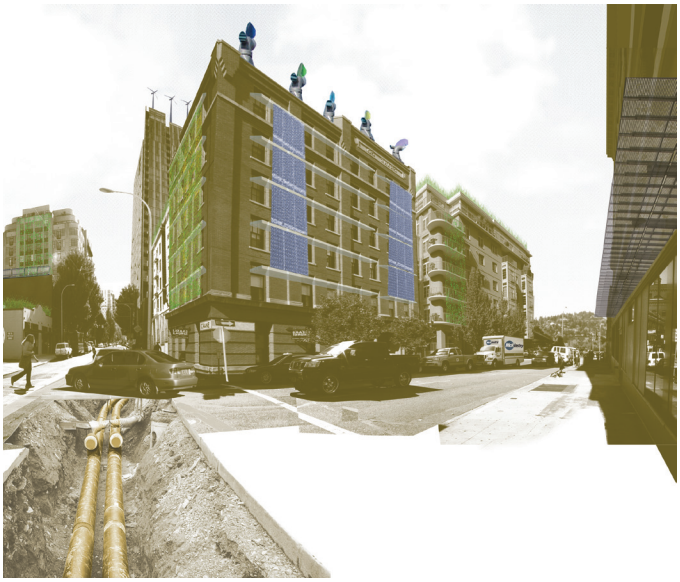
Portland District Energy:
Frequently Asked Questions

What is district energy?

District energy systems are comprised of thermal heating and/or cooling plants that distribute energy via a network of pipes. Using insulated water (hot and/or chilled) or steam, district systems provide buildings with space heating, domestic hot water and/or air conditioning. District energy is not a new technology, as these systems are common on university and hospital campuses, as well as in many cities (especially in northern Europe and Canada). Some district energy systems employ combined heat and power (CHP) technology, which generates electricity and utilizes the waste heat for thermal purposes (e.g. to heat water for a district heating system).



Rendering: Portland Sustainability Institute

What are the benefits of district energy?

District energy systems can offer attractive returns to investors, are energy-efficient, and can provide reductions in greenhouse gas emissions. By sharing the same equipment between many buildings, district energy systems can also save building owners usable space, building construction costs and ongoing operating and maintenance expenses. District energy systems can run on natural gas or a range of renewable fuels including wood waste and biomass (food scraps, refuse, and even sewage) and can quickly adapt to changing energy markets. Many technologies that can be used to supply a district energy system (e.g., cogeneration, large-scale heat recovery, or biomass) are not viable at the scale of individual building sites, either because of economies of scale, the time profile of supply and demand, or because of the location of supply sources.

Where do district energy systems already exist?

Over the past 30 years, a number of European countries, most notably Sweden and Denmark, have drastically increased the use of district energy for heating and cooling buildings, while also using alternative energy sources. In particular, these district energy systems employ combined heat and power (CHP), which also increases the efficiency of electricity generation and allows greater use of alternative fuels. During this period, these nations have shifted from being net energy importers to net exporters, while experiencing dramatic economic growth, reduced greenhouse gas (GHG) emissions, and developing diverse domestic wood-based biomass energy supply industries. Meanwhile, Vancouver B.C. and Seattle both recently commissioned successful renewable district energy systems.

The Portland metro region already has several district energy systems including the Beaverton Round Central Plant, the Brewery Blocks district cooling system, and district steam systems at Portland State University (PSU) and Oregon Health and Science University (OHSU). All of the existing Portland systems currently operate on natural gas.

Why is the City of Portland interested in district energy?

The City of Portland's 2009 Climate Action Plan recognizes the advantages of district energy and establishes the goal of producing "ten percent of the total energy used within Multnomah County from on-site renewable sources and clean district energy systems" by 2030.

Actions to be completed before 2012 include:

- Making investment funds available to help finance distributed generation and district energy systems,
- Establishing at least one new district heating and/or cooling system,
- Facilitating the installation of at least ten megawatts of on-site renewable energy, and
- Collaborating to reduce the role of carbon, including from coal and natural gas sources, in Portland's electricity mix.

Are district energy systems likely to be publicly or privately owned and operated?

Because district energy systems require installation of major long-term infrastructure (in the form of energy plants and piping infrastructure within the public right-of-way), some form of public involvement is often required. This could be in the form of direct investment, or through policies to help reduce investment risk and internalize public benefits in private decision-making. There are numerous examples of publicly-owned systems, privately-owned systems and public-private partnerships. The appropriate model will depend on the local context.

In Portland, a privately-financed system with some form of public involvement is likely to be the preferred ownership structure. Entities with experience in building and operating district energy systems will likely take on the bulk of the project risk. However, even if the City does not have an ownership stake, it will likely need to facilitate district energy development through policy mechanisms and incentives, zoning code amendments, expedited permitting and/or helping to convene the relevant project stakeholders.

What are the next steps for district energy in Portland?

The next phase of work will build off completed baseline screens and analyses. More in-depth feasibility studies are needed before district energy can move forward. Various opportunity sites within Portland are under consideration, including South Waterfront, Rose Quarter, North Pearl District, and PSU or Brewery Blocks system expansion, among others. The City of Portland will help engage the private sector, utilities, district energy developers and other key stakeholders in a project-focused dialogue on how to move to this next phase of feasibility study.

Photo: Flickr user Thomas Milne