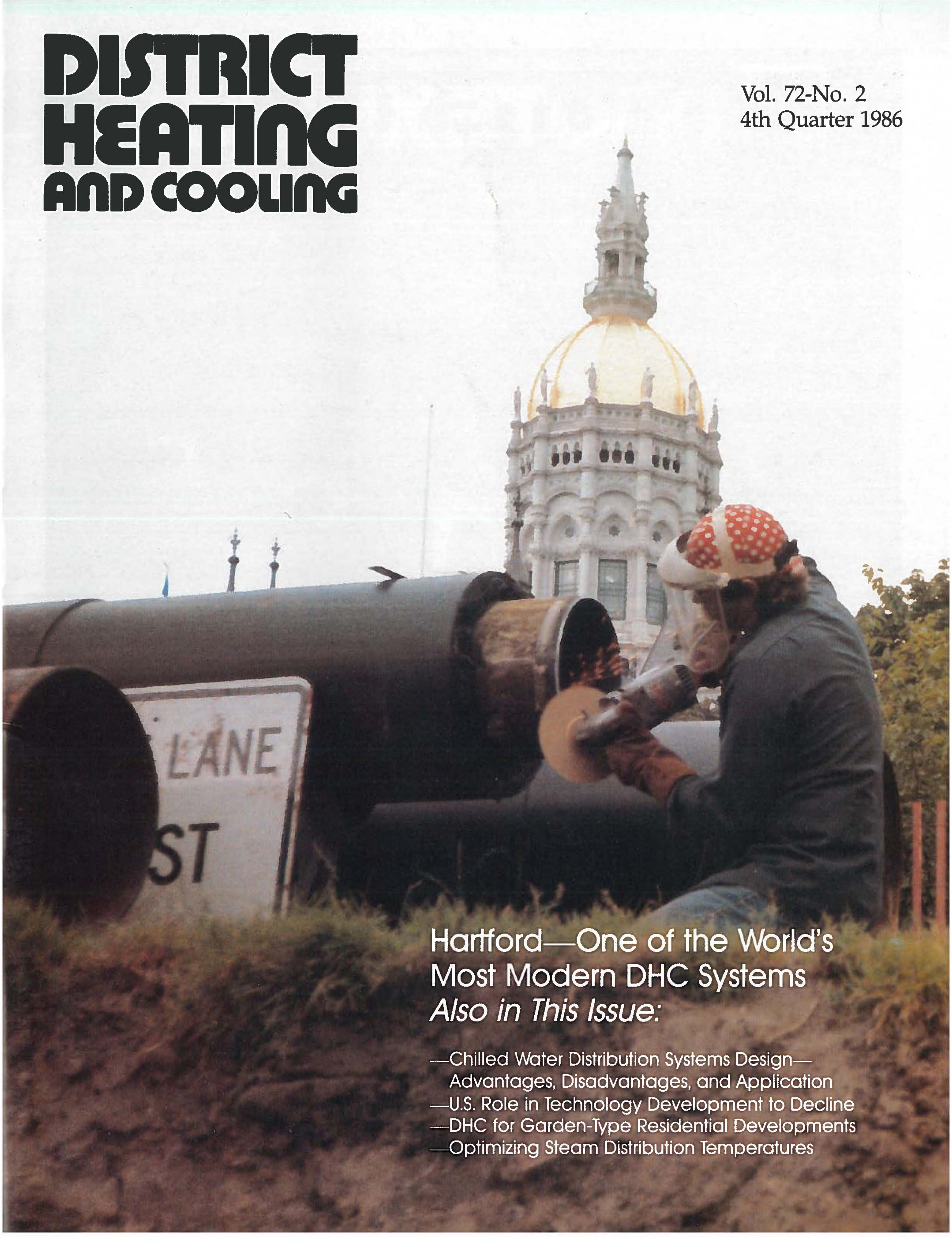
DISTRICT HEATING AND COOLING

Vol. 72-No. 2
4th Quarter 1986



Hartford—One of the World's Most Modern DHC Systems

Also in This Issue:

—Chilled Water Distribution Systems Design—
Advantages, Disadvantages, and Application
—U.S. Role in Technology Development to Decline
—DHC for Garden-Type Residential Developments
—Optimizing Steam Distribution Temperatures

On September 1 average prices were lowered from $18 per thousand pounds to $14.19.

The reduction in price was due to the cooperative purchasing self-help gas from producers rather than buying gas from the local utility. Additional cost saving measures being investigated are cogeneration and installing condensate return lines.

The cooperative currently has 40 members, and discussions are in progress with the developers of a new Hyatt Hotel.

Solar Energy for District Heating

Trials are in progress at Nykvarns, a small town about 50 km south-west of Stockholm, of the supply of solar energy to the town's district heating system. The trials installation consists of a solar collector array and a short-term water heat store. The solar system, which requires only a minimum of maintenance, meets almost the entire energy requirement of the town during the summer, and makes a modest contribution to heating energy requirements during the winter. Energy cost is expected to work out lower than the cost of energy from any previous installation of this kind.

Nykvarn is a small community of about 500 households and two factories. The Södertälje Energy Company has built a solar district heating plant there, incorporating solar collectors of the leknolerm Central type. The collectors supply heat to a short-term water heat store, which stores heat from sunny to cloudy periods.

Solar energy supplied by the system provides about one-tenth of the town's annual total energy requirement, being almost the entire energy requirement needed during the summer and a minor contribution during the winter.

The collector installation, with an area of about 4 000 m^2, consists of 320 12.5 m^2 collectors, connected in series in groups of ten, so that the incoming water temperature is raised from, say, 60°C to 90°C during a sunny summer day.

The solar heat is stored in a water heat store, which can store heat for a couple of days or so. The store is in the form of a 30 m high steel tank, in which the water temperature at the top can reach 95°C.

On a really sunny day, the collectors can supply sufficient heat to the store to meet half a week's heat demand. During the winter, the heat store provides back-up buffer capacity in the event of any of the boilers breaking down. The ability to store heat from night to day also allows the boilers to be operated at maximum efficiency.

The high-temperature solar collectors are of the flat plate type, with glass cover plates and arranged in 12.5 m^2 modules for ground mounting. They are a development of the collectors used in the Lyckebo project and for other applications. They incorporate specially-designed anti-convection baffles of Teflon between the absorber plates and the glass to reduce heat losses from the absorber to the air and to allow energy to be produced at high temperatures. The stagnation temperature, i.e. the temperature reached if cooling of the absorbers is lost, is 200°C.

The collectors are connected in parallel in 32 groups, with 10 collectors in each group, and connected to a heat exchanger. The liquid circulating through the collectors contains propylene glycol as anti-freeze.

The specific investment cost of the solar collector equipment, including the collectors themselves and the piping, foundations, heat exchanger and control equipment, etc., is SEK 1 600:–/m^2, allowing energy to be supplied to the store for less than 30 öre/kWh. The cost of the store is often met by the savings it provides in the form of improved boiler efficiency and the value of having a peak load reserve during the winter. As a result, the cost of solar energy from the store is the same as the cost of energy to the store, as heat losses from the store are negligible.

Over 90% of the cost of investment is accounted for by the collectors themselves and by the piping system. The collectors are entirely without moving parts, and the system as a whole has been found to require very little maintenance.

An Underground Piping System Made Entirely of Plastic in Use in Sweden

District heating systems have so far been built in areas where they are most profitable—towns and larger urban areas. They are now expanding to smaller urban areas and to detached house developments in the vicinity of areas with district heating. For such applications, the cost of heat distribution constitutes a higher proportion of the total energy cost. A new method is being tried out for the construction of a district heating system. It is hoped that it will reduce distribution costs considerably by using an underground piping system made entirely of plastic and as simplified method of installation needing a minimum of groundwork. The method is known as GRUDIS, derived from the Swedish GRUppcentralDIStribution (group heating distribution).

A three-year programme of trials has been carried out by Studsvik Energiteknik AB on behalf of the Swedish Council for Building Research, with the aim of developing a means of building district heating systems which can be competitive even in areas with relatively low heat load densities. Such systems will find application in smaller urban areas, detached house developments close to existing district heating systems and new development areas. The system should also be suitable for replacing worn-out group heating distribution systems.

(continued on page 44)

The heat supply system at Hammarstrand, in the north of Sweden, is the first one to be built based on the GRUDIS method, with a plastic piping system. The objective of the experimental installation is to:

—reduce capital and operating costs of the heat distribution system by employing new materials, new components and a simpler method of building:

—reduce heat losses by designing the system to operate at lower distribution temperatures:

—reduce the costs of subscriber service units by using direct connection, and

—improve operating conditions for heat production plant based on indigenous energy sources.

The heat distribution system at Hammarstrand is being built with all-plastic piping, i.e. not only the outer sheath and insulation, but also the media pipes. Most of the system is being installed using flexible piping which, as a result of simpler laying methods, can reduce installation costs by 20–40% relative to those of a conventional system.

The all-plastic system is corrosion-resistant, so that ordinary domestic hot water can be used as the heat-carrying medium.

Subscriber equipment in the Hammarstrand system has been simplified by supplying domestic hot water directly to each building, effecting a considerable saving in comparison with a conventional system. On average, this has resulted in a reduction of about 20% in the cost of subscriber equipment.

The efficiency of heat production, which at Hammarstrand is based on solid fuels, can be improved by the GRUDIS method. The solid fuel boiler is flexible in its choice of fuels, and can even burn damp fuels. It is fitted with a flue gas cooler which acts as a preheater for the incoming cold mains water to be heated to domestic hot water temperature. This allows cheaper fuels to be used, making more effective use of the boiler.

Other types of heat production systems, e.g. heat pumps, can also be connected to a GRUDIS system.

The cost of groundworks is reduced considerably by the fact that all piping work between branches and tee-off points is done at ground level, i.e. not in the pipe trench. This allows a narrower pipe trench to be used, and also means that excavation and refilling can be accelerated. IDHCA

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- Interview of Norman R. Taylor Award Recipient
- Report on the Fifth HUD/DOE National District Heating and Cooling Conference
- District Heating and Cooling Statistical Report
- Preview of the 78th Annual IDHCA Conference

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Editorial Deadline: January 30, 1987
Advertising Deadline: February 9, 1987