

District Energy Backgrounder

What is District Energy?

- **A proven, sustainable, cost-effective method of heating and cooling communities**
- **A catalyst for economic development**
- **The foundation for a cleaner, healthier and prosperous community**

In a district energy system, a central heating and cooling facility supplies hot and chilled water via a network of insulated, underground pipes to surrounding buildings where it can be used for heating, air conditioning and heating hot water.

Buildings connected to the district energy system do not need to own or operate their own individual heating systems (furnaces, boilers and electric baseboards), cooling equipment (chillers, air conditioners and cooling towers) or water heaters.

Benefits include lower fuel and equipment costs, reduced space requirements, lower building and maintenance costs and reduced greenhouse gas emissions.

Is District Energy a New Concept?

No. District energy is an internationally accepted, proven and cost-effective method of heating, cooling and powering communities.

District energy traces its roots back to the hot water-heated baths and greenhouses of the ancient Roman Empire. District energy systems gained prominence in Europe during the Middle Ages and Renaissance, with one system in France in continuous operation since the 14th century. The first commercially successful district energy system was launched in Lockport, New York, in 1877 by American hydraulic engineer, Birdsill Holly, considered the founder of modern district energy.

Modern district energy systems have been used extensively in Europe since the 1970s. Today, in some European countries district energy is mandated. In Denmark, about 60 per cent of buildings are supplied by district energy; in the city of Copenhagen that number rises to 98 per cent.

In North America, district energy is used in many major cities and has most often been used on university campuses and military bases.

How Common are District Energy Systems in Canada?

In Canada, a number of communities have developed and operated district energy systems for decades. The oldest system is in London, Ontario, and dates back to 1880.

In Ontario, district energy systems are currently in operation in Markham, Windsor, Kingston, Ottawa, Toronto, Barrie, Sudbury, Cornwall, Oshawa, Mississauga, and Hamilton.

In Guelph, two district energy facilities are currently in operation at the University of Guelph and the Sleeman Centre. Additional district energy facilities are under development in the Hanlon Creek Business Park, at the West End Community Centre and at Guelph General Hospital.

What Fuels Can be Used in a District Energy System?



Fuel sources can be renewable or non-renewable such as:

- Natural gas / propane
- Solar
- Waste heat
- Heat pumps
- Biogas / Biomass
- Geothermal

As an added benefit, district energy systems can be adapted or changed over to new, more advantageous, energy sources as they become available.

What Types of Buildings Can Connect to a District Energy System?

- Industrial
 - New and existing industrial facilities
- Institutional
 - Educational institutions
 - Health care facilities
 - Government facilities such as City Hall, municipal buildings, arenas, recreational facilities
 - Places of worship
- Commercial
 - Large commercial buildings such as retail stores, theatres, office buildings, etc.
 - Multi-building developments such as malls, professional buildings, etc.
- Residential
 - Single-family dwellings in close proximity to each other
 - Multi-residential buildings such as apartment complexes, condominiums or townhomes with at least three stories

What are the Benefits of District Energy?

Community Benefits

- Substantially reduced community carbon footprint
- Increased local electricity supply
- Increased energy reliability and security

Environmental Benefits

- Reduced need for fossil fuels
- Ability to integrate renewable energy fuels
- Reduced greenhouse gas emissions
- Reduced need for heating and cooling equipment in individual buildings

Economic Benefits

- Helps attract companies and jobs
- Enhances reputation of the community
- Keeps energy dollars circulating locally

Customer Benefits

- Individually controlled thermostats
- Worry-free operation and maintenance 24/7/365
- Reduced building operation and maintenance costs
- Avoidance of capital costs for heating and cooling systems
- Higher reliability than conventional heating and cooling systems
- Reduced fuel costs and predictable long-term energy costs
- Reduced space requirements
- Possibility to retrofit and convert existing buildings

How can District Energy Help Guelph Achieve Targets Set out in the Guelph Community Energy Initiative?

- Currently, the energy required to heat and cool homes and buildings accounts for approximately half of Guelph's total energy use and is a major contributor to greenhouse gas emissions. In order to achieve the targets set out in the Community Energy Initiative, it is necessary that the efficiency of the heating and cooling of homes and buildings be greatly improved.
- With greater efficiencies, lower greenhouse gas emissions and better fuel flexibility than conventional heating and cooling systems, district energy has a large role to play in helping Guelph achieve the energy and emission reduction targets set out in the Guelph Community Energy Initiative.

Does a District Energy System Impact the Local Water Supply?

Since district energy facilities generally operate in a closed loop system, they consume minimal water resources and produce effectively zero effluents.

What does a District Energy System Look Like?

District energy facilities can be constructed to blend in with their surroundings. They can also be housed within buildings so that they are not seen from the street.

Pictured are the Sudbury District Energy Cogeneration Facility (left) and Hamilton Community Energy (right).



For more information, please contact Envida Community Energy at DE@envida.ca