



PROMOTING SWEDISH DISTRICT HEATING & COOLING TECHNOLOGY IN CHINA (2019)



Swedish
Energy Agency



Embassy of Sweden
Beijing



THE SWEDISH TRADE & INVEST COUNCIL

SWEHEAT
& COOLING

SUMMARY

Business Sweden, in close collaboration with Embassy of Sweden and SweHeat & Cooling, has been arranging 14 district heating/cooling roadshow conferences in China from 2012 to 2018 in twelve cities.

A well-structured district heating and cooling promotion plan for year 2019 is required to coordinate the promotional activities. The plan shall also support a long-term ambition to promote Swedish district energy expertise in China.

Swedish Energy Agency, Embassy of Sweden, Business Sweden and SweHeat & Cooling are working closely in performing a market evaluation and creating a district heating/cooling promotional plan for 2019 based on understanding of the Chinese market and Swedish offerings. The intent is to update this plan for 2020 onwards on a yearly basis.

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Introduction

Business Sweden, in close collaboration with Embassy of Sweden and SweHeat & Cooling, has been arranging 14 district heating/cooling roadshow conferences in China since 2012.

The roadshow conferences have covered twelve cities in China. Among the roadshow conferences performed, one roadshow focused on district cooling and the rest was district heating focused.

Companies that have been participating in the district heating/cooling activities include but not limited to the following:

- Alfa Laval
- Golden forest
- PG Monitoring
- Regin Controls
- SaltX
- SweHeat & Cooling
- SWEP
- Termoekonomi
- Vexve
- Wideco
- Zeta Boiler
- Johnson Controls (US company, invited for cooling event)
- Evapco (US company, invited for cooling event)
- Engie (former GDF Suez) (French international company, district heating & district cooling investments, operations and maintenance)

Map 1: Swedish district heating and cooling event has covered 12 cities in China since 2012



A well-structured district heating and cooling promotion plan for year 2019 is required to coordinate the promotional activities. The plan shall support a long-term ambition to promote Swedish district energy expertise in China, and the short-term promotion shall support the long-term vision.

District Heating and Cooling Market in China

District Heating

Market overview

Back in the 1950s, the Chinese central government drew a line across the country, dividing the north and the south, determining what parts of the country that would have access to district heating. The division has been criticized by people living just south of the line who consider it to be it unfair, as temperature in these areas can reach minus 10 Celsius degrees during wintertime.

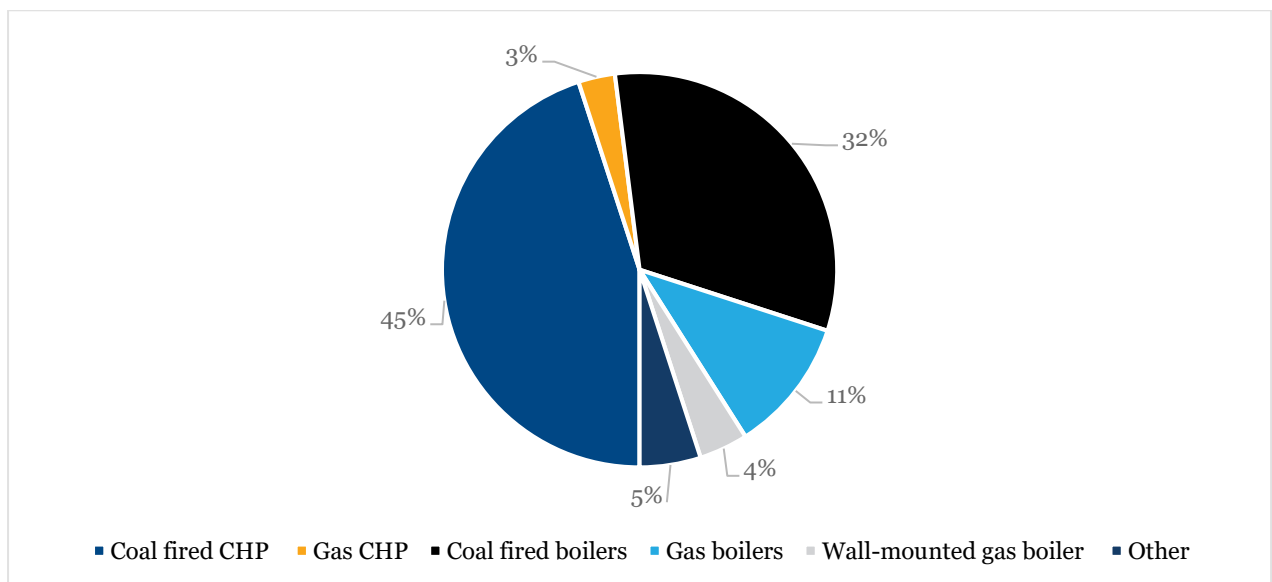


By 2017, the total area of district heating in north China reached 14 billion square meters, incl. 80% in cities, 20 % in smaller towns. China has the world's largest and fastest-growing district energy system, including 192 721 km of hot water networks and 11 692 km of steam networks.

Heating projects are one of urban and rural public municipal infrastructure in China. From the management point of view, the heating involved in those authorities in the central, provincial, municipal and county government, and heating enterprises, so that is local or urban affairs. The authorities of the central, provincial and municipal governments shall carry out macro-management, and the county and/or district governmental sectors shall directly manage the thermal supply. Heating price is regulated by the government.

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Chart 1: Heating source in north China (2016)



Coal, as the dominant heat source fuel, has resulted in a series of environmental, health, and economic challenges. There is considerable potential for improving China's district heating system and reduce greenhouse gas emissions.

In December 2017, the state council issued “Winter Clean Heating Planning in North China (2017-2021)” (the “Plan”) addressing the heating issues from three aspects:

- Heating source: the Plan has given advice on heating sources from five aspects namely using renewable energy as heating source; using gas as heating source; using electricity as heating source; utilizing industrial waste heat and adopting clean coal technology for district heating;
- District energy system: renovate heat supply system to make it more efficient;
- End users: promote energy meters and promote thermal isolation of buildings.

A number of provinces has issued their own action plan in realizing clean heating in the winter time as a reflection to the national plan.

Table 1: Highlight of provincial action plan for clean district heating

Province/ municipality	High light of the clean heating development plan
Tianjin:	<ul style="list-style-type: none"> - Increase the proportion of CHP, renewable and other clean energy heating - Reduce coal-fired boilers (target is below 20% by 2020) - New projects include gas-fired thermal power plants; deep geothermal and sewage source heat pump systems for district heating
Hebei	<ul style="list-style-type: none"> - Encourage the construction of medium to large coal-fired CHP - Increase the use of industrial waste heat (target is by 2020, 250 million m² is covered by industrial waste heat as heating source) - Encourage use of geothermal resources - Promote the use of electrical energy and biomass - Minimize negative environmental impact caused by district heating
Inner Mongolia	<ul style="list-style-type: none"> - Make full use of low-grade heat sources - Encourage to use gas, geothermal energy, solar energy and other renewable energy as heating source
Beijing	<ul style="list-style-type: none"> - Development clean district heating <ul style="list-style-type: none"> o Encourage power plant waste heat recovery and reclaimed water source heat pump system - Construction of energy center at Tongzhou district and renovation of coal boilers

	<ul style="list-style-type: none"> - Accelerate clean heating at Yanqing new city - Prioritize gas as heating sources in the areas covered by gas pipes; suggest use heat pumps and LNG/CNG at areas not covered by gas pipes - Promote solar energy and GSHP (Ground Source Heat Pump) at places where is applicable
Shanxi province	<ul style="list-style-type: none"> - Strongly promote CHP for district heating and clean energy - Remove all small coal fired boilers - Gradually increase the use of solar energy
Jilin	<ul style="list-style-type: none"> - Promote CHP back pressure turbines in Changchun, Jilin, Songyuan, Yanbian and Liaoyuan city - Remove small coal boilers - Promote heating film and ground source heat pump technology
Heilongjiang	<ul style="list-style-type: none"> - Increase proportion of clean heating - Promote district heating and use of natural gas at cities - Back pressure turbines preferred at coal fired CHP - Explore new heating methods such as electric heating, gas heating, decentralized heating and geothermal energy utilization
Henan	<ul style="list-style-type: none"> - Speed up CHP construction - Promote large scale super low emission coal-fired boilers / gas boilers - Promote renewable energy as heating source - Explore biomass energy, biomass boilers - Develop shallow geothermal energy
Shandong	<ul style="list-style-type: none"> - Clean heating rate reaches 70% by 2020 - Promote CHP - Increase use of renewable energy such as industrial waste heat, natural gas and electric energy - Explore biomass energy, solar energy, air heat and shallow geothermal - Key cities for clean heating agenda include 7 cities among the “2+26” cities of air pollution transmission channel in Beijing-Tianjin-Hebei

Chinese authorities are not able to stop the waste stream from growing but can reduce the rate of growth, the government's role in promoting waste management for energy production and recovery is of extreme importance.

In response to the mounting problem, China unveiled the “Zero Waste City” pilot project to promote urban solid waste management. It is also an important measure to build a beautiful China.

The pilot plan aims to minimize solid waste generation and maximize recycling in urban areas. 10 cities are selected as pilot cities in 2019. After the 10-city pilot program ends in 2021, its results will be used to guide expansion of the initiative.

There seems to be a change in attitudes in the Chinese authorities to start considering putting the Waste to Energy plants closer to the cities to also be able to recover the waste heat from the electrical production and deliver to existing District Heating systems.

Map 2: No waste city pilot in China (2019)



Key challenges for the district heating market in China

Interviews with Swedish companies active in the district heating sector indicates the following challenges:

- Knowledge and capabilities on how to make the most of the available technologies, the design, construction and operation of the project needs to be improved;
- Chinese heating supply companies are very often city-owned and highly dependent on local government funding (subsidy). Most of the heating

companies (except those in big cities like Beijing) lack enough financial support from the government so they have strong price pressure in the procurement process that leads to the reduction of work quality;

- Local heat and business plans should be developed
 - This includes plans for merging DH companies, pooled operation, rehabilitation of outdated and low-efficient technology, and demand-driven supply;
 - So far there is no initiative from the Central Government to implement a policy requiring cities to develop energy plans.

Foreign companies in China has identified some barriers to work with Chinese heating companies:

- Since the heating companies are financed by the city or state-controlled companies, procurement of equipment has to go through public tenders and very often the lowest price wins;
- District heating companies are operators. Heating fees collected from end users are not able to support their sustainable development, therefore the heating companies have to request funds from the city for upgrading equipment etc. Some district heating companies are not able to afford advanced technology / equipment due to financial reasons.

District Cooling

Market overview

District cooling in China is a relatively new technology. It was developed early in the 21st century and gradually gained in popularity after the 11th Five-Year Plan (2006–2010) was launched, which pushed for conserving energy and reducing emissions.

With the purpose to reduce local emissions and the stress on the electricity transmission grid, in 2012–2013 the Government of the China called for more distributed energy projects—gas-fired combined heat and power (CHP) and CCHP plants, as well as solar photovoltaic projects. As a result, district cooling started to be implemented on a larger scale as part of CCHP technology.

The business climate for district cooling in the China is market driven, which is relatively similar to that in other countries. In the absence of regulations specific to district cooling, some building codes indirectly support the energy efficiency improvements espoused by district cooling.

International best practice technologies are available, but many district cooling projects in China are not selected, developed, or implemented according to international standards.

Most of district cooling project is for commercial buildings, e.g. CBD¹ in a city. Project owners very often are real estate developers or subsidiaries of developers. And many district cooling project owners are fully or partly owned by companies that were originally set up as state-owned enterprises.

The size of the district cooling market in the PRC is hard to determine as there is no database of statistics or information exists for the sector.

Comparing with district heating, district cooling is regarded as high-end sector by Swedish companies, that Business Sweden has interviewed, as district cooling often has higher technical requirements and project owners have stronger financial competence.

Cities with district cooling project/ potential has been identified:

- Beijing
- Changsha, Hunan province
- Chongqing
- Guangzhou, Guangdong province
- Haikou, Hainan province
- Hefei, Anhui province
- Nanjing, Jiangsu province
- Sanya, Hainan province
- Shanghai
- Shenzhen, Guangdong province
- Suzhou, Jiangsu province
- Wuhan, Hubei province
- Xiong'an, Hebei province
- Zhuhai, Guangdong province

Key challenges for the district cooling market in China

Interviews with industry experts have identified some key issues within the district cooling market in China:

- Oversizing the capacity is typical for district cooling installations in China – more equipment and heat exchanger installed than necessary;
- Large investment is made upfront & a step-by-step approach is not implemented
 - An example is that Guangzhou University built everything at the beginning and it took 10 years to reach a breakeven result;
- Since district cooling in China is a relatively new technology, there is room for improvement at relevant design institute(s) or expert committee(s).

¹ CBD: central business district

Sweden enjoys a high reputation of district cooling in the Chinese market. Swedish experience and competence in district cooling are to be shared at the Swedish cooling conference².

Swedish Competence in District Heating and Cooling

The Swedish government has announced *Sustainable Heating and Cooling* to be a prioritized area for international collaboration in the coming years.

Sweden has 60 years of experience of installing & modernizing heat networks and District Heating worldwide.

- During the last 60 years Sweden has achieved a nationwide expansion of heat networks with a substantial reduction of CO₂-emissions;
- Nearly all of the fuel is from renewable sources;
- The Swedish Electrical Power market was deregulated 1996;
- District heating is competing with other heat sources and the heat networks have mixed ownership, municipalities, investors (large, small), coops (customer owned).

Example of competences in the Swedish offerings

<p>Products, components, management and engineering competences are highly developed in Sweden in all the areas</p>	<p>Building and installation</p> <ul style="list-style-type: none"> • Automation • Radiators/under floor heating • Balancing valves • Pumps <p>Energy Transfer Stations (ETS)</p> <ul style="list-style-type: none"> • Heat exchanger • Automation & Control • Meters <p>Heat and cooling distribution</p> <ul style="list-style-type: none"> • Pumps • Leakage detection systems • Pre-insulated valves • Monitoring & Control <p>Energy supply</p> <ul style="list-style-type: none"> • Biomass hot water/ steam boilers • Large heat exchangers / brazed heat exchanger • Gas turbines & Gas engines • Combined Heat & Power
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² More information of the Swedish cooling conference plan is included in this report under “Suggested activity plan 2019”

	<ul style="list-style-type: none"> • Large heat pump applications • Thermal energy storage tanks • Heat energy meters • Waste to energy <ul style="list-style-type: none"> ○ Waste handling, sorting etc. ○ Combustion process ○ Combined Heat & Power ○ Flue gas treatment ○ Flue gas condensing
Services	<p>Knowledge/ consultants</p> <ul style="list-style-type: none"> • Pre-feasibility/Feasibility • Peer-to-peer advice • System design • Project planning • Procurement • Installation & operations • Maintenance and administration <p>Energy Management</p> <ul style="list-style-type: none"> • Scada, controllers, optimisation • Communication • Decision support • Maintenance support • Operations services

In addition, experiences from Baltic countries, e.g. Riga and Liepaja indicate that energy management at building levels are equally important. Measures such as replacement of central substations with individual building substations and upgrading of substations control systems will help to reduce the heating consumption with more than 30%.

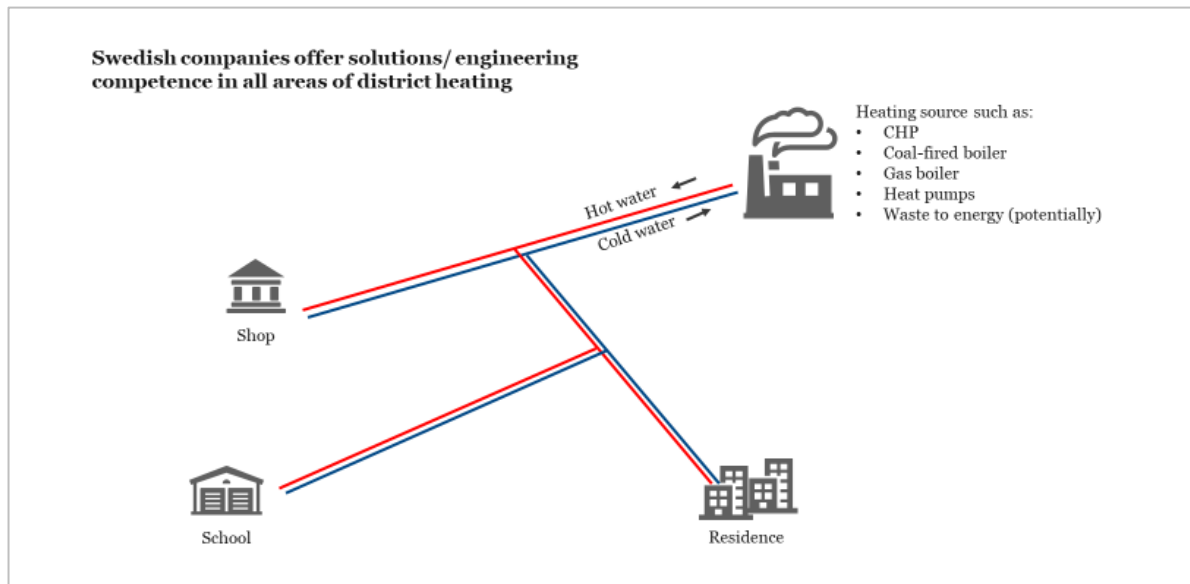
Improving the operation of networks and optimizing the Heating Boiler Plants and CHP plants in combination with Energy Management at building levels will dramatically reduce the usage of fossil fuels and improve the environment.

Household waste is a very important untapped resource with regard to energy production in China and there seems to be a change in attitudes to start considering putting the Waste to Energy plants closer to the cities to also be able to recover the waste heat from the electrical production and deliver to existing District Heating systems. This is also one of the most important changes in District Heating industry in Sweden that has especially expanded in the last 20 years and where Swedish concept and knowledge is very competitive.

Opportunities for Collaboration and Target Stakeholders for Heating and Cooling Promotion Activities

District Heating

Illustration 1: District heating



Potential target areas³ for Swedish companies includes:

Energy systems based on household waste

- Waste to Energy for production of electricity, District Heating & District Cooling
- Sorting of garbage will result in possibilities for bio-gas production that can be upgraded to transportation fuel
- Recycling of different materials
- Minimization of requirements for landfills

Upgrade of existing Power Plants to more flexible operation

- Modification of steam turbines and boilers combustion systems
- Addition of thermal energy storage
- Installation of electrical boilers for use of renewable electricity at night

Long Transmission lines for District Heating

Rehabilitation of existing District Heating systems

³ “Energy systems based on household waste” is not a prioritized area for 2019 promotion plan

Key stakeholders for Swedish district heating conference:

Target participants from Chinese side are:

- Relevant agencies
- Municipal government officials
- Development and Reform Commission of city level, preferably provincial level
- Municipal heating supply offices
- Local District Heating companies
- City planners
- Local thermal groups, such as Beijing Thermal Group, Taiyuan Thermal Group, etc.
- Design institutes, such as North China Municipal Engineering Design & Research Institute Co., Ltd.

District Cooling

Starting in Sweden in the early 1990's, District Cooling (DC) has had a rapid development. Today, District Cooling production in Sweden has grown to the same size as the production of the much older product wind power. But there is a very important difference: Unlike wind power, District Cooling has been successfully established without any subsidies! The cooling business in Stockholm is run by the energy corporation Fortum and alone accounts for about half of the national supply. 7 000 000 square meters of commercial area in the Swedish Capital are supplied with District Cooling via the cooling distribution network, that is currently 250 kilometers long.

Potential target areas for Swedish companies includes:

- Energy Transfer stations with Heat Exchangers & Control Equipment
- Piping networks
- Production Plants with Thermal Energy Storage

Key stakeholders for Swedish district cooling conference:

Target participants from Chinese side are:

- Project owners, such as commercial building developers
- Municipal government officials
- Development and Reform Commission of local level
- Design institutes, such as Guangdong South China Architectural Design & Research Institute and East China Architectural Design & Research Institute (ECADI)
- Engineering companies

Engagement Options

Swedish actors have for a long time been working actively in the promotion of district heating and cooling. During the last couple of years, the government, embassies, Business Sweden and SweHeat & Cooling have conducted activities together with among others China District Heating Association. The goal has been to promote knowledge and understanding of Swedish expertise in district heating and cooling. The competition within the area is substantial from the Nordic region – Finland and Denmark – as well as from other countries – Germany, Italy, Korea and USA. Large global actors such as EDF, Engie, Suez, Veolia/Dalkia and more are also established in the market. With regard to suppliers of equipment there are also numerous Chinese companies that make up the competition.

Foreign companies seeking to expand in China have in the past met significant challenges. Hence, a Swedish initiative within district heating and cooling in China needs to be long term (minimum 5 years), well established within a broad base of companies and organizations and defined by clear goals and aspirations.

Form of promotion activities

- Memorandum of Understanding (“MoU”) or similar

The purpose of Memorandum of Understanding (“MOU”) is to formally create a mutually beneficial working relationship between the parties signed.

A Memorandum of Understanding on energy cooperation was signed between the Ministry of the Environment and Energy of Sweden and the National Energy Administration of China in March 2017. The objective of this Memorandum of Understanding is to establish a framework for cooperation in the field of energy between Sweden and China including enabling scientific and technology exchange, capacity building, exchange of experiences and exploring trade exchange opportunities in Sweden and China, with a special focus on sustainable energy development.

MoU can be signed between countries, cities, associations etc. Follow-up activities are crucial after MoU signed. In the field of district heating and cooling it can be further explored the need and possibilities of a particular agreement.

- Workshop / seminar / conference / roadshow in China

Tailored made program with local partners aiming to influence and engage with a targeted audience. Themes can be technical, commercial and/or policy focused. Audience can be potential customers, partners or influencers relevant for the Swedish companies.

High level participation from Embassy of Sweden helps to secure high level participation from the Chinese side. This is particularly important to the heating event as district heating is not a pure commercial business in China (semi-government business).

- Training targeting managers and engineers in China

Tailored training program to managers and engineers in China's District Heating companies. Theme needs to be carefully defined. Suggest cooperating with China District Heating Association to arrange the trainings and listen to their suggestion on training topics.

- Study trips to Sweden

Political and top management-level visit to Swedish District Energy Utility Companies. Tailor-made program on experience sharing and site / company visits.

Study trip to Sweden preferably could be combined with major conference / fairs in Sweden or in other neighboring countries.

Suggest cooperating with China District Heating Association or other relevant organizations to recruit Chinese participants.

Suggest cooperating with Swedish solution providers in district heating / cooling in order to secure a good program in Sweden.

- Follow up city by city

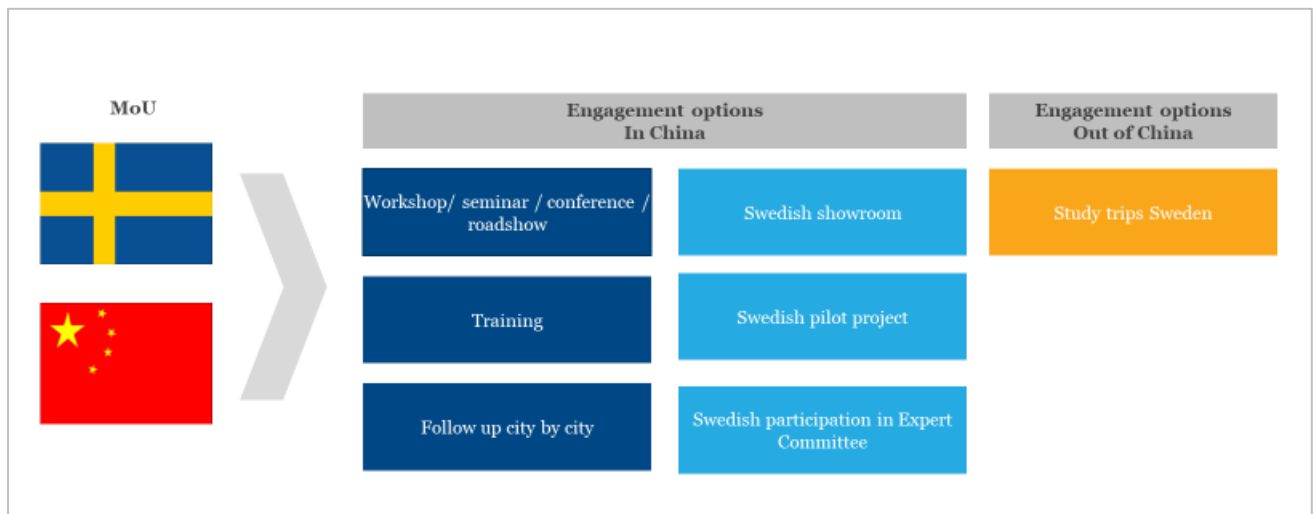
Based on the relations created through this process a "Swedish" team will visit each city and together with officials and professionals outline and structure a cooperation project where services and products from Swedish companies can be implemented.

List of cities: refer to Introduction of this report for city names.

- Other engagement options

- Showroom showcasing Swedish solutions
- Pilot project supported by Swedish and Chinese government
- Swedish participation in Expert Committee in China providing advice to project owner etc.

Illustration 2: Option of promotion activities



Relevant geographies for promoting Swedish competence

A number of cities have been selected for further evaluation. Comments / suggestion from Chinese partners (co-organizers) will be taken into consideration as well.

Suggested cities include:

District heating:

- Hefei, Anhui province
- Hohhot, Inner Mongolia
- Linyi, Tai'an, Yantai in Shandong province
- Xi'an, Shaanxi province
- Xuzhou, Jiangsu province
- "2+26" cities facing stricter emission control
- No waste city pilot

City selection criteria for district heating include:

- Change of fuel type (changing from coal to oil/gas; using renewable energy, industrial waste energy etc. as heating source)
- 2nd tier city in major province (e.g. tier two cities in Shandong province)
- New district heating cities (e.g. Hefei of Anhui province)
- No waste city pilot
- "2+26" cities of air pollution transmission channel in Beijing-Tianjin-Hebei area
- Recommendation from Swedish companies as well as Chinese relevant organizations

District cooling:

- Shenzhen, Guangdong province
- Chongqing,
- Nanjing, Jiangsu province

City selection criteria for district cooling include:

- Potential projects
- Recommendation from Swedish companies as well as Chinese relevant organizations

Necessary partnerships

Summary of potential partners in China

China Renewable Energy Engineering Institute (CREEI)	Design institute	Potentially invited speaker for Swedish district heating/cooling roadshows
China District Heating Association (CDHA)	Association	Local partner for Swedish district heating conference
China Association of Building Energy Efficiency Clean Heating Industry Committee (CHIC)	Association	An association established in 2018 Potential local partner for Swedish district heating conference
China Association of Building Energy Efficiency, District Energy Division	Association	Potential local partner for Swedish district cooling conference
Chinese Association of Refrigeration	Association	Potential local partner for promotional activities in district cooling
China Refrigeration and Air-conditioning Industry Association (CRAA)	Association	Potential local partner for promotional activities in district cooling
Heating Office of municipality	Governmental organization	Potential partner for district heating conference at local levels

Potential partners in China

China Renewable Energy Engineering Institute (CREEI, 水电水利规划设计总院)

<http://www.creei.cn/portal/index/welcome.html>

The Institute is currently under the management of China Power Construction. The institute manages hydropower, wind power, solar photovoltaic power generation from technical perspective; and it functions as an industrial policy research center for the development and construction of electric power, water conservancy and clean renewable energy.

CREEI is involved in the MoU action plans signed between Ministry of Environment and Energy of Sweden and National Energy Administration of China.

National Energy Agency recently has designated CREEI to write a report on cleaning heating practice in China.

China District Heating Association (CDHA, 中国城镇供热协会)

<http://www.china-heating.org.cn/>

Founded in 1987, China District Heating Association is a national, industry-based, non-profit social organization that is voluntarily formed by urban heating enterprises, institutions, and social organizations. The purpose of the association is to serve as a bridge between government departments and enterprises, provide services, reflect demands, regulate behaviors, develop self-discipline, safeguard the legitimate rights and interests of members, strengthen industry norms, and promote the sustainable development of urban heating in China.

The Association has more than 700 membership companies including heating suppliers, research institute and equipment suppliers.

China Association of Building Energy Efficiency Clean Heating Industry Committee (CHIC) (清洁供热产业委员会)

<http://www.chic.org.cn/>

Established in 2018, China Clean Heating Industry Association (CHIC) is an organization composed of entities and individuals such as clean heating enterprises, product equipment manufacturers, energy conservation and environmental protection companies and financial investment institutions. It is a branch of China Association of Building Energy Efficiency.

Mission of CHIC is to publicize the policy of clean heating, guide the market for reasonable competition and promote the healthy and sustainable development of the industry.

Key tasks of CHIC include: clean heating industry policy research; industry standard formulation; technology promotion; financing service; brand publicity; market expansion and international exchange.

China Association of Building Energy Efficiency, District Energy division (中国建筑节能协会区域能源专业委员会)

<http://www.cabee.org/>

Under the Ministry of Housing and Urban-Rural Development, the association is a nationwide, industry-based, non-profit organization organized by building energy conservation and green building related enterprises, social organizations and individuals. It is mainly engaged in community standards, certification marks, technology promotion in the field of building energy conservation and green building. District Cooling is an area that the Association works on.

Chinese Association of Refrigeration (中国制冷学会)

<http://www.car.org.cn/>

Chinese Association of Refrigeration (CAR) was founded on April 25th, 1977. CAR is a national scientific organization in the field of refrigeration and air-conditioning. CAR is a member of the International Institute of Refrigeration (IIR, headquarter in Paris). Up to now, CAR has 620 company members, 101 fellow members, more than 1,000 senior members, more than 13,000 ordinary members and 10,000 student members. CAR has the most of the KOLs in China in the areas of refrigeration and cooling as their advisors, executes, or members.

CAR is committed to solidify and serve its members and the refrigeration workers. For the development of refrigeration science and technology, CAR has conducted a wide range of events and activities such as academic exchange both at home and abroad, publishing professional books, technological materials and science textbooks. CAR is responsible to formulating and revising standards of refrigeration technology and products, improving cold chain standardization system. CAR is co-organizer of China Refrigeration Expo.

China Refrigeration and Air-conditioning Industry Association (CRAA, 中国制冷空调工业协会)

<http://www.chinacraa.org/>

China Refrigeration and Air-Conditioning Industry Association (CRAA), founded in 1989, is a national non-profit industrial organization mainly representing refrigeration and air-conditioning manufacturers, research, and design institutes. CRAA is a major voice for the whole industry and works for members' mutual interests and benefits.

CRAA is manufacturers' liaison to government and has been devoting to provide members and whole industry with multifaceted and valuable services. Its activities are as following:

- Consultation service: Research related regulations and policies, and communicate with CRAA members, investigate industry status, and provide advices to government and consultant to members on common problems.
- Statistics: Collect data from CRAA members and other enterprises; accomplish annual reports by analysis and summary, as a valuable reference for government policy establishment and enterprises development plans.

- International Cooperation: Promote technology, economic and trade cooperation between CRAA members and the international industry.
- Information Communication: Promote information exchange by organizing industrial information conferences, theme forums and technical/academic seminars.
- Certification: Administer CRAA Performance Certification and Service & Installation Qualification Certification to regulate the industry.
- Publications: Issue publication Refrigeration and Air-Conditioning bi-monthly, newsletter China Refrigeration and Air-Conditioning monthly, and publish CRAA technical series.
- Exhibition: Organize China Refrigeration Expo every year. Assist enterprises in participating international professional exhibitions and products export.
- Standards Establishment: Participate in improving standardization system for Chinese refrigeration and air-conditioning industry, promote standards harmonization by international cooperation.
- Hot-topic Research: Investigate the development trends and hot-topics, carry out project research, and issue research reports to serve CRAA members and the industry.
- Professional Training: Carry out professional training to improve personnel qualification of the industry.

Synergies/collaboration opportunities with other Swedish and international initiatives

- Nordic Sustainable Cities

A 2-year program supported by Nordic Innovation with involvement of trade promotion organizations from all Nordic countries in China. Business Sweden is actively involved in the project.

Six cities in China has been selected to promote Nordic Sustainable Cities concept. The selected cities are: Beijing winter Olympics, Xiong'an New Area, Xixian, Chengdu, Zhaoqing and Yixing. The program started from the beginning of 2018.

- Smart Cities
<http://smartcitysweden.com/global-goals/>

Smart City Sweden has a showroom located in in Hammarby Sjöstad, Stockholm. In the showroom, visitor will be able to explore smart and sustainable city solutions from all over the country. Smart City Sweden showroom has received many visitors from China incl. city management, researchers, company representatives etc.

Smart City Sweden is managed by IVL Swedish Environmental Research Institute. IVL China organization has promoted the Smart City Sweden concept at many locations in China incl. Beijing, Qingdao, Harbin, Baotou (Inner Mongolia) and Sichuan etc. According to IVL, the Smart City Sweden concept is well received by relevant stakeholders in China.

- Cleantech Hub
<http://cleantechhubs.se/hub/shanghai/>

Given Sweden's long experience and strong expertise in cleantech, and more specifically in the field of innovation of renewable energy, sustainable technologies and green transport, the program was established to spread knowledge and innovations internationally.

The program, powered by Swedish Energy Agency, aims to support Swedish cleantech companies to grow internationally by the establishment of three cleantech hubs in San Francisco, London and Shanghai. These selected cities across different continents are all characterized by major economies, a high level of innovation and a thriving investment climate.

The project started from 2017 and purposes of the program are:

- Increase marketing and exposure of Swedish innovations through strategic promotion and advisory
- Prepare the selected cleantech companies for an international expansion
- Offer a fast track introduction to new markets, strategic partners and investors
- Provide local support and business development to maximize their international growth potential

Business Sweden in China is the operator for the Cleantech Hub program.

- Swedish Winter in Hong Kong (2019)

In December 2019, the Swedish Consulate General will carry out the largest Swedish promotion event ever in Hong Kong: Swedish Winter 2019.

Swedish Winter 2019 will consist of a number of activities:

- Christmas market
- Concerts and performances
- Winter sports
- Swedish innovations
- Swedish design etc.

Events and conferences

Summary of key events and conferences organized by 3rd parties in 2019

CRH 2019, The 30th International Exhibition for Refrigeration, Air-Conditioning, Heating and Ventilation, Frozen Food Processing Packaging and Storage	Shanghai	April 9 th -11 th , 2019
ISH China, China International Trade Fair for Heating, Ventilation, Air-conditioning, Sanitation & Home Comfort System	Beijing	May 6 th -8 th , 2019
China Clean Heating Summit	Beijing	May 28 th -29 th , 2019
ISH Shanghai, Shanghai International Trade Fair for Heating, Ventilation, Air-conditioning, Sanitation & Home Comfort System	Shanghai	September 3 rd -5 th , 2019
China Smart Heating Summit Forum	Dalian, Liaoning province	2 nd half of 2019, precise date is to be confirmed

Events and Conferences in China

CRH 2019, The 30th International Exhibition for Refrigeration, Air-Conditioning, Heating and Ventilation, Frozen Food Processing Packaging and Storage (中国制冷展)

<http://www.cr-expo.com/?lang=en>

Date: April 9-11, 2019

Location: Shanghai

Initiated in the year of 1987, the International Exhibition for Refrigeration, Air-conditioning, Heating and Ventilation, Frozen Food Processing, Packaging and Storage (China Refrigeration Expo / CRH Expo) has been reputed as one of the leading exhibitions in HVAC&R industry for its over 30 years persistent improvement and innovation.

This exhibition is organized by China Council for the Promotion of International Trade (CCPIT-Beijing), Chinese Association of Refrigeration (CAR), China Refrigeration and Air-conditioning Industry Association (CRAA).

As a well-established exhibition in the industry, CRH Expo makes every effort to expand the group of trade buyers, end-users and the influence worldwide. CRH Expo has established strategic partnership relation with most of the important organizations and key players of the industry all over the world. Each year, CRH Expo receives more than 50,000 professional visitors and trade buyers from over 100 countries.

The exhibited products/service includes: heating equipment, renewable energy, air-conditioning equipment, ventilation equipment, refrigeration equipment and cold storage, cold chain logistics etc.

CRH has country/region pavilions, e.g. US, Korea, India and EU pavilions. There are also international forums/seminars organized in parallel co-organized by UN Environment, UNDP, EPEE (European Partnership for Energy and the Environment) etc.

ISH China, China International Trade Fair for Heating, Ventilation, Air-conditioning, Sanitation & Home Comfort System (中国国际供热通风空调、卫浴及舒适家居系统展览会)

<http://bj.ishc-cihe.com/index.html>

Date: May 6-8, 2019

Location: Beijing

ISH Shanghai, Shanghai International Trade Fair for Heating, Ventilation, Air-conditioning, Sanitation & Home Comfort System (上海国际供热通风空调及舒适家居系统展览会)

<http://sh.ishc-cihe.com/>

Date: September 3-5, 2019

Location: Shanghai

Both the above two fairs belong to ISH China. ISH was originated from Frankfurt, Germany, as a benchmark for the global HVAC industry. ISH China & CIHE – China International Heating, Ventilation, Air Conditioning, Sanitary and Comfortable Home System Exhibition entered China in 1996 and has now developed into an annual event for the Asian HVAC industry covering HVAC, building water supply and drainage, smart heating, and comfortable home and other architectural products. China District Heating Association (CDHA) is one of the co-organisers. ISH China/Shanghai has become an important platform for the launch of new global brand products, leading the future development trend of HVAC industry. The event is considered as one of the Asia's top-notch trading platform for tapping into China's HVAC market. ISH China & CIHE is an efficient trade platform for overseas exhibitors to extend their reach to business partners from around the world, gain access to latest market intelligence and raise brand awareness in China.

The fair has a diverse range of exhibits on display. Products categories include energy-saving heating, renewable energy heating, district energy solutions, control technologies, plumbing, home comfort systems.

International pavilions offer overseas companies access to the China market. There are country pavilions organized in the past years for German, Italian, Turkish etc.

China Clean Heating Summit (中国清洁供热产业峰会)

Date: May 28-29, 2019

Location: Beijing

This is the first cleaning heating summit organized by the Clean Heating Industry Committee (CHIC) of China Association of Building Energy Efficiency.

The theme of the summit will be “New opportunities for clean heating, new blue ocean of a trillion Yuan industry”. The China Clean Heating Industry Development Report (2019), edited by CHIC, will be released for the first time. The report contains

the national and local industrial policies, core data of industrial development, best practice sharing and technology showcase. The report predicts industrial development trends and it could be used as a reference for companies in the sector to make strategic decisions.

China Smart Heating Summit Forum (中国智慧供热高峰论坛)

Date: second half of 2019 (date to be confirmed)

Location: Dalian City, Liaoning province

A forum with focus on smart heating, environmental solutions, heat storage solutions etc. Program and topics of the 2019 forum is to be released.

Suggested Activity Plan 2019

Summary of key activities planned in 2019

	Activity	Major Operator(s)	Time of the Activity
Marketing material	“Best Practice Guide” for Swedish District Heating and Cooling in Chinese	SweHeat & Cooling; Business Sweden	Q2-Q3
Delegation visit	Visit to Xiong’an New Area	Embassy of Sweden, Business Sweden	To be confirmed
Roadshow 1	Swedish District Heating Conference	Business Sweden, SweHeat & Cooling, supported by Swedish Energy Agency and Embassy of Sweden	September 17 th - 19 th , 2019 (Tentative)
Roadshow 2	Swedish District Cooling Conference	Business Sweden, SweHeat & Cooling, supported by Swedish Energy Agency and Embassy of Sweden	Early December, 2019 (Precise date is to be confirmed)

Activity plan 2019

- **Production of marketing material (Q2-Q3)**

A “Best Practice Guide” for District Heating and Cooling that together with a Power Point presentation will be used to communicate the best approach. An orientation of how Swedish District Energy utility companies are operating these systems will also be covered.

Handled by SweHeat & Cooling & Business Sweden, supported by Swedish Energy Agency. Comments from Chinese experts, e.g. CDHA are essential to ensure the best practice guide is truly needed in the Chinese market. Potentially it could be summarized in an article that can be published in CDHA magazine or other relevant channels that may be offered.

- **Visit to Xiong’an New Area**

Actively participate in the visit to Xiong’an New Area organized by Embassy of Sweden and Business Sweden. Date of visit is not yet confirmed.

Xiong'an New Area is a state-level new area in Hebei province, China. Established in April 2017, the area is located about 100 km southwest of Beijing. Its main function is to serve as a development hub for the Beijing-Tianjin-Hebei (Jingjinji) economic triangle. Additionally, "non-core" functions of the Chinese capital are expected to migrate here, including offices of some state-owned enterprises, government agencies, and research and development facilities.

The Chinese government targets 100% Clean Power for this new area.

- **Conferences and trainings in 2019**

Key success factor of the conferences is to create a complete value chain to impress the audience. One option is to invite the relevant actors e.g. companies from other countries that are supplementary to the Swedish solutions. High-level participation from Embassy of Sweden will be invited to the conferences.

The project is to be carried out by Business Sweden and SweHeat & Cooling, supported by Swedish Energy Agency and Embassy of Sweden in Beijing.

Proposed program⁴ – District Heating Conference in two cities in China (September 17th- 19th, 2019)

China is hosting a meeting within the IEA TCP/DHC (The Technology Collaboration Programme on District Heating and Cooling including Combined Heat and Power, deals with the design, performance and operation of distribution systems and consumer installations within International Energy Agency) in Beijing (or Tianjin, subject to approval from Chinese government) on September 18th -20th 2019. In conjunction with the meeting, a workshop focusing on Swedish district heating solutions will be organized on September 19th, 2019.

In addition, Xuzhou City of Jiangsu province is selected as the 2nd location for the district heating roadshow.

- Xuzhou is in the north of Jiangsu province with a population of 9 million. Xuzhou is the only city in Jiangsu province that offers district heating in the winter time. Xuzhou is a traditional industrial city and coal burning has been the main source of air pollution in the city. The city faces pressure to use clean energy for district heating to reduce air pollution. Xuzhou is one of the No Waste Pilot Cities in China.

Preliminary Program:

Monday, September 16th, 2019

Individual arrival in Xuzhou city, Jiangsu province

19:30-21:00 Dinner & project kick off (Swedish delegation)

Tuesday, September 17th, 2019

09:30 -12:30 Xuzhou Swedish District Heating Seminar

12:30 -14:00 Mingle lunch

14:00 -17:00 Roundtable discussion between Swedish and Chinese stakeholders on predefined DH themes

19:00 Dinner (Swedish delegation)

Wednesday, September 18th, 2019

08:20-11:28 Xuzhou- Beijing by train G202, (or Xuzhou – Tianjin by train G108 10:29-12:45)

12:30-13:20 Lunch in Beijing (or a late lunch in Tianjin)

14:00-17:00: participating in IEA TCP/DHC country report presentation

Thursday, September 19th, 2019

09:00- 12:00 Swedish District Heating Seminar

The seminar will be a mix of best practice sharing and company presentations

12:00 – 13:00 Mingle lunch

13:00- 15:00 Swedish District Heating Seminar

The seminar will be a mix of best practice sharing and company presentations

⁴ A tentative program only.

15:00- 16:00 Networking
16:00 End of the program

Proposed program⁵ - District Cooling Conference in one city in China (December⁶ 2019)

An annual conference of China Association of Building Energy Efficiency, District Energy Division will be held in Shenzhen in early December. A 2-day event promoting Swedish solution is planned in conjunction with the annual conference. Shenzhen Qianhai Group is co-hosting the annual conference.

Preliminary program:

Day 1

19.00-19.45 Swedish delegation kick-off meeting
20:00-21:00 Dinner

Day 2

09.00-12.30 Shenzhen-Swedish District Cooling Conference
The program will be a mix of best practice sharing and
Company presentations

12.30-13.30 Lunch

13.30-17.00 Shenzhen-Swedish District Cooling Conference
The program will be a mix of best practice sharing and
Company presentations

Day 3

09.00-12.00 An Expert Panel will be arranged, conference participants to
discuss and ask questions

12.00-13.00 Lunch

13.00-15.00 Site visit to district cooling plant

⁵ A tentative program only.

⁶ Date is to be confirmed.