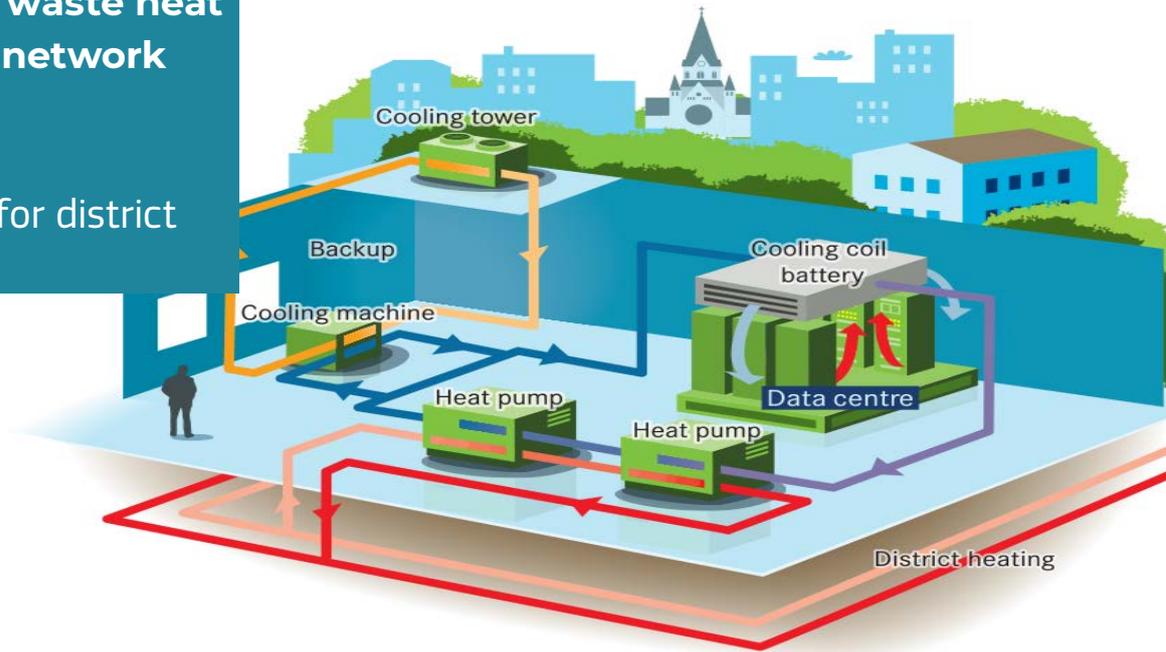


OpenDH - feed-in of waste heat into district heating network

Smart solution 6

New business models for district heating and cooling



Measured impacts

208 T

Reduced CO₂ emissions yearly

73%

Heat recovery ratio

3,16Wh

recovered per year



Stockholm

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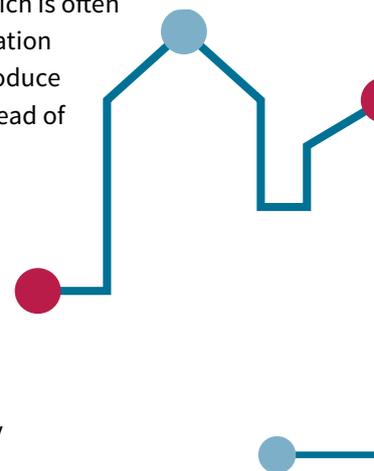
What is it?

A technology that recovers surplus heat and integrate it into existing district heating (DH) networks to meet local heating demands by citizens in an urban environment. An innovative business model has been developed for a yet unexplored potential, where installation of plug and play heat pumps at the waste heat producer facilities the ability to recover the energy into the DH network.

Waste heat is abundant in cities but rarely used. Data centres and shopping malls with many freezers and coolers generate lots of excess heat which is often costly to get rid of. The technical innovation used is a heat pump model that can produce hot water at a temperature of 85°C instead of around 68°C.

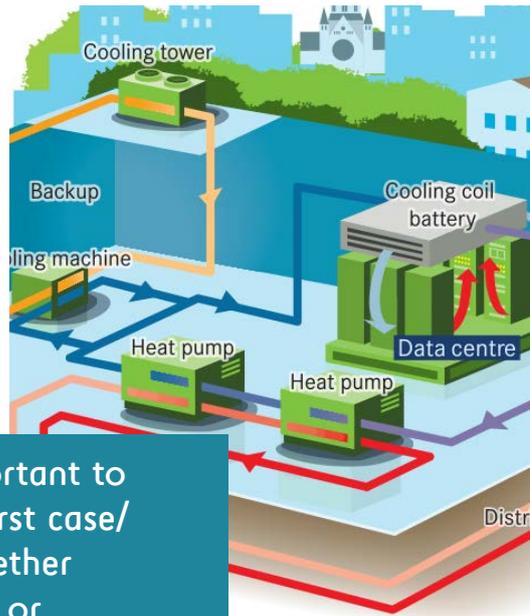
What did GrowSmarter do?

The potential for heat recovery in Stockholm alone is estimated at 1 TWh annually, and the district heating utility Stockholm Exergi has developed this



innovative approach called Open District Heating (OpenDH). Within GrowSmarter, the utility company Stockholm Exergi has delivered two heat recovering projects: one local supermarket and a data centre in the city. The heat recovered in those two projects is then injected into the existing DH network of the area.

The installation at the supermarket proved to be promising, and the initial results showed the heat production from the freezers and coolers to be stable and economical feasible during a larger part of the year than originally expected. Only initial results are available, as the supermarket stopped the testing after a change of ownership. The implementation at the data centre proved very successful both for Stockholm Exergi and the data centre owner Glesys. The heat reuse of the data center chosen for the GrowSmarter project is expected to increase gradually to a level of approximately 1MW heat, a heat recovery that is sufficient to heat more than 1,000 apartments while reducing annual CO₂ emissions in Stockholm



It is important to build a first case/pilot together with one or several customers when large-scale heat recovery is identified.

Lessons learnt

Robustness of the measured data collection is crucial and much more important than the periodicity of measurements. In cases of data loss, mean values for invoicing must be created and, in areas with higher proportion of recovered heat, the delivery temperature to the district heating customer must be ensured. Furthermore, since the heat pump operation responsibility is on the waste heat supplier, the Operations and Maintenance governance needs to be ensured for a successful project.

Upscaling & replication potential

This measure is applicable to any city where there is a heating system nearby into which the waste heat can be fed. The DSO (Distribution System Operator) needs to allow, and pay, for third-party feed-in into the network. Therefore, the upscaling possibility of this measure is good when there is a DH-network in place and a DSO who are willing to apply a waste heat business model towards third parties.

How did the measure work?

Technical feasibility

Since the excess energy recovered is not a high-level heat (25-40°C), the energy can be consumed either in the return lines or in the supply line after being further heated by efficient heat pumps (using renewable electricity).

Economic feasibility

The business model is based on the balance between connection/pipe investment and value of avoided other own production due to purchased waste heat. The heat supplier can lower their operating expenditure due to a new income for waste heat and avoid reinvestment cooling system costs.

Replication potential

If the foundation is in place, focusing on the data centre segment (a growing worldwide business where the cooling demand is the same throughout the year) is seen as a promising replication area.