

TO LOT

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Digitalized District Heating - from buzz to business case

kamst

Heat Intelligence

CITIES Zagreb 2019

Kamstrup A/S - our customers and solutions





Smart meters for heating and cooling - flow and temp sensors in every connected building



Heat Intelligence - Overview



Use of meter data combined with system GIS data to monitor, analyze and optimize the distribution network

- □ Numerical model/ digital twin to find
 - Flow in all pipes
 - Temperature at all nodes
- □ Immediate data value/ functionality
 - Transparency in the network
 - Get an overview of load & capacity
 - Detect too high/ low temperatures and cooling (dT) at end-user
- □ Analysis of data/ Outliers
 - Enable detection of by-passes and low flow zones
 - Enable detection of small and large leakages
 - Evaluate heat losses for pipe sections



$$Q_{\rm f} = 0.26 \,{\rm m}^3/{\rm h}$$

 $T_{\rm f} = 69.4 \,{}^{\circ}{\rm C}$
 $T_{\rm r} = 41.1 \,{}^{\circ}{\rm C}$

All functionalities at a glance....



Monitor forward temperature and flow



Detect too high return temperatures and low cooling (dT)



Look for temperature deviations and identify by-passes



USE CASE Haverslev (Aars FV): Closing of by-pass



Look for temperature deviations and identify small leakages kamstrup



USE CASE Aars FV: Service pipes with high heat loss and small kamstrup leakages



Identifying broken pipes with high heat loss

- Heat Intelligence detects multiple temperature outliers with lower temperatures than expected
- In this case the reason was broken service pipes with wet insulation. This caused forward temperature to be >10 °C lower than expected

Temperature deviations disappears after new service pipes are installed

After new service pipes are installed ..

ightarrow Forward temperature goes up

\rightarrow Flow reduced

USE CASE Assens FV: Data could have found where to dig!



Users with un-expected low temperature identified by Heat Intelligence and indicated with blue dot

The pipe section which based on Heat Intelligence data would have been 1st priority for digging to find leakage



Search for leakages with Heat Intelligence

- In the area around the leakage the temperature pattern changes significantly
- In this case the consumers downstream from the leakage are all "blue", i.e. they are colder than expected
- Upstream from the leakage there is no difference in temperature!
- Based on data from Heat Intelligence the first dig would have been done between the blue consumers (deviation) and the consumers (no deviation)
- The concrete repair of the broken pipe demonstrated that in this case instead of making 4 digs before the leakage was found, 1 dig would have been enough as the leakage was found exactly where Heat Intelligence indicated it should be!

Heat Intelligence - new functionalities on the way....

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Brandlund



