



Commentary

What's Green And Is Both New And Old?

Olivier Barbaroux 08.01.07, 6:00 AM ET

While cable music channels urge their viewers to unplug their cellphone chargers and businesses strive to understand how big their carbon footprint is and how to reduce it, many authorities, city business districts, industrial sites and campuses are already turning to robust, tried and true solutions without waiting for magic-wand policies or revolutionary technologies.

This explains why we're seeing renewed interest in district heating and cooling systems around the world.

The district energy concept is actually an old idea that is an increasingly responsible solution to today's environmental concerns. District energy systems connect multiple buildings to central plants that generate environmentally responsible heating and cooling fluids. These plants produce steam, hot or chilled water and distribute the steam and water through a network of underground pipes to heat or cool buildings that are part of the network.

In Pictures: Eco-Solutions

For more than 150 years, they have contributed to the quality of life and the development of both large cities and industrial corridors. District heating was introduced in London in 1851. In the United States, the U.S. Naval Academy in Annapolis built a steam network in 1853 that has been in continuous operation ever since. And in 1877, inventor Birdsill Holly began installing the first of 50 commercial systems in New York State.

By combining the thermal needs of hundreds of buildings, district energy systems deliver economies of scale for employing equipment and technologies that are far more efficient and versatile than for individual buildings providing their own cooling and heating equipment. These economies, for example, can mean using truly sustainable energy sources such as biomass and household waste, thus reducing emissions of greenhouse gases while cutting energy costs.

In a market for heating and cooling networks that is growing at an annual rate of more than 10%, one can clearly see opportunities to maximize district energy usage. Large central business districts and university campuses are the most common users of district energy systems in the U.S. Other users include hospitals, military bases, research campuses and airports.

In fact, hundreds of U.S. universities rely on district energy, and many are adding to or increasing their ability to generate electricity on campus and recycle that heat for heating and cooling.

In Cambridge, Mass., the district energy system was recently renovated by making investments to convert the system from heavy fuel oil-fired boilers to a new, gas-fired steam heating plant. This is a major benefit of district energy: the flexibility to adopt new fuels. The boiler may change, but the network remains. The new plant in Cambridge can generate 150,000 tons of steam per year. The new facilities have significantly reduced so-called greenhouse gas emissions and other air pollutants, and recycled the waste heat of a nearby power plant, which otherwise would have been released into an adjacent river.

District energy is rapidly becoming a crucial option for urban development. A United Nations report estimates that by 2008, half of the world's people will be living in cities. Over the next 30 years, almost all population growth will take place in metropolitan areas. This growth trend will place increasing stresses on precious natural resources, and will demand the need for more sustainable energy resources and much higher standards of efficiencies in energy production and delivery.

Many more European cities use district energy than their U.S. counterparts, due to a greater density of population and the higher cost of energy. The requirements for an efficient and environmentally responsible method of energy distribution have been recognized longer there. In Denmark, for example, over half of the country's space-heating needs are met with district energy systems.

With green-city programs and state initiatives aimed at lower emissions and increased environmental consciousness, many U.S. companies and municipalities are now reconsidering their energy decisions and investigating more efficient options. In fact, companies that used to make energy-purchasing decisions based on cost alone are now heavily factoring environmental impacts into their decisions.

As environmental standards are tightened, municipalities see district heating and cooling systems as a way to reduce their greenhouse gas emissions and perhaps to gain entry into carbon trading markets, which look set to spread, even in the U.S. Because they are robust, with a relatively small carbon footprint, heating systems are reassuring for authorities, users and investors concerned about long-term reliability.

As a result, two major trends are emerging. First, owners/partners in legacy district energy systems are upgrading their production plants, investing in new technologies and new infrastructure to improve efficiencies, and expanding their networks—especially cooling networks, which offer strong

potential in city centers. They also offer the extra benefit, through co-generation, to generate the electricity needed for local consumption. This is the concept of decentralized power generation, which is safer and reduces the need for large electricity distribution networks.

Second, developers are increasingly considering the creation of district energy systems for new construction projects, notably for mixed-use development projects which combine residential, commercial and office space, thus reducing commuting time and facilitating life. It is more cost-effective to build a district energy system for new developments than to try to install district energy in an existing group of buildings where no such system exists.

The International District Energy Association reports that its members from 2000 to 2004 connected or committed an average 28 million square feet of new space to district energy solutions. Since 2000, 12 cities in North America have built new downtown district cooling systems.

As the energy and environment emerge more forcefully as critical concerns, more and more companies will be asking how to reduce their carbon footprint. District energy offers energy-efficient, environmentally friendly solutions and should be at the forefront of options considered.

My commitment with Veolia Energy is to promote this technology as a major tool in the effort to structure the energy-efficient city of tomorrow.

In Pictures: Eco-Solutions

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