



DISTRICT HEATING AND COOLING SYSTEMS

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Fuel Sources

District heating and cooling systems can be fueled using energy sources including waste heat from power generation, municipal solid waste incineration, and biomass. They can also be designed to use multiple fuel sources.

ISSUE

This report explains district heating and cooling systems and describes related legislation in Connecticut.

SUMMARY

District heating and cooling systems transport thermal energy in the form of water or steam from a central source to multiple buildings through a network of pipes. According to one organization, at least a dozen district heating and cooling systems exist in Connecticut.

In Connecticut, over the last decade, at least three public acts have addressed district heating and cooling systems:

1. [PA 15-5, June Special Session](#), which required gas companies to create an incentive program for certain systems;
2. [PA 13-116](#), which added district heating and cooling systems to the types of projects that can be financed under the commercial property assessed clean energy (C-PACE) program; and
3. [PA 09-15](#), which authorized the state's purchase of the capitol area system in Hartford.

DISTRICT HEATING AND COOLING SYSTEMS EXPLAINED

The C-PACE program statutes define a district heating and cooling system as a local system consisting of a pipeline or network providing hot water, chilled water, or steam from one or more sources to multiple buildings ([CGS § 16a-40g](#)). Such systems typically link one or more offsite generation sources to multiple locations, providing thermal energy by delivering water or steam through underground pipes.



Generally, buildings on a district system do not need to operate their own boilers, furnaces, or air conditioners. Instead, they receive their heating or cooling from a central plant feeding water or steam into a pipeline that connects to the building.

District energy systems are not a new technology or concept. The first systems in the United States were constructed in the 1870s and 1880s. New York City has used some form of district energy for over one hundred years.

District energy systems are sometimes found in densely populated areas or situations where multiple adjacent or nearby buildings are owned or controlled by the same owner (e.g. hospitals or college campuses). They are generally more common in Europe than in the United States.

DISTRICT HEATING AND COOLING SYSTEMS IN CONNECTICUT

According to the International District Energy Association (a district energy lobbying organization), there are over a dozen district heating and cooling systems in Connecticut, including systems at Bradley International Airport, Yale University, and the capitol area in Hartford.

RELATED LEGISLATION

District Heating System Incentive Program

[PA 15-5, JSS \(§ 242\)](#) required each gas company to develop a district heating incentive program to reduce natural gas demand. Under the act, a district heating system is a thermal loop natural gas reduction system that (1) is located in a designated area, (2) is designed to capture at least 30 million British Thermal Units of waste heat annually, and (3) distributes at least 75% of that waste heat to end use customers located in the system's service area.

Under the act, each company's incentive program must provide a one-time payment to end-use customers who connect to a district heating system on or after March 1, 2016. The payment is based on the customer's projected natural gas demand reduction for the period the customer commits to using the district heating system. The act also allows the district heating system's owner or operator to charge the end-use customer a connection charge up to an amount equal to the incentive payment the customer received. The funds for the incentive payment come from a fully reconciling conservation adjustment mechanism (part of the company's rates) capped at \$9 million and collected from gas company customers in the service area where the district heating system is located. The full Public Act summary is available [here](#).

The act required the gas companies to submit their plan for the incentive program to the Energy Conservation Management Board and to the Department of Energy and Environmental Protection (DEEP) as part of [the conservation and load management plan](#). In practice, the companies did so by including district heating loop incentives in their Energy Opportunities program ([see page 400](#)).

DEEP additionally required the companies to report on the status of the incentive program by September 1, 2016 (see [Attachment A of DEEP's approval of the plan, Item #1](#)). According to [that report](#), the companies have been in contact with one district heating loop developer, are currently acquiring clients for the project, and are not ready to apply for funding. The companies state that they will continue to work with district heating loop developers to make incentives available.

Commercial Property Assessed Clean Energy (C-PACE)

[PA 13-116](#) added district heating and cooling systems to the types of projects that can be financed under the commercial property assessed clean energy (C-PACE) program.

In participating municipalities, commercial property owners may choose to participate in the Connecticut Green Bank's C-PACE program, which provides funding for energy improvements that the property owner repays through a charge on his or her property tax bill. Capital provided under the program is secured by a lien on the property.

Capitol Area System

According to [the Department of Administrative Services](#) (DAS), the capitol area system in Hartford serves 18 buildings (including the Capitol and the Legislative Office Building), including 10 state customers and four private sector customers. Its underground piping system delivers chilled water for cooling and hot water for heating to each building. The Capitol District Energy Cogeneration Cooperative Association generating plant provides chilled water and steam for the system under a long-term contract.

[PA 09-15](#) authorized the Department of Public Works (DPW, DAS' predecessor) to purchase the capitol area system from TEN Companies, Inc. The act gave DPW various powers regarding the system including entering into contracts for its operation, providing energy services to state and non-state customers, and granting certain easements. The act also authorized the State Bond Commission to issue general obligation bonds to acquire the system. The full Public Act summary is available [here](#).

By law, the DAS commissioner must periodically invoice and collect a proportional share of various system costs from each customer. The law requires the commissioner to base the rates on, among other things, proportional shares of the cost of (1) acquiring the system; (2) energy products and services; and (3) operating, maintenance, and repair ([CGS § 4b-17](#)).

RESOURCES

DAS: [Bureau of Property and Facilities Management, Capitol Area System \(CAS\)](#), last visited November 2016.

DEEP: [Approval with Conditions of the Connecticut Energy Efficiency Fund's Electric and Natural Gas Conservation and Load Management Plan for 2016 through 2018](#), December 31, 2015.

Eversource Energy, the United Illuminating Company, Connecticut Natural Gas Corporation, and Southern Connecticut Gas Company: [Letter to Tracy Babbidge, Bureau Chief of DEEP's Bureau of Energy and Technology Policy](#), September 1, 2016.

Eversource Energy, the United Illuminating Company, Connecticut Natural Gas Corporation, and Southern Connecticut Gas Company: [2016-2018 Electric and Natural Gas Conservation and Load Management Plan](#), October 1, 2015.

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