

# District cooling is **5-10 times more energy efficient** than conventional cooling

District cooling is a future-proof system that efficiently cools buildings through centralized distribution of chilled water. By investing in the use of district cooling, cities will become much more energy efficient and heavily reduce greenhouse gas emissions – supporting the objective of reducing Europe’s greenhouse gas emissions by 80-95% by 2050.



**40%**

of commercial and institutional buildings in Europe already have cooling systems and demand is set to grow substantially.



**50-60 TWh**

reduction in energy consumption annually if district cooling is expanded to cover 25% of the European cooling market.



**9,500.000**

cars worth of CO<sub>2</sub> can be saved every year if district cooling is expanded to cover 25% of the European cooling market.



**> 50%**

reduction of CO<sub>2</sub> emission and hazardous refrigerants can be achieved with district cooling.



**Free up space**

on rooftops and in basements for increased aesthetics and design freedom.



**Up to 50%**

reduction of cooling energy consumption through higher energy utilization with district cooling.

**CASE STUDY**

**Realizing district cooling potential**

Paris is a pioneer in district cooling, resulting in great environmental improvements.

**Source:** Climespace: Discover District Cooling

**50%** improvement in energy efficiency.

**35%** lower electricity consumption.

**50%** reduction in CO<sub>2</sub> emissions



## How district cooling works

**COOLING SOURCES**

Free cooling from e.g. sea, lake, river or ground water etc. or renewables from e.g. waste heat.

**DISTRICT COOLING UTILITY**

Combines cooling sources and produces chilled water.

**COLD TOWER**

Stores cooling to balance peak demand.

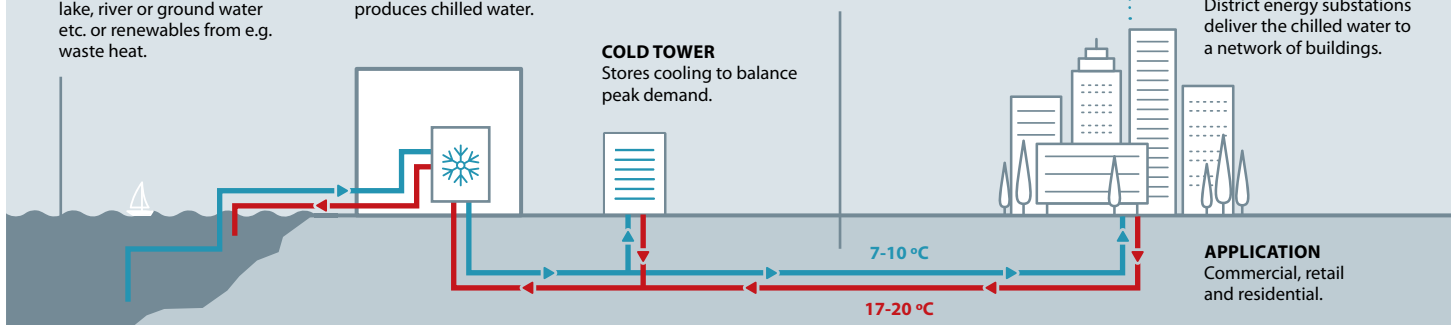
**DISTRIBUTION NETWORK**

Underground, insulated pipes carry the chilled water.

**DELIVERY**

District energy substations deliver the chilled water to a network of buildings.

**APPLICATION**  
Commercial, retail and residential.



## How district cooling can release **the full potential of energy efficiency** and renewables in cities

District cooling represents a paradigm change in the fundamental thinking behind the provision of comfortable indoor environments. Providing the required cooling effect from a high efficiency central facility, district cooling combines the most environmentally responsible technologies currently available with considerable economies of scale.

This has a great impact on lowering the energy bill due to higher energy efficiency. Furthermore, district cooling has a number of advantages, e.g. lowering CO<sub>2</sub> emissions, lowering operating costs and improving the balancing on energy peaks, demand capacity, and integration of renewables.

Danfoss is the only total supplier of cooling solutions and provides a range of automatic controls, heat exchangers and substations needed throughout the process of generating and distributing district cooling to homes and buildings.

Danfoss solutions will secure the most energy efficient operation of the district cooling network:

- Accurate control of the temperatures
- Hydronic balancing of the network from supply to last terminal unit

**1°C deviation lower than desired temperature** will cause energy costs to increase by 10-16%



Independent research institutes have determined that Danfoss pressure independent control valves on terminal units in the building installation provides the best control performance compared to others in the market. Thereby, a stable temperature control and indoor climate is guaranteed at lowest energy costs.

**1°C lower return temperature** will result in up to 20% higher flow, increasing pumping costs with 73% and reducing chiller efficiency



By installing Danfoss automatic controls and pressure independent control valves at the building interface and terminal unit, high delta\_T\* is guaranteed in the district cooling network and no deviations in the flow temperature for the building will occur.

Both the measures at the terminal units and at the building interface are pre-requisites to achieve an energy efficient operation.

\*delta\_T is the difference between supply and return temperature.

## Danfoss offers consultancy of control component selection, design, and supply of substations



### CONTROL VALVES AND PLATE HEAT EXCHANGERS

Need a component?  
Danfoss is the global leader supplying all control components and heat exchangers for District Energy. Danfoss supports your choice of the optimal component for your application.



### SUBSTATIONS

Need a design of a energy transfer station and optimization of internal HVAC installations?  
Just send us your cooling demand, design temperature, design pressures, space requirements, and all other relevant information.



### ELECTRONIC CONTROLLERS AND SCADA

Need electronic controllers and communication?  
Accurate control of substations is a precondition for perfect indoor climate and reduced energy costs. Danfoss electronic controller ECL provides that, and offers external communication possibilities.

Find more information at [www.district-cooling.danfoss.com](http://www.district-cooling.danfoss.com)

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