Present and future of Beijing District Heating

Beijing District Heating Group

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The introduction of speaker--Mrs. Liu Rong

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China District Heating Association (CDHA)

CDHA is a national industrial non-profit social organization co-founded voluntarily by urban heating enterprises, relevant enterprises and institutions, and social groups on June 20, 1987.

Abiding by the Constitution, laws, regulations and policies and complying with social morality, CHA shall fully play the role of bridge between government departments and enterprises in providing services, reflecting the demands, regulating behavior, and achieving self-regulatory development. It shall safeguard the legitimate rights and interests of members, strengthen the industry standards, and promote the sustainable development of urban heating utilities.

CDHA is in the charge of Ministry of Housing and Urban-Rural Development (MOHURD) and registered at Ministry of Civil Affairs (MCA).
Standardization Administration of the People's Republic of China (SAC) is the member institutions of the People's Republic of China in the international organization for Standardization (ISO). It is the management institution for state Administration of quality supervision, inspection and quarantine of the People's Republic of China, which is authorized by the state council of the People's Republic of China to perform the administrative functions District Heating Standardization Administration of China is responsible for the district heating industry.
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1. District Heating in China
China's land area is about 9.6 million square kilometers; the population is about 1.3 billion.

Last year, the total energy consumption is 4.2 billion tons of standard coal.

Heating consumption is 25%, 1.05 billion tons of standard coal.

- Heating Demand: 848Gw;
- District Heating Coverage Rate: around 76%;
National Energy Structure
National District Heating Energy Structure

- Coal-fired boiler: 48%
- Combined heat and power generation (CHP): 42%
- Gas-fired boiler: 8%
- Others: 2%

combined heat and power generation (CHP)  |  coal-fired boiler  |  gas-fired boiler  |  others
2. District Heating in Beijing
1+4+N+X

- Total district heating area: about 223 million m²
- Length of pipeline network: about 1400 km;
- Number of heating exchange stations: 3277;
- Heating users: 1,080,000.
BDHG is the largest heating enterprise in China, which is also the unique state-owned heating enterprise in Beijing with the history of 57 years. It is charged with the responsibility of offering district heating services for central government and military agencies, embassies, Beijing government offices, large enterprises and the public. By the end of 2014, the total assets is 32.9 billion CNY, with total liabilities 18.2 billion CNY, and net assets 14.7 billion CNY. In 2014, the revenue is 6.8 billion CNY and the total staff is 8,075.
2.2 Three Stages of Heating Energy Method

- **District Heating**
  - Recovery heat of CHP+ peak gas-fired boiler (1998-)

- **Independent District Heating**
  - Take over about 350 independent coal-fired boilers (1998-2013)
  - Independent gas-fired boilers

- **Clean Energy Heating**
  - Formed clean energy heating system, which is based on CHP central heating, taking independent gas-fired boilers as supplements since 2013
2.3 Four Milestones of Heating Technology Development

1. Direct heating system changed into indirect heating system
2. Usage of the flow controller
3. Pooled Operation of Multi-heat sources technology
4. Digital management of energy metering
Heating Consumption is declining

2008-2014 heating season consumption (Converted to 0.6°C)
2.4 Application of New Technology

- Waste heat recycling technology
- Shield technology
- Treatment of gas boiler NOx emissions
- Multiple source projects of geothermal, solar, air source heat pump heating
- Water mixing technology
- Long-distance transportation pipeline
- Construction of enterprise technology standards

New Technology
Northeast CHP Center: shield tunnel diameter is DN6000, lay two pipelines of DN1400, tunnel length is 6 km. This project is specially designed with waterproof silicone rubber seals to solve the force problem of shield tunnel segment caused by thermal expansion and contraction, which has got the relevant national patent.
Treatment of Gas boiler NOx emission

Beijing local standards
NOx emission standards: <80mg/m³;

Our enterprise makes use of low-nitrogen burners and pressurized combustion technology to limit the NOx emission under 30mg/m³.
Multi source heating

Ground source heat pump

Air source heat pump project
Edited several Chinese heating industry standards

Most China heating standards are edited by us: from 2010 till now,
4 industry standards, 1 local standard edited;
14 national, industry and local standards associated.
3. Future Prospect
3.1 Future Prospect of China

• Consumption control:

  Till 2030, the total amount of energy consumption less than 5.5 billion tons of standard coal.
Adjust of energy structure.
The clean utilization of coal - pulverized coal boilers and micro coal atomization

- Control the total coal consumption, develop the proportion of natural gas and renewable energy sources.
- Our country is featured by “lean oil, less gas, rich coal”. The use of coal should be gradually clean. Such measures can be taken.
- Make efficient use of pulverized coal boilers, coal boiler.
- Use supercritical and ultra-supercritical generating units.
- Accelerate the use of coal liquefaction and coal gasification technology.
Capacity of wind power in China is 41.8GW.

Abandoned wind power rate 11%
• Replacing small boiler plant with CHP

• Formulate new standards of emission

• Adopt LEED (Leadership in Energy and Environmental Design) architecture
3.2 Future Prospect of Beijing

- smart heating
- Energy network
- Low temperature heating technology
- Long-distance transportation pipelines

Innovation Development

- urban and district heating as main way
- utilize different non fossil fuel
- utilize different social resource, accept different operation model

Technology Leading
Smart Heating System

Scientific wisdom in command and decision-making

Efficient cooperation

Intelligent and low-consumption heating network

Centralized data base
Low temperature heating parameters
Primary system: 125°C/50°C
Secondary system: 75°C/50°C

Low temperature heating parameters
Primary system: 125°C/50°C
Secondary system: 75°C/50°C
45°C/30°C
Long-distance transportation pipelines
Development target (2016-2030)

Unit: 10 thousand m²

Network area | regional area | independent area
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3868 | 4620 | 4700 | 3071 | 2429 | 5000 | 10000 | 16000 | 24000
16304 | 17111 | 18000 | 18500 | 20000 | 22000 | 40000 | 8000 | 16000 | 10000
20172 | 21731 | 22700 | 24000 | 30000 | 40000 | 50000 | 10000 | 16000 | 24000

Strengthen International Cooperation

CDHA has maintained long-term partnership with:
DBDH (the Danish Board of District Heating)
ISH(International Sanitation Heating)
SDHA(Swedish District Heating Association)
EHI(European Heating Industry)
FDA( French Development Agency)
KDHC(Korea District Heating Cooperation)
IREN(Italian Heating Association)
Strengthen International Cooperation

In the past few decades, BDHG has established the cooperation and friendship with the European well-known enterprises, especially in Denmark, Sweden, Finland, Germany, Holland, the partner including: OILON, VEXVE, SAMSON, KAMSTRUP, COWI, DANFOSS, BETTER START, ALFA-LAVAL, THERMAFLEX….and so on.
Intelligent green
Interconnected energy
Efficient service
Creating a better future!