



China: District heating in China - from a Danish perspective

China is rapidly becoming the world's largest market for district heating (DH) technologies. But China is also facing several challenges. Danish companies and authorities have committed themselves to assist the ongoing Chinese efforts to develop the DH sector in a sustainable and cost-effective manner.



March 5, 2014

China has experienced an impressive growth in DH and the total supply area covered by DH systems has increased 17-fold between 1990 and 2011. Half of all major cities in China now have DH systems and the district heated floor space covers almost 5 billion square meters corresponding to more than 30 % of the potential DH area in China.

The expansion of DH has been a major topic in Chinese energy policy. The impressive growth in DH in China is the result of significant local efforts facilitated by sound national policies and regulations. Furthermore, in some regions industries have exploited their surplus heat in the form of DH - supported by local governments and implemented in a variety of different setups.

There is, however, still a pronounced potential for further development in the Chinese DH sector.

Chinese district heating is expanding; China is set to be world's largest market for DH technologies

First and foremost, the Chinese urbanization rate is progressing at extraordinary speed these years. Half of China's population now lives in urban areas, as compared to 19 % in 1980 and it is expected that China may have as many as one billion urban residents in 2030. To accommodate the increasing urban population it is expected that 2 billion square meters of residence floor

space will be constructed every year. This will increase district heating significantly in selected areas in Northern China designated by the Chinese Ministry of Housing and Urban-Rural Development (MoHURD). MoHURD is considering to expand the indoor heating zone in China to also include the upper belt of Southern China where the temperature frequently drops below 5 °C during winter time - an area that is home to a total population of 100 million people.

Secondly, the current DH systems in China have been developed without an overall national policy or guidelines and therefore they appear as a patchwork of often sub-optimized DH systems. There are big differences between DH systems in China - also when it comes to the level of efficiency. Thirdly, China has a strong focus on increasing the share of heating from renewable energy sources such as biomass. Biomass-based DH and combined heat and power plants (CHPs) could replace the widespread coal-based boilers in some county capitals and other large towns in the countryside. China's National Energy Administration has launched a "Green county programme" for counties that wish to increase their share of renewable energy in the heating sector to 50 percent by 2020. The programme currently has more than one hundred participating counties and is set to include 500 counties by 2020.

For all of these reasons China is set to be the world's largest market for district heating technologies within a few years - and a market with a significant potential for further development of the DH sector.

Denmark holds key experiences to assist China

Denmark is in a very strong position to assist the ongoing Chinese efforts to develop the DH/CHP sector in a sustainable and cost-effective manner. Denmark has a unique know-how and experience in making fuel- and cost-efficient high quality DH while keeping consumer prices low - experiences gained from the developments over the last four decades concerning both technical breakthroughs as well as institutional reforms.

The Chinese government acknowledges the need for energy reforms and has already formulated several policies in this regard, which has paved the way for a close cooperation between the Chinese and Danish authorities on DH and renewable energy through the China National Renewable Energy Centre that serves as a common platform for cooperation on energy policy development. Danish companies also see great opportunities within district heating in China, both within delivering hardware such as boilers and heat pipes as well

as in consultancy on energy efficiency, planning etc. One current example is the Anshan project in Liaoning province where Danfoss and COWI are involved in a large project where excess heat from the steel industry is converted into DH for more than 300,000 Chinese citizens. Especially within biomass related technologies Denmark has a strong expertise ranging from advanced boiler systems and flue gas cleansing down to very practical and hands-on experiences with biomass combustion and boiler operations as well as biomass handling where especially the logistical challenges associated with the huge supplies of biomass warrant attention.

The combination of DH and renewable energy is a win-win solution with numerous possibilities that remain to be fully explored. A recent example of such a project is the Yilan project in China which deploys the Danish experiences to introduce more renewable energy in their DH system as reported in our [February newsletter](#). And there are still significant potentials for further use of district heating systems in China, including waste heat recovery, energy efficiency and further development and use of renewable energy.

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