

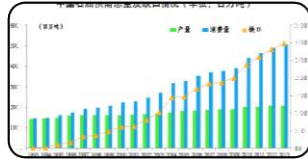
# **The Role of Gas in China's Energy Transition**



**CNPC Delegation**

May.8, 2018

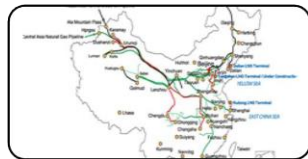
# Review on the China's Gas Progress



**Continued to enhance capability of gas supply and promote gas market, consumption maintains a high growth, climb to 237bcm in 2017.**



**Further optimized energy structure to decarbonization and proportion of gas increase sustainable, almost 7% in 2017, grow at a faster pace than any other form of fossil energy .**



**Gas infrastructure and transmission capacity has increased greatly. Pipeline >71,000km, transition capability>180bcm, 17 LNG terminal station, capability> 65MT/annual, 18 underground storage bank, working volume>7bcm.**



**Substantial progress has been gained on international gas cooperation, and utilization of foreign gas keeps growing. The volume of gas imports is 95bcm in 2017.**



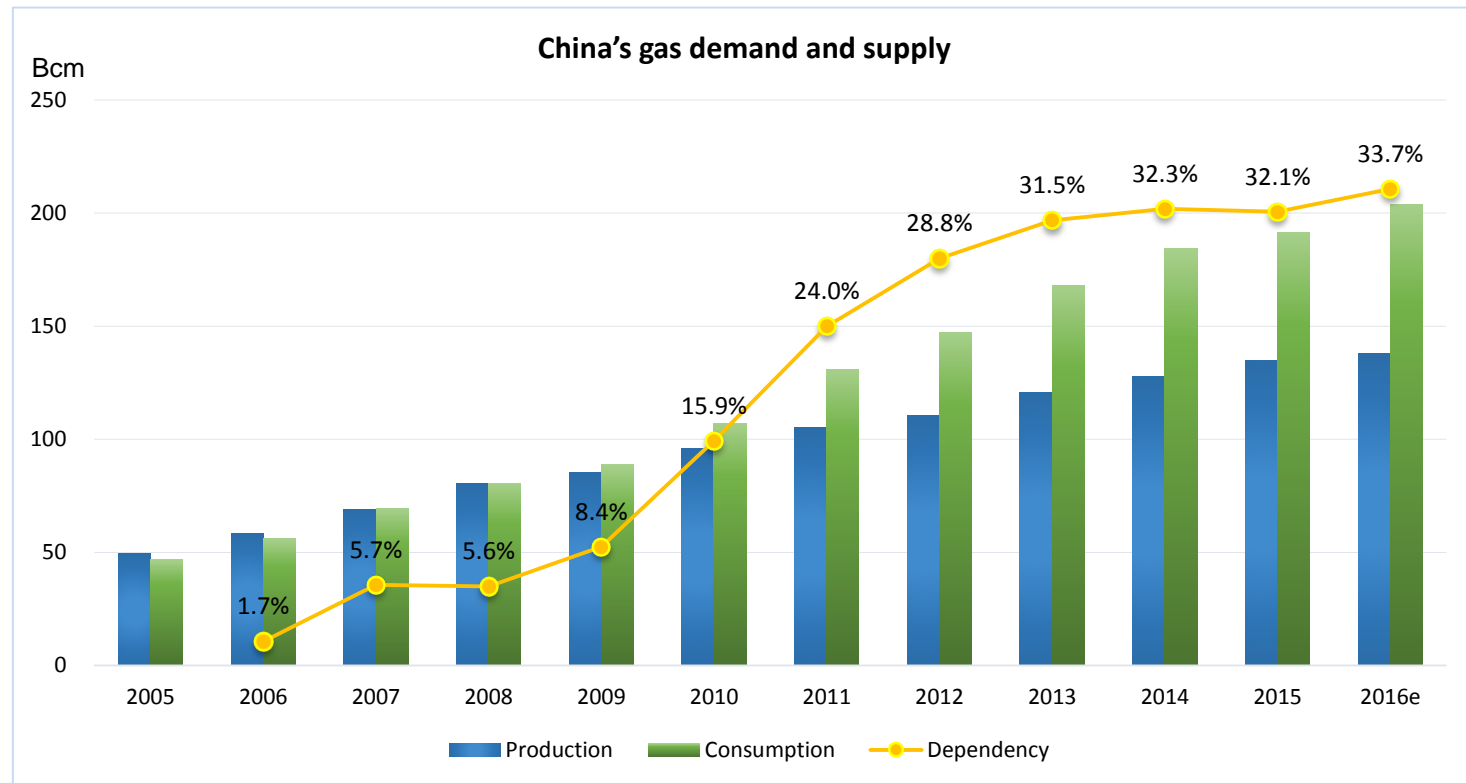
**Gas conservation gradually improved. NG in-place resources is estimated at 90TCM, with 50 TCM of recoverable resources, the proved ratio is just 14%, still in the early stages of exploitation.**

# Review on the China's Gas Progress



## Current Status of Gas Market : Demand and Supply

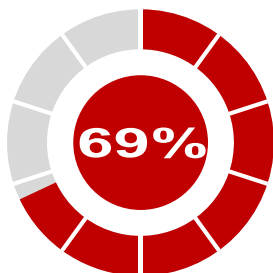
- Gas consumption keeps growing
- Domestic gas production is increasing stably
- Dependence on imports has been rising rapidly in recent years



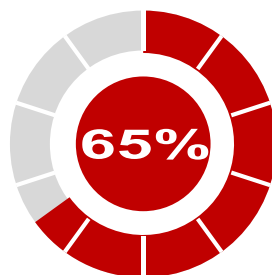
# CNPC is the leading Company in China NG Market



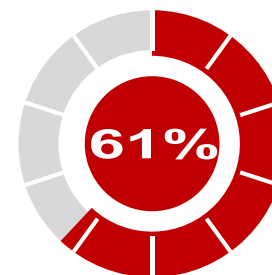
**Output >100 bcm**



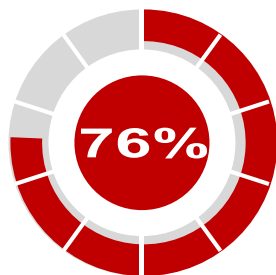
**Sales >150 bcm**



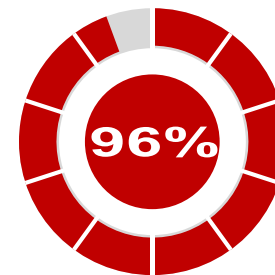
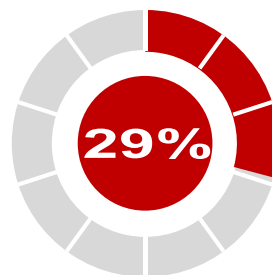
**Import >57 bcm**



**pipeline >53000 km**



**LNG capability> 19MT Storage volume> 7 bcm**

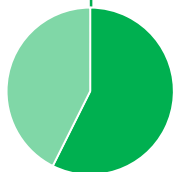


# Challenges Faced by Energy Transition in China



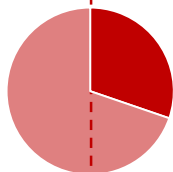
## ■ Challenge 1: Increasing Foreign Dependence

Crude: 68%



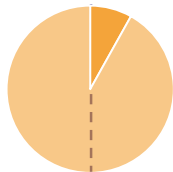
Net import of oil is 420MT in 2017, and foreign dependence ratio is 68%.

Gas: 39%



Import of natural gas is 95 bcm in 2017, and foreign dependence ratio is 39%

Coal: 9.5%



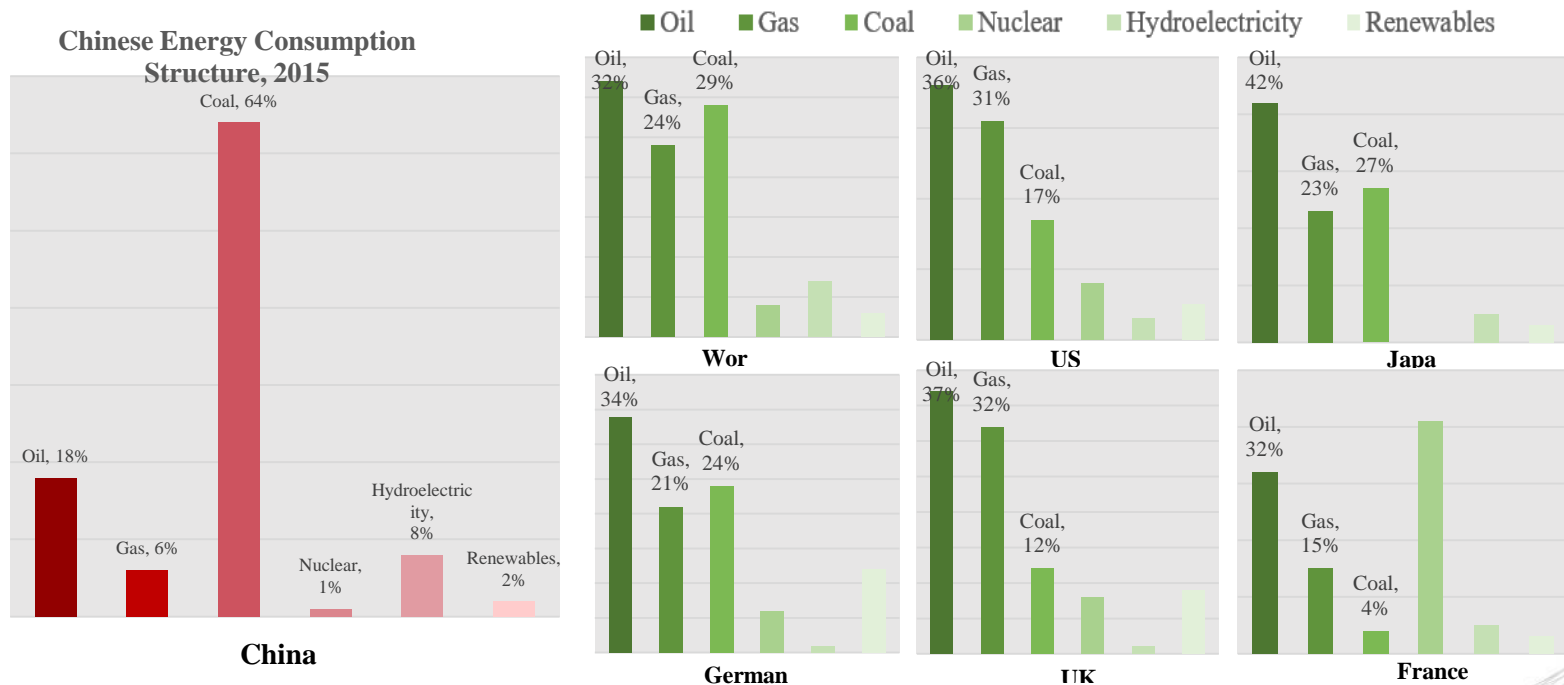
China became a net importer of coal in 2010 for the first time, and net import of coal is 270MT in 2017.

# Challenges Faced by Energy Transition in China



## ■ Challenge 2: Coal-dominated energy structure

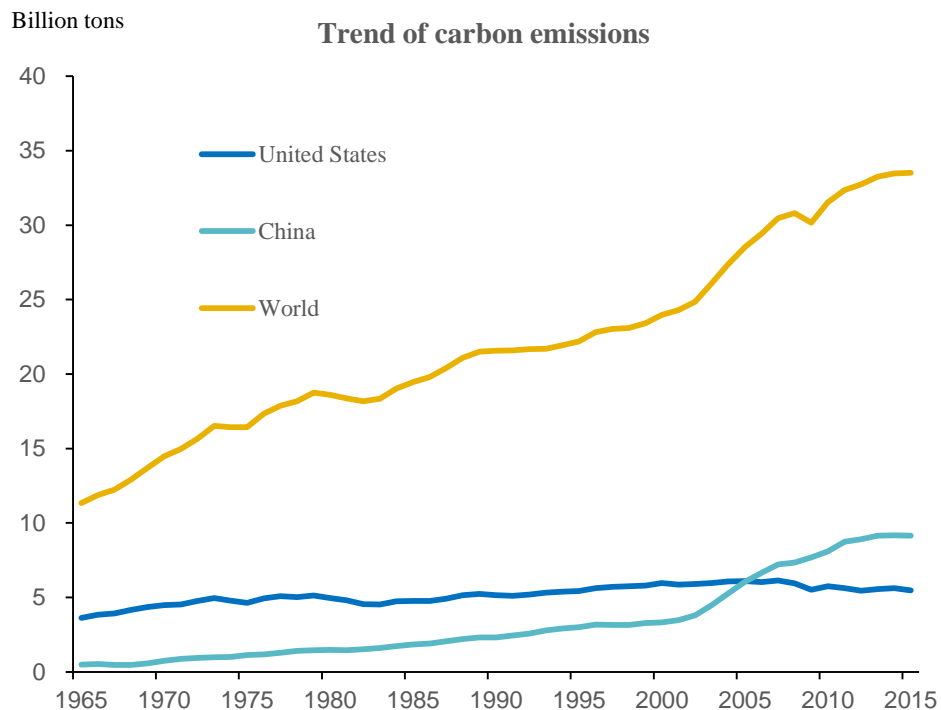
Chinese coal production accounted nearly half of world's total coal output, coal still occupied >60% of total primary energy consumption in 2017.



# Challenges Faced by Energy Transition in China

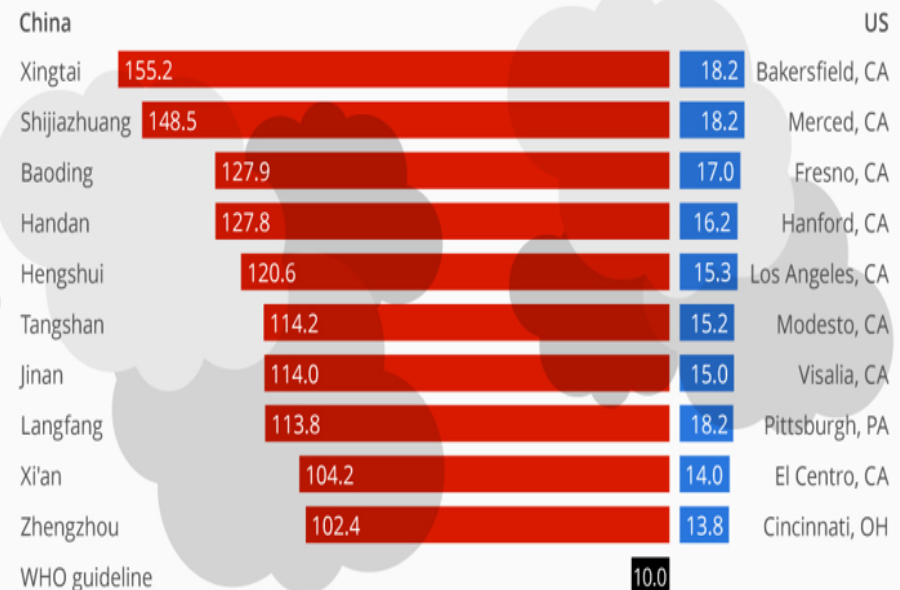


## ■ Challenge 3: Current industrial structure and energy consumption mode lead to excessive carbon emission



### Air Pollution Levels In Perspective: China And The US

Daily average particulate pollution (PM2.5) in the 10 worst Chinese and US cities\*



\* Anything over 10 micrograms per cubic meter of PM2.5 considered hazardous to health by WHO

# Energy Revolution and Market-Oriented Reform



## ■ Four energy revolutions and one international cooperation

**Promote revolution in energy consumption**— to restrict irrational uses of energy.

**Promote revolution in energy supply** — to build a diversified supply system.

**Strengthen international cooperation in an all-round manner**——to ensure energy security under opened conditions

**Promote revolution in energy technology**— to foster industrial upgrading.

**Promote revolution in energy governance** — to pave a fast track for energy development.





**Mineral rights**

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**Pipeline**

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**Refinery**

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**Marketing**

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**Import and Export**

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**Pricing**

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# China's 13th Five Year Energy Plan

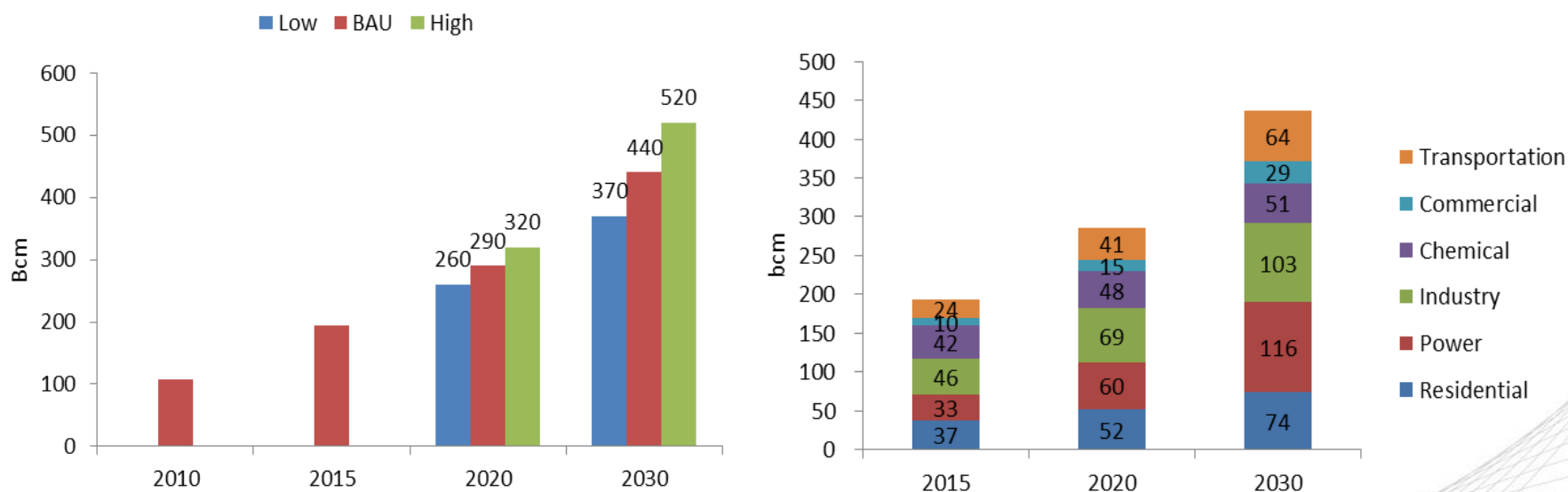


- ❑ By 2020 the total energy consumption in 5 billion tons of standard coal and the proportion of non-fossil energy consumption increased to more than 15%, where as natural gas consumption ratio increased to 10% and coal consumption decreased to below 58%. The clean and low-carbon trend is similar with the world's.
  - Continue to promote the scale development of non fossil energy
  - Expand the natural gas market
  - Clean and efficient utilization of coal
- ❑ Improve energy efficiency and development quality
  - Effectively reduce excess coal capacity
  - Further promote the ultra low emission and energy saving transformation
  - Strictly control the scale of new coal power

# Outlook for China's Gas Market



- ❑ **Baseline Scenario by CNPC ETRI, Natural gas demand will amount to 290bcm and 440bcm(Annual growth 8.6% between 2016-2020 and 4.3% between 2020-2030)**
- ❑ **Reform Policy Scenario by CNPC ETRI, 320bcm in 2020 and 520bcm in 2030. In the 13th Five-Year plan, Comprehensive supply capacity amount to 360bcm.**





# Build a 5A-Class NG Industry in Supply Chain

A perfect supply system is the basis and guarantee for the sustainable development of NG industry. it is necessary to achieve the “5A” in the production and supply chains.

## **Availability**

**NG supply capacity must be guaranteed**

## **Accessibility**

**The connection between s&d must be relied on an extensive and efficient pipeline network**

## **Assurance**

**A strong comprehensive peak-shaving must be form in network system**

## **Affordability**

**A scientific and reasonable pricing system must be established**

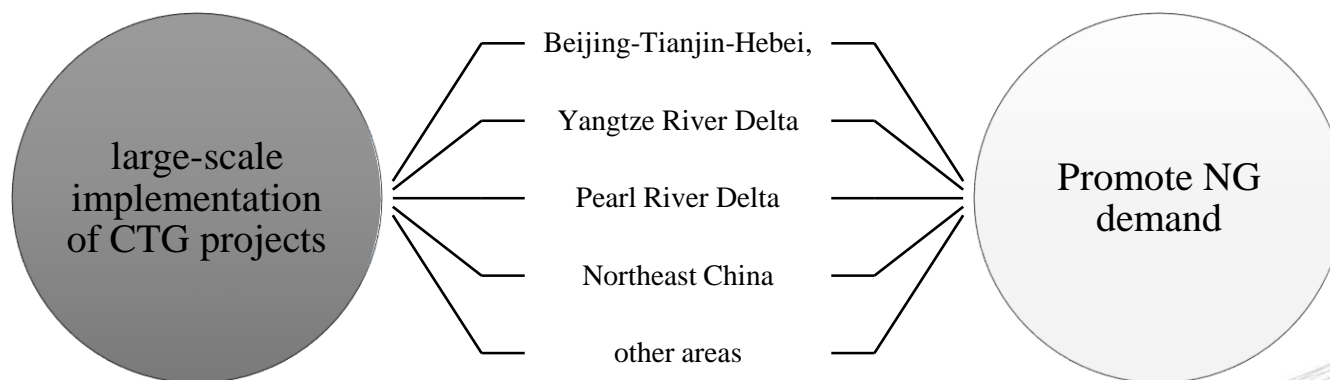
## **Accountability**

**All links in the whole industry must be environmental friendly**

# Expand Clean Utilization in Demand Side



- With the accelerated pace of urbanization and the environmental pollution control efforts, China has a large potential of urban gas demand growth
- In the period of the 13th Five-Year Plan, the increase in NG demand will mainly come from the gasification projects in key air pollution control areas, NG power generation and distributed energy projects, gasification projects in the transportation field and conservation and substitution projects.



# Expand Clean Utilization in Demand Side



- gas power generation is expected to become a main driving force for the growth of NG consumption, the NG utilization scale will be about 73bcm, accounting for more than 5% of the total installed power-generating capacity by 2020.
- NG transportation is expected to usher in new opportunities for development, by 2020 there will be about 10 million various types of vehicles with NG as fuel, more than 12,000 supporting filling stations for vehicles and more than 200 filling stations for ships. This means that the expected consumption of NG for vehicles and ships will be between 50~60bcm.



- ❑ Compared with alternative energies such as coal and refined oil product, NG does not have the price competitiveness yet
- ❑ For lack of infrastructure construction capacity, it's difficult to meet the gas transmission and distribution peak-shaving needs

- According to IGU, when a country's NG dependence reaches or exceeds 30%, the working gas capacity of underground gas storages should be more than 12% of NG consumption to ensure the supply security

- If the NG consumption in 2020 will reach  $3600 \times 10^8 \text{ m}^3$ , assuming the ratio of gas storage to consumption is 12%, China's NG peak-shaving demand in 2020 will be  $432 \times 10^8 \text{ m}^3$ . In this case, the current capacity of the peak-shaving facilities cannot meet the peak-shaving demand in the future NG market

- Lagged construction of infrastructure such as pipelines and LNG receiving stations cannot meet the gas transmission and distribution needs either.

# Conclusions



- ❑ China's gas industry is to enter a period of strategic opportunity for rapid development.
- ❑ Energy transition is a long journey, Natural gas play a key role in transition and may serve as the perfect transition substitute for non-fossil energy forms.
- ❑ China gas market would speed up if all reform and policy could be pushed in the near future.
- ❑ Build a more flexible and efficient system of gas production, supply, storage and sales is crucial as a whole.