

ENERGY EFFICIENCY IN CLEAN WATER

Steen & Strøm is an established shopping centre on 'Kongens gate' in the heart of Oslo city. Although the centre is old, the thinking of the operations team has proved to be anything but outdated. They have managed to successfully identify potential energy saving opportunities within their closed loop heating and cooling systems. Moreover they have been able to capitalise and realise savings. Over the next two decades they will reduce the energy costs by over 7,5 Mil NOK (£652,000), through an initial investment of 60,000 NOK (£5200).



Water is the energy carrier within many of today's industrial and commercial buildings and even if energy efficiency is in the spotlight, few think or are aware of the potential savings that can be achieved.

Dirt and sludge prohibit transfer

“We invested some time ago in a new oil fired and electric coil boiler system so that we could switch between electricity and oil. The system covers an area of 28,000 m²,”

Lars Ørmen, Operations Manager.

“When Mr and Mrs Pettersen take a trip to Steen & Strøm on their shopping trip on a cold winters day in Oslo, they give little thought to the warm water running through hidden pipes that is actually keeping them warm. They think even less about how efficiently the heat is being transferred throughout the building. We wanted to ensure that we had optimal energy transfer from source to point of use, so we installed an EnwaMatic® in 2002. We have witnessed first hand that the cleaner the water is, the easier it is to transfer heat”

The Technique

Regional Manager Harald K. Hanssen of Enwa Water Treatment, supplier of the EnwaMatic® unit states that a 2mm layer of sludge reduces energy transfer by 5 % , the sludge and particles in the system hold onto the heat having an insulating effect. In other words, without the contaminants heat requirement would be less because the transfer of energy would become more efficient.

Treating the water generally gives an energy saving of between 5 – 25% depending on the amount of debris in the system. *“The greater the amount of sludge, the greater savings”* says Harald K Hanssen.

Water treatment will have a similar effect for chilled water systems. When the sun is blazing and temperatures soar, buildings in the Centre of Oslo need to be cooled down. Chilled water meets the warm air at a heat exchange device and the air is cooled as the chilled water ‘picks up’ the heat. The cleaner the water, the easier it is to transfer the heat from air to water, reducing the energy required to run the chiller.

Savings within a month



So what is the pay back period for the investment made by Ørmen & Co? This is an interesting question.

- With Steen & Strøm the only change made on the cooling system is the water treatment unit; therefore the change in energy consumption can be attributed to this. When it comes to the heating system, which has experienced significant refurbishment, it is less easy to determine the actual savings attributable to the EnwaMatic® alone.

The cost of the water treatment unit was 60,000 NOK including installation. Before the cooling system was installed the cooling effect achievable was a Delta T of 2 °C. Since installation the Delta T has increased to 5 °C.

“Before the installation the water had a return temperature of 8 °C and a flow from the chiller of 6 °C. After the ‘clean up’ the return is 11°C and a flow of 6°C. We have regained the design efficiency of the system”, says Las Ørmen.

This equates to a saving of 2,100 NOK (£182) per day

If one assumes that the energy price is 0,20 NOK (1.7 pence) per kWh, then the shopping centre saves 2,100 NOK per day. The payback period is then 29 working days and usage after this is net profit. With a life span for treatment of 20 years and 180 operational days a year, the collective savings will be almost 7,5 Mil NOK on the cooling side, i.e. almost 375,000 NOK (£32,600) per year.

Harald K Hanssen finishes by saying that *‘In addition to this is the profit on the heating side. Normally one would achieve around the same effect on the heating system’*.