The Anshan Project
A Chinese City Rethinking District Energy
- Rainer Schild, Vice President Sales & Marketing, Danfoss District Energy
A Tough Five Year Plan

- 16% reduction in energy usage per GDP unit
- 17% reduction in CO₂ emissions per GDP unit by 2015
- “Promote clean energy production & energy-saving technologies”
- More cities report that demands to energy efficiency in this plan is much tougher than before
- Heat meter reform now seem to be implemented
- Follow up on energy savings initiatives in each region

Energy Efficiency high priority

>30% of all buildings in China utilize District Heating today
Anshan – the Journey to Energy Efficiency

History Journey to make Anshan-Danfoss Cooperation

2007
Danfoss form a JV in Anshan

2008
Danfoss establish factory producing District Heating substations in Anshan

2010
Danfoss sales of 30 mio. RMB in Anshan

March 2012
Danfoss/COWI presents a first project proposal for party Secretary Mr Gu in Beijing

June 2012
In relation with President Hu Jintao visit to Denmark Danfoss sign contracts with Anshan overment and Qianfeng DH Company regarding Anshan District Heating project

July 2012
Danfoss/COWI visit Anshan for final project discription

November 2013 marked a milestone: Groundbreaking for Anshan District Heating transmission line and Danfoss factory expansion

2011
Party Secretary Mr Gu visits Denmark and discuss the vision for District Heating in Anshan

April 2012
Danfoss/COWI presents a revised project proposal in Anshan for related stakeholders
Anshan TODAY
- Anshan inner city 1.8 M residents
- Heating area: 53 million m²
- Installed capacity:
  - Heat only Boilers: 2050 MW
  - Potential to utilize 1000-2000 MW surplus heat
- Annual heat demand: 7,900 GWh
- Separated (unbalanced) network (coal fired)

Anshan VISION
- A transmission line utilizing surplus heat from CHP and steel plant and the geothermal sources
- 12 month District Heating supply, domestic hot water
- Pooled (balanced) networks
Anshan Embracing a New Vision

- Close cooperation with Anshan City Government, Angang Steel and Qianfeng District Heating Company
- Supplying energy to the city by simply recovering energy that is already available but wasted
- Increase energy efficiency and reduce CO₂ emissions
- Stable heat supply, cleaner air, improved indoor climate
Anshan in 2014/2015

Connected areas in 2014/2015:

- Total of 5 heating networks to be connected in 2014 & 2015
- Balancing in heating networks significantly improved

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<thead>
<tr>
<th>District heating network</th>
<th>Heating Company</th>
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<tbody>
<tr>
<td>Ertaizi</td>
<td>Qianfeng DHC</td>
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<td>Jiefang Rd</td>
<td>Qianfeng DHC</td>
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<tr>
<td>Fengshen Rd</td>
<td>Qianfeng DHC</td>
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<td>Lida DHC</td>
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<tr>
<td>Shuangshan</td>
<td>Lida DHC</td>
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Anshan – a World Class Energy Model

Energy Saving Calculation, 1st Phase 2014/2015

- Available capacity: 200 MW (in Summer 20 MW)
- Energy consumption: 831,840 MWh
- Coal savings: 173,000 ton
- CO₂ emission reduction: 289,000 ton
- Yearly savings Coal: 86 mio.RMB
- Investment level: 200 to 250 mio. RMB 2-2.5
- Payback time: ~3 years

As a ‘visual’ reference: according to COWI, it can be assumed that 8.5 tons of CO₂ is emitted per person in Denmark per year

- 289,000 tons are equivalent to a town with approx. 34,000 persons
Anshan Target for Full Extension

- Pooled (balanced) networks
- A transmission line utilizing surplus heat from CHP and steel plant and the geo-thermal sources
- The existing boilers will be used for peak load only
- Massive reduction in coal consumption annually: 1,2m tons (when 2000MW connected)
- CO₂ emission reductions: 2m tons (when 2000MW connected)
- Coal savings and CO₂ emission reductions approx. 60-90%
District Energy – a **Key Infrastructure** to Realize World Class Energy Efficiency

- **District Heating** system in Anshan, Liaoning being developed to most advanced technology level available = 4\(^{th}\) Generation
Danfoss’ role in the project

- Danfoss is not a turn-key provider
- Danfoss and its partners deliver a technical feasibility plan to the city for the project
- Danfoss – together with partners – are initiating the projects with the city via the Mayor and provincial government (signs a frame agreement for the project)
- Danfoss supports the city in the implementation of the project – participating in dialogues with e.g. surplus heating companies (support in negotiating the price for surplus), design institutes (inform about key benefits of the concept) etc.
- Danfoss enters into a commercial agreement with the Heating company, who are the key arm to implement this
The solutions are ready!

Learnings from Anshan:

- Establish close, trustful partnerships with the decision-makers from key stakeholders
- Create innovation and ideas in the team
- Execute with passion and endurance and with highly competent partners
- Share best practices and learn from/adapt to national conditions (Europe’s deep and proven district energy heating knowledge also works in China!)

Where can we run projects in Europe?