CNPC Economics & Technology Research Institute

ETRI

# China Natural Gas Market Status and Outlook for 2023


SHAN Weiguo

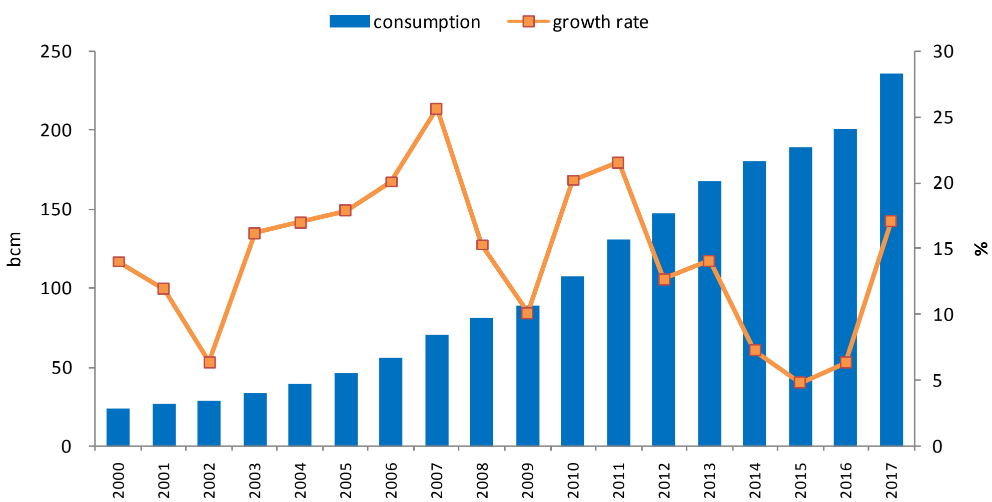
**AGPRCC**


2018.10 Saint Petersburg

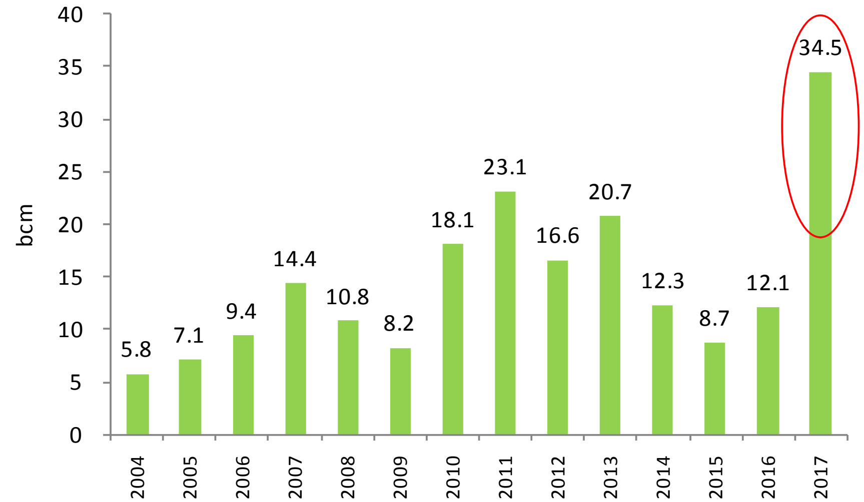
# Table of content

# China gas demand growth remarkably rebound in 2017

- **In 2017, China gas consumption has increased to 235 BCM, with annual growth rate of 17% and a recorded annual incremental consumption of 34.5 BCM.**
  - **Better GDP performance**: 6.9% in 2017; Market recovering: Demand and price rising in industries, such as steel, glasses and chemical plants.
  - **“Coal to Gas” shift**: Coal-to-gas projects surged in heating, power and industry driven by environmental policies.
  - **Improving price competitiveness**: Alternative fuels prices increased.



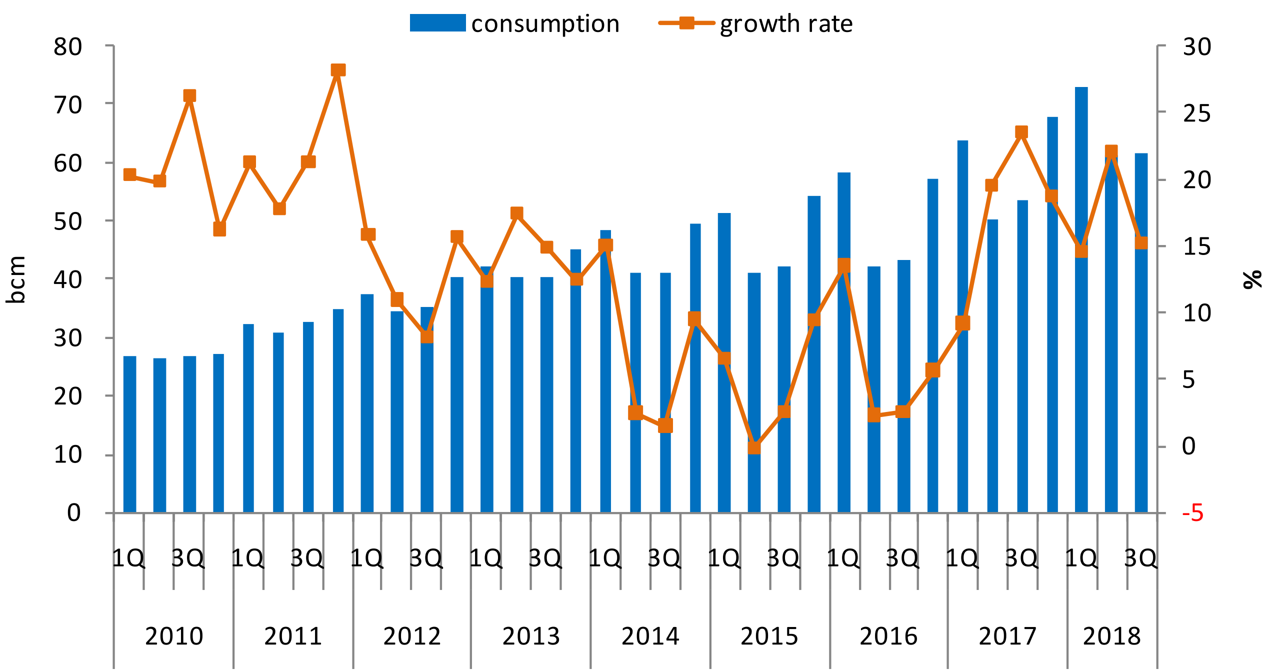

**China’s Gas Consumption 2000-2017**




**China’s Annual Incremental Gas Consumption**

# Gas demand surge is continuing in 2018

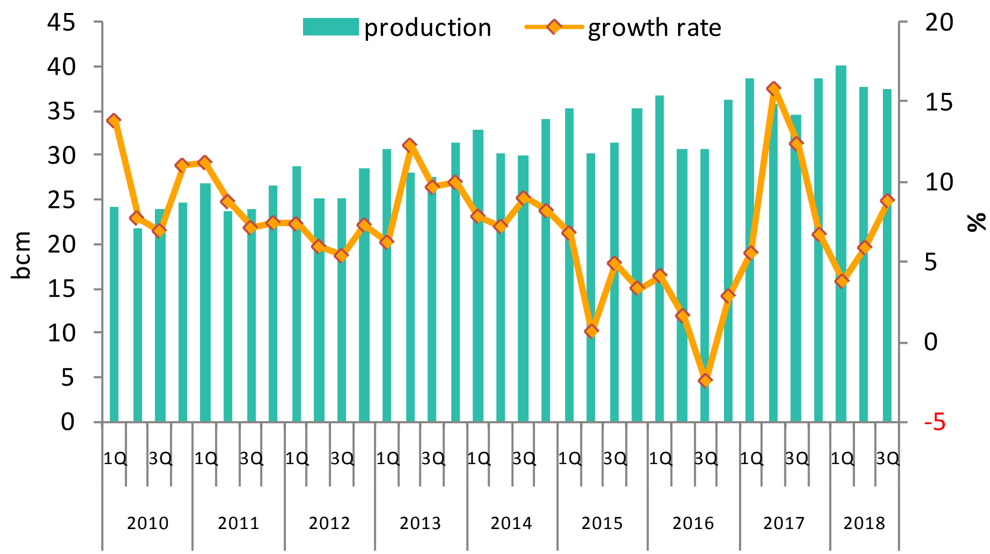
- During 2018 Q1-Q3, gas demand in China increased by 17% y-o-y, even higher than the rate of same period 2017.
- The key drivers are mostly the same with 2017.
- Gas suppliers have to restrict gas supply to some power and industrial consumers.




China's quarterly gas consumption, 2010-2018

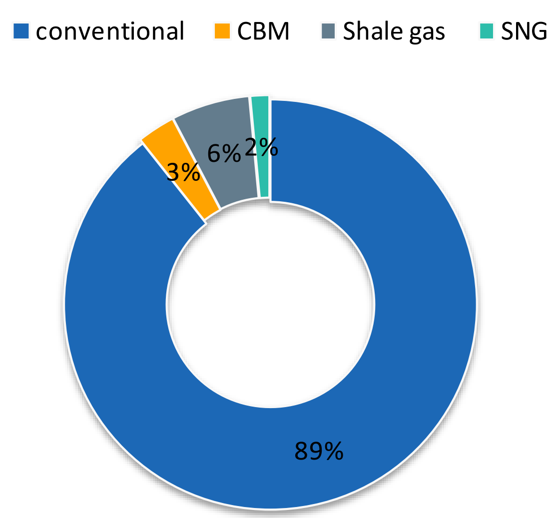
# Domestic production growth cannot keep pace with consumption

- **During 2018 Q1-Q3, domestic gas production reached 115.5 BCM, with Y-O-Y growth rate of 6%, much lower than the consumption growth.**
- **In 2017, domestic gas production was 147.5 BCM, grew by 9.8% y-o-y.**
  - Total shale gas output raised to 9 BCM.
  - CBM production was 4.4 BCM.
  - Coal-based synthetic gas production was 2.2 BCM.




**China's quarterly gas production, 2010-2018**

Source: NDRC

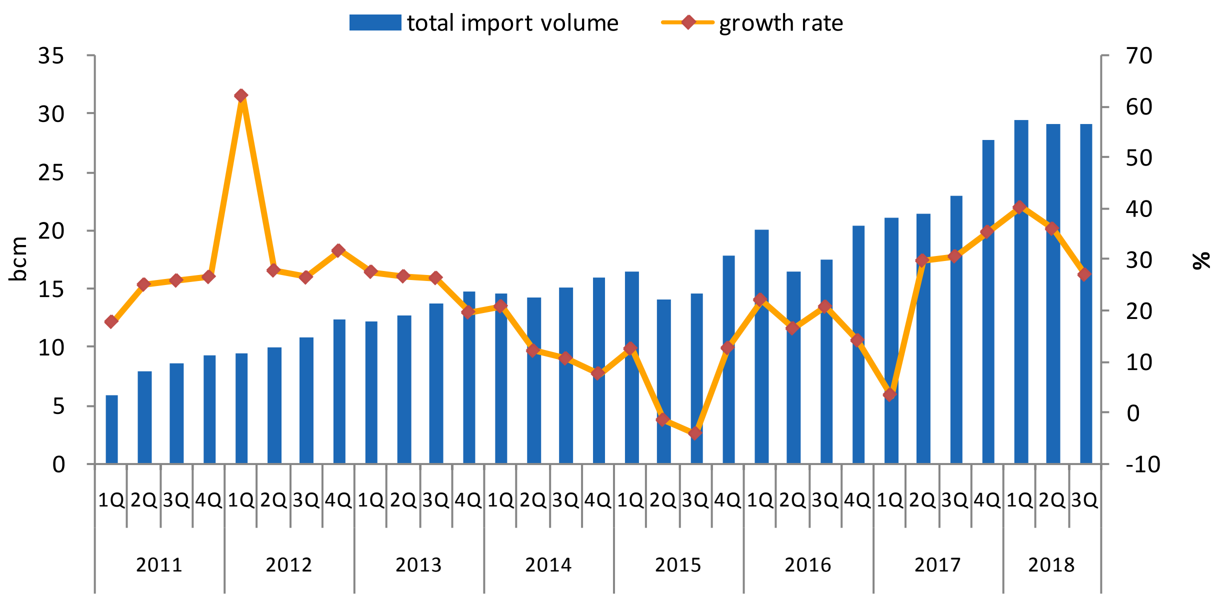



**China's domestic gas production, 2017**

# Surging gas demand resulted in remarkable import growth

- **Total imports for 7M 2018 reached 68.4 BCM , with y-o-y growth rate at 38%, higher than that in 7M 2017. The foreign dependence has historically recorded 47% in Q2.**
  - PNG imports: 30.4 BCM, growth rate :22.2%.
  - LNG imports: 38 BCM， growth rate: 54%.

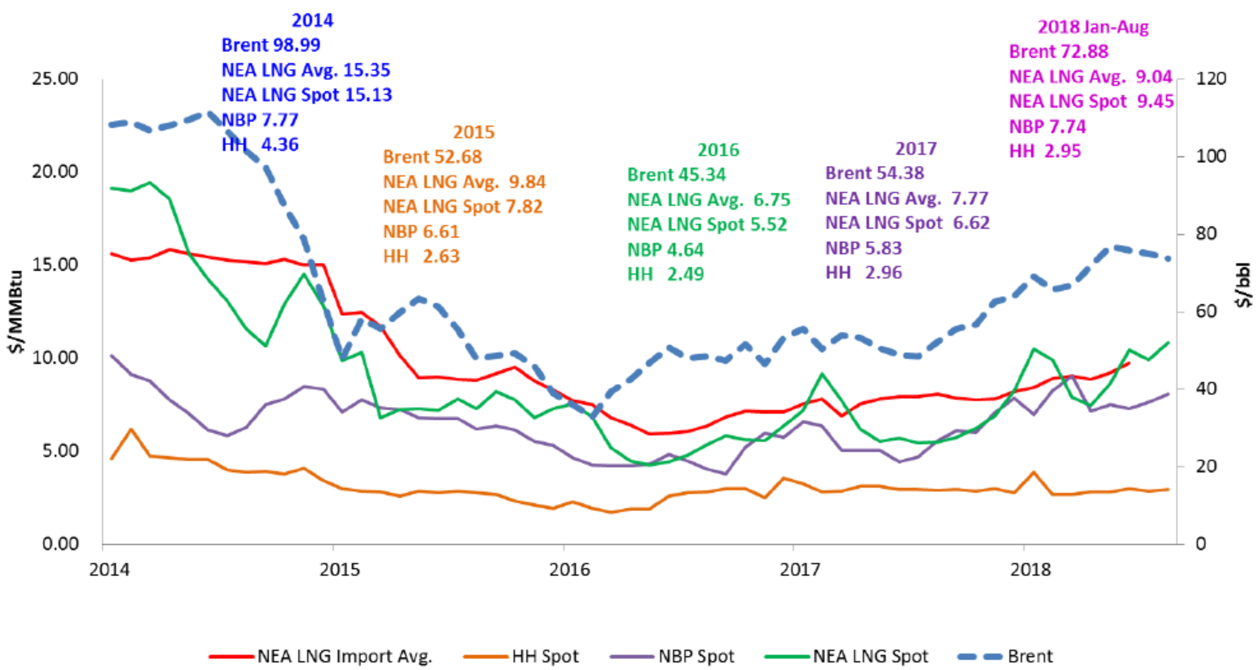
**China's Quarterly Gas Imports and Growth Rate 2011-2018**



# Imported LNG price rose continuously

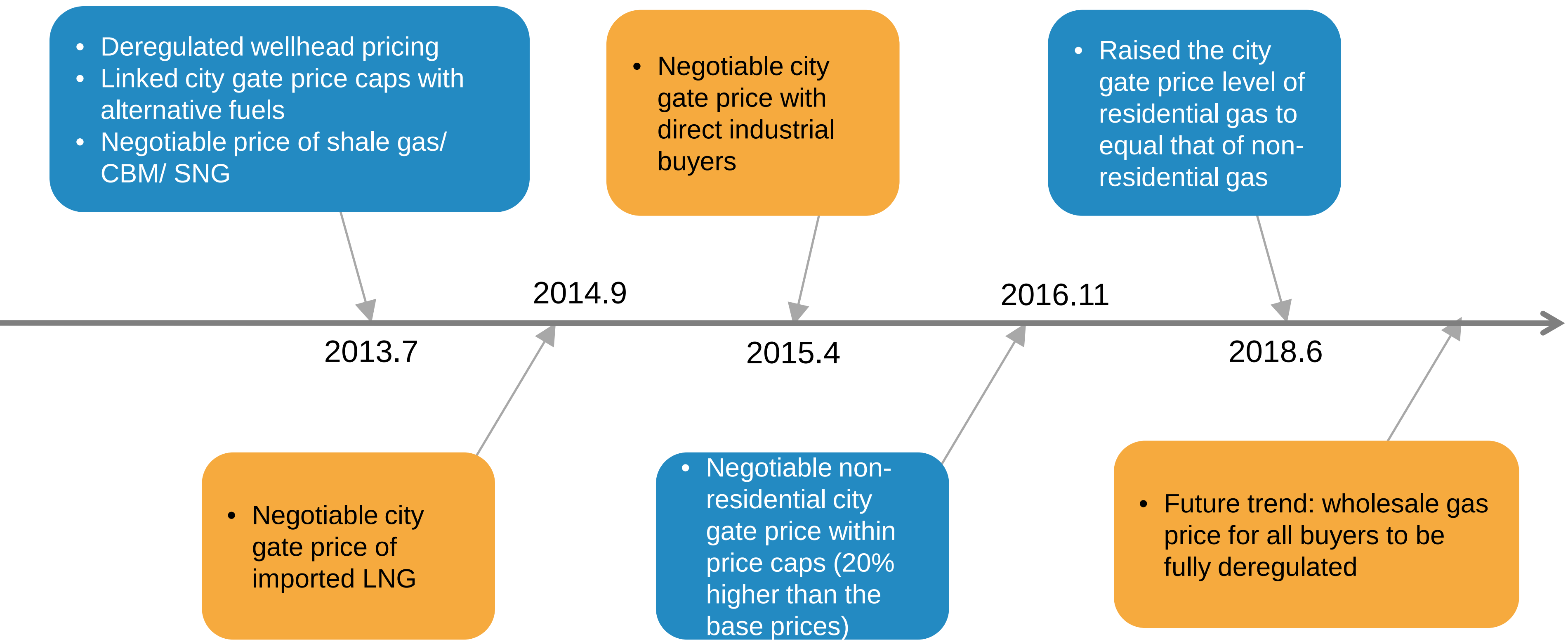
- **As oil price rebounded since the second half of 2017,China's import LNG price rose continuously.**
  - For 2017,LNG average CIF 1.86 RMB/m$^3$, up by 14.2% year-on-year.
  - From Jan. to Jul., 2018, LNG average CIF 2.1 RMB/m3, up by 15.2% year-on-year.
  - For Jul 2018, LNG average CIF 2.28 RMB/m$^3$, up by 21.9% year-on-year.

**World Oil and Gas Price, 2014~2018**



# Wholesale gas price liberalization made headway

- **In 2018, the city gate price of residential is unified with non-residential price and this benefits for improving the long-standing cross-subsidy between those two kinds of customers and hopes to rationalize the retail prices.**
- **By now, the wholesale price of unconventional gas, imported LNG, direct industrial buyers all realized market pricing which accounting for 1/3 of total consumption.**



# Gas pipeline reform has shown preliminary effect

- 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 owning to the strong regulatory nationwide and the consumers could benefit from the reform.

**2014.2**
NEA:
Measures for Supervision of the Oil and Gas Infrastructure TPA

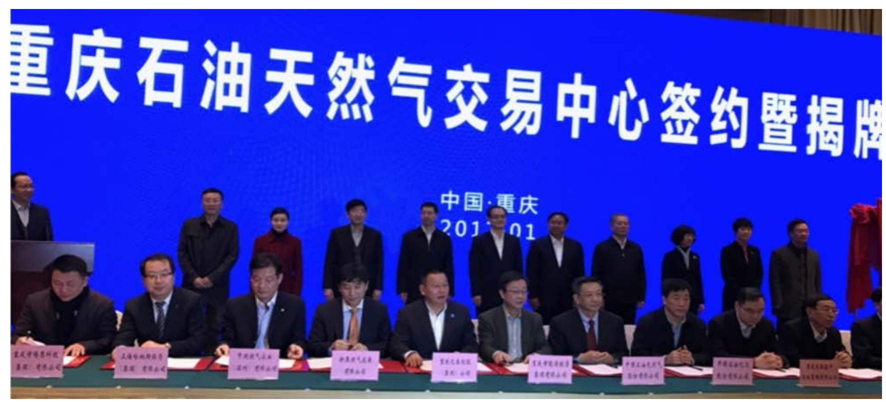
**2014.3**
NDRC:
Regulation for the Natural Gas Infrastructure Construction and Operation

**2016.10**
NDRC:
Regulation for the Natural Gas Pipeline Tariff (trial); Measures for Supervision of the Nature Gas Pipeline Tariff and Cost (trial)

**2017.6**
NDRC:
Opinion on strengthen the city gas distribution tariff supervision

# China gas trading exchange enters a new stage

- Shanghai Petroleum and Gas Exchange formally started trading in November 2016.
- Trading volumes in 2017 reached 51.2 BCM (bilateral). PNG 47.5 BCM; LNG 3.7 BCM.
- First LNG bidding was realized in July 2017, First PNG bidding was realized in Sep 2017.
- Second national gas trading exchange was established in Chongqing and started trading in May 2018.

# Storage capacity become bottleneck for China gas market

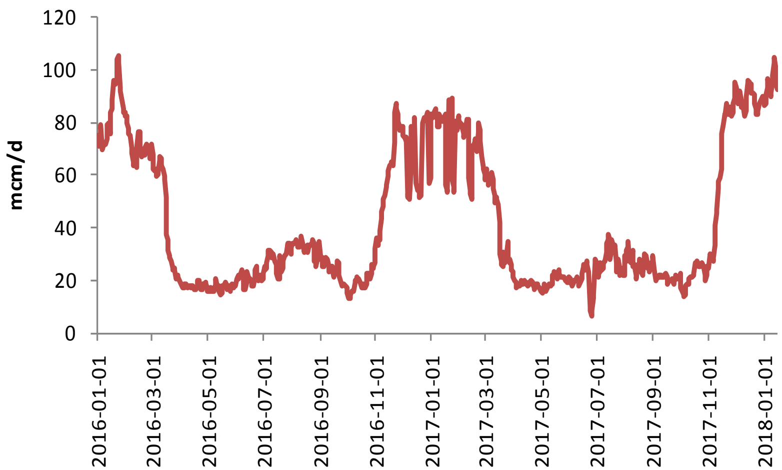
## ➢ Gas supply shortage during winter of 2017

- **High seasonal volatility of gas demand as heating consumption surge**
- **Unplanned reduction of gas supply from Central Asia**
- **Inadequate gas storage capacity**
- **Gas storage and peak shaving responsibility system is deficient**

## ➢ Government has issued specific requirement for gas supply company in April 2018

- **The storage capacity need to reach 10% of the total gas sale volume by 2020 for each gas supply company, including the peak-shaving capacity from underground storage, LNG terminal and the onshore LNG/CNG tank.**

Gas consumption per day in one city




Foreign countries underground gas storage facilities

| Country | Number of storages | Working gas Bcm | Gas consumption Bcm | % of gas consumption |
|---|---|---|---|---|
| US | 400 | 133.7 | 759.4 | 17.6 |
| Russia | 24 | 69.6 | 409.2 | 17.0 |
| Ukraine | 13 | 32.2 | 38.4 | 83.9 |
| Germany | 53 | 24.6 | 70.9 | 34.7 |
| Canada | 61 | 23.2 | 104.2 | 22.3 |
| Italy | 12 | 17 | 56.8 | 29.9 |
| France | 13 | 12.2 | 35.9 | 34.0 |
| Netherlands | 5 | 10.2 | 32.1 | 31.8 |
| Austria | 9 | 8.2 | 7.8 | 105.1 |
| Australia | 7 | 6.4 | 29.2 | 21.9 |
| **China** | **12** | **8** | **235.5** | **3.3** |

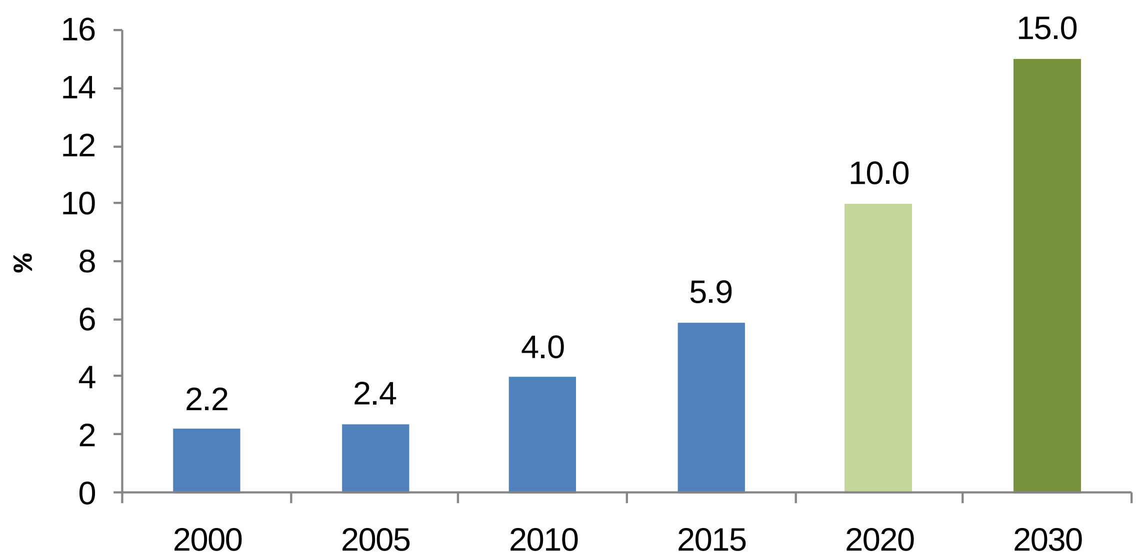
# Table of content

# Chinese government is vigorously promoting the gas consumption

- Central government
  - ✓Plan：*Natural Gas 13th Five Year plan, Energy 13th Five Year Plan, Long Term Oil and Gas Pipeline Network Plan*
  - ✓Environment：*Air Pollution Control Action Plan for Beijing-Tianjin-Hebei Area 2017-2018; Clean Heating Plan for Northern China 2017-2021;* ***Battle for Blue Sky Action Plan 2018-2020****, etc.*
  - ✓Utilization：*Suggestion of Promoting Gas Utilization, etc.*
  - ✓Others： *Suggestions on Deepening Oil and Gas Industry Reform,* ***Opinions on promoting the gas industry's development more coordinated and stable.*** *etc*.
- Local government
  - ✓cooperated actively and published local policies correspondingly.

# Government's plan means huge potential

- ***Strategic Action Plan for Energy Development, Natural Gas 13th Five Year Plan, Energy 13th Five Year Plan ,Suggestion of Promoting Gas Utilization*** **targeted 8.3%-10% by 2020 and 15% by 2030 for gas share in primary energy consumption.**
- **It means a huge potential for gas consumption even exceeding 600 BCM in 2030.**

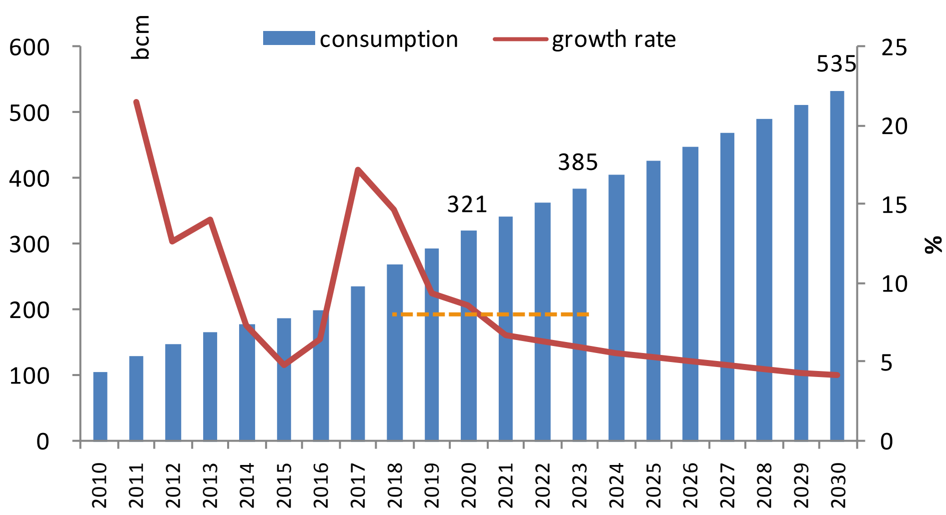


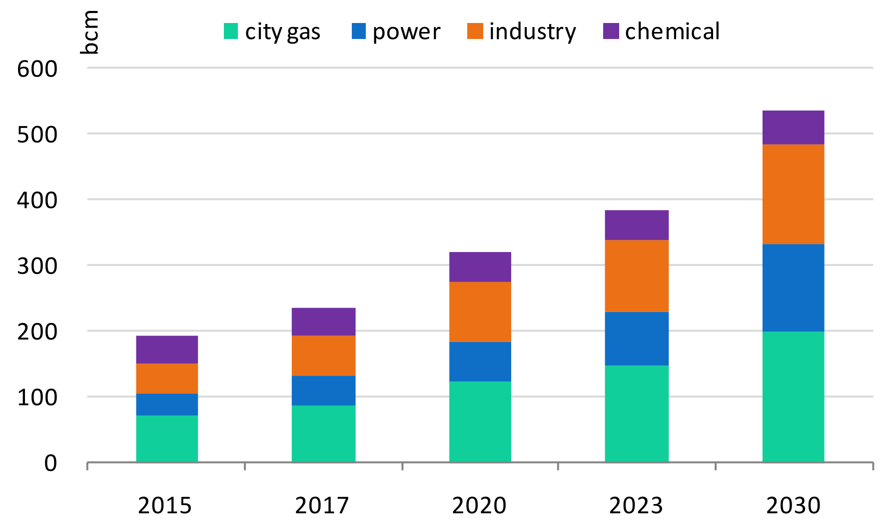

Share of gas in primary energy mix – planned goals by 2020 and 2030

# Future demand growth may not be so high as 2017

- It's projected that China natural gas demand will be **321 BCM** by 2020 and **385 BCM** by 2023, and the average annual growth rate will be **8.5%** for 2017-2023. That means the gas demand growth could be decreased from 15% this year to 6% by then.
- During 2018-2023, 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 and industry sector.

Gas Demand Forecast of China



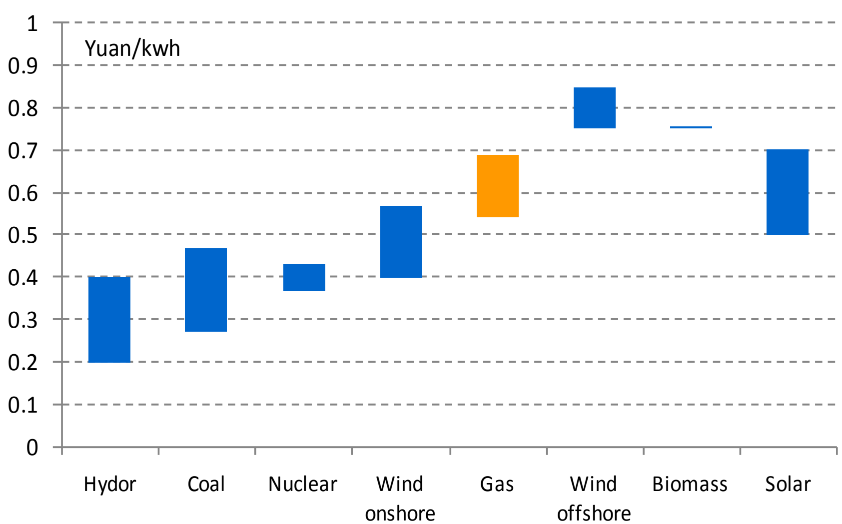



# Uncertainty remains in power sector

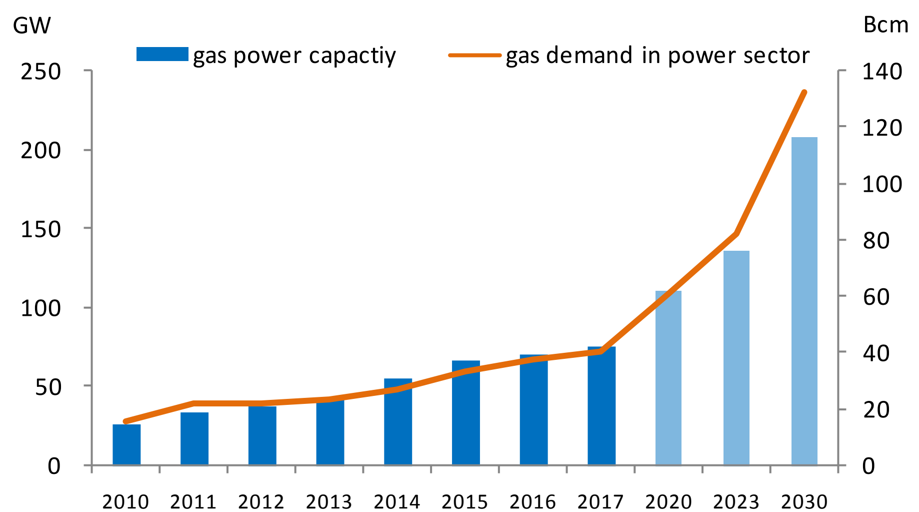
- It is projected that gas consumption in power sector will grow from 45 BCM in 2017 to **82 BCM** in 2023, however, there are several uncertainties

  - ✓ Chinese government is vigorously promoting the " clean coal power "
  - ✓ Gas power has no price competitiveness compared with clean coal power
  - ✓ Chinese power market will be more market-oriented in the future

Feed-in tariffs of different power in China 2018



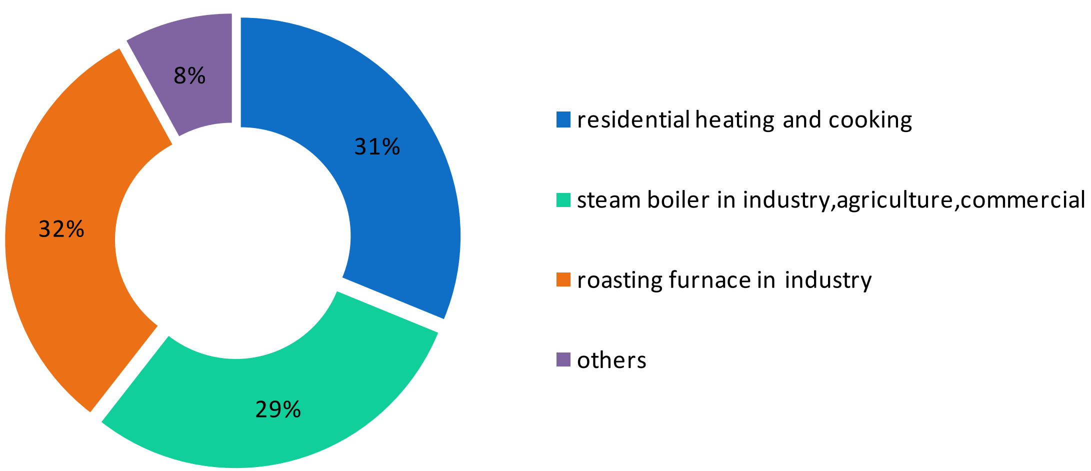

Gas demand outlook of power sector



# Gas used in industry need strong policy drive

- The scattered coal used in China is about 750 million ton and more than 50% is consumed by industry sector. Therefore, there is great potential for gas.
- However, the demand increase need strong environmental policy drive given to the low price competitiveness of gas.
- **It is projected that gas consumption in industry will grow from 60 BCM in 2017 to 109 BCM by 2023.**

Scattered Coal Consumption Structure in China



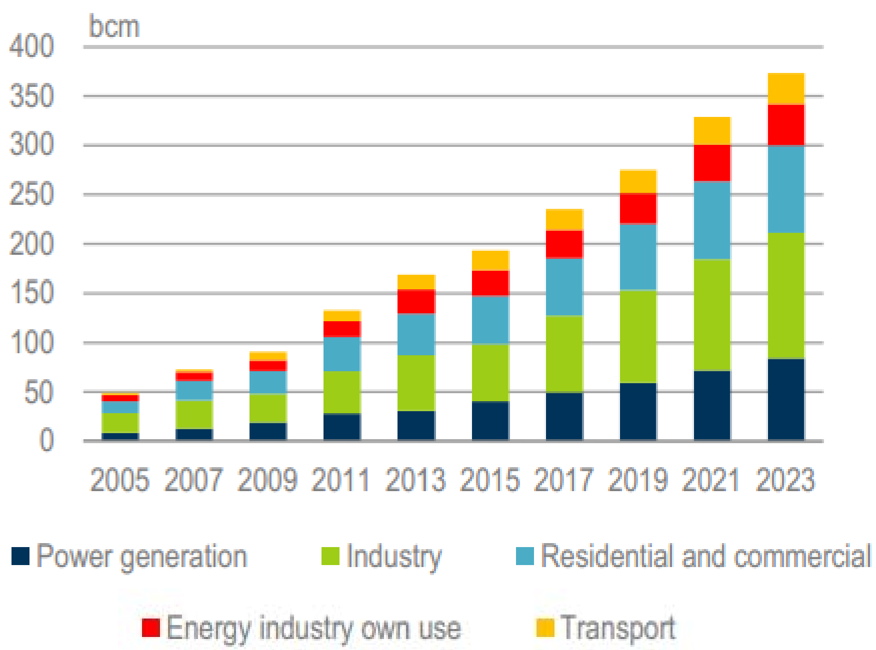



Source: The Investigation Report of Scattered Coal in China 2017

# ETRI's demand projection is nearly the same with IEA

- Although the classified gas consumption sectors are slight different with IEA, the projection outcome is nearly the same, both for total consumption (376 BCM, 8% AGR) and critical sector consumptions such as power and industry.

Gas Demand Forecast of China by IEA (2018-2023)




●Driven by continuous economic growth and strong policy support to curb air pollution, China accounts for 37% of the global increase in gas consumption between 2017 and 2023.
●China becomes the world's largest gas importer by 2019 and with 171 bcm of imports by 2023, is mostly supplied by LNG.

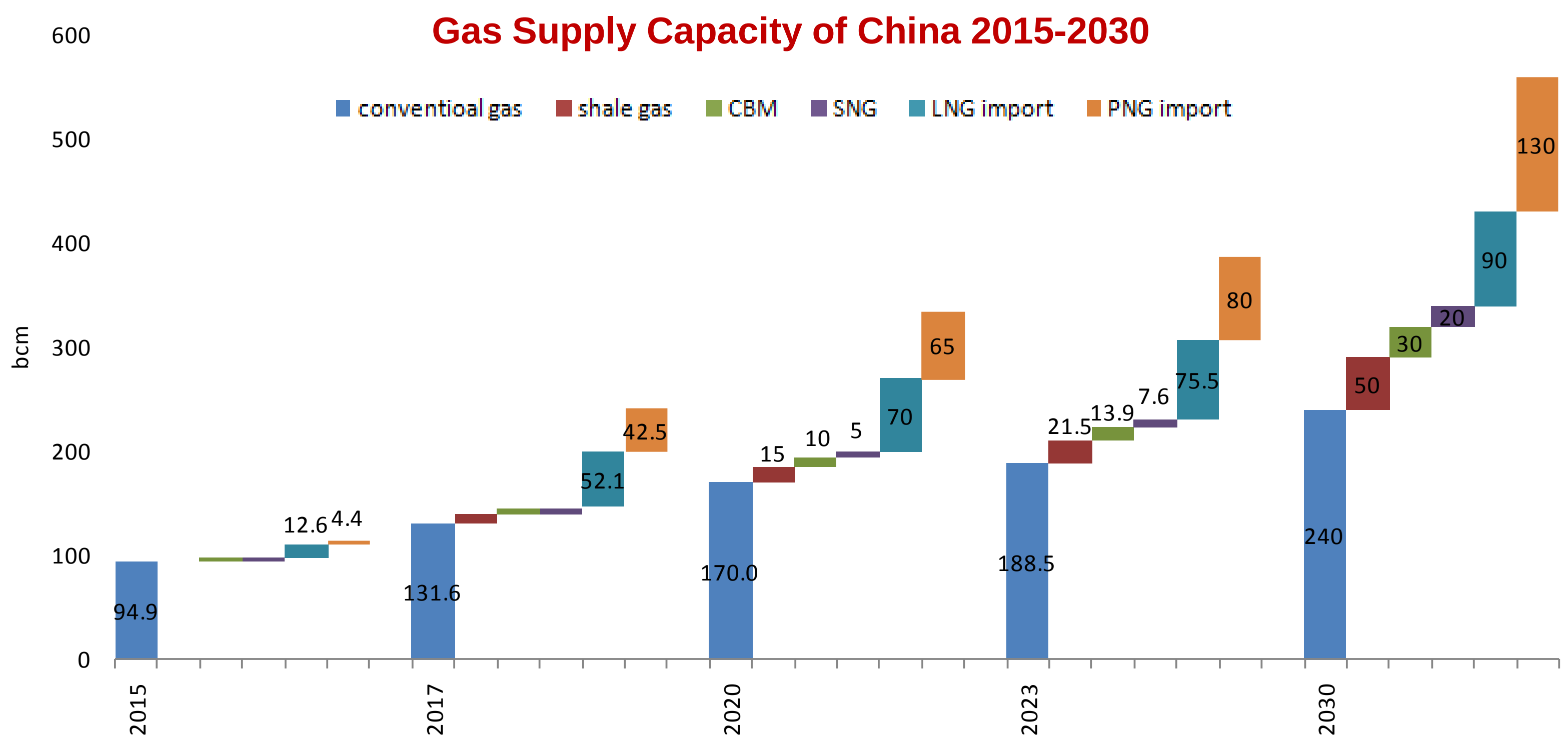
- IEA believes that the strong policy for improving air quality is expected to ensure persistent growth for natural gas in China, but uncertainties remain:
  - China's economic development
  - sufficient gas supply
  - gas price competition with alternative fuels
  - expansion and accessibility of the gas supply infrastructure

Source: IEA : Gas 2018, analysis and forecasts to 2023

# Table of content

# Gas supply capacity will be 387 BCM in 2023

- It  is expected that the supply capacity will be 387 BCM in 2023, with 232 BCM domestic gas, and 155 BCM imported gas(less than 171 BCM by IEA forecast).
- Supply capacity will be as much as 560 BCM in 2030, with domestic production of 340 BCM and 220 BCM imported gas.
- The supply capacity can be able to meet demand by 2030.



# PNG import capacity increases rapidly

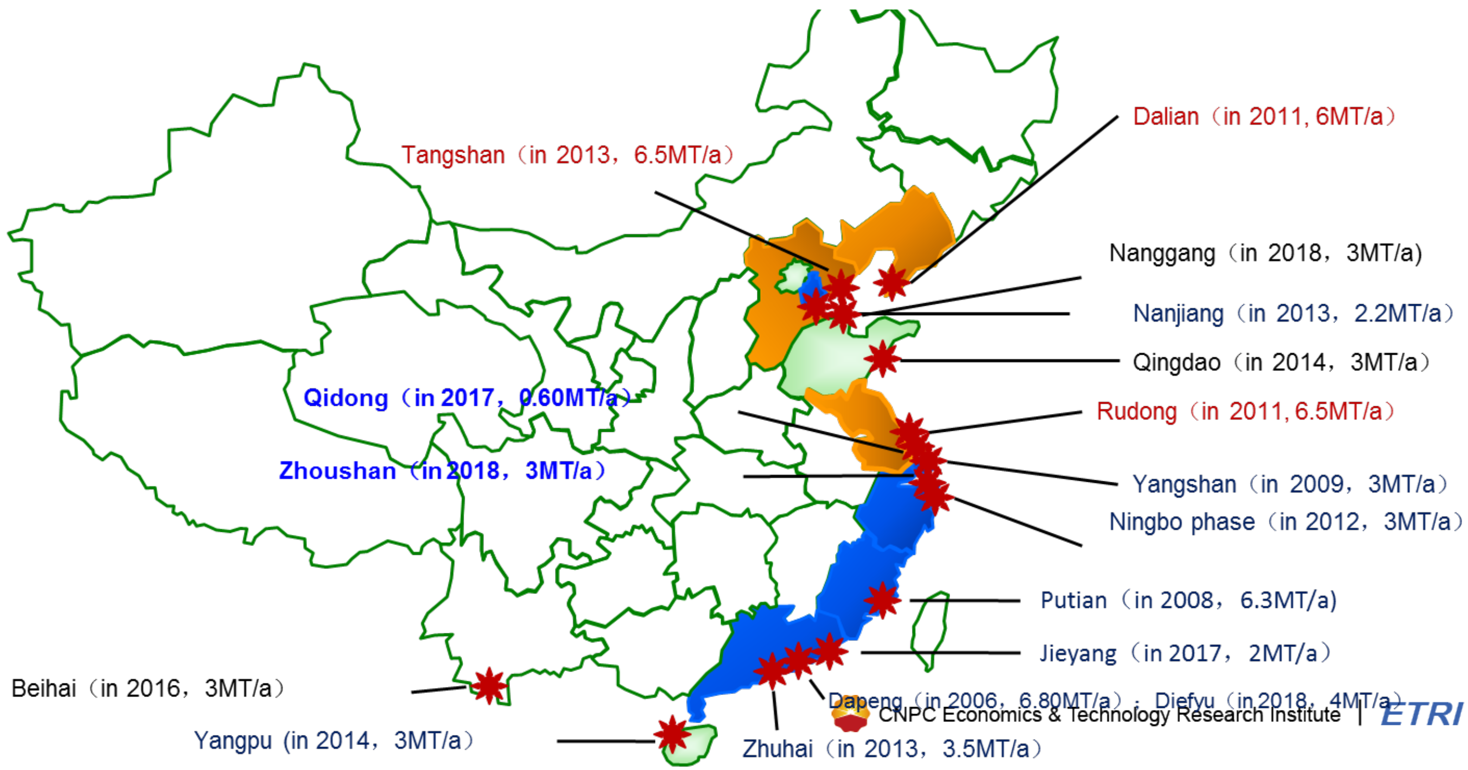
- **Pipeline gas import capacity is 67 BCM in 2017. It can be expanded to 105 BCM after completion of China-Russia East Line in late 2019, and over 135 BCM by 2030.**
- **We expect PNG import to reach 80 BCM by 2023, and further reach 130 BCM by 2030**.

**China gas supply capacity, 2018**

| 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 | — |

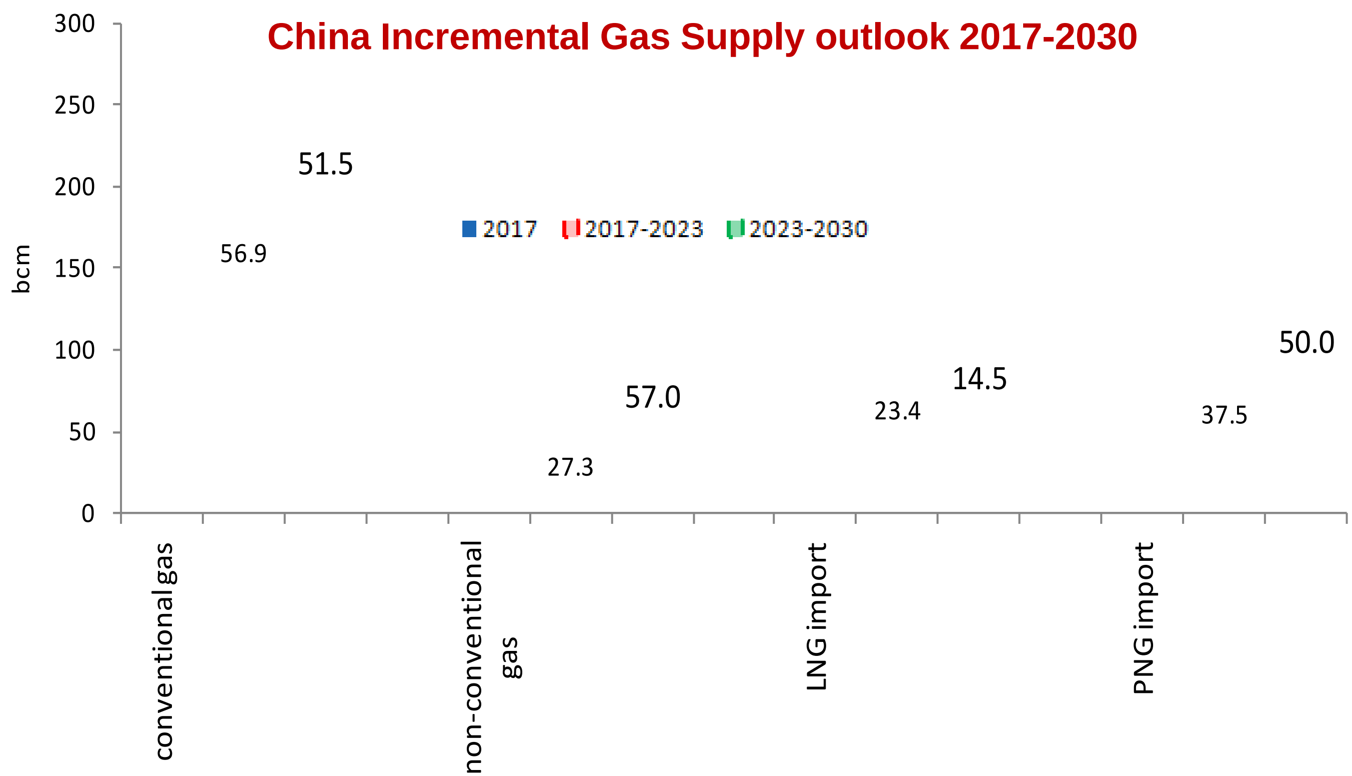
# LNG terminal projects are accelerating

- **Driven by domestic demand, LNG import capacity increased quickly to 66.4 MTA**
  - 5 new terminals have started operation in 2017 and 2018 (CNOOC Jieyang, Guanghui Qidong, Sinopec Nangang, CNOOC Shenzhen, and ENN Zhoushan)
  - 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 reach 120 MTA by 2022 according to the under construction and proposed additional terminals.**



# LNG supply growth will be limited after 2023

- Domestic production will steady increase as Chinese government is vigorously promoting the exploration of natural gas aiming to improve energy security.
- Successive subsidy for non-conventional gas can be expected after the 13FY and we predict that the shale gas production will increase quickly after 2020 due to technology progress.
- LNG import still has potential before 2023 (+ 23.4 bcm) but the incremental volume will be limited after that (+14.5 bcm), mainly because the shale gas production and PNG import increase.



# Summary

- Chinese gas consumption keep fast growing in 2018. The domestic production can't keep pace with consumption, then gas import show remarkable growth.
- The market-oriented reform of gas industry has shown preliminary positive effect, more and more gas realized market pricing and the strong regulation on gas pipeline has adjusted the tariffs downward.
- It's predicted that the AGR will be 8.5% for 2017-2023. Power sector and industry sector account for the biggest growth potential, however, uncertainties remain and future government policies are necessary.
- Gas supply capacity is expected to be abundant in the long run. Incremental LNG import seems to be limited after 2023.

# Thank You



**CNPC Economics & Technology Research Institute, *ETRI***