

Prospects of Gas Market in China

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Content



1. Status and Challenges

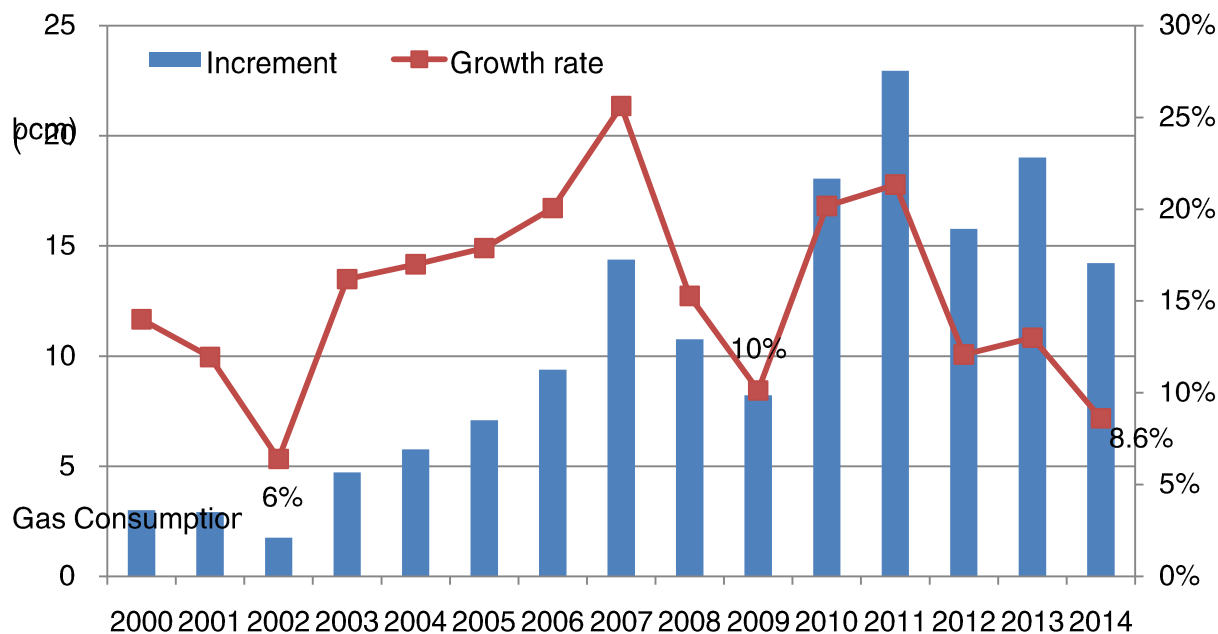
2. Opportunities and Prospects

3. Suggestions



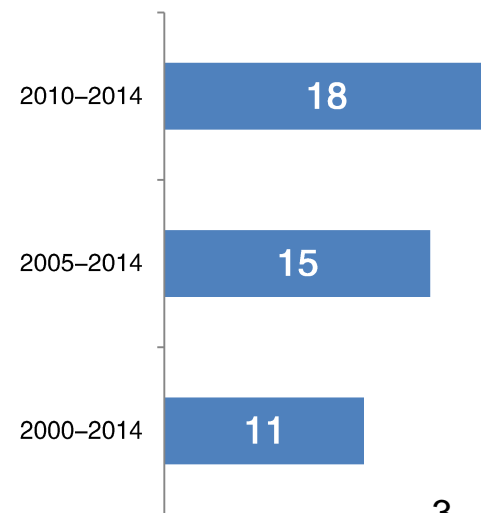
1.1 Gas demand is slowing down

- From 2000 to 2013, China witnessed a “Golden Age” in its gas industry development with a double digit-growth of **16.1%/year** (24.5 bcm to 170.5 bcm). It was mainly supply-driven and low price driven.
- However, due to economic “New Normal”, price rising, mild winter and penetration of alternative energy sources, the gas demand growth declined to **8.6% y-o-y** in 2014 and further declined to **2.5%** for the first 9 months in 2015.



Gas Consumption Growth in China 2000-2014

Annual Demand Increment (bcm)





1.2 Gas market is over-supplied

- China's gas demand in 2015 is expected to be **192 bcm**, 10 bcm lower than supply, and nearly 40 bcm lower than the goal of 12th Five-Year-Plan.
- The top 3 gas companies have already limited their domestic gas production, and even resell their long term cargos in the international LNG market.



- Limited production in upstream field
- Lowest output of LNG terminals



- Limited production in upstream field
- Resale of PNG LNG
- Resale of AP LNG






- Quit the shale gas project in Anhui province
- Resale of QC LNG



1.3 “Take or pay” contracts is facing pressure

- During January through October 2015 China has imported 5.7 MMt under its contracted volumes.
- With considerations of the pipeline capacity of China-Myanmar pipeline (12 bcm per year) and Central-Asia pipeline C (25 bcm per year), domestic gas production growth potential, and also the many long term contracts coming online (24 MTA or 30 bcm) in the next few years, at least 15 bcm annual incremental demand is needed to absorb the excess resource.

Long term contracts coming online in the next few years

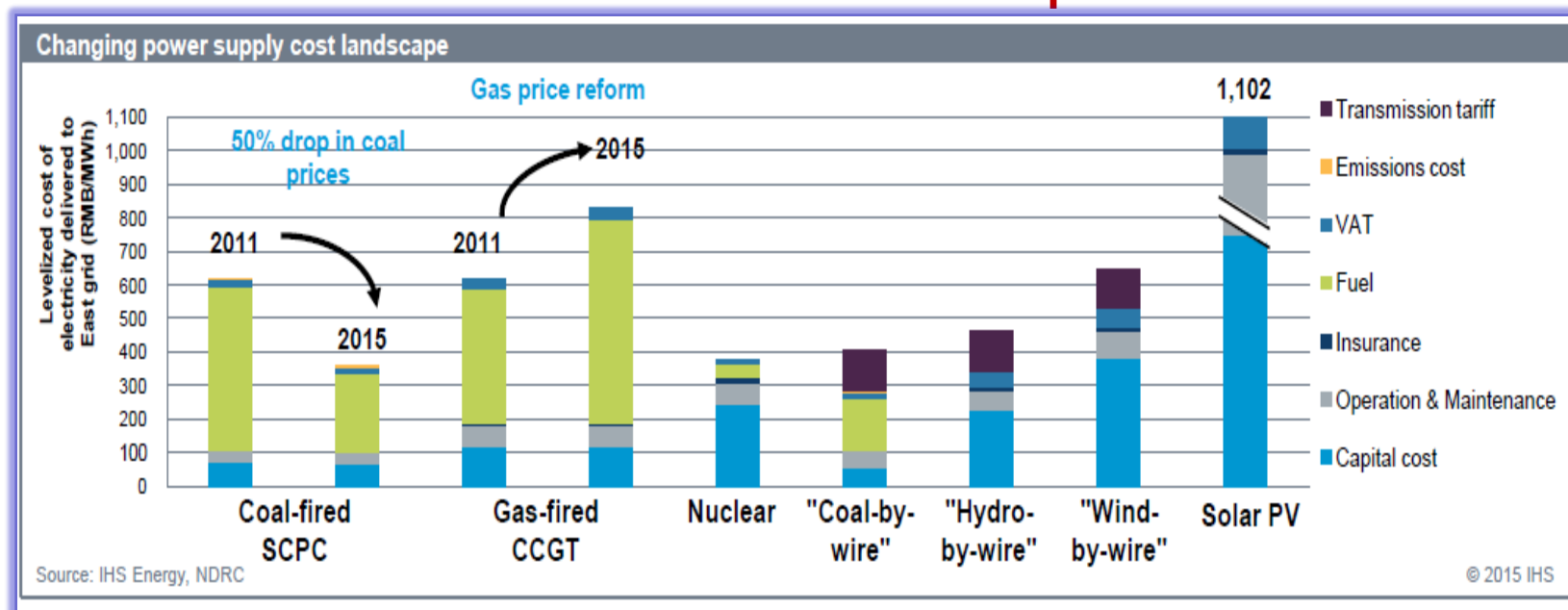
Buyer	Resource	Volume (mtpa)	Period (years)	Contract year	Delivery start year
	Total Portfolio	1	11	2014	2014
	BG QCLNG	3.6	20	2010	2014
	BG combined resources	5	20	2012	2015
 中国石油	Shell Gorgon	2	20	2008	2016
	ExxonMobil Gorgon	2.25	20	2009	2016
 中国石化	PNG LNG	2	20	2009	2014
	APLNG	4.3	20	2011	2015
	APLNG	3.3	20	2011	2016



1.4 Gas is losing its price-competitiveness

- From July 2013 to April 2015, the “3-step gas price reform” lead to city gate gas price increased by **36%**, while Brent dropped by **55%** and coal price dropped by **33%**.
- By November, domestic gas price come close to LPG and was 2 times higher than coal.
- The latest price drop announced by NDRC, made Chinese gas price at city gate returned to its level in 2011.

Power Generation Cost Comparison

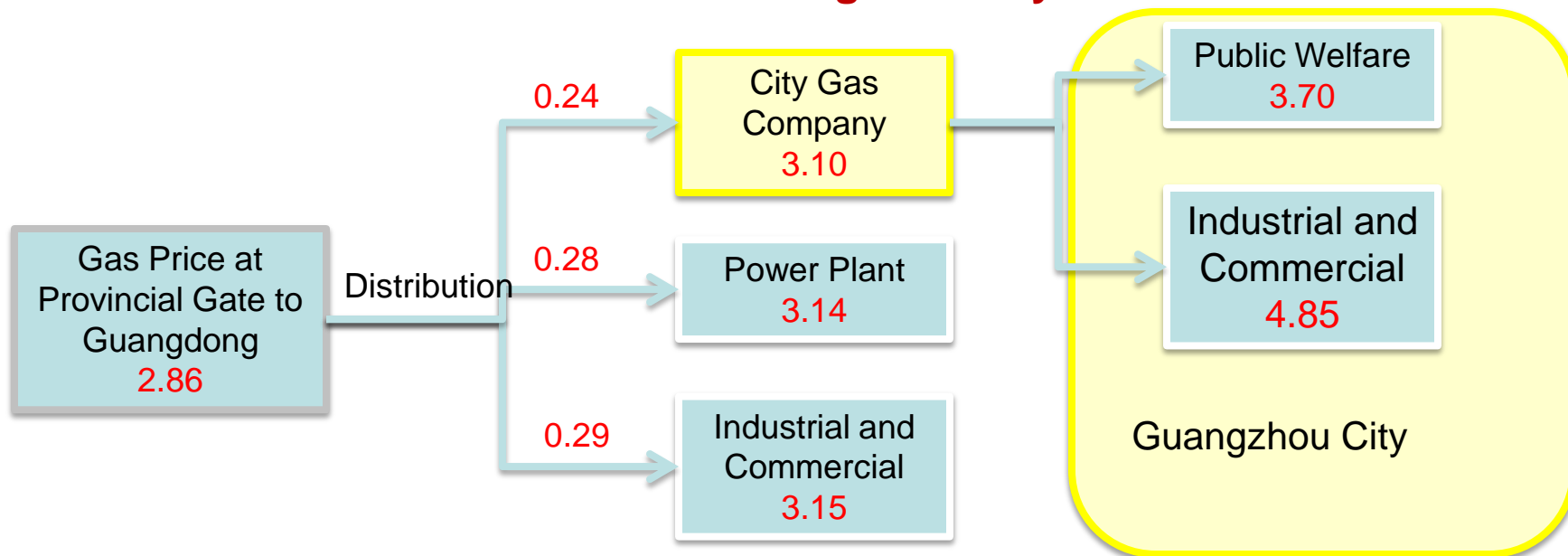




1.5 New price will promote gas demand but with new problems

- The gas price at city gate was decreased by **RMB ¥ 0.7/m³**, which would promote gas demand and could alleviate oversupply.
- However, the distribution sector is still monopolized in some provinces and all the cities, end-users may not be benefited from the recent price reduction, and gas industry is facing a new 2-tier price system and price distortion (Problem I).

Gas Value Chain in Guangzhou City (RMB ¥/m³)

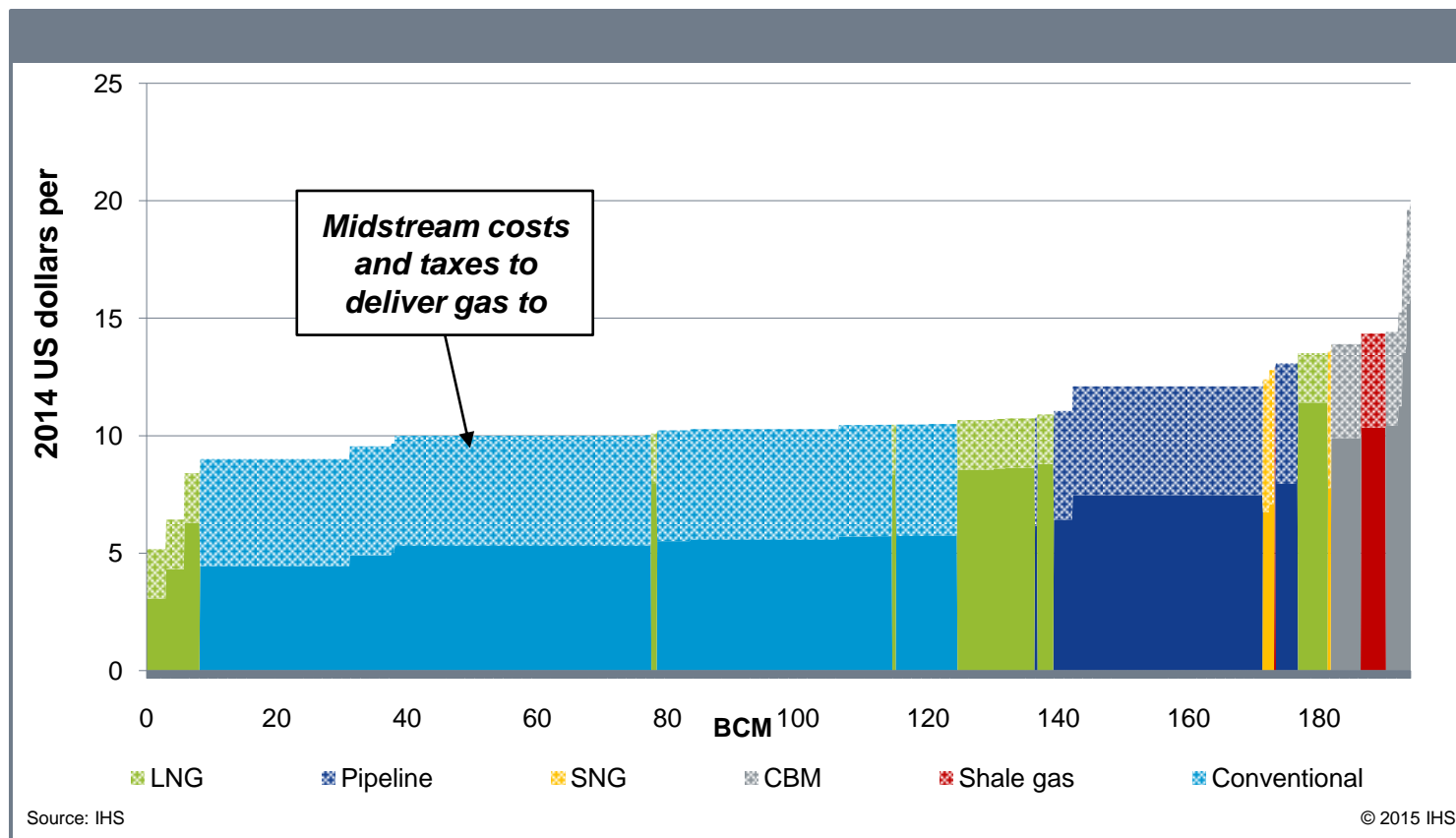




1.5 New price will promote gas demand but with new problems

- Problem II: Lower gas price will discourage high cost gas production
- Problem III: Lower gas price will discourage long-term gas import

China's 2015 supply cost curve at Shanghai citygate

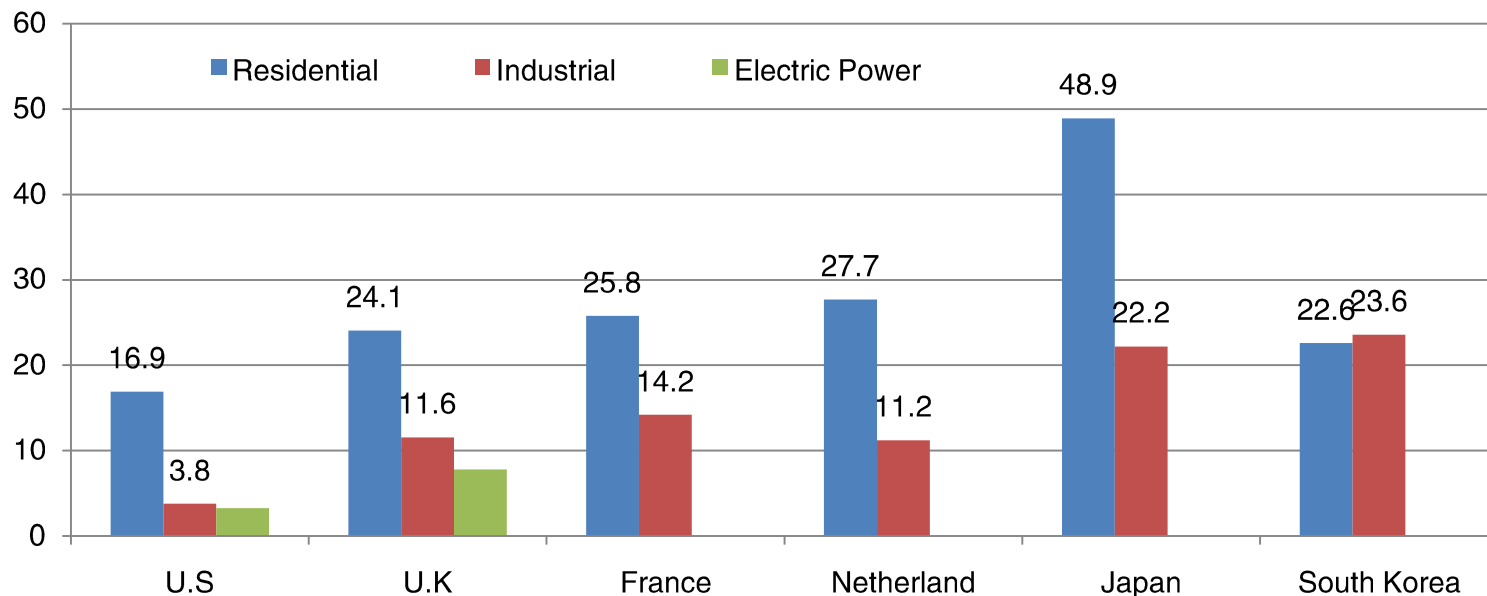


1.6 Price gap between residential and non-residential gas



- Gas price for residents is 100%+ higher than that for industries and power plants in OECD countries, but in China:
- Residential gas price in Beijing is RMB ¥ 2.28 /m³, which is much lower than ¥ 2.78 /m³ for non-residential gas at gate price
- The industrial gas price is as high as ¥ 3.78 /m³

Comparison of International Gas Price (US\$/MMBtu)





1.7 Infrastructure is still inadequate

- By the end of 2014, China's total gas pipeline length amounted to 435,000 km, including **65,000 km** of trunk-lines.
- With a similar geographical size, the transmission and distribution gas pipeline lengths in the US are 7.7 and 5.4 times of in China.
- By 2014, there are 11 gas storages in China, with total capacity of **4.3 bcm**, only around 2.4 % of total gas consumption, far below 10%-15 % of the world's average.

Pipeline Networks in China, USA and France

	Population (100 millions)	Area (10, 000 km ²)	Transmission pipeline (10, 000 km)	Distribution pipeline (10, 000 km)	Transmission pipeline intensity (km/10, 000 km ²)	Distribution pipeline intensity (km/10, 000 km ²)
China	13.7	963	6.5	40	67.5	415
US	3.1	960	50	200	521	2083
France	0.66	55	3.8	20	691	3636

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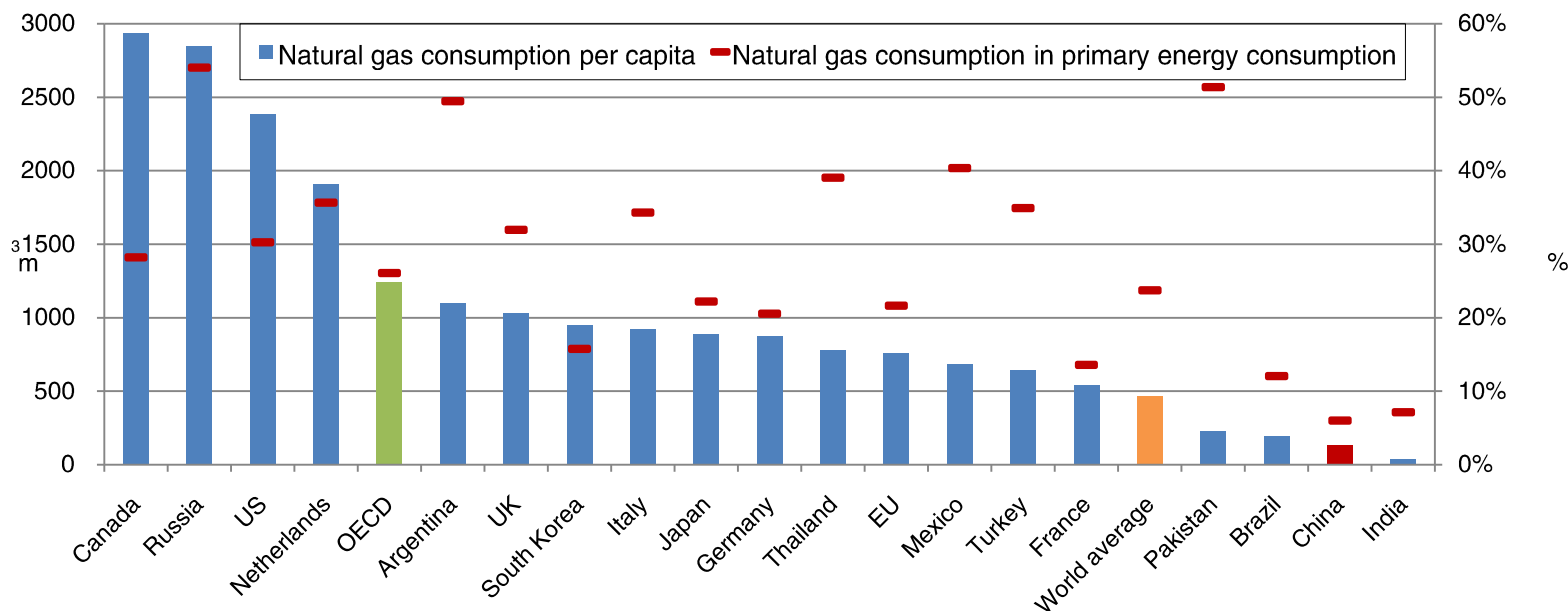
3. Suggestions



2.1 Theoretical huge market potential

- China's per capita gas consumption was **135 m³** in 2014 and gas penetration in total primary energy consumption is only **6%**, while the world averages were 467 m³ and 23.7%.
- China's gas market development is still in relative early stage. 1.4 billion population would mean **650 bcm** gas demand, if calculated upon world average consumption level.

Per capita gas consumption and gas share in TPE



2.2 Opportunities from environmental protection



2.2 Opportunities from environmental protection



- As the biggest energy consumer, biggest coal burner and a major carbon emitter in the world, China promised to limit its carbon emissions at various occasions.
- China's Policies and Actions on Climate Change (2015) was released by NDRC on Nov 19th. At COP 21 in Paris , President Xi committed once again that China Co2 emission in 2030 shall be **60%-65%** less than the level of 2005.
- The action itself will not only promote new and renewable energies, but also stimulate demand growth of gas, which can be working as a “bridge”.



Nations Unies
Conférence sur les Changements Climatiques 2015
COP21/CMP11
Paris, France





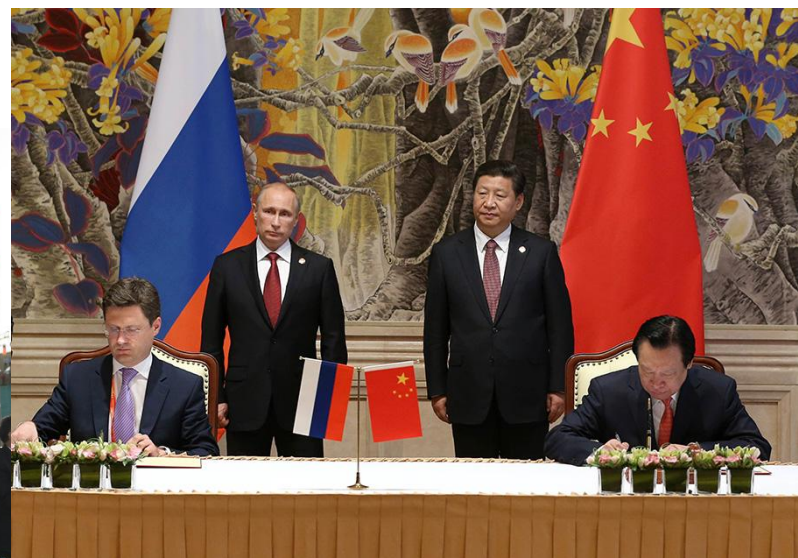
2.3 Gas sources from “One Belt and One Road”

- The Chinese government has already signed lots of strategic energy cooperation agreements with Russia, Central Asian and South-East Asian countries, which will provide a solid foundation for domestic gas market development.

Sep. 4th, 2013
Turkmenistan



Sep. 13th, 2014
Tajikistan
Central-Asia Pipeline D

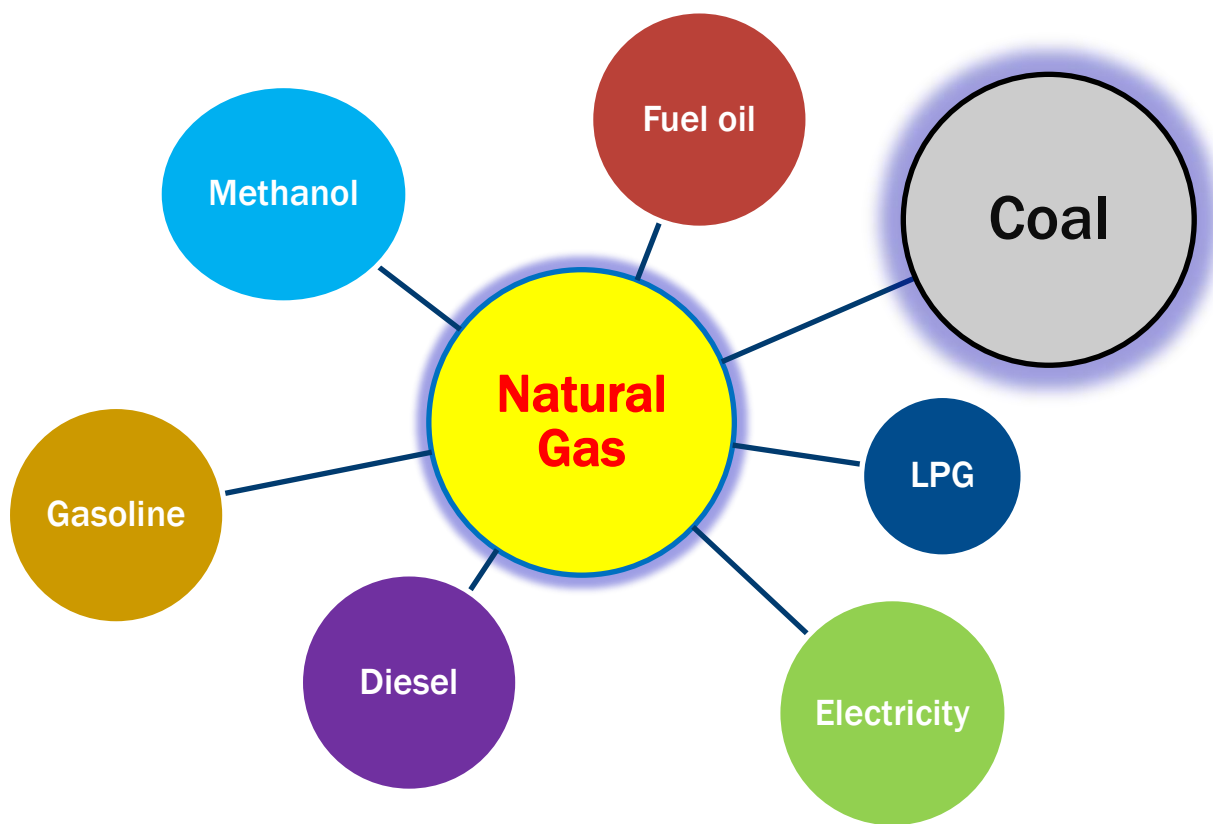


May 21st, 2015
Shanghai
Sino-Russia East Pipeline



2.4 Roadmap for gas is to replace coal

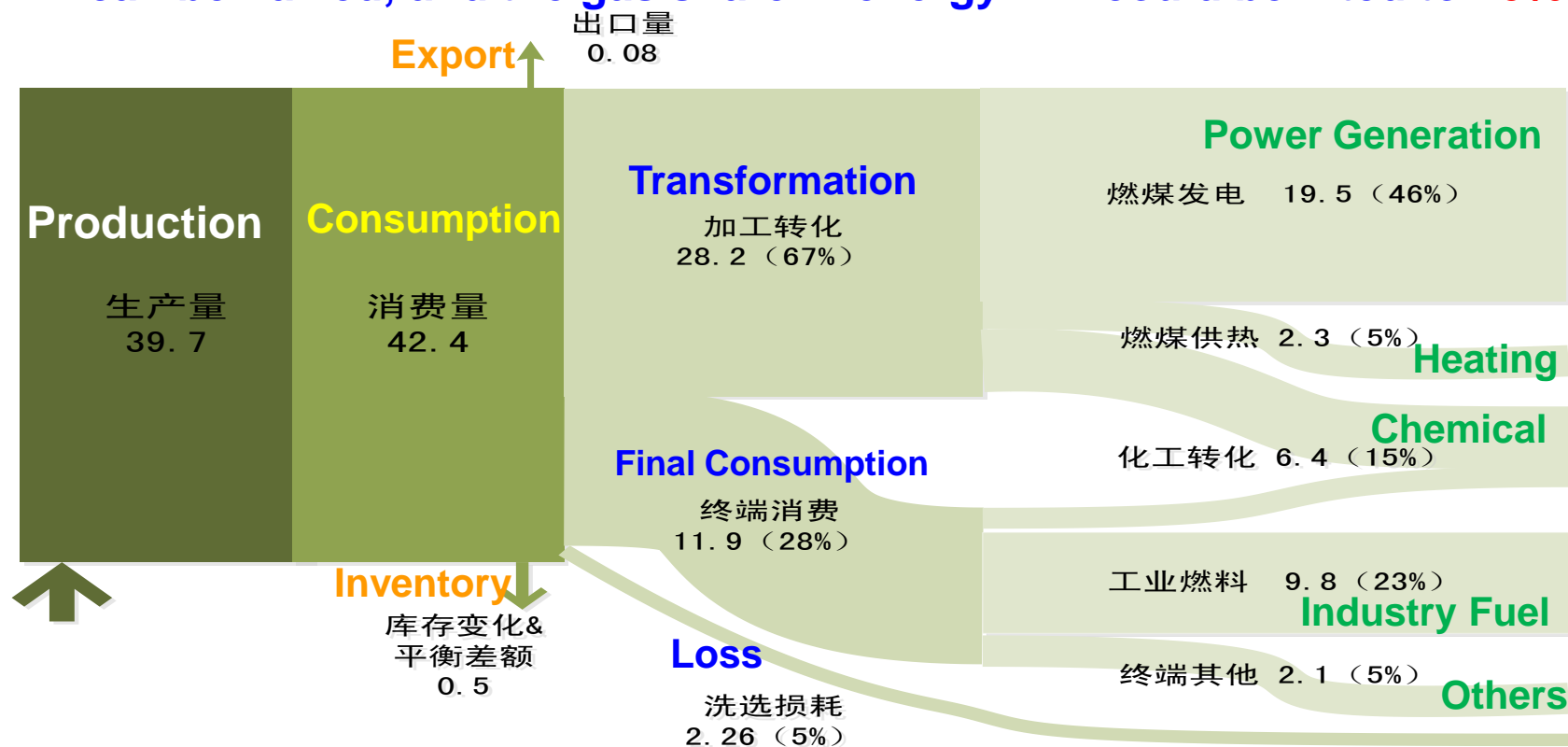
- Unlike oil is born as transportation fuel and coal as power source, Natural Gas is born to be an alternative fuel. Its development is based upon replacement of other energies in all sectors.
- In China, the major direction for gas demand booming lies in “coal-to-gas” switch in industries and power generation.





2.5 Coal-to-Gas switching is the main direction

- In OECD countries, Coal-to-Gas switch first happened in industries and then in Coal consumption in power generation. That leads to coal is densely consumed in power generation, e.g., US (90%), Germany (80%), Korea (60%) and Japan (53%).
- By contrast, the share in China less than **one half**. If the other half is replaced by renewable and gas, i.e., the 66% coal's share in China energy mix can be halved, and the gas share in energy mix could be lifted to **20%**.

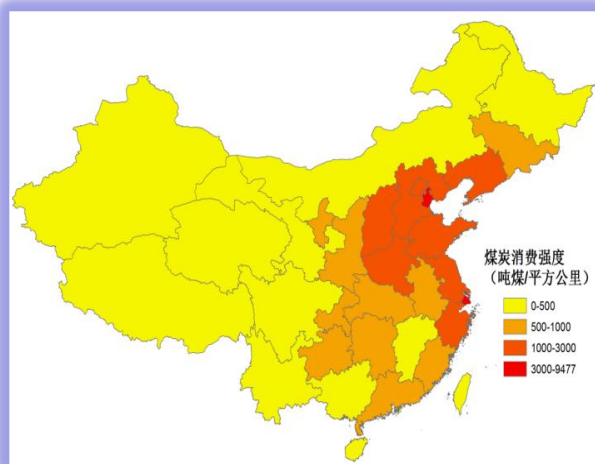




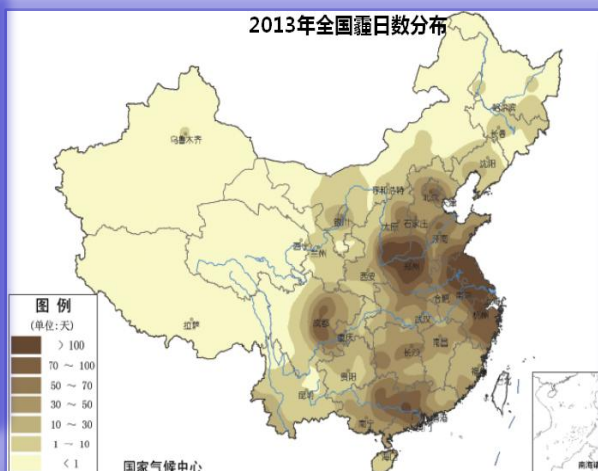
2.6 Coastal China will be target of energy switch

- Beijing-Tianjin-Hebei-Shandong Region, Yangtze River Delta and Pearl River Delta are coal demand centers, with both higher environment pressure and higher affordability.
- Emission level in the above regions where coal power plants concentrated is **5 times** of national average, leaving potentials for gas power development.

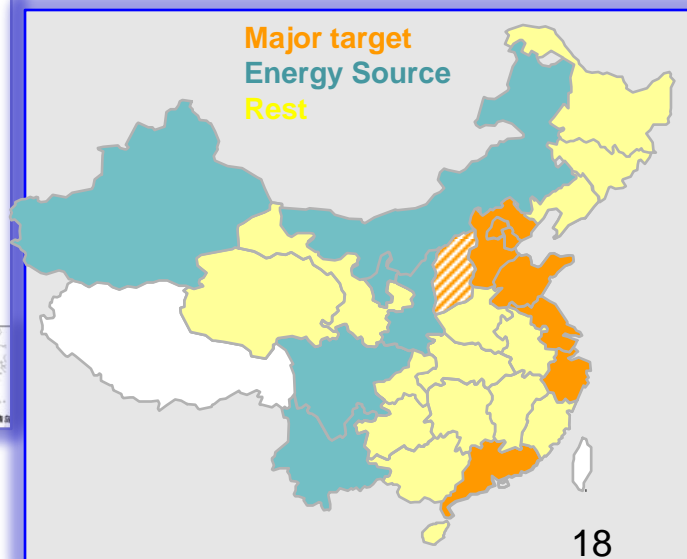
Coal Consumption Intensity in China



Number of Fog & Haze Days in China



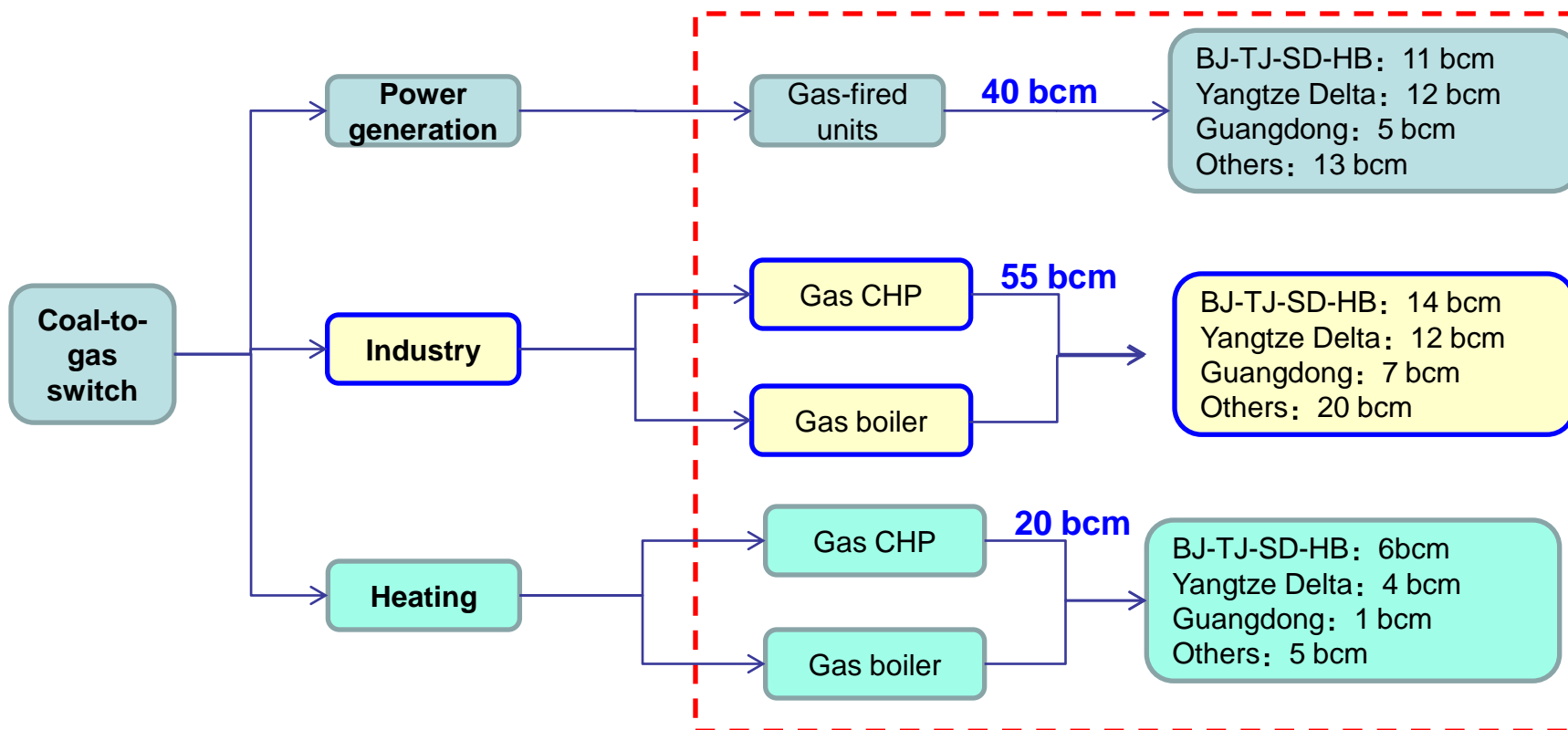
Target of Coal to Gas Switch





2.7 Market potential of coal-to-gas switch

- More than **110 bcm** gas will be needed for Coal-to-Gas switch in 5 years.
- Most of the switch will happen in industrial sector (47%), followed by power sector (37%) and heating (16%).



2.8 Gas demand in transportation is impacted by low oil price and weak economy



- Total truck production in the first 9 months of 2015 in China decreased by 13.3%, while LNGV production decreased by 39%.
- However, gas will still keep its price advantage in transportation sector upon:
 - more liberalized market and cheaper gas sources
 - future oil price rebound and oil quality upgrading
- Gas demand in transportation is expected to be 40 bcm in 2020.

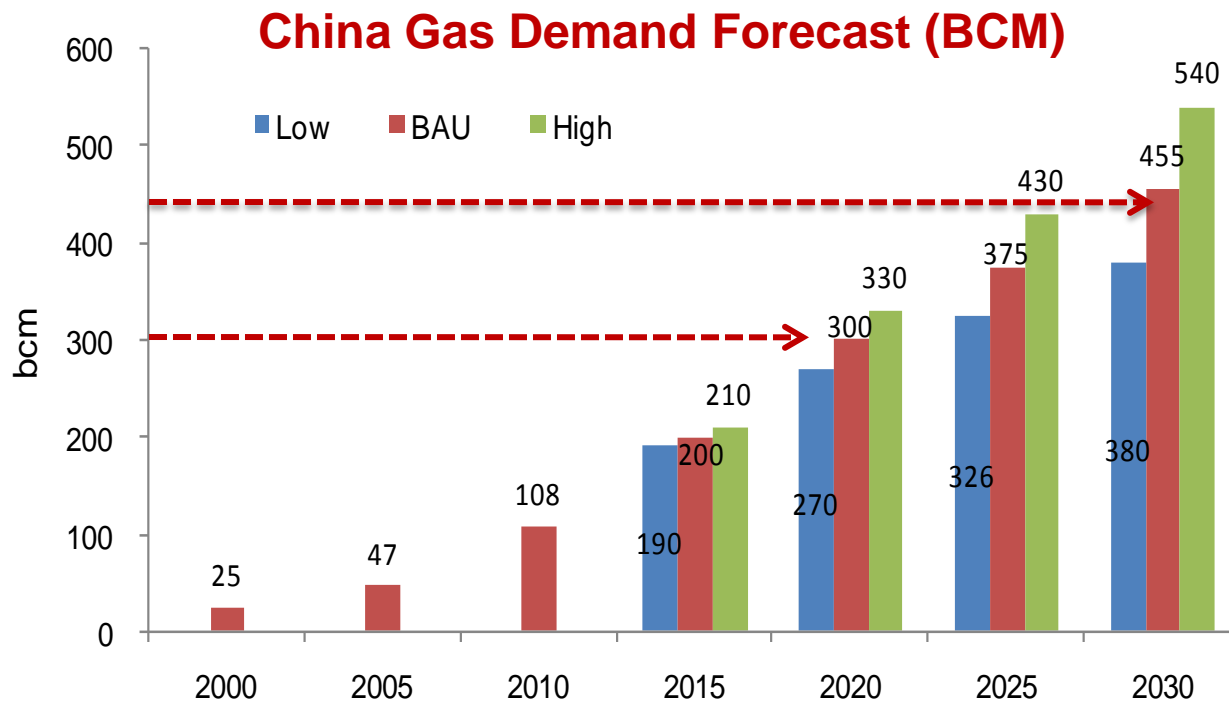
Comparison of LNG and Diesel Price (RMB Yuan per ton)

	Inner Mongolia		Shandong		Jiangsu		Guangdong	
	2014.9	2015.9	2014.9	2015.9	2014.9	2015.9	2014.9	2015.9
LNG retail price	5350	3575	6075	4090	6300	4101	6950	4357
Ceiling price of diesel	8012	5953	8007	5333	7536	5842	7634	6093
Price ratio of LNG to diesel(%)	68.3%	61.9%	77.3%	79.1%	85%	72.4%	92.5%	77.8%



2.9 Gas demand in China will keep rising

- Economic growth is most fundamental to future gas demand in China .
- Recent gas price downward adjustment will ignite gas consumer's willingness and affordability.
- It is expected that gas demand will grow at CAGR 9% and reach **300 bcm** by 2020. If proper policy adopted, the double digit growth could be resumed and gas demand might reach 330 bcm by 2020.
- If so a new tight gas market balance may be emerging at 2020.



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3. Suggestions

Deepen Market Reform

- **Optimizing gas pricing mechanism:** eliminating cross-subsidiary and price gap between non-residential and residential gas ; shortening gas adjustment timing; establishing gas hub.
- **Power market reform:** adopting gas linked pricing mechanism, and peak-shaving price mechanism.
- **Pipeline system:** market supervision; more direct sale to or purchase by large gas user; gas metering and pricing by calorific value.

Strengthen Environmental Protection

- Adopting stricter environmental standards and guarantying policy implementation.
- Encourage coal-gas switch, set up 'no-coal area' in big cities.
- Adopting Co2 tax or environmental tax on energy consumption.

Promote Gas Industry Development

- Cooperation between gas and power enterprises.
- Gas turbine R&D, reduction in purchase and maintenance cost
- Fiscal and taxation policy to support infrastructure investment.
- Guidance on coal industry upgrading, special support to resource-based cities.



Thank You