



## 275,000 households linked up to CTR

**Approximately** 10% of the total Danish requirement for heat is covered by CTR's network of pipes. This means that more than half a million people (or 90-95% of all those living in the area) enjoys the benefits of the common district heating system.

**Already**, the price for district heating can compete with that for other forms of energy - and what's more, district heating is also extremely reliable. CTR's heating price, which is a pool system price, is identical for all five municipalities, and has basically been kept at the same level throughout the whole of the project's lifetime.

**Investment expenditure** for the entire transmission net currently totals DKK 3 billion, or US\$ 500 million (US\$ 1 = DKK 6). This has been financed mainly by foreign currency loans.



*Mr. Klaus Bondam  
Mayor of the Technical and  
Environmental Administration of  
Copenhagen and  
Chairman of CTR.*



*Mrs. Inga Thorup Madsen  
Managing Director of CTR*

## Future requirements to technology and the environment

**More stringent requirements** as regards efficient sources of energy, reliability of supply, and effects on the environment were the original impetus for the rapid expansion of collective supply networks in Denmark.

**And the results** so far have completely lived up to expectations. A targeted and systematic usage of the very latest and most efficient technology and know-how has been an important element in this process.

**The quick period** of transition witnessed in the Greater Copenhagen Area has strengthened the opinion that district heating is an extremely versatile, adaptable form of supply which should be apportioned a central place in future, environmentally friendly energy structures.



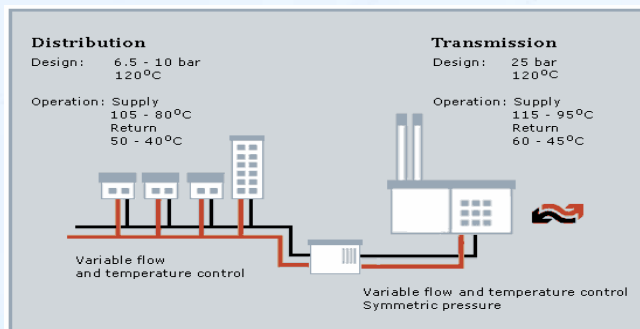
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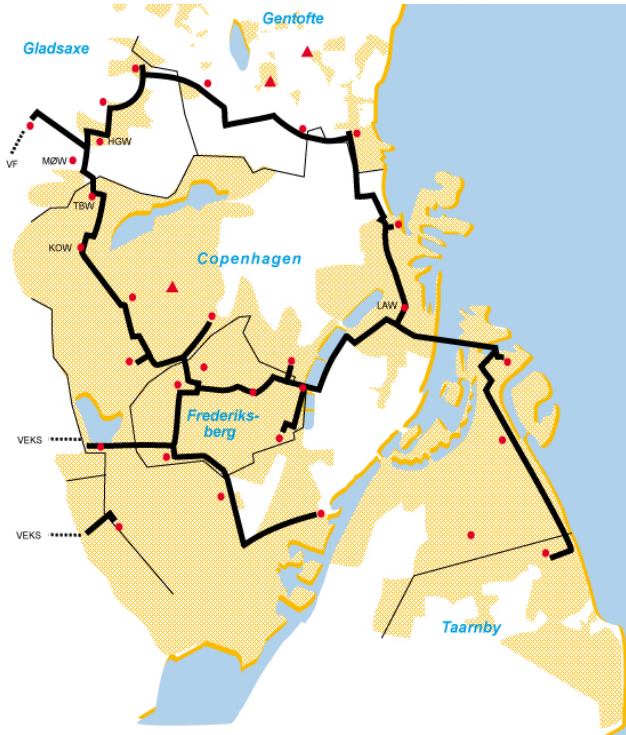
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# ENVIRONMENTALLY FRIENDLY DISTRICT HEATING TO GREATER COPENHAGEN







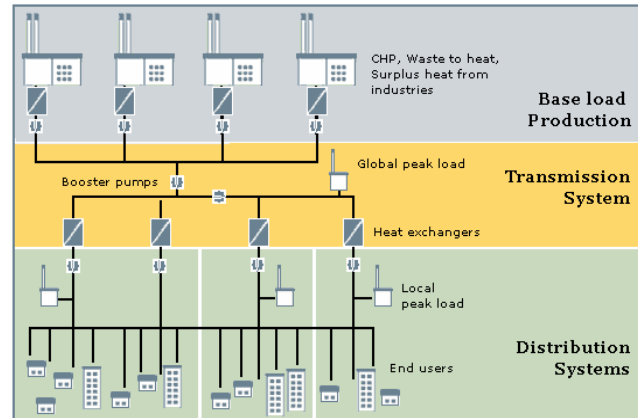
## Five municipalities join forces to secure an environmentally friendly district heating

In the Greater Copenhagen Area five municipalities have joined forces to produce a common district heating system. In 1984 the municipalities of Frederiksberg, Gentofte, Gladsaxe, Copenhagen and Taarnby formed the Metropolitan Copenhagen Heating Transmission company - known as CTR.

The main objective for CTR is to utilize waste heat from refuse incineration plants and combined heat and power plants (CHPs). The company is responsible for the purchase of heat from production units and for the transport of this heat through the transmission net for sale to its five owners and to VEKS - CTR's affiliated company to the west. CTR also operates backup units and produces heat on its own account during peak load periods.

### To be able to fulfil all these tasks

CTR has a 54 kilometre (34 miles) long pipeline using three booster pump stations, fourteen peak load units, and twenty-six heat exchanger stations to transfer the heat to the local district heating systems. All these installations are managed from CTR's operation centre in Frederiksberg, using computer-based control, regulating and monitoring systems.



## Energy from waste heat and refuse incineration

CTR utilizes waste heat from refuse incineration and from the joint production of electricity and heat. This strategy not only saves considerable amounts of energy, it also significantly reduces the emission of pollutants. Sulphur dioxide emissions have been reduced to less than a third of previous levels, and CO<sub>2</sub> emissions have been halved.

CTR purchases some 70% of its district heating from the large CHPs in the Greater Copenhagen Area, more specifically from Amagervaerket, Svanemoellevaerket, H.C. Oersted Vaerket, and Avedoerevaerket. Another 25% is produced by refuse incineration plants (Amagerforbraending, Vestforbraending, and Rensningsanlaeg Lynetten). The remaining requirement is met by oil-fired heating plants.

CTR's and VEKS's two networks are interconnected so that excess heat and/or reserve capacity in the one area can be utilized if necessary in the other.

This much more effective utilization of energy gives the Greater Copenhagen Area an energy saving equal to an annual consumption of more than 500,000 tons of oil.



Avedoerevaerket. Energy-E2.



CTR's operation centre.