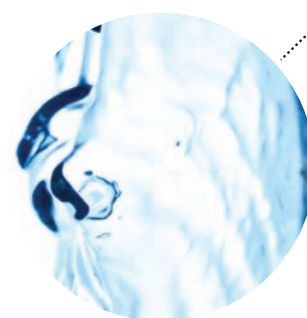
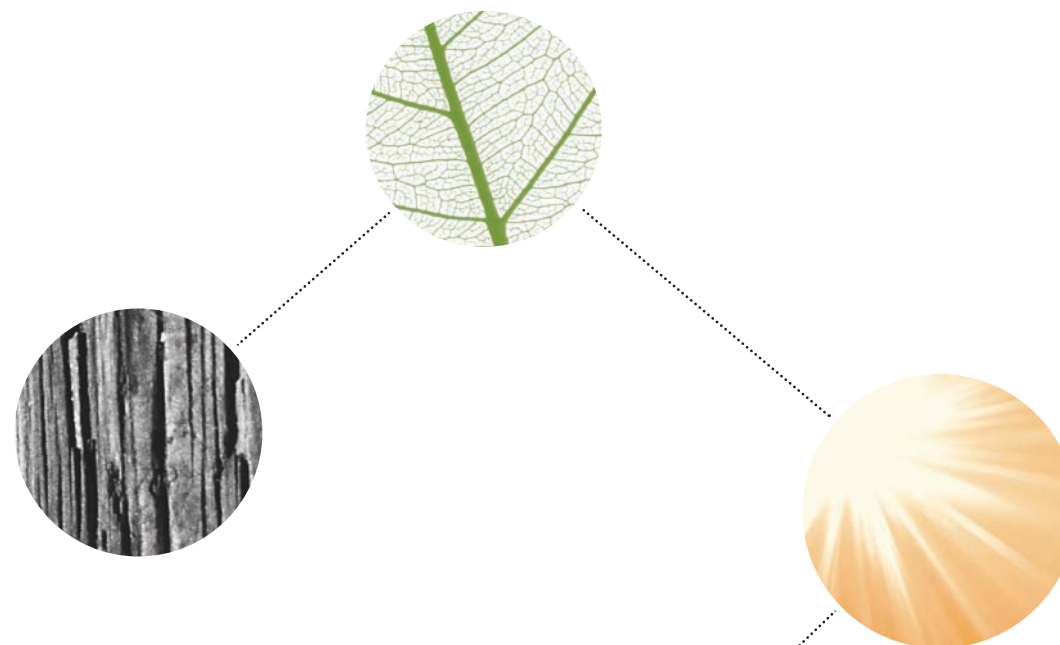


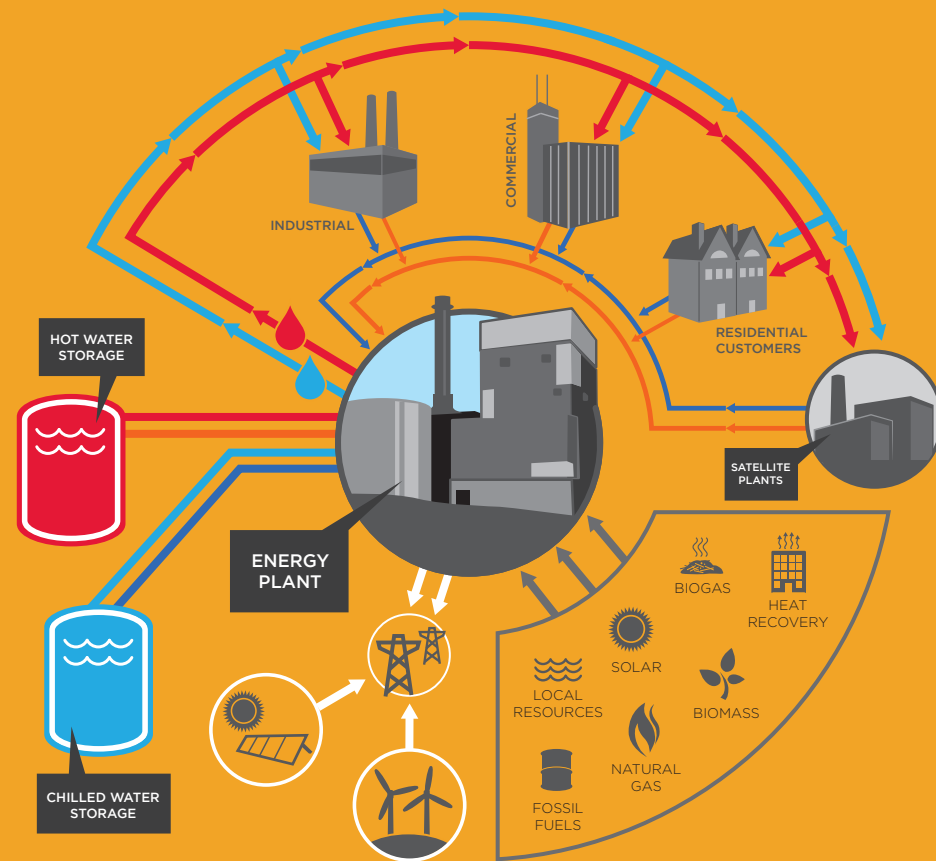
**DISTRICT ENERGY**  
ST. PAUL™

# integration

# integration



Community energy systems are part of a livable city. District Energy St. Paul has demonstrated that integrating a variety of renewable energy sources and advanced technologies decreases fossil fuel usage and greenhouse gas emissions, while increasing the flexibility, security, and resilience of the community's energy system.

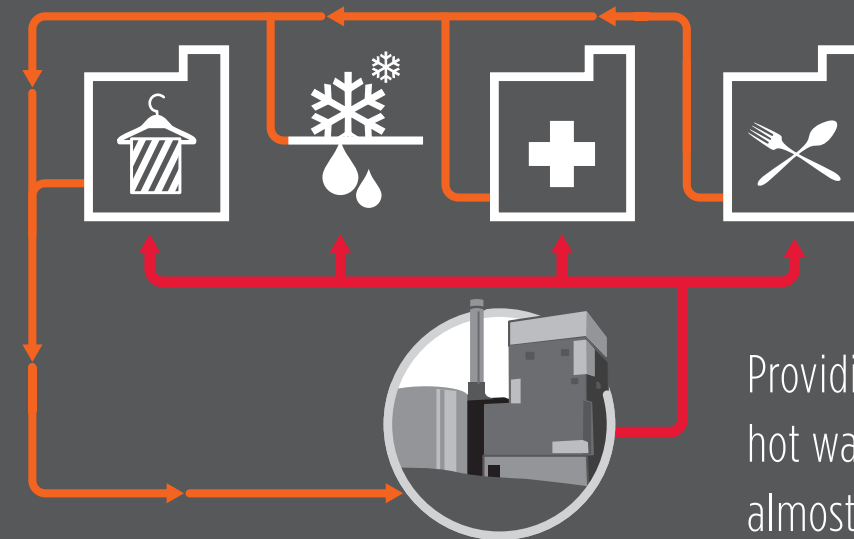


District Energy St. Paul's founders had a vision of using hot water to enable a broad array of options for **integration** of renewable fuels and advanced technologies such as combined heat and power. District Energy St. Paul leadership, engineers, and project developers continue to identify, evaluate, and to implement **technologies** that advance this national model for community energy systems.

# district heating & hot water

District Energy St. Paul provides a superior alternative to on-site gas boilers, by providing highly efficient hot water service to almost 200 buildings, totaling over 31 million square feet of building area. Hot water is generated at the central plant as well as satellite facilities then circulated to buildings connected to the hot water loop. The system

circulates its system volume of one million gallons of water, with a supply temperature of 250° in the winter and 190° in the off-season. The system's reliability has exceeded 99.99% since service began. The hot water system provides space heat and domestic water heating for restaurants, hotels, and laundry facilities, as well as heat for snowmelt systems.



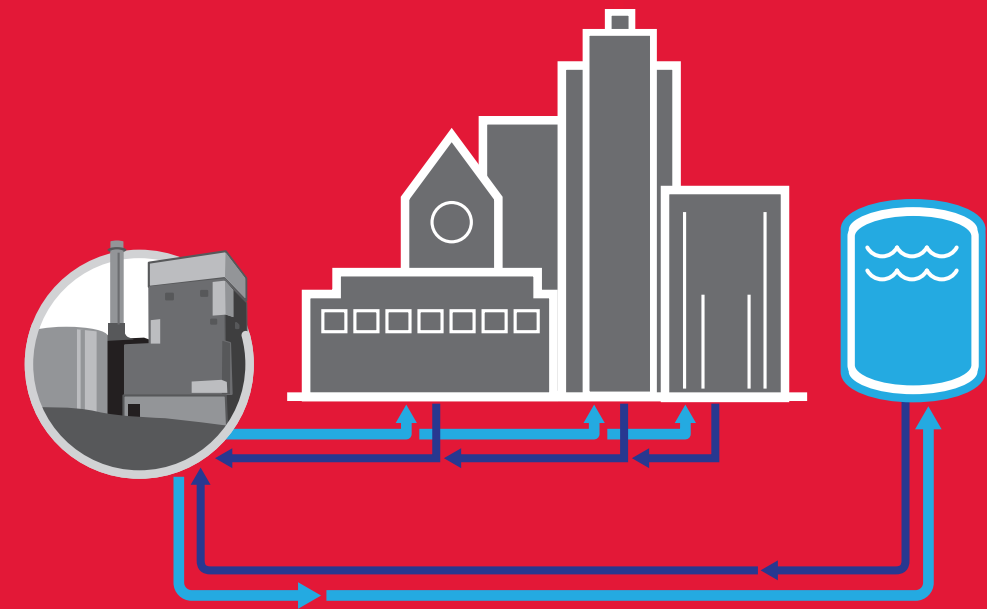
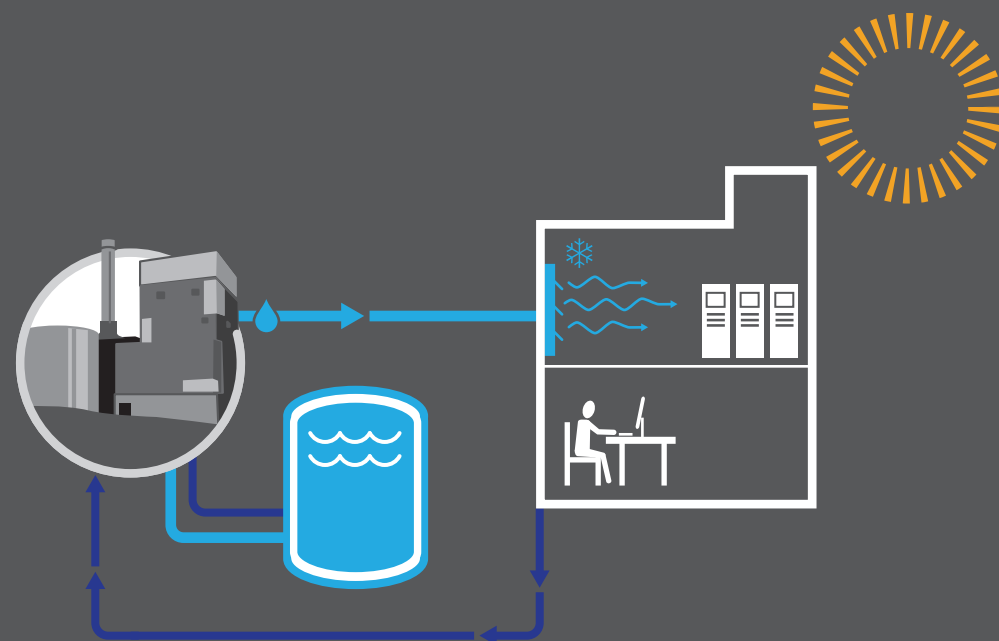
Providing highly efficient hot water services to almost 200 buildings.

# district cooling

District cooling is the process of distributing chilled water from a central generation source for cooling and air-conditioning. District Cooling provides year-round chilled water services to over 100 buildings in Saint Paul, totaling over 19 million square

feet. District cooling can reduce the use of ozone-depleting refrigerants, reduce potable water usage at the building, and use energy more efficiently.

The chilled water service replaces stand-alone chillers and cooling towers by providing reliable cooling served at 42°F. District cooling can also reduce the use of ozone-depleting refrigerants, reduce potable water usage at the building, and use energy more efficiently. District Cooling St. Paul utilizes electric centrifugal and low-pressure steam absorption chillers. The district cooling service has proven to be just as reliable as district heating service, exceeding 99.99% since service began.



Thermal storage improves system capacity, lowers rates, and reduces stress on the electric grid.

# thermal storage

The district cooling system achieves its unmatched reliability through the use of chilled water storage and backup capacity. The tanks store water chilled by electric and absorption chillers and distribute the chilled water to the system during periods of peak demand. The cooling system utilizes a 2.5-million-gallon storage tank adjacent to the District Energy St. Paul facility and a 4.2-million-gallon storage tank located on the opposite end of downtown Saint Paul. Thermal

storage improves system capacity, lowers rates, reduces stress on the electric grid, and is an ideal solution for high-demand data centers and overall system reliability. Plans are underway to convert one of the chilled water storage tanks to store hot water during the primary heating season. This tank conversion will be the first completed in the United States and will create opportunities to utilize additional waste heat and alternative energy sources.



# solar thermal

District Energy St. Paul owns and operates the 23,000 square foot, 144-panel solar hot water system on the Saint Paul RiverCentre's roof. Designed to peak at over 1 MW (thermal equivalent), the high-efficiency collectors can meet temperature demands of over 200° F that provides renewable and effective thermal energy year round.

The system serves the heating and hot water needs of the host building, the Saint Paul RiverCentre, and the excess heat is then delivered to other customers in downtown through the district energy hot water piping. District Energy St. Paul is the first in the United States to successfully integrate solar thermal into a district system.

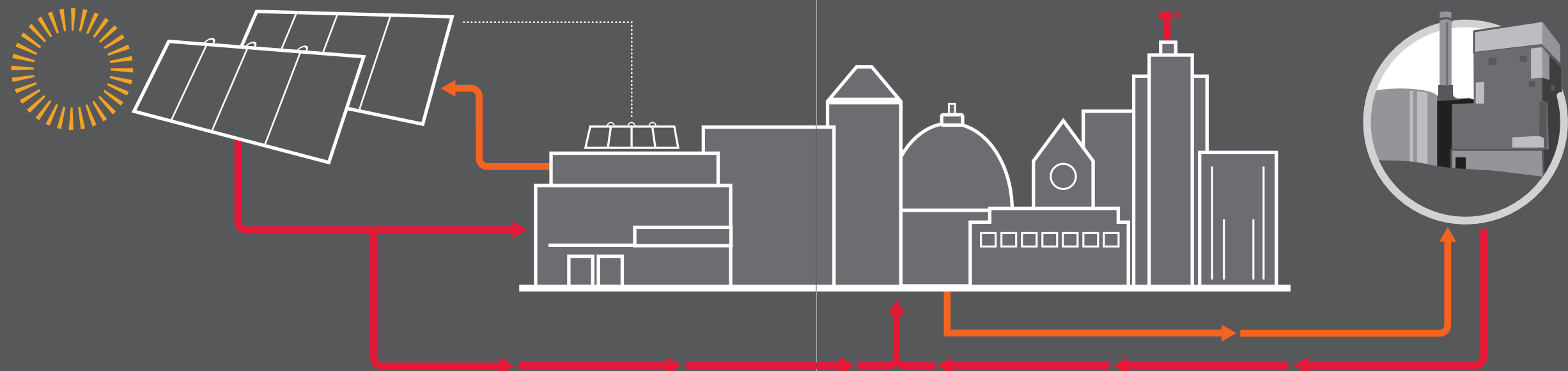
District Energy St. Paul is the first in the United States to successfully integrate solar thermal into a district system.

The use of local wood residues puts more than \$10 million annually into the local economy for biomass fuel.

District Energy receives the majority of its heat from a high-efficiency, renewable fuel combined heat and power plant (CHP). CHP is a very efficient process in which waste heat from power generation is captured and used for heating. Utilizing a steam-driven turbine, the CHP plant produces up to 33 MW of electricity. Waste heat is captured

from the process of generating electricity, creating up to 65 MW of thermal energy for the district heating system. The waste heat from the CHP plant meets the majority of the heating needs for District Energy customers. The use of local wood residues puts more than \$10 million annually into the local economy through collection, processing and transportation of biomass fuel. Through CHP, Saint Paul derives two energy products from the same fuel.

# combined heat & power



# shared vision

Saint Paul is the only city in North America to integrate biomass, combined heat and power, thermal storage, and solar thermal into a district system. **We have delivered this technology integration while maintaining stable rates for three decades.**

The integrated nature of our system and its success draws hundreds of visitors from around the world each year. District Energy is thrilled to be one of the City of Saint Paul's many partners in energy initiatives, edging the City ever closer to hosting the most advanced energy system in

the U.S. Through strong community partnerships we will continue to build from the accomplishments of our organization's history to support the revitalization of our home city. District Energy is committed to achieving this success for our customers, our community, and our environment.



Argentina  
Austria  
Belgium  
Brazil  
Cameroon  
Canada  
China  
Colombia  
Croatia  
Czech Republic  
Denmark  
Dominican Republic  
Ecuador  
France  
Germany  
Guatemala  
Hungary  
India  
Ireland  
Israel  
Japan  
Kazakhstan  
Korea  
Mexico  
Montenegro  
Nepal  
Netherlands  
New Zealand  
Nigeria  
Norway  
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