



CFD/HEBEI LNG PROJECT

Going FID

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26 October 2017

**CHINA
OVERSEAS
HOLDING GROUP**

Project
Background

CFD LNG
Terminal

NG Pipeline
Project

Gas
Cogeneration
Plant

Market Outlook
& Competition

Project Background

Creation of a North Asian Energy Platform



Global Forum for Energy Security

2015 policy report of the Chinese Academy of Social Sciences

The **Tangshan Caofeidian** area, located in the North-Eastern part of China, has the best conditions for construction of a potential **North Asian energy Platform**.

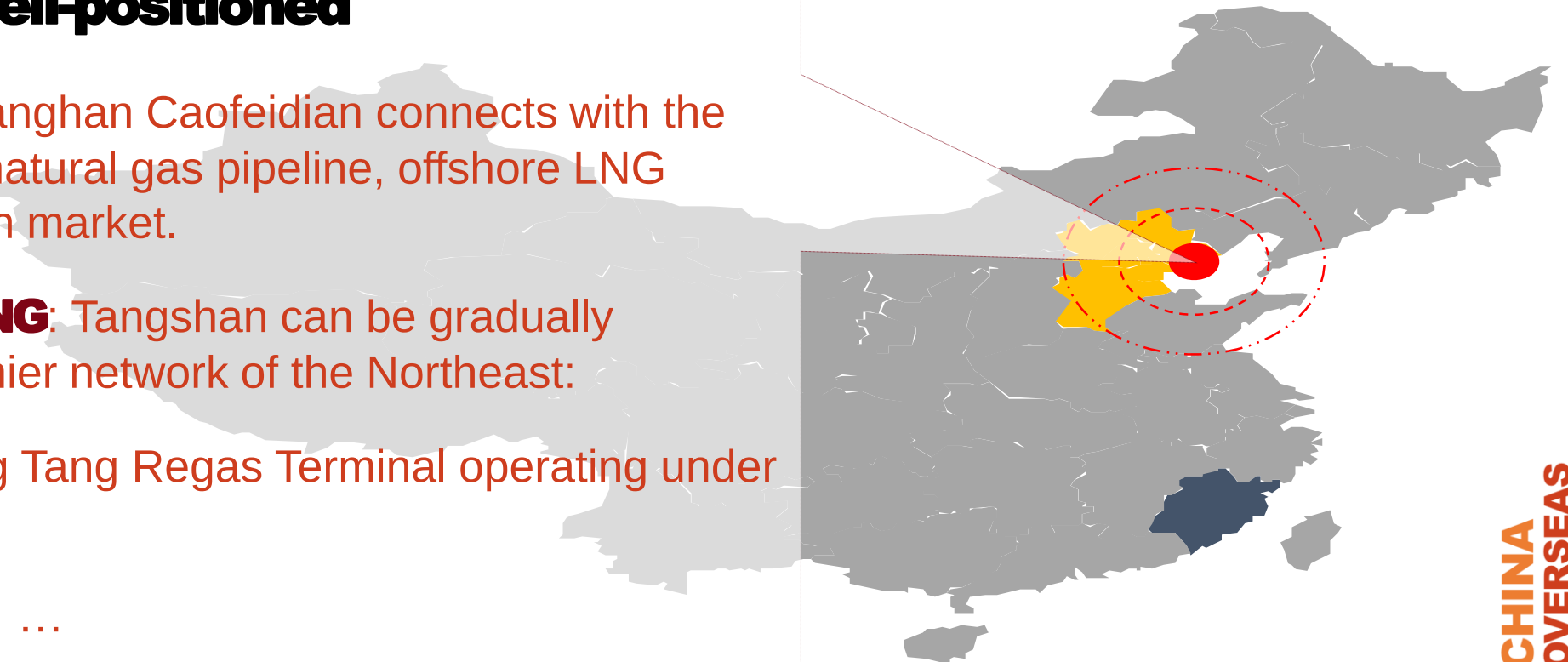
Geographically well-positioned

PIPELINE ACCESS: Tangshan Caofeidian connects with the Eastern Sino Russian natural gas pipeline, offshore LNG import and consumption market.

EXPANSION PLANNING: Tangshan can be gradually expanded into the premier network of the Northeast:

REGAS FACILITY: Jing Tang Regas Terminal operating under a tolling agreement

DOMESTIC DEMAND: ...



Huge market potential (consumers & industries)

Coal substitution by LNG has a huge potential in the region

China LNG Association & International Energy Research Center

Beijing	13 million MT of coal (6 MTPA of LNG)
Tianjin	10 million MT of coal (5 MTPA of LNG)
Hebei	40 million MT of coal (20 MTPA of LNG)

China's 2020 Energy Action Plan

Targeted coal conversion in the Beijing region is **31 MTPA of LNG** in order to gradually reduce the proportion of coal.

CAOFEIDIAN is one of the primary gateways to cover this demand

Impact of additional demand on new regional infrastructure

- New domestic pipeline to connect urban areas.
- Peak-shaving plants to supply peaks of domestic demand

Lead company: HengTai Energy



Company Profile

RMB

200mln

Registered capital

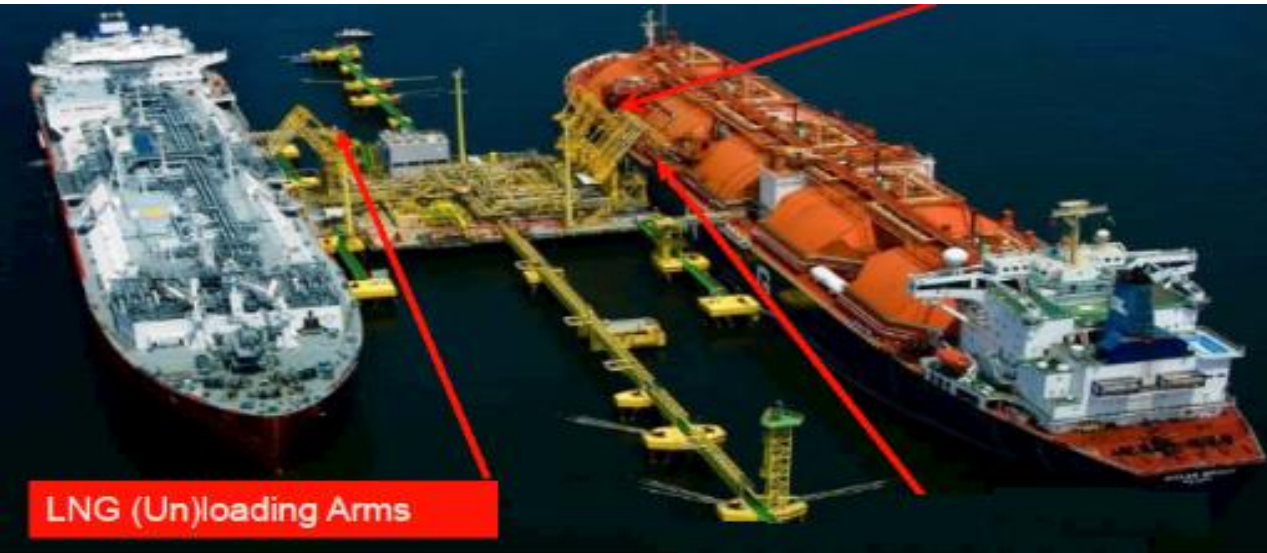
HENGTAI ENERGY was registered in CaoFeiDian Industrial Park in September 2016, has registered capital of RMB 200 million and is 100% owned by COHG (China Overseas Holding Group).

BUSINESS SCOPE includes urban gas supply | the construction of a commodity trading platform | the import and export of goods | wholesale and retail of chemical products (except hazardous chemicals), steel, coal, ferrous metal mineral products, electronic products | Internet information services.

COHG (CHINA OVERSEAS HOLDING GROUP) was established in 1993 by the State Administration for Industry and Commerce and is a state-owned enterprise. COHG is actively expanding its domestic business while also enlarging its overseas international footprint. COHG is active in strategic areas including Infrastructure Investment, Real Estate, Energy Industry, and Investment Banking.

CFD LNG Terminal

CFD FSRU and onshore terminal project



CFD LNG TERMINAL PROJECT located at Caofeidian Industry Park, Tangshan city, Hebei province, with reserved land area of about 53 hectares.

MAXIMUM DESIGN CAPACITY is up to 10 million t/a

SERVICE SCOPE including vessel discharging, vessel loading, bunkering, regasification and truck loading etc.

Development in three stages



1st PHASE

1. Starting FSRU with size of 170K cbm and regasification capacity at about 3 million t/a
2. 2x267K cbm + 1x10k dwt jetties and pipeline connection to gas grid of TEDA and CNPC;
3. For about 2 years as intermediate solution before startup of onshore tanks.

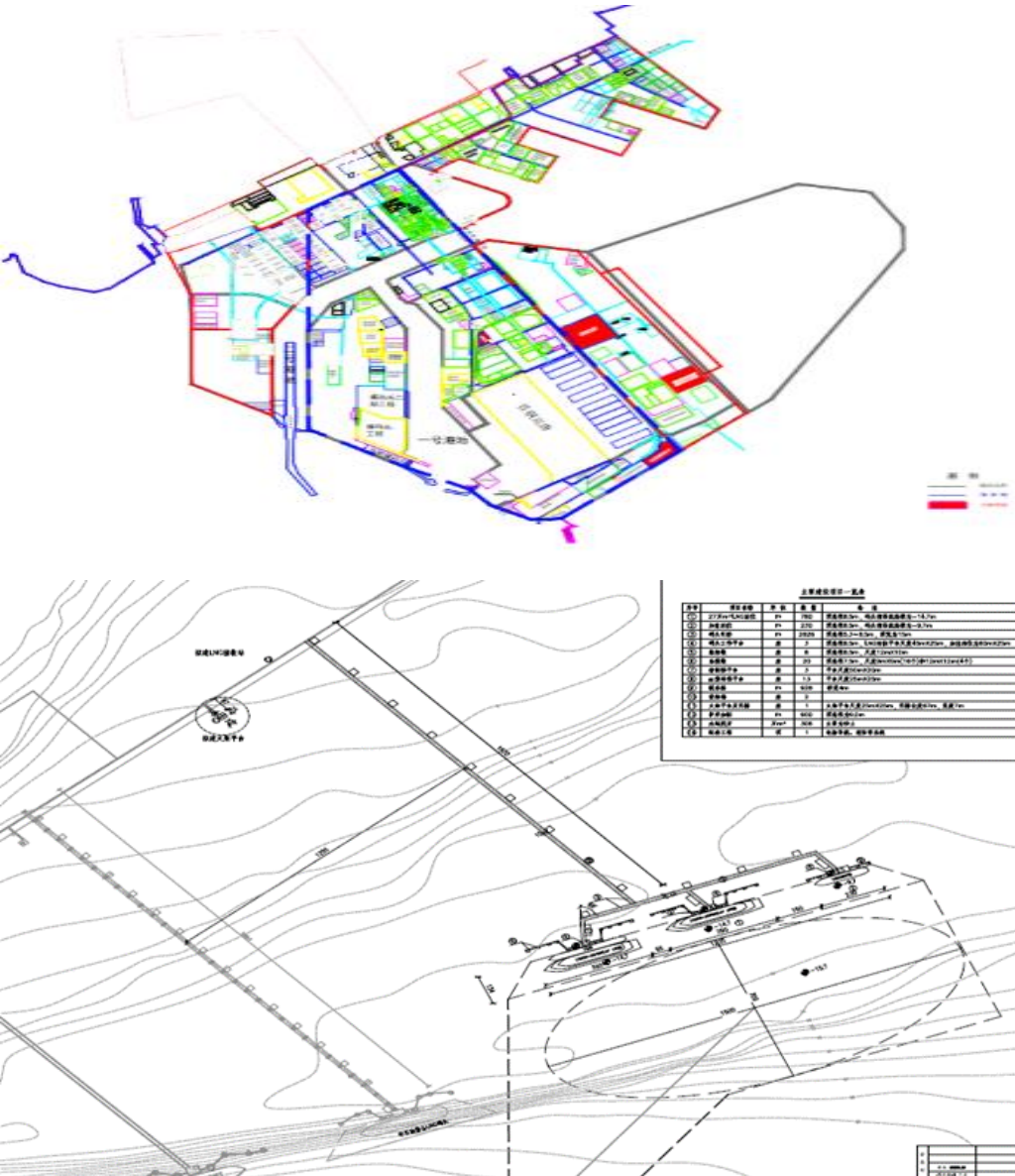
2nd PHASE

- 2x200K cbm LNG onshore tanks and regasification system;

EXPANSION PHASE

1. Add another 4x20K cbm tank per market development & breakbulk (small scale LNG)
2. Reaching maximum design capacity potential of up to 10 million t/a

CFD FSRU and onshore LNG tank



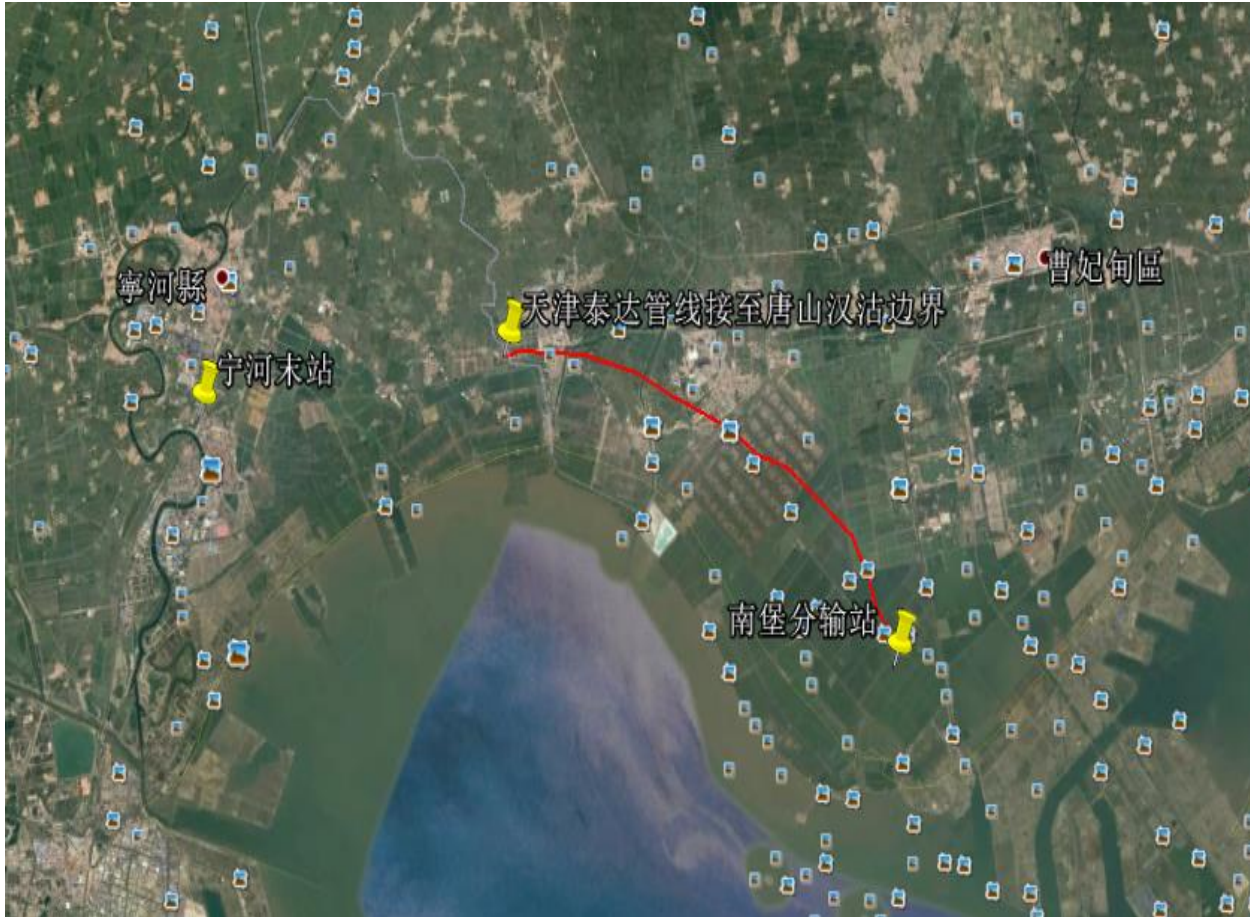
- Supported by Hebei DRC and Energy Administration Bureau, already in the 13th FYP of Hebei province.
- Submitted to NDRC for approval in July, 2016.
- Hengtai (investor and joint project developer) is coordinating with Caofeidian government for permitting process.
- JDA is under negotiation. Joint project team is being organized and appointed.
- CPPE (China Petroleum Pipeline Engineering – CNPC subsidiary) and Harbor Engineering No.4 Institute have been engaged for preliminary feasibility report.

Natural gas pipeline project

NG transportation pipeline #1



Route of NG pipeline No.1



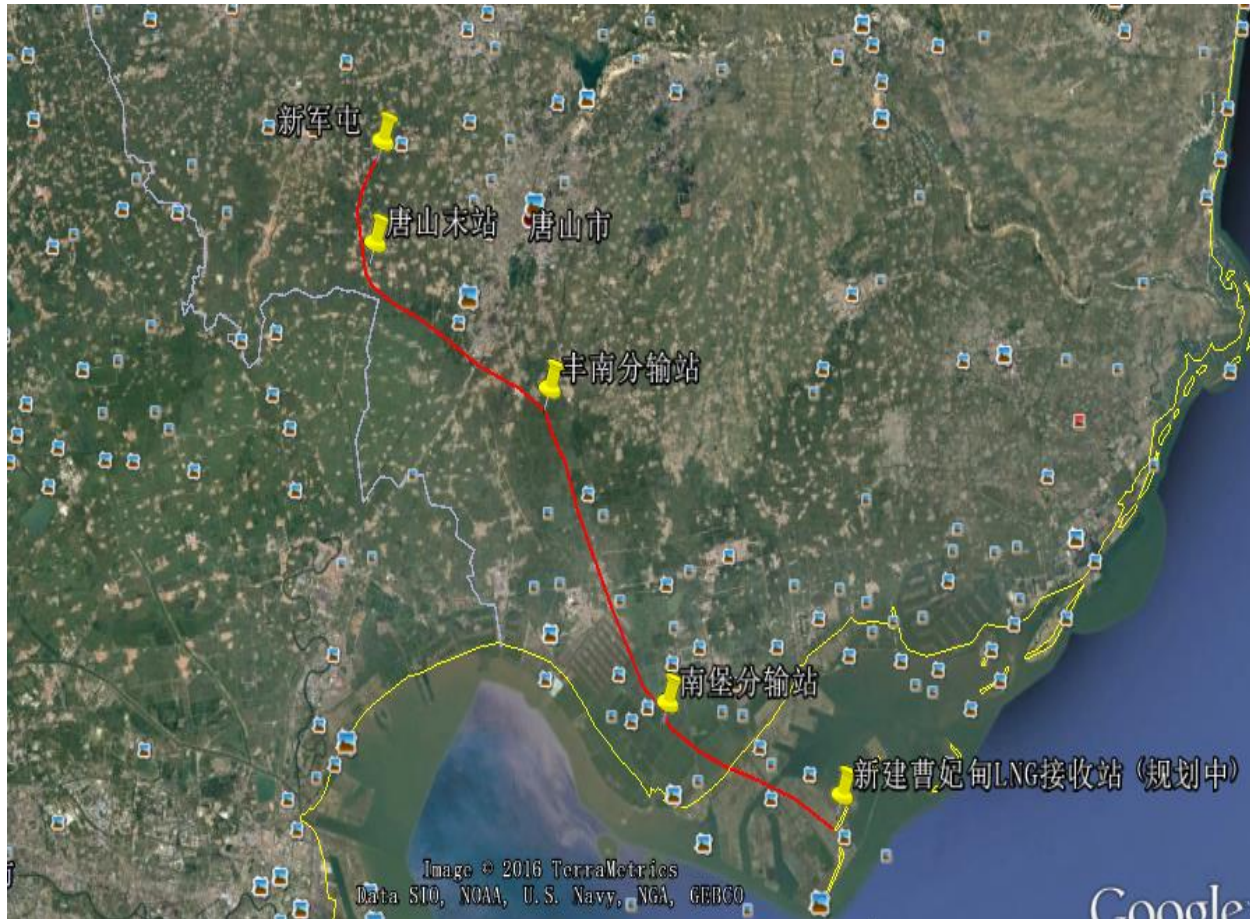
Pipeline No. 1: Hangu – Nanbao

- Pipeline to be connected with TEDA gas grid of Tianjin at Hangu gas transmit station.
- Pipeline route: starting from Hangu, ending at Nanbao transmit station. pipeline length of 60 KM.
- Design capacity @ 3 billion cbm/year
- Pipeline: DN650 with design pressure @ 4.0mpa

NG transportation pipeline #2



Route of NG pipeline No.2



Pipeline No. 2 : CFD—Yong Tang Qin

- NG pipeline along Tangcao highway to be connected with CNPC trunk line named Yong Tang Qin, serves Hebei, Tianjin and Beijing area.
- Pipeline route: starting from CFD LNG terminal, across Nanbao transmit station, Tanshan city ending at Yong Tang Qin Pipeline of CNPC. Pipeline length of 110km.
- Design capacity: 10 billion cbm/year
- Pipeline: DN800 with design pressure @ 4.0mpa

NG transportation pipeline project



Pipeline project progress

- Approval of NG transportation pipeline project is controlled at provincial DRC level, no need to NDRC. COHG has full support from Hebei DRC.
- Supported by Tangshan DRC, in Oct. NG pipelines project was submitted to Hebei DRC and Energy Admin. Bureau, now is under evaluation. Initial feedback is very positive.
- Pipeline No.1: framework agreement signed with TEDA for pipeline connection with gas grid in Tianjin.
- Pipeline No.2: pipeline can serve Beijing, Tianjin, Hebei and northeast area. Communication with CNPC at senior management level is ongoing, a preliminary agreement is reached and to be signed.
- Construction lead-time of pipeline project is about 18 months.

Gas **co-generation project**

Gas co-generation plant



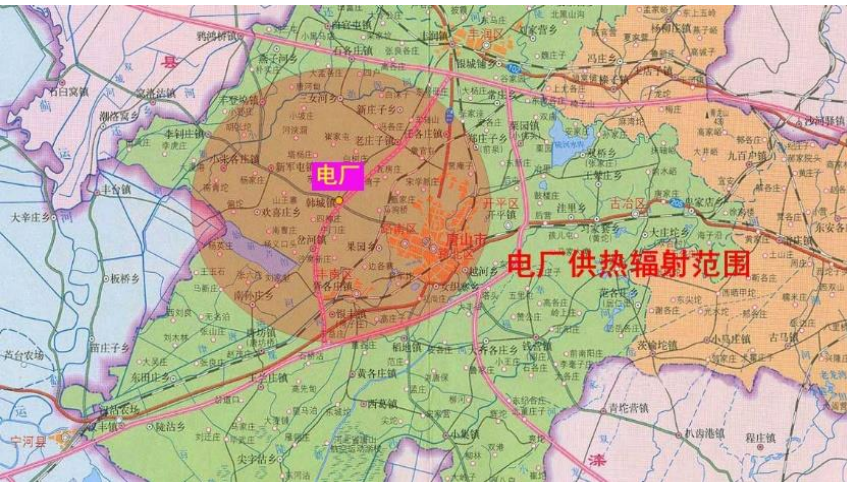
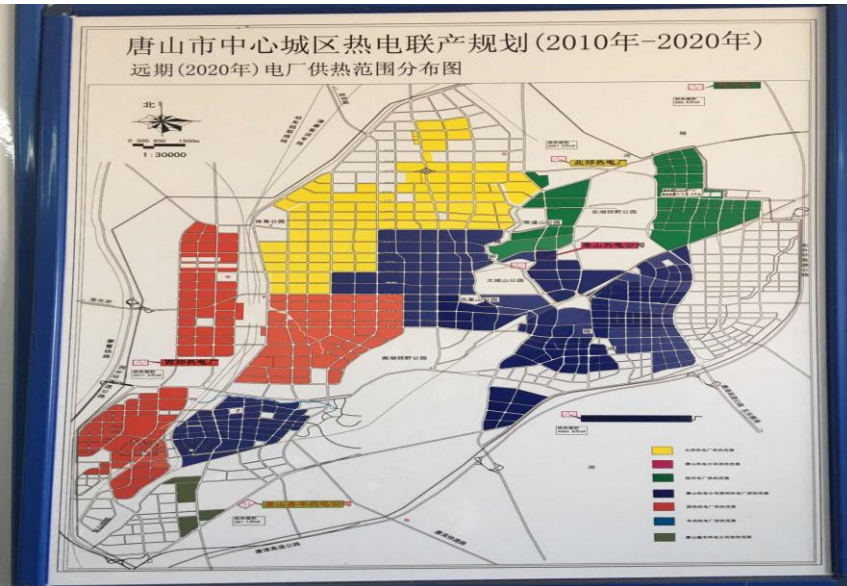
Development of gas co-generation plant



Gas Cogen plant

- Project locates at Lubei district, Tangshan being one of most polluted city of China, with population of approx. 8 million
- Project with design capacity of 2x350MW; 2 back pressure gas congregators.
- To replace coal boilers and serve centralized heating demand of covering 13 million m³; generate electricity of 4 billion GHW.
- To be stable NG off-taker of NG transportation pipeline.

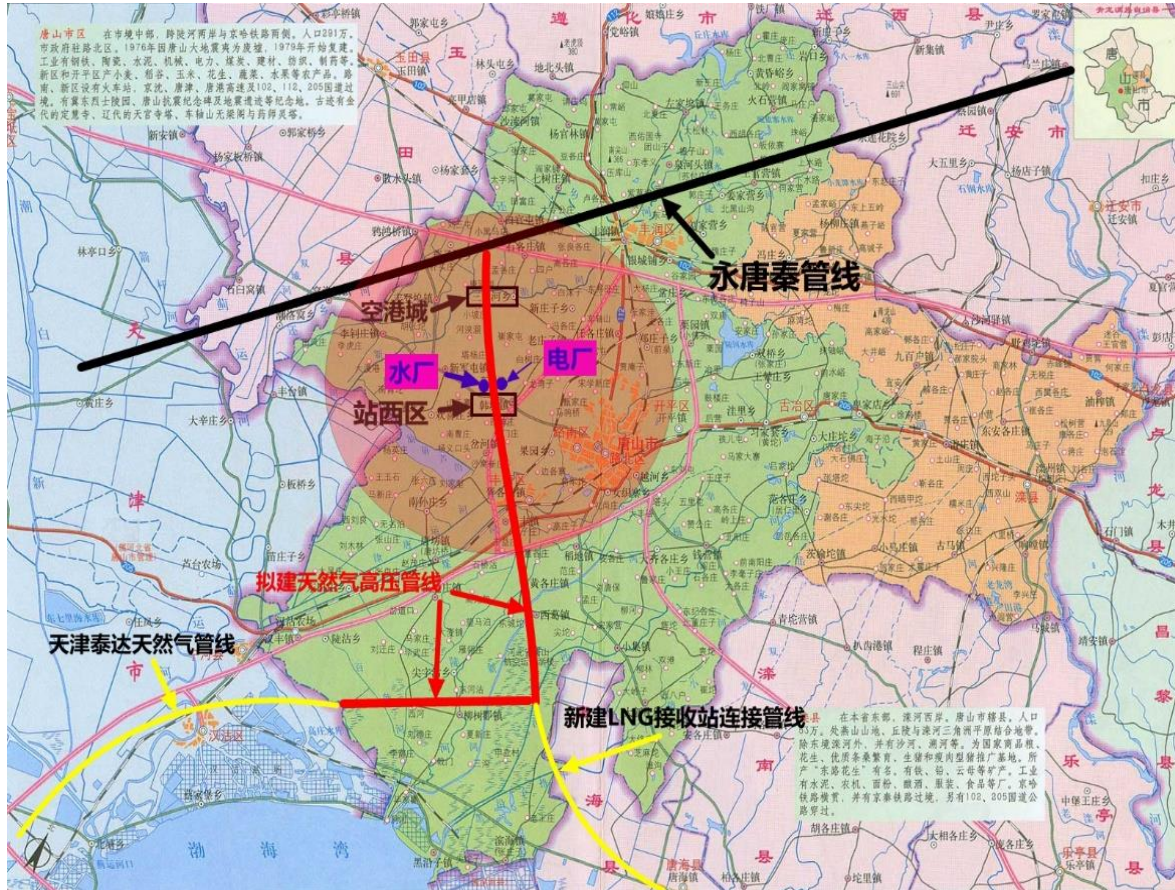
Gas co-generation plant



Project progress

- Approval of gas cogeneration plant project is controlled at Provincial DRC level, no need to NDRC.
- In line with 13th FYP of Tangshan city, full support from Tangshan government, land reservation secured in Nov. Now working on permitting process:
- Gas cogeneration project is encouraged project in Hebei province due to clean energy need which is now politic driven in Hebei.
- Solid demand of centralized heating by using clean energy to replace coal.
- Construction lead time of gas cogeneration plant is about 24 months

Location of Cogen plant and NG pipeline Route



- **BLACK PIPELINE:** CNPC trunk line (Yong Tang Qin)
- **RED PIPELINE:** new HP NG transportation pipeline to be built.
- **YELLOW LINE:** pipeline from CFD LNG terminal to newly built HP NG pipeline; and TEDA gas grid.
- **SHADOW CIRCLE:** the area to be served by new gas cogeneration plant

Combining the value components

Role and positioning in the integrated supply chain



Organization and coordination of the supply chain



Trade and investment with established names in the industry

Large scale supply	
10-15 MTPA (shipments of 80,000 MT)	
✓	Allocated for Tianjin & YangJiang region 5.0 MTPA
✓	Allocated for domestic (national) trading 5.0 MTPA
✓	Allocated for designated receiving areas 5.0 MTPA

YangJiang LNG terminal	
5 MTPA	
✓	LNG Trading 0.5 - 1.0 MTPA
✓	Small scale LNG (barging and trucking) 0.5 MTPA
✓	Main pipeline & large regional end-users 2.0 MTPA



LNG market outlook and competition

Hebei, Tianjin and Beijing LNG market outlook



HEBEI, TIANJIN AND BEIJING, collectively called Jing Jin Ji region, is the most polluted area of China, clean energy needs driving coal to gas change is now a political matter. In particular Hebei being most polluted province, governments at all levels are in high public pressure. However NG supply is insufficient due to seasonal demand fluctuation and pipeline transportation capacity limitation, limiting coal to gas change in power sector, residential use and industrial use etc.

LOW DEMAND VS PEAK DEMAND @ 1:15; CNPC pipeline in place, however NG transportation capacity is limited at 48 million cbm/day, which is only about 1/3 of Beijing peak demand in winter. To ensure Beijing supply, gas cogeneration & power plants and industrial users in Hebei and Tianjin can not get sufficient and stable supply.

NG demand in Jing Jin Ji region		2015	2020 forecast	Remark
	Hebei	6 Bcm	15 Bcm	Population of about 74 mln
	Tianjin	5 Bcm	12 Bcm	Population of about 15 mln
	Beijing	15 Bcm	20 Bcm	population of about 21.5 mln

Note: If NG supply is sufficient, driving more coal to gas change will lead to much higher demand. Huge potential in Hebei due to much larger population.



中国石油

CNPC LNG terminal at CaoFeiDian

- Phase 1 started up in Dec 2013.
- Design capacity of Phase 1 @ 3.5 million t/a
- 4x 160K cbm tanks
- 1 jetty for Q max LNG vessel
- Max regasification capacity @ 24 million cbm/day
- Can further expand to 10 million t/a.

Restriction: 1) pipeline transportation capacity at max 48 million cbm /day. 2) To ensure Beijing demand as priority. No sufficient volume to supply Hebei, in particular in winter.



Sinopec LNG terminal at Nangang, Tianjin

- Phase 1 start up scheduled in Q1 2017
- Design capacity of Phase 1 @ 3 million t/a
- 3x180K cbm tanks
- 1 jetty for Q max LNG vessel
- Can further expand to 10 million t/a

Restriction: 1) To ensure Beijing and Tianjin demand as priority, also need to supply Shandong (population of about 98 million), no sufficient volume to Hebei.

CNOOC LNG terminal at Tianjin



- Phase 1: FSRU + 2 x30K cbm onshore tank started up in Dec 2013.
- Phase 2: FSU size of 170K cbm + onshore regasification system, operational end of Nov 2016.
- Phase 1+ Phase 2: Design capacity of about 2.2 million t/a, regasification capacity @ 1.85 million t/a + trucking capacity @ 350 K t/a
- Phase 3: 1X 160 K cbm onshore tank is pending due to Tianjin blast incident.
- can further expand onshore facility with capacity up to 6 million t/a.

Restriction: no own gas transportation pipeline, rely on CNPC pipeline which capacity is limited at 48 million cbm/day.

The background of the slide is a composite image. The upper portion shows a close-up of the Chinese national flag, with its red field and yellow stars. The lower portion shows a high-angle view of a modern skyscraper with a glass facade, reflecting the sky. A diagonal white line separates the flag from the building.

Thank you!

Hope to see you in 2018 for another status report

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