

Alternative Energy

1 What is District Energy?

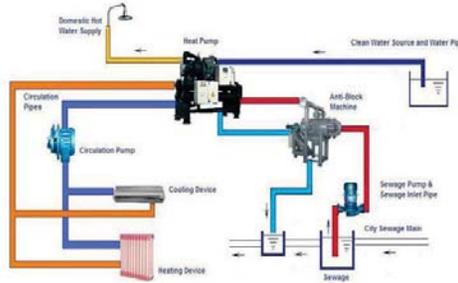
District energy systems are a highly efficient way to heat and cool many buildings in a given locale from a central plant. They use a network of underground pipes to pump steam, hot water, and/or chilled water to multiple buildings in an area such as a downtown district, college or hospital campus, airport, or military base. Providing heating and cooling from a central plant requires less fuel and displaces the need to install separate space heating and cooling and hot water systems in each building.

The sources of thermal energy distributed by district energy systems vary. Often, district energy systems are connected to combined heat and power (CHP) plants. Also known as cogeneration plants, CHP plants generate electric power in addition to heating and cooling, and can achieve energy efficiencies above 80 percent. (This is far more efficient than a conventional power-only plant, which exhausts two-thirds of the energy content of its fuel as heat into oceans, rivers, and/or the atmosphere.) Other sources of thermal energy include “waste” heat from industrial processes, coal- or gas-fired boilers, and renewable energy such as geothermal, hydrothermal, solar thermal, biogas, municipal solid waste, or other types of bio-mass.

District energy systems that were built on college campuses and in central cities many decades ago were usually powered by fossil fuels. The majority of district energy systems being built today run on natural gas, but many take advantage of locally-produced renewable fuels. According to the International District Energy Association, there are more than 700 district energy systems in the United States (including at least one system in every state), some of which date back to the 1800s. But there are many more locations where district energy would be appropriate and hundreds of district energy systems with expansion potential.

District energy helps communities reduce their operating costs and keep more energy dollars local by reducing their need to import fuel for heating and cooling. Environmental impacts from heating and cooling are significantly reduced because of the greatly improved efficiency of these systems and developing district energy/CHP systems can help ease the transition of the power sector as older, polluting coal plants are shut down and removed from the grid. District cooling can cut peak electrical demand that typically occurs in the late afternoon – reducing strain on the grid and avoiding expensive peak power costs.

(Excerpt from: www.districtenergy.org; Environmental and Energy Study Institute Fact Sheet: What is District Energy)



2 Geothermal-Style Heat Exchangers:

Wastewater heat recapture is an emerging technology that captures heat energy from domestic wastewater (i.e., sewage) and reuses that energy for building heat and domestic hot water. Small-scale systems can recapture heat from as few as 30 or so residential units and re-purpose that energy for domestic hot water. Larger scale systems can capture heat energy from 200 to 300 homes or more and can re-use that heat energy for hot water and building heat. Larger systems can also be used for building cooling. This type of system, coupled with other innovation energy systems, such as solar or geothermal, can significantly reduce a building’s utility demand.



Solar slate roof tiles blend in with historic materials.



Thermoslate system captures heat from dark roof material.



3 Solar

The use of traditional solar arrays can be incorporated into a multitude of locations within the site such as open spaces, roofing, and carpools to reduce electricity demand from the grid. An emerging technology that can be used as an alternative to traditional solar systems are Tesla Tiles for new building construction. Tesla Tiles are higher efficiency solar systems with potentially lower installation costs, when compared to traditional roof systems and solar panels. Similar to current solar arrays the Tesla Tiles would also qualify for a 30% Solar Investment Tax Credit. Depending on the desired use of the building or open space both options can be explored.”



Medfield State Hospital Strategic Reuse Master Plan

Medfield State Hospital Master Plan Committee, Town of Medfield, MA

McCabe Enterprises Team

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