

Anshan – First city to deploy European DH model in China

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Cooperation with

The COWI logo, consisting of the word 'COWI' in a bold, orange, serif font, set against a light gray rectangular background.

18.08.2014

Agenda, contents

- Figures for the city of Anshan
- The long term perspective for Anshan
- Details on the DH network/building installations
- The pilot project/Construction site
- Concluding remarks and outlook

Some figures about Anshan



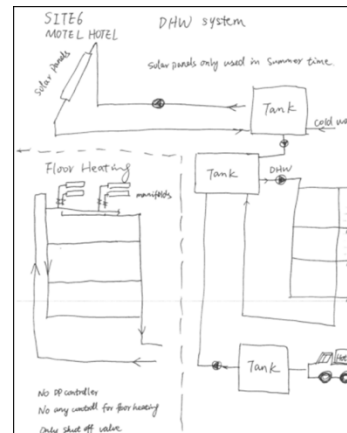
Province of Liaoning

Anshan:



- Population: 1.5 million (central part of city)
- Heating area: 53 million m²
- Installed capacity: HOB: 2050 MW
- Annual heat demand: 7.900 GWh
- Separated DH networks with HOBs

Some impressions from the DH system in Anshan



The concept for Anshan city/DH

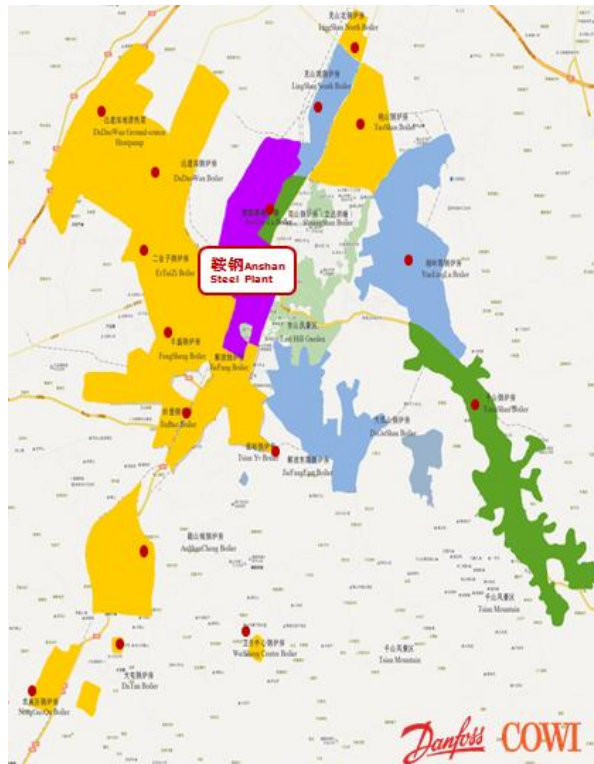
- Coal is the dominant fuel in Anshan and China, and the situation will remain steady in the coming years
- Reliance on coal causes environmental, health and economic challenges
- The majority of the air pollution in China is caused by the burning of coal to generate electric Power and Heat (HOB)

- To utilize surplus heat from AG steel plant as much as possible
- Replacing/reducing coal based heat production HOB
- Leading to operation cost savings, energy saving, coal saving and CO2 reduction
- Business model for increasing overall system efficiency
- Heat and hydraulic balancing
- Besides this, its a good business case !

Vision Anshan DH system

- Separated DH networks
- Steel plant available surplus heat capacity ~1000 MW

- Interconnected DH nets by transmission line
- Pooled operation (Surplus heat from steel plant, CHP and other possible sources)
- Existing boilers for peak load only
- 12 month operation > DHW

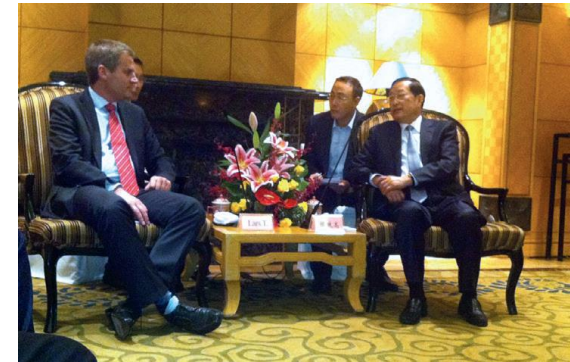


Some figures for Anshan on energy and emissions saving potential

- Coal savings annually: 678,000t coal (~ 400 million RMB only in coal savings)
- CO₂ emission reductions: 1,380,000 tCO₂
- About 40-60% of coal savings and CO₂ emission reductions for the long term perspective for Anshan
- Operational expenses reduction for DHCs
- Increase thermal comfort level of customers
- Increase the management and control level of DHCs

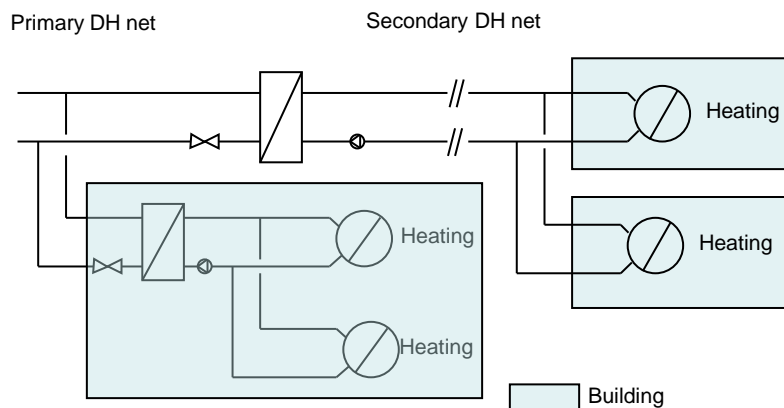
“Your project is the most promising project I have heard about in the last many years. This is a milestone in the development of Anshan city, and an exciting project for the entire province, which I will follow closely”.

Mr. Chen Zhenggao, Governor of Liaoning Province



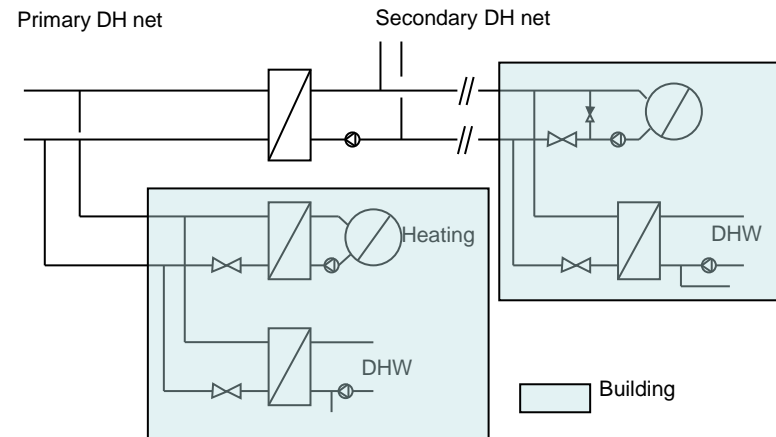
The DH system - primary, secondary net and building installations

Typical DH system today



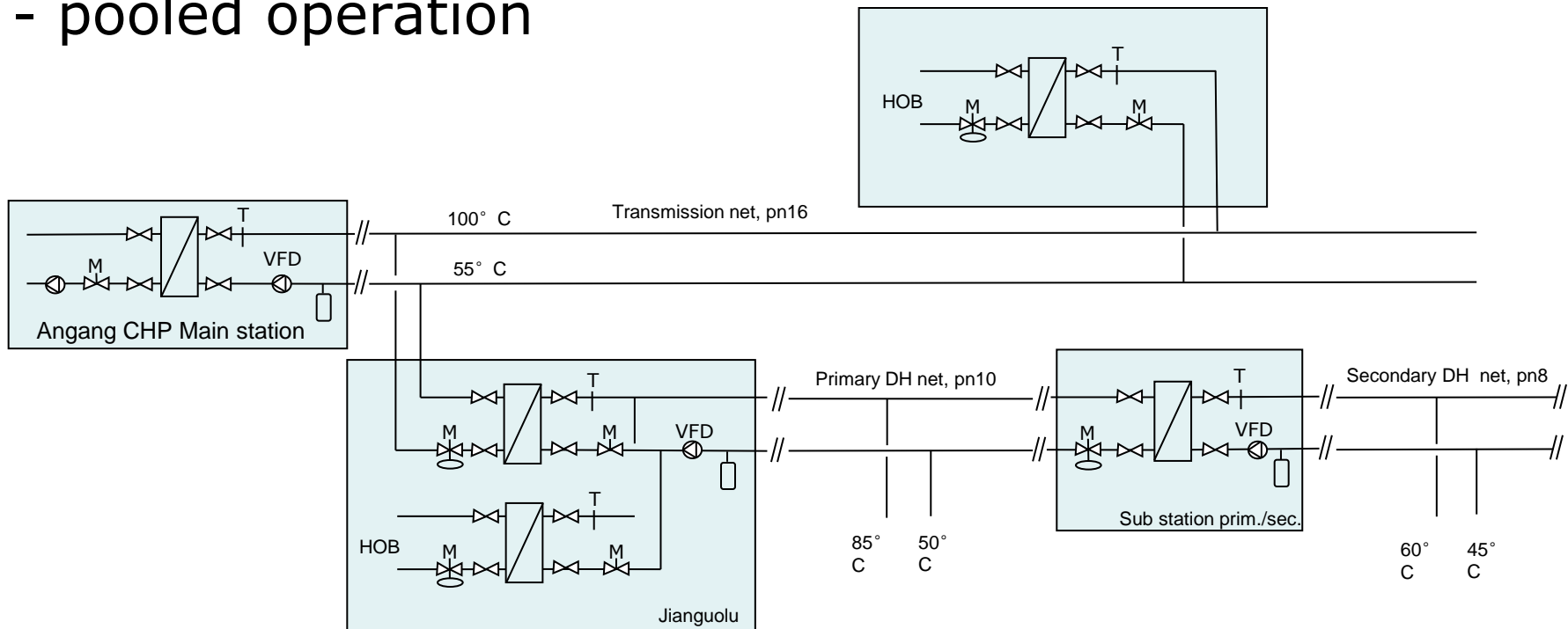
Existing connection principle, where the DH system supplies buildings with heat for room heating. Buildings can either be connected to the primary or secondary side of the DH network. Typically constant flow in secondary net

DH system in the future



Possible future connection principle, where the DH system supplies buildings with heat for both room heating and DHW. The DHW is centrally produced in the building. Buildings can either be connected to the primary or secondary side of the DH network. Alternatively DHW is produced in the flats. DHW: This is on a longer time horizon

The Transmission system - pooled operation



Pooled operation, like the Greater Copenhagen CTR/VEKS system.
Multiple sources, utilising the most attractive source
Avoiding investments in new HOBs
DH system is to be controlled by SCADA system

The Pilot project



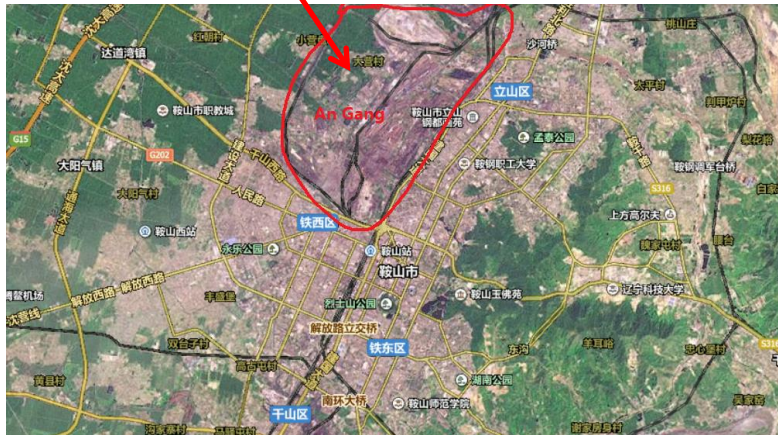
Connected to
The existing primary
system in Quinfeng

Angang CHP

3,4 km transmission line, DN1200, directly connected to the existing primary system in 2014
Supplying heat up to 10-15 mill. m² in the future
Capacity 200 MW step 1 (3 mill. M²) . And 600MW step 2 from Angang CHP
More surplus heat will connect to the transmission system in the near future
The main station at Angang CHP will be finished before the heating season this year
Transmission line expected finalized within next months

The Pilot project

Angang Steel



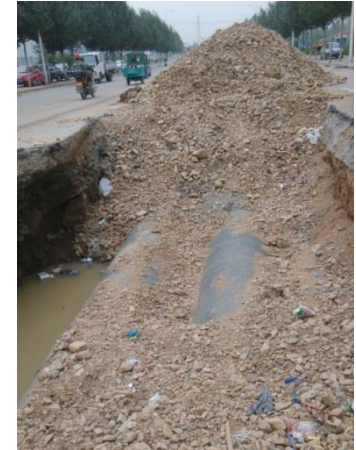
Angang steel located optimal in relation to heat consumers !

Transmission line

The Pilot project



Main station at CHP/Angang Steel



Some figures on energy, emissions and finances for pilot project

- 200 MW for step 1, and 600MW for step 2 from CHP
- 800-1000MW surplus heat for the future in the transmission system
- As base load, 10-15M m² heated floor area for the future
- Energy demand 730.000 MWh (1st step)
- Coal savings annually: 138,000t coal (1st step)
- CO₂ emission reductions: 230.000 tCO₂ (1st step)
- Yearly energy savings approx. 80 Mill. RMB (1st step)
- Investment level of 200 Mill. RMB (1st step)

Concluding Remarks

- Its future ready, variable flow system and 12 month operation is a precondition for efficient DH systems, and opens the possibility for DHW.
- State of the art heat transfer stations including balanced motor control valves
- Substation is ready for external control and surveillance by SCADA system
- The concept of transmissions line opens the possibility for pooled operation, where the best suitable source can be utilized.
- Benefits for the nation, the DHCs, the steel plant, the customers and the environment
- Sustainable development of economy and society according to political goals

