



DRIVING DISTRICT HEATING WITH MINIMAL COST & ENERGY LOSS

District heating systems play an important role in the efficient and sustainable heating of buildings. But it is not enough to simply generate heat efficiently – it must be transmitted and distributed with minimal cost and energy loss. That’s where pumps operated by variable speed drives play a vital role, as Frank Taaning Grundholm, Vice President, Global HVACR Sales, ABB Motion explains.

District heating networks comprise a distribution system of insulated pipes that take heat from a central source and deliver it to several domestic or non-domestic buildings.

The heat source might be a facility that provides a dedicated supply to the heat network, such as a combined heat and power (CHP) plant. Or it could be heat that is recovered from industrial sites, such as large data centres, or energy from metal processing or chemical plants.

Heat networks provide an opportunity to exploit larger scale – and often lower cost – renewable and recovered heat sources that otherwise cannot be used.

District heating systems can vary in size, distributing heat just a few hundred metres or up to 50 kilometres and, at their largest, can encompass an entire city. The smaller communal heating systems will service a single campus or a village.

Regardless of the energy source, district heating has higher efficiency, with less carbon emissions than individual heating. It can unlock multiple opportunities for renewable thermal energy and residual heat from industrial processes, sewage, waste incineration. It also enables Power-to-X technology by converting surplus electricity to heat, which can be stored and used later.

The critical factor in the success of a district heating scheme is to optimise energy use. This is where variable speed drives (VSDs) play an important role in providing precise pump control for optimal heat carrier flow rates and pressures.

The result is that energy use is managed to match the needs of the building while ensuring a comfortable environment for the occupants.

On average, VSDs deliver energy savings of 20 to 60% compared with solutions that rely on the throttling of fixed-speed pumps. In addition, utilizing the latest IE4 or IE5 efficiency class motors

in heating applications significantly reduces energy consumption in heat generation, transmission, and distribution processes.

Digitalization, in the form of smart sensors for motors, together with VSD energy monitors, also helps analyze energy use and to identify areas of improvement for the entire system, while also improving operational resilience.

Practical experience in China

As a practical example of what is possible, ABB has supplied a complete district heating system to Dêqên Tibetan Autonomous Prefecture Heat Development in Shangri-La in the Himalayas.

Shangri-La suffered badly from air pollution caused by wood-burning stoves that were the primary source of heat for its 50,000 residents.

ABB supplied all equipment from the steam to water heat exchanger in the boiler room to the end-user installation. This included electrical and mechanical equipment needed to provide heat to the citizens.

ABB automation and electrical solutions interconnect and monitor the new heating plants for maximum efficiency, while air-source heat pumps have enabled the move from individual

heat-only boilers and stoves to boilers based on electricity.

The pumps boost the system’s energy efficiency and help improve the quality of life substantially by reducing coal-fired emissions.

To meet the changing needs of the population, five local SCADA systems communicate with the central control and monitor the system to deliver heat most efficiently.

The shift from stoves to the district heating systems has provided substantial environmental benefits.

About 17,000 tonnes of coal is no longer burnt in Shangri-La every year, which is the equivalent of 105,000 tonnes in annual carbon-dioxide emissions, and means dust emissions are reduced by 460 tonnes.

Cities around the world have a great deal to gain by investing in the deployment and development of district heating. In particular, using smart digital solutions to connect multiple heat sources and facilitate control and planning according to forecast availability will make it possible to start leveraging the available energy faster.

For more informatipn visit:

<https://new.abb.com/drives/segments/hvac/hvac-industries/district-energy>

