



*Installation of district heating system in Willmar. Following page: Willmar's district heating plant and downtown after completed pipe installation.*

# District heating in Minnesota

**Tom Hughes**

An old idea has returned. It is district heating. In use in some Minnesota communities for over 60 years, district heating consists of a central plant that produces steam or hot water and distributes it through pipes to customers. These customers, whether commercial, residential, or manufacturing, use the hot water or steam for heating, domestic hot water, or manufacturing purposes.

Minnesota's dependence on imported fuels, today's economy, and the growing concern over protecting our environment have caused communities to once again explore central heating systems. District heating is an important energy alternative for Minnesota and offers many benefits to communities including:

- Using a wide variety of alternative fuel sources such as solid waste, peat, wood residue, coal, and others.
- Capturing and selling waste heat.

- Providing revenue-generating options.
- Reducing air pollution in downtown areas by eliminating the need for individual heating systems.

The Legislature, the Minnesota Pollution Control Agency, and others have made it clear that solid waste disposal is a significant problem. For this reason, many cities and counties are now studying the feasibility of waste incineration as an alternative to landfills, renewing interest in district heating as an energy by-product of refuse burning.

At one time, 31 Minnesota communities used district heating, but as fossil fuels became increasingly available, many communities abandoned the systems. Today, 14 systems are in operation in Minnesota, though many are old and in need of repair. The difficulties municipalities confront when attempting to renovate or build a system are

the large capital cost and private investors' lack of familiarity with and confidence in district heating as an investment.

For this reason, in 1981, the Minnesota Legislature established and funded programs to assist communities with district heating development. The aim of the programs was to facilitate development of new hot water district heating systems, reconstruction or major expansion of existing systems, and development of satellite systems or "heat islands" which a community might later connect to an existing or proposed major heating system. The Minnesota Department of Energy and Economic Development (DEED) has the authority to operate the state's district heating program. Several communities have taken advantage of the state programs and are nearing completion of their feasibility studies. The following Minnesota cities have district heating projects on the horizon:

## Bloomington

The city of Bloomington is coordinating its district heating development plans with Triple Five Corporation, the developer for the stadium site. The proposed heat source is a natural gas-fired facility that could eventually hook up with Northern States Power Company's Black Dog Plant. Because Bloomington's district heating system is integrated with stadium development plans, the final outcome of the feasibility study is presently on hold.

## Hibbing

With a well-maintained steam district heating system already serving 1,500 customers, Hibbing Public Utilities looked at expanding into other areas of the city. As a result of its study, the utility decided to provide district heating to the Hibbing Campus of Arrowhead Community College and several residences near the college. These customers connected to the system this summer. District heating may also serve a 180-acre industrial park that the IRRRB and the city are currently developing.

## International Falls

Although International Falls has no district heating system now, officials are looking at developing one for the western area of the city. Originally, the city considered a waste-wood-fired district heating system for the entire

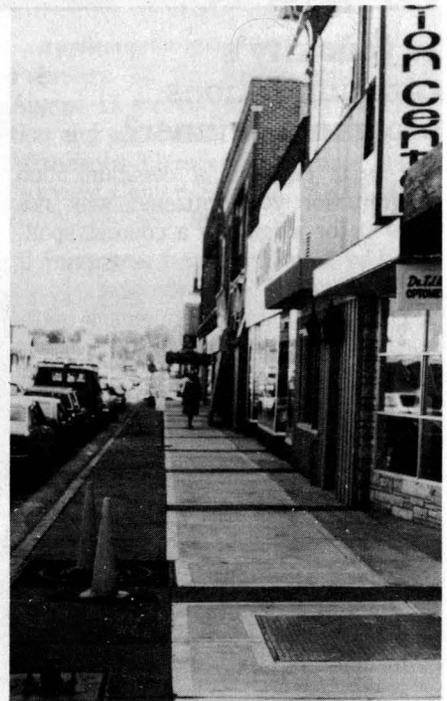
downtown area, but layoffs at the nearby Boise Cascade Paper Mill made such plans economically unfeasible. Plans now are for a west end mini-system to heat an elementary school, high school, community college, and a hockey arena. The city is looking at waste wood as a possible fuel source. A final decision is due shortly.

## Virginia

Virginia is known for having one of the largest residential district heating systems in the world, serving 3,120 customers. But, it is also one of the oldest systems, and steam regularly escapes through worn-out pipes up into the streets. The top priority for the Virginia study team was to determine the feasibility and cost of converting the existing steam system to a hot water system. Economic analysis of alternatives is still in progress and a final report will be complete soon.

## Willmar

Willmar has had a steam cogeneration district heating system in operation since the early 1900s. In 1982, 78 downtown customers converted from steam to hot water. The public utility has recently analyzed the economics of connecting residential customers who are located adjacent to the existing system. So far 92 potential customers of hot water district heat have signed contracts. The utility will connect these



residences, as well as a nursing home, public housing facility, and elementary school, this heating season.

If your community has wood waste, landfill or solid waste problems, or an abandoned power plant, perhaps district heating is an option. To help you get started, DEED has a book titled *District Heating Planning in Minnesota: A Community Guidebook* that can assist you.

DEED has no funds for feasibility studies. However, the U.S. Department of Energy will be announcing a grant program in early December with applications due in February. DOE will award approximately 10 to 15 grants nationwide. HUD has also requested funds for a similar district heating program and is awaiting approval from its undersecretary.

To receive information about district heating in Minnesota or federal grant programs, please contact:

Tom Hughes  
Minnesota Department of Energy  
and Economic Development  
900 American Center Building  
150 East Kellogg Boulevard  
St. Paul, MN 55101  
(612) 297-1942. ■

*Tom Hughes is Coordinator, District Heating Program, Research Development Finance Division, Department of Energy and Economic Development.*

