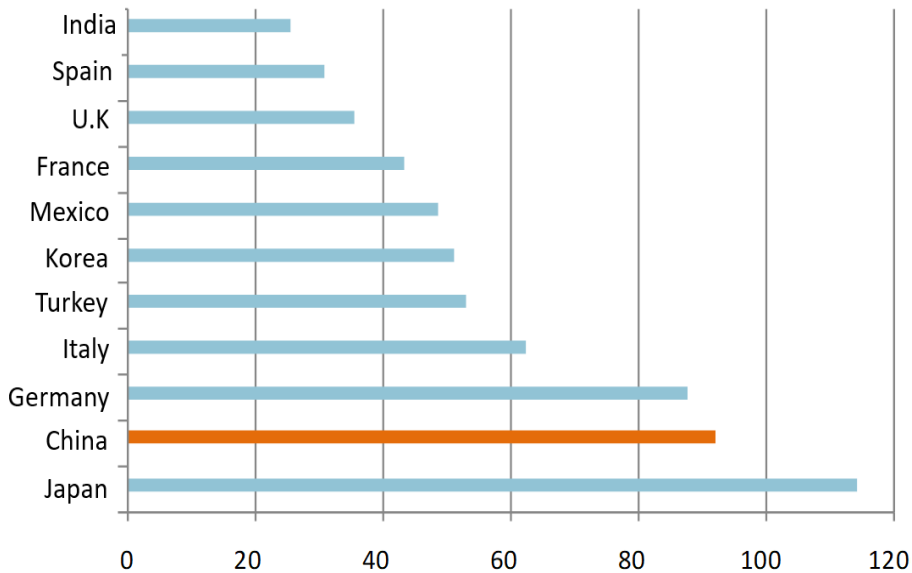
China gas import volume and import reliance, 2006~2017

Source: CNPC ETRI

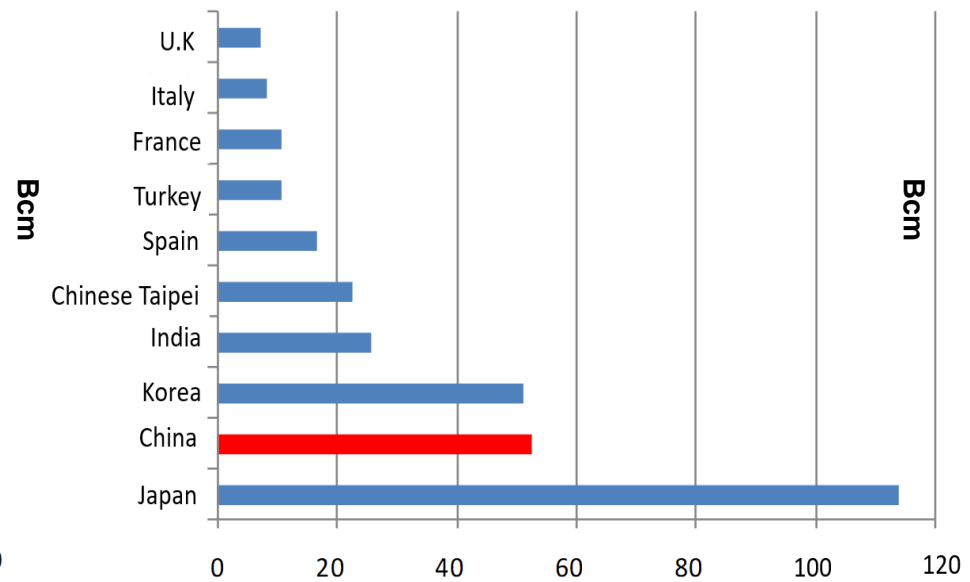


A diversified gas supply system is established

➤ In 2017, China became the world's second largest importer of natural gas and second largest importer of LNG.



Global natural gas import ranking, 2017

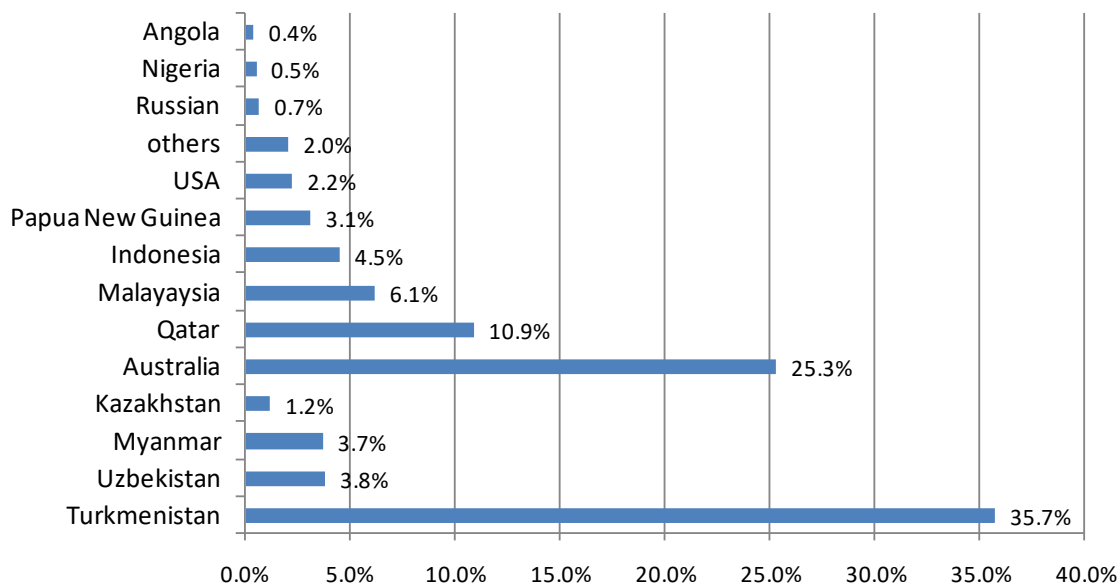


Global LNG import ranking, 2017

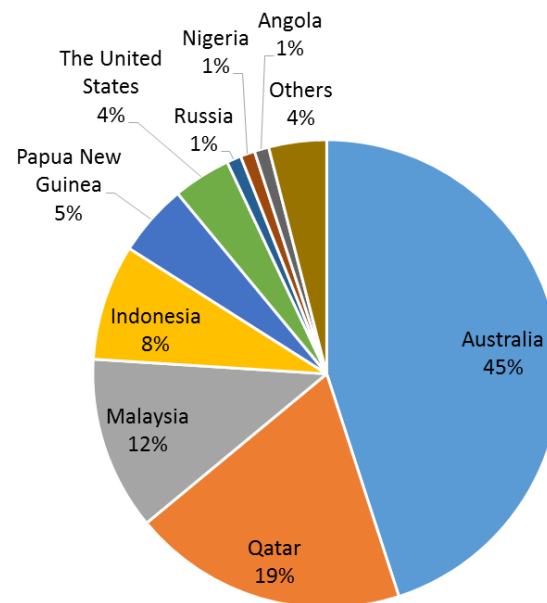


A diversified gas supply system is established

- Major LNG Importing sources were Australia, Qatar, Malaysia, Indonesia, etc.
- Pipeline importing sources were Central Asia and Myanmar.



China gas import sources in 2017



China LNG import sources in 2017

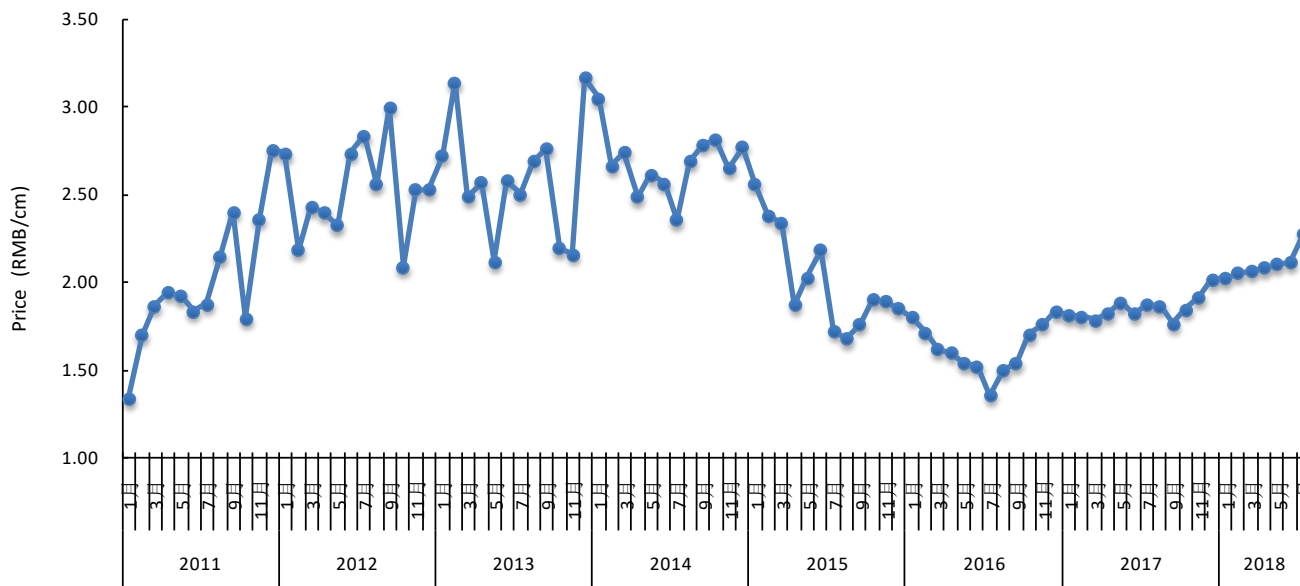
Source: BP



A diversified gas supply system is established

➤ As oil price rebounded since the second half of 2017, China's import LNG price rose continuously.

- For 2017, LNG average CIF 1.86 RMB/m³, up by **14.2%** year-on-year.
- From Jan. to Jul., 2018, LNG average CIF 2.1 RMB/m³, up by **15.2%** year-on-year.
- For Jul 2018, LNG average CIF 2.28 RMB/m³, up by **21.9%** year-on-year.



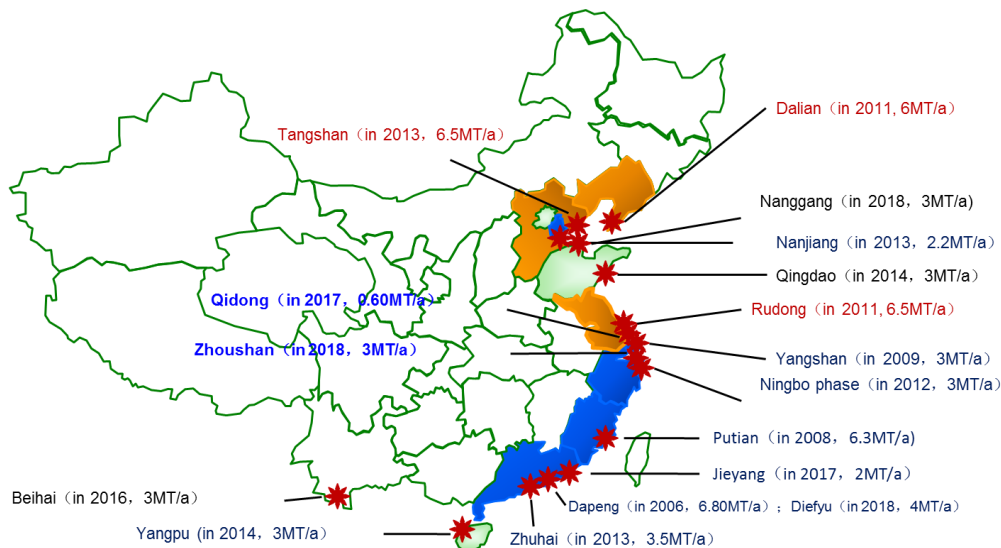
2011~2018 Imported LNG Price in China





A diversified gas supply system is established

- Pipeline: natural gas trunk pipelines totaled over 74000 km
- A total of 12 storage reservoirs (groups) have been built, with the peak load capacity of underground storage reaching 10 bcm and the peak load reaching nearly 8 bcm, accounting for about 3.4 percent of the country's natural gas consumption.
- LNG terminals: 18 in operation, current import capacity 66.4 MTA. 3 new terminals have started operation in 2018 (Sinopec Nangang, CNOOC Shenzhen, and ENN Zhoushan).

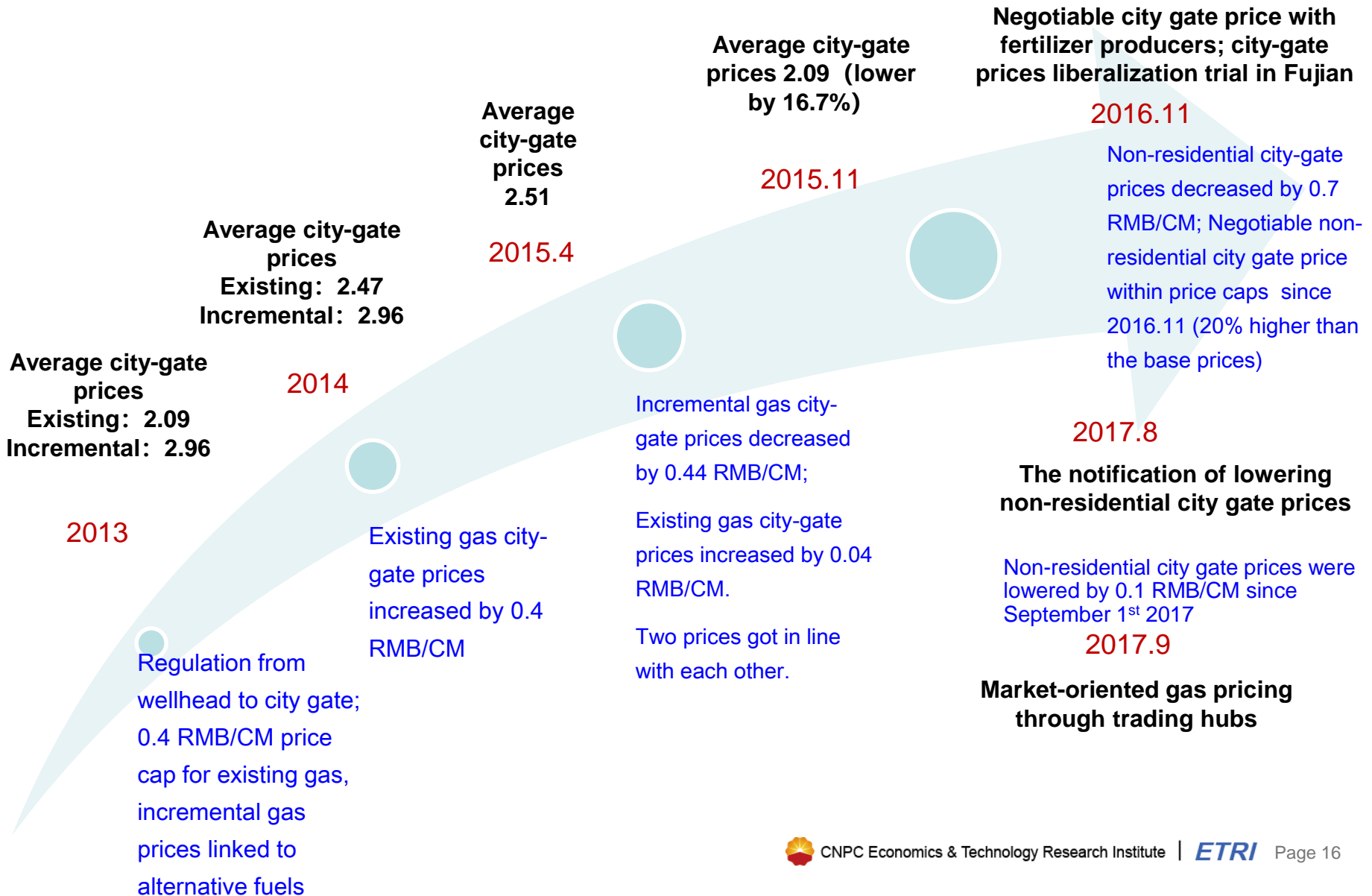


LNG regasification capacity in China, as of Sep 2018



Gas market reform accelerated

—gas price liberalization

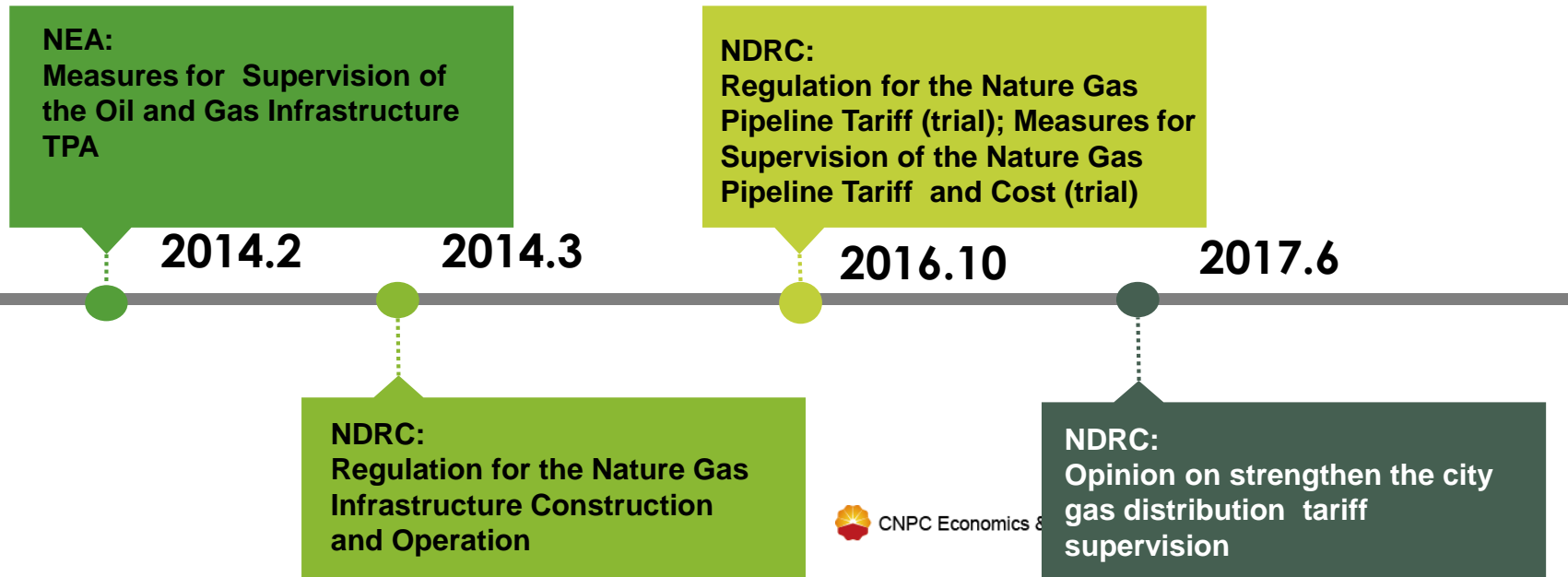




Gas market reform accelerated

—gas pipeline reform

- In 2017, Chinese government carried out the first cost investigations and inspection for 13 pipeline companies, the pipeline tariffs are decreased according to the inspection results and the city gate prices are decreased correspondingly.
- China's gas pipeline reform has extended from the interprovincial trunk line to the city gas distributing network, the return on investment is restricted at lower than 7%.
- The retail price has been generally decreased owing to the strong regulatory nationwide and the consumer benefits from the reform.





Gas market reform accelerated

—establishment of gas trading exchange

- Shanghai Petroleum and Gas Exchange formally started operation in November 2016
- Trading volumes in 2017 reached 51.2 bcm (bilateral), PNG 47.5 bcm, LNG 3.7 bcm, LNG and PNG bidding started in July and September of 2017
- More gas trading hubs are emerging in Chongqing, Xinjiang etc.

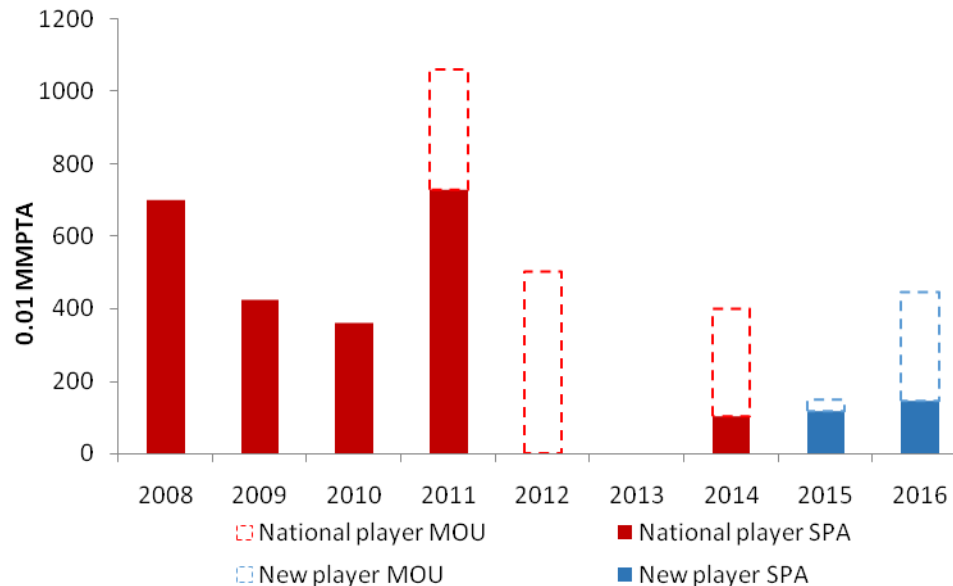




Gas market reform accelerated

— 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.



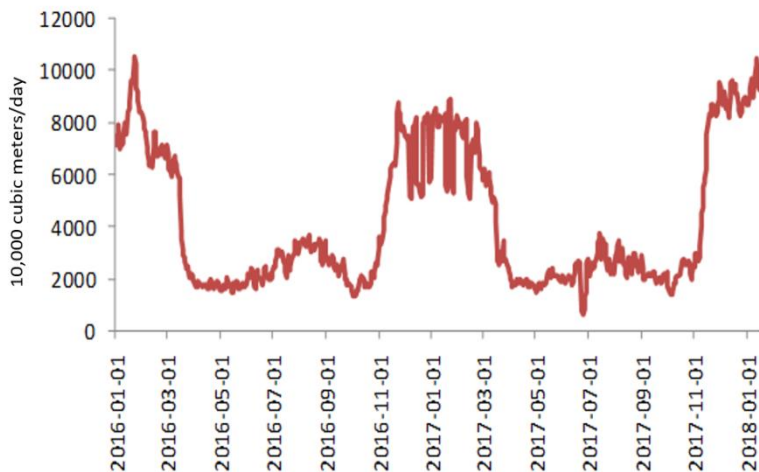
LNG importing contracts signed by Chinese buyers 2008-2016





Challenges met by China gas market

- Gas supply shortage during winter of 2017
 - ✓ High seasonal volatility of gas demand and beyond-expected coal to gas switching
 - ✓ Supply reduction of Central Asian gas
 - ✓ Inadequate gas peak shaving capacity (Total underground gas storages working capacity is 8 bcm, accounting for 3.4% of gas consumption)
 - ✓ Lack of responsibility and emergency system for gas peak shaving
- It is necessary to alleviate the contradiction between supply and demand by increasing gas supply, accelerating construction of gas storages and peak-shaving facilities, improving peak-shaving mechanism, and increasing pipeline connectivity.



Daily gas consumption of a major city

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



Outline

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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.*

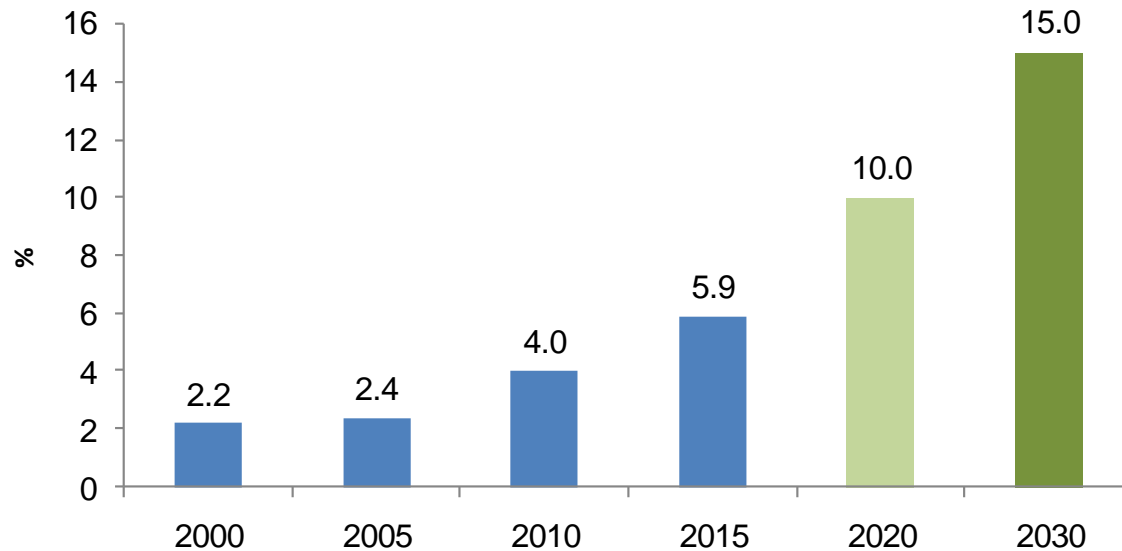
➤ Local government

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.

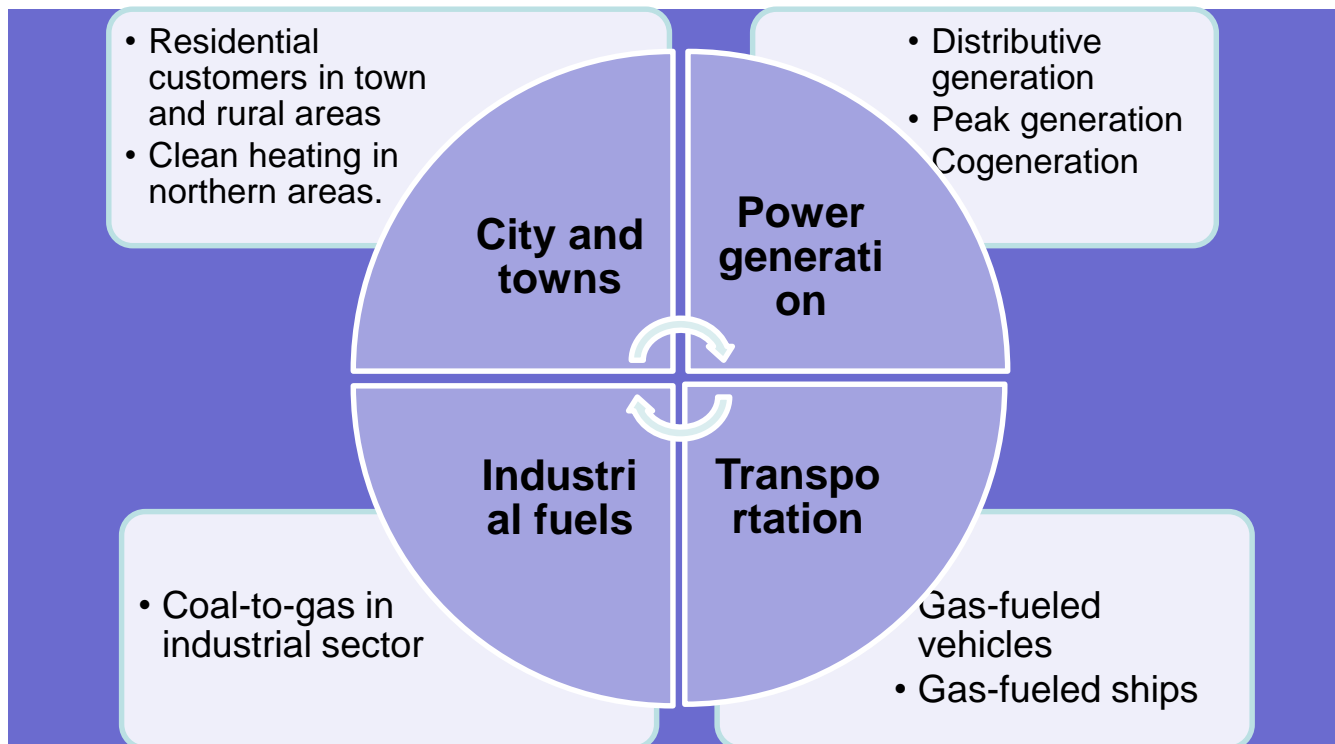


Share of gas in primary energy mix – planned goals by 2020 and 2030



Key orientation of China gas demand

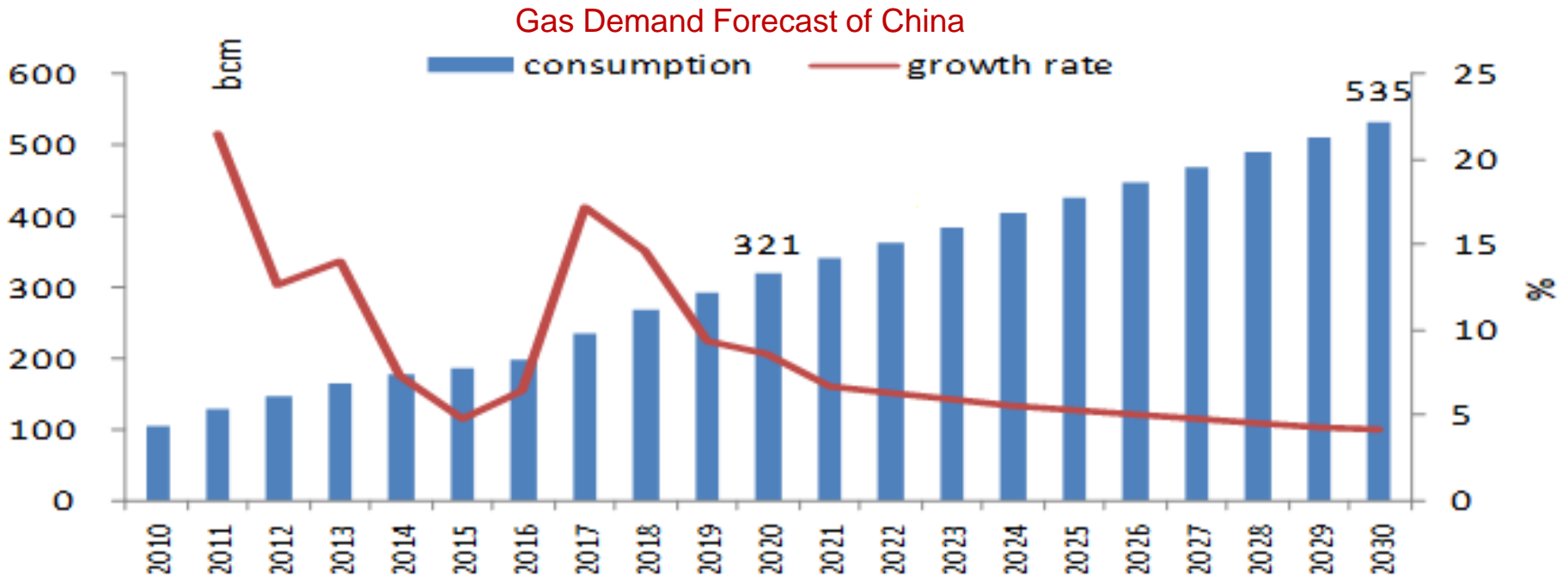
- The major gas consuming sectors in China are city gas (40%), industrial (30%) , power generation (15%) and chemical (15%)
- *Suggestion of Promoting Gas Utilization* distributed by 13 national departments pointed out four key utilization areas for gas: cities and towns, power generation, industrial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





Outlook: Demand

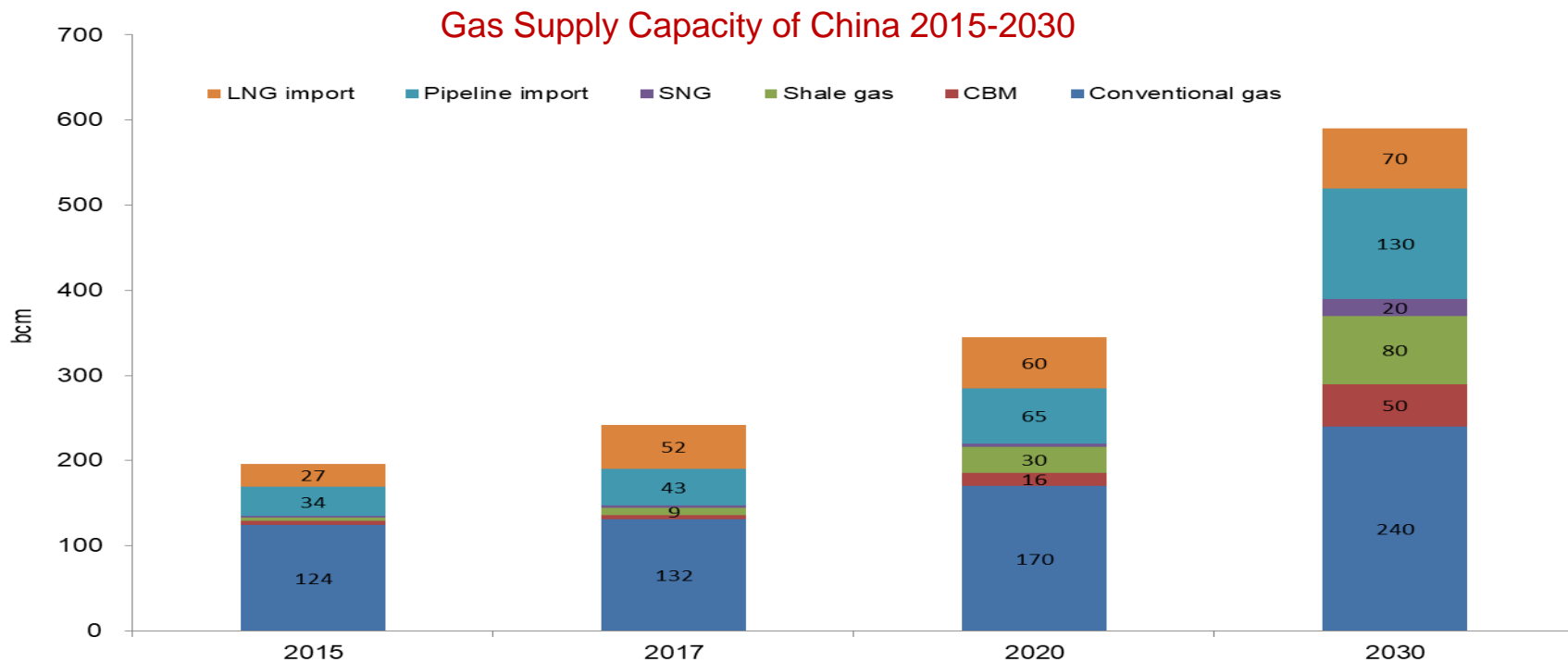
- It's projected that China natural gas demand will be **321 bcm** by 2020 and the average annual growth rate will be **9%** for 2018-2020.
- During 2020-2030, the gas demand in residential heating(belongs to city gas in our model), power sector and industry sector are projected to grow fast and the biggest uncertainties come from power sector.





Outlook: Supply

- It is expected that the supply capacity will be **345 bcm** in 2020, with 220 bcm domestic gas, and 125 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.
- The supply capacity can be able to meet demand by 2030.





Outlook: Supply

- Pipeline gas import capacity is 67 bcm in 2017. It's projected that the PNG import capacity will be 105 bcm after completion of China-Russia East Line in late 2019, and over 135 bcm by 2030.
- We expect PNG import to reach 130 bcm by 2030.

China gas supply capacity, 2017

Project	Designed capacity (bcm/yr)	Status	Operation start date
Central Asia Gas Line A	30	Operation	2009.12
Central Asia Gas Line B		Operation	2010.10
Central Asia Gas Line C	25	Operation	2014.5
Central Asia Gas Line D	30	Delayed	—
Myanmar-China gas pipeline	12	Operation	2013.07
Sino-Russia East Gas Line	38	Under construction	—
Sino-Russia West Gas Line	30	Planned	—



Outlook: Supply

- Driven by rapid LNG import growth, LNG import capacity increase quickly, by now, 18 LNG terminals in operation, import capacity reached **66.4 MTA**.
- There are **12** projects are under construction with import capacity **29.3 MTA**, most of which are expansion of existing projects. Moreover, there are more than 50 proposed projects.
- It's projected that the capacity will exceed **100 MTA** by 2025 according to the under construction and proposed additional terminals.



Thank You



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