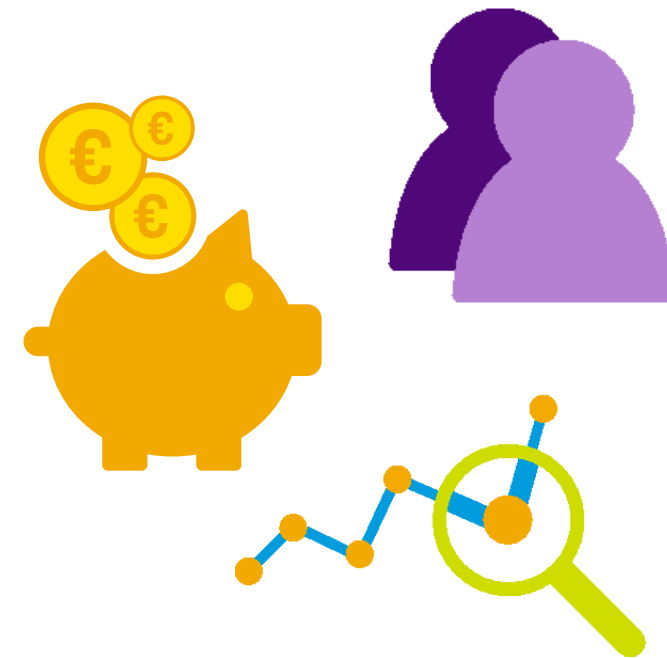


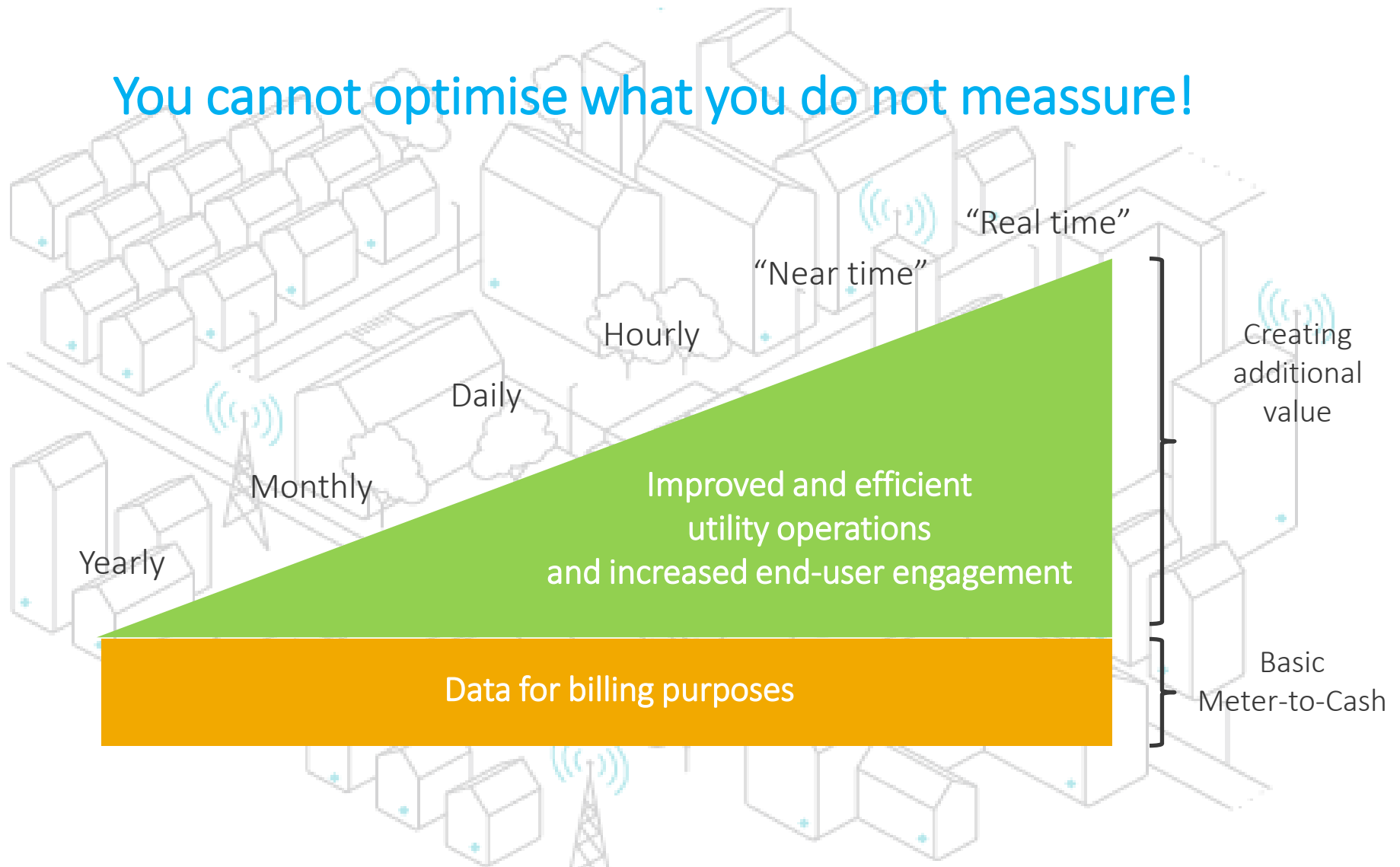
Introducing SCADA for district heating distribution

SES4DH2018, Aalborg, November 2018

Steen Schelle Jensen
Head of Product Management
Kamstrup A/S



You cannot optimise what you do not measure!



Study in Denmark demonstrating the value of the potential in digitalised district heating.

Savings will come from using data-based transparency to reduce losses, increase operational efficiency as well as streamline the heavy investments in this area

In total, this amounted to an efficiency potential of 11 to 30 times the cost of going from basic meter reading to frequent and intelligent meter reading

The total savings potential from digitalisation in the Danish utility sector is estimated at between 360 million and 1.3 billion euros.

Additional cost of EUR 8 per year per connected customer



Digitalised District Heating

Digitalisation creates transparency
and reduces losses

Because you cannot optimise what
you do not measure



Smart metering for heating and cooling

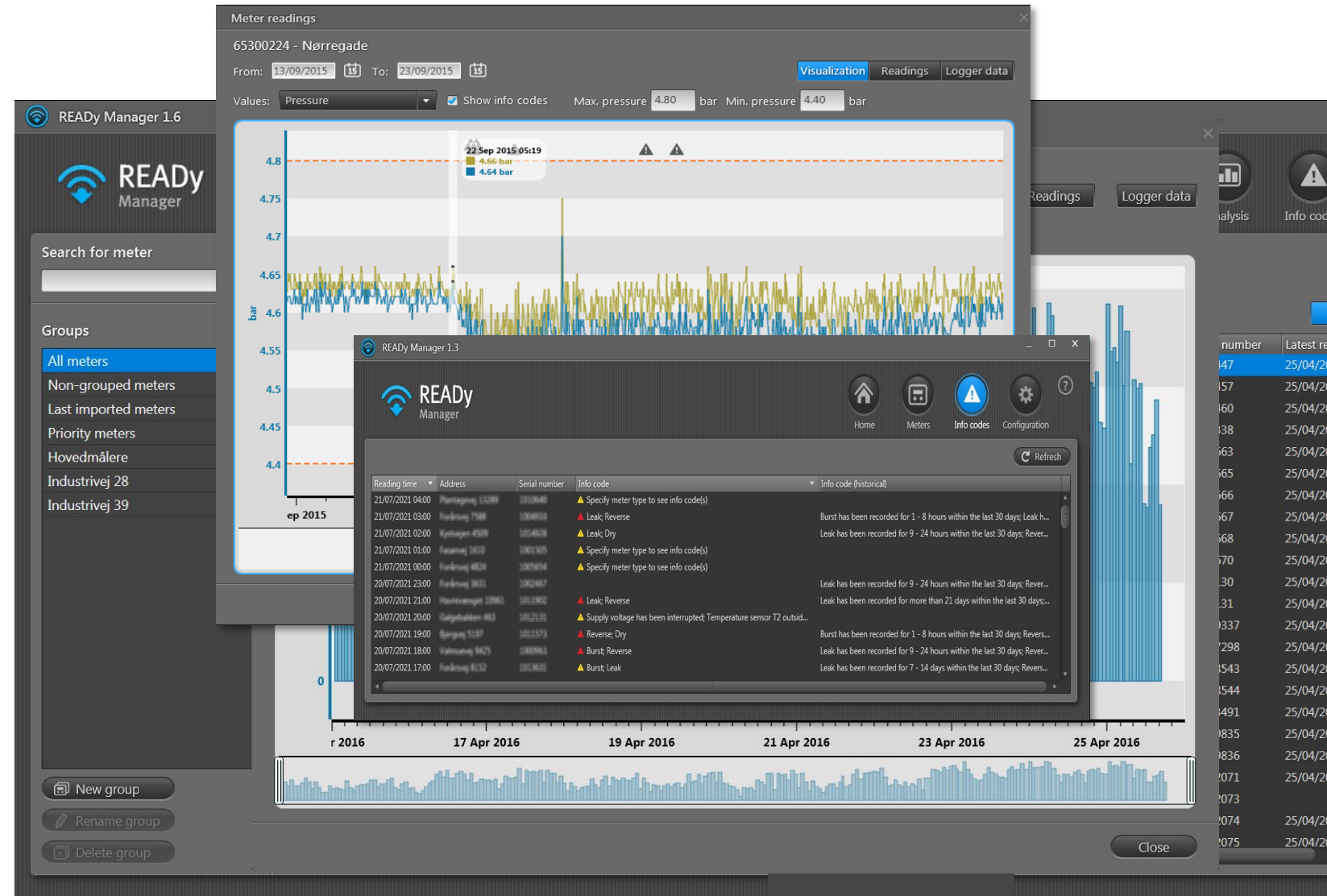


Smart meters are fuelling the digitalisation

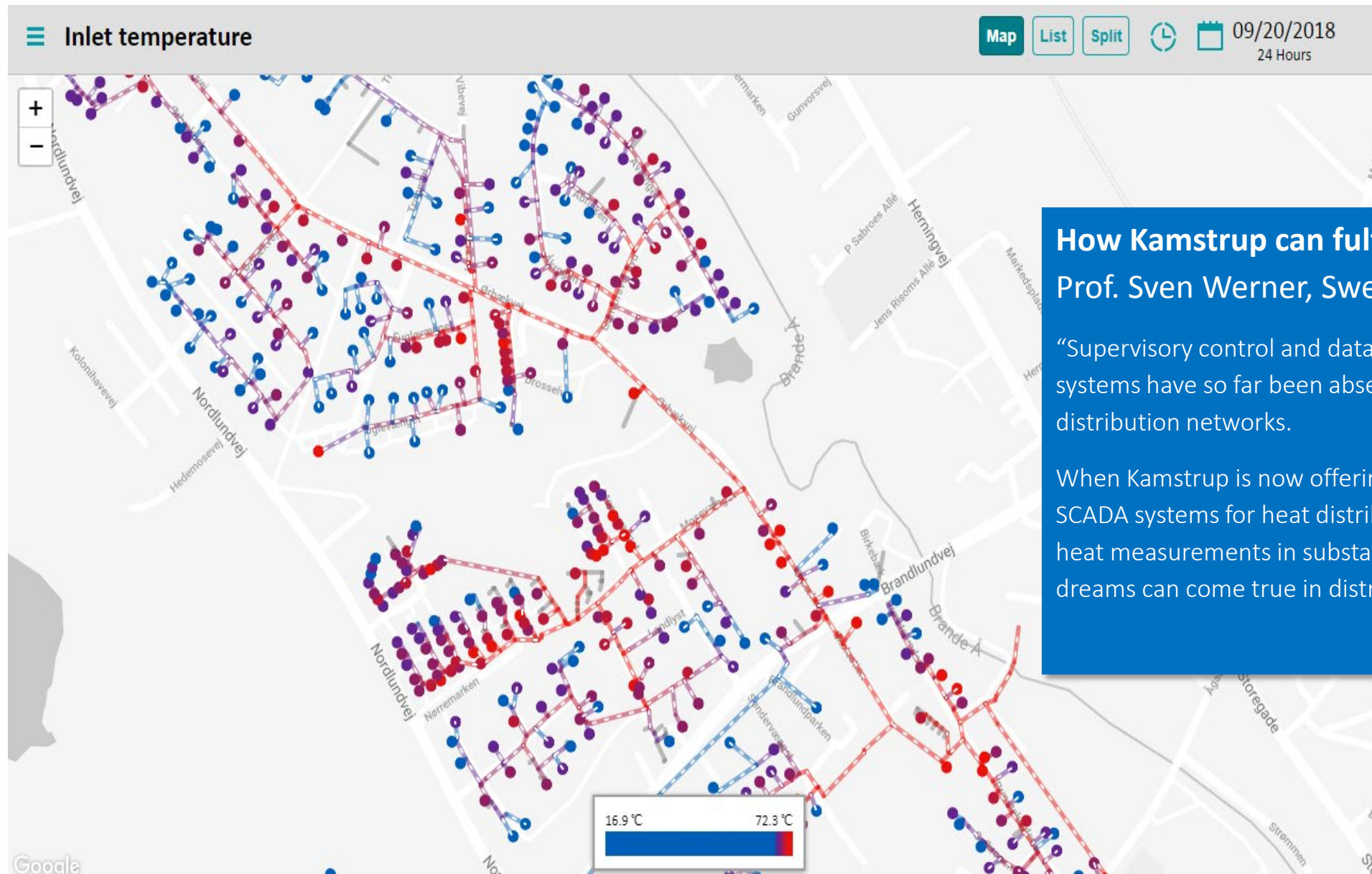
Temperature and flow sensors in every connected building

Provide valuable data that can tell something about both the building, end-user behaviour and the distribution network

No need for additional sensors in the distribution network



Creating SCADA for District Heating distribution



How Kamstrup can fulfil our dreams!

Prof. Sven Werner, Sweden

"Supervisory control and data acquisition (SCADA) systems have so far been absent for heat distribution networks.

When Kamstrup is now offering to provide future SCADA systems for heat distribution based on all heat measurements in substations, many old dreams can come true in district heating systems"

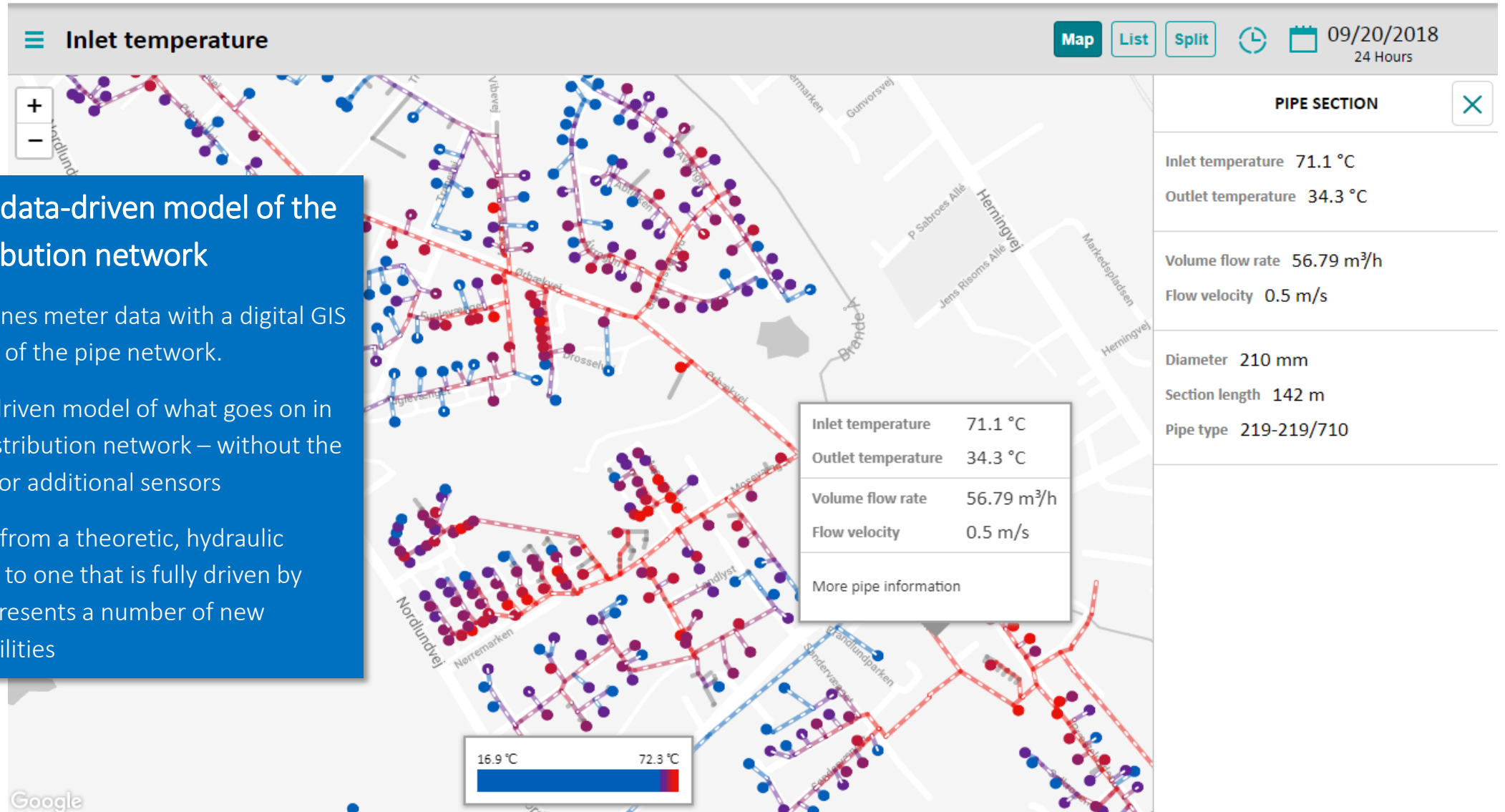
Creating virtual meters throughout the distribution network

New data-driven model of the distribution network

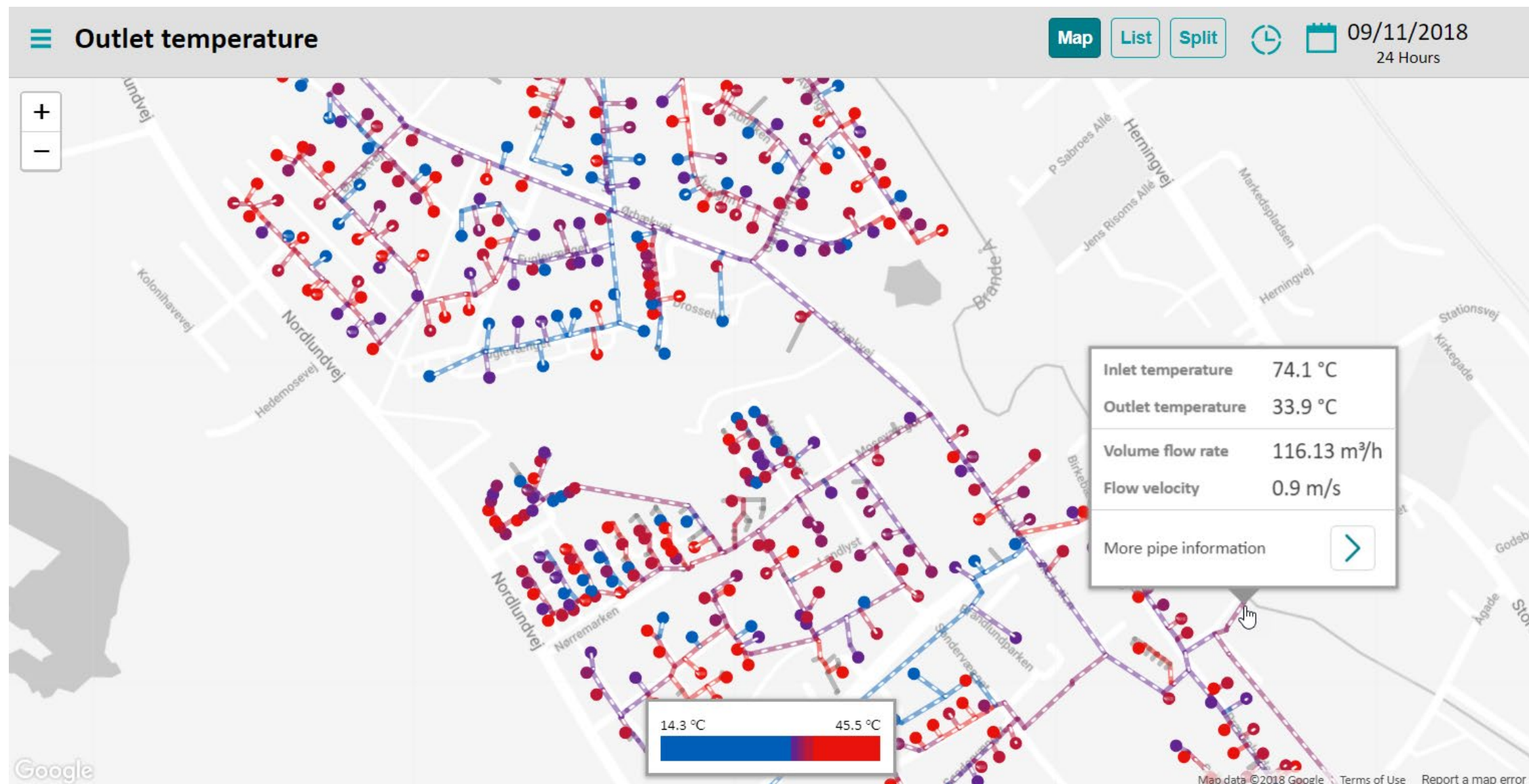
Combines meter data with a digital GIS model of the pipe network.

Data-driven model of what goes on in the distribution network – without the need for additional sensors

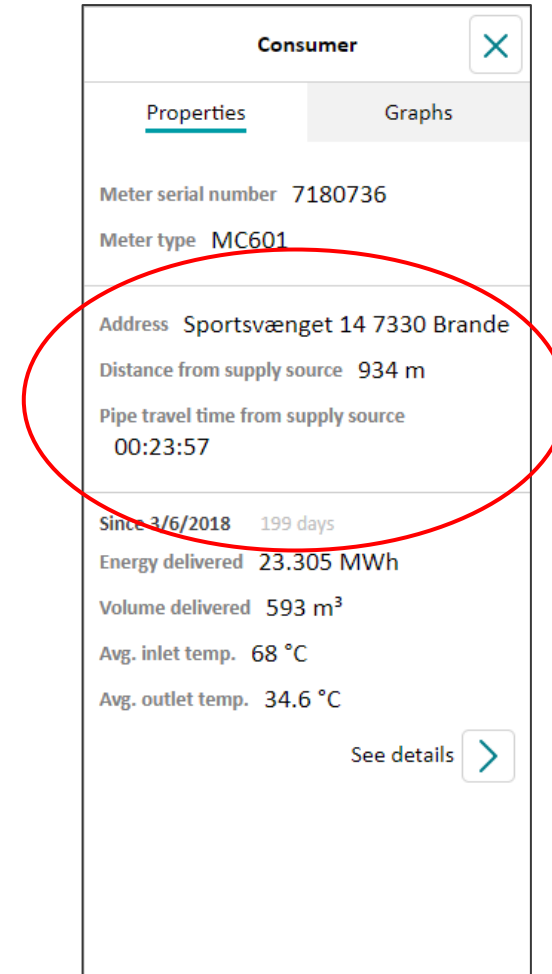
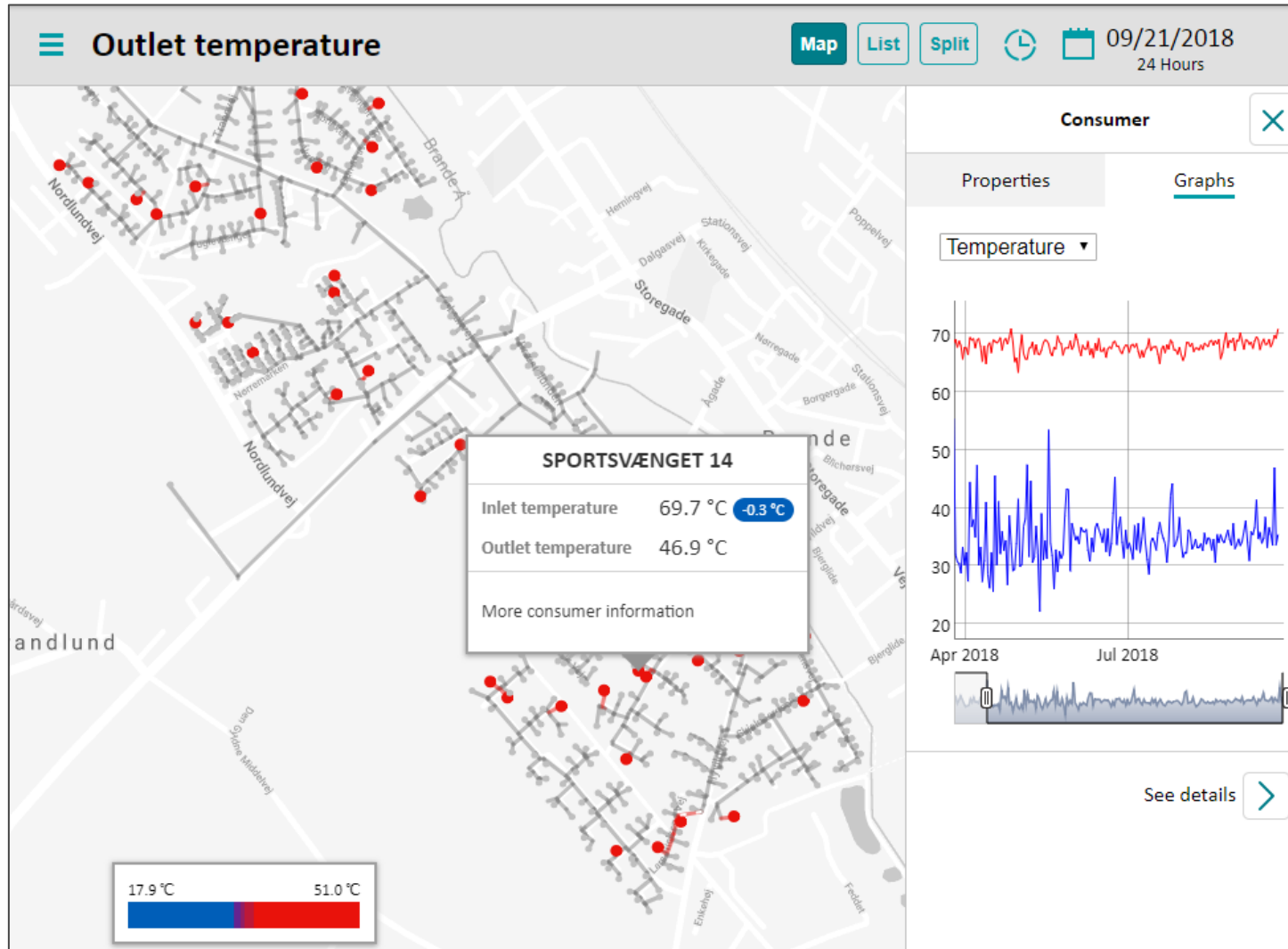
Going from a theoretic, hydraulic model to one that is fully driven by data presents a number of new possibilities



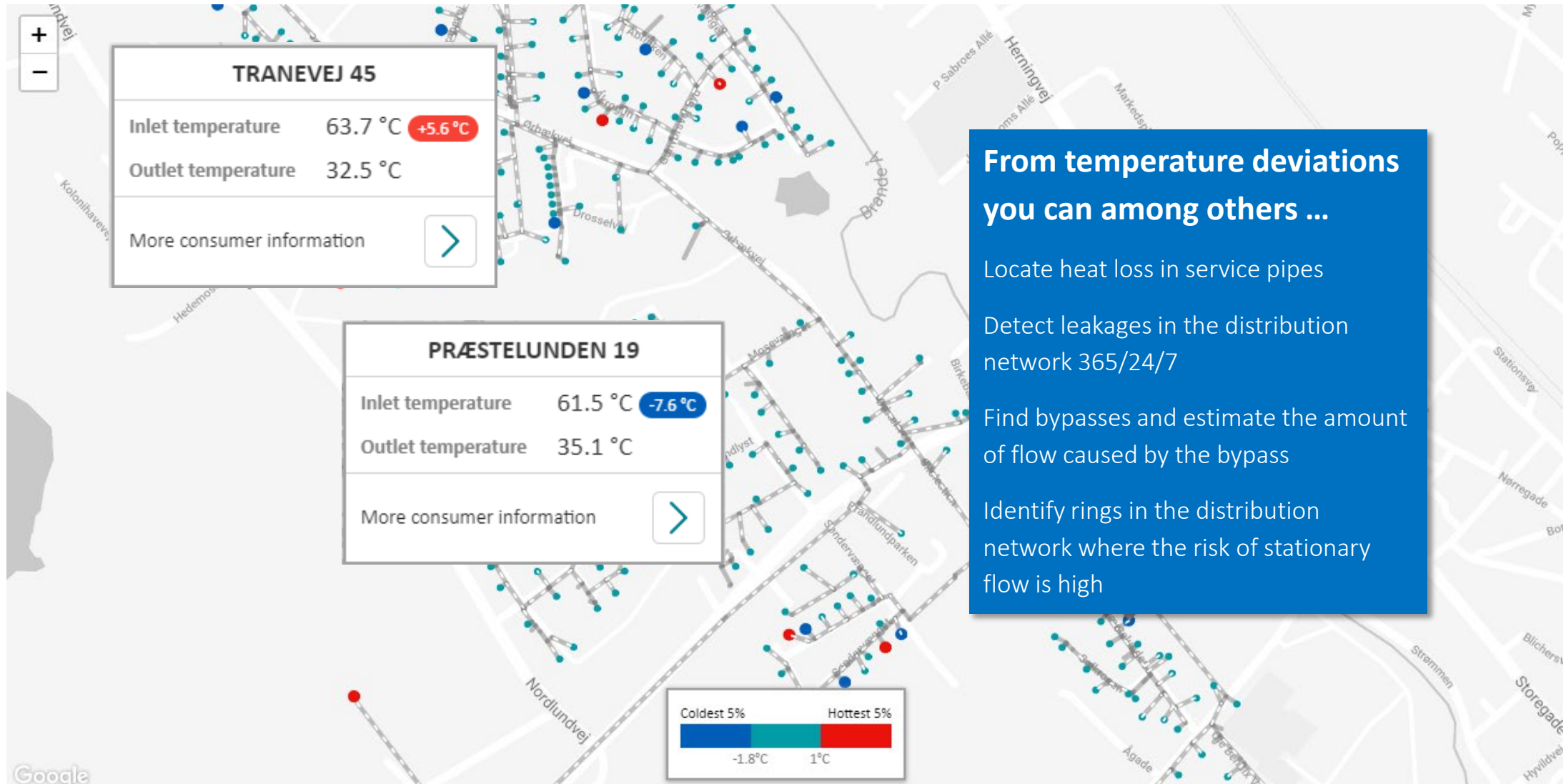
Creating virtual meters – also for return temperature



Look into the individual buildings

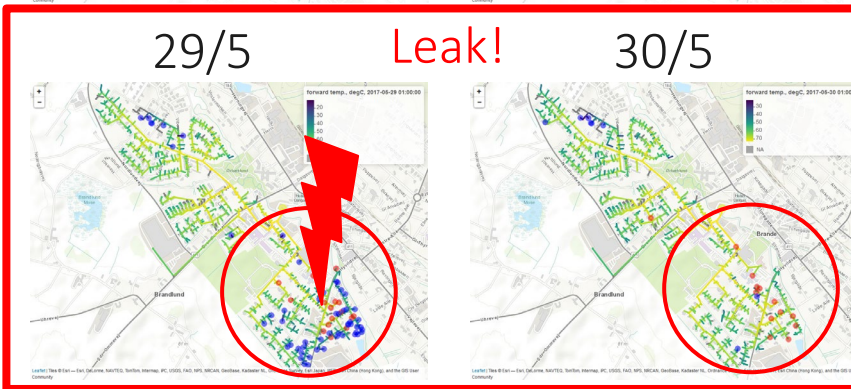
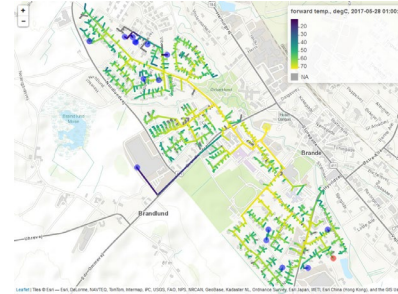
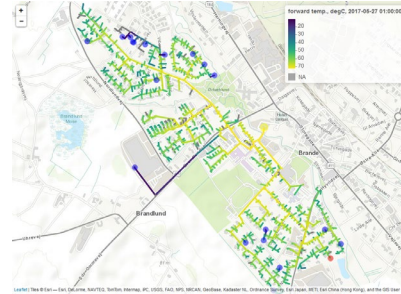
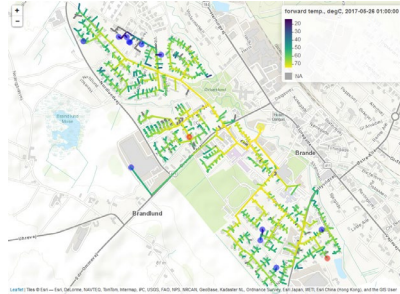


Temperature deviations reveals many secrets

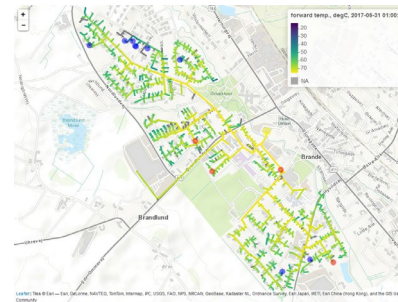


Data could have found that leak!

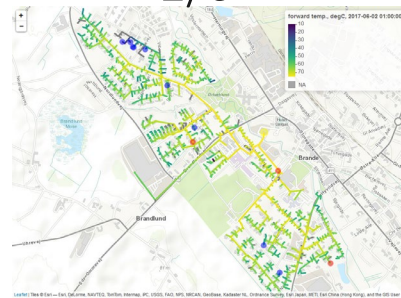
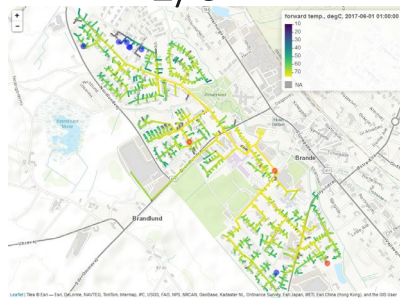
26/5 Normal operation 27/5 Normal operation 28/5



31/5 Leak fixed



1/6 Normal operation 2/6



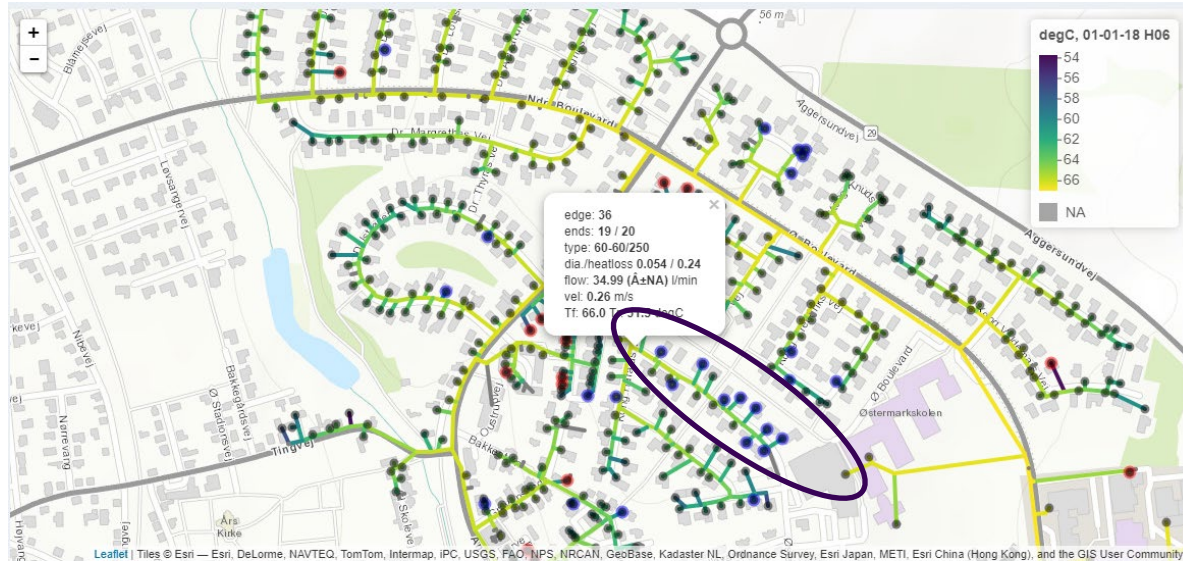
Leakage detection using Heat Intelligence

New disruptive approach to leakage detection

During the leak Heat Intelligence detects multiple temperature outliers (red and blue dots), where the temperatures measured by the meters deviate significantly from the predicted temperature values

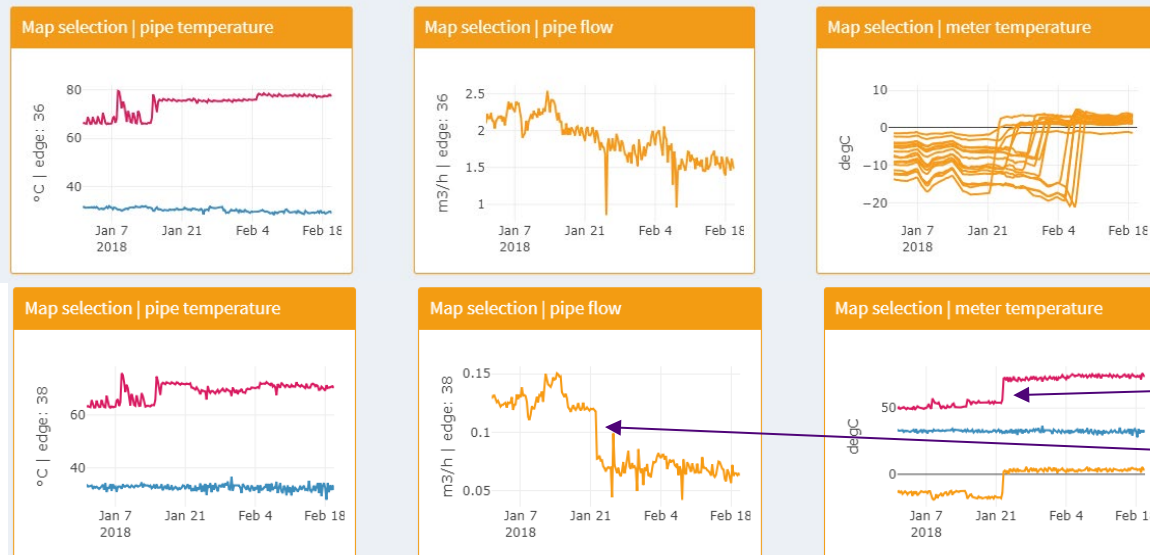
In this way, the leak can be located near the point indicated in the figure

Detecting service pipes with high heat loss



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 >10C lower than expected



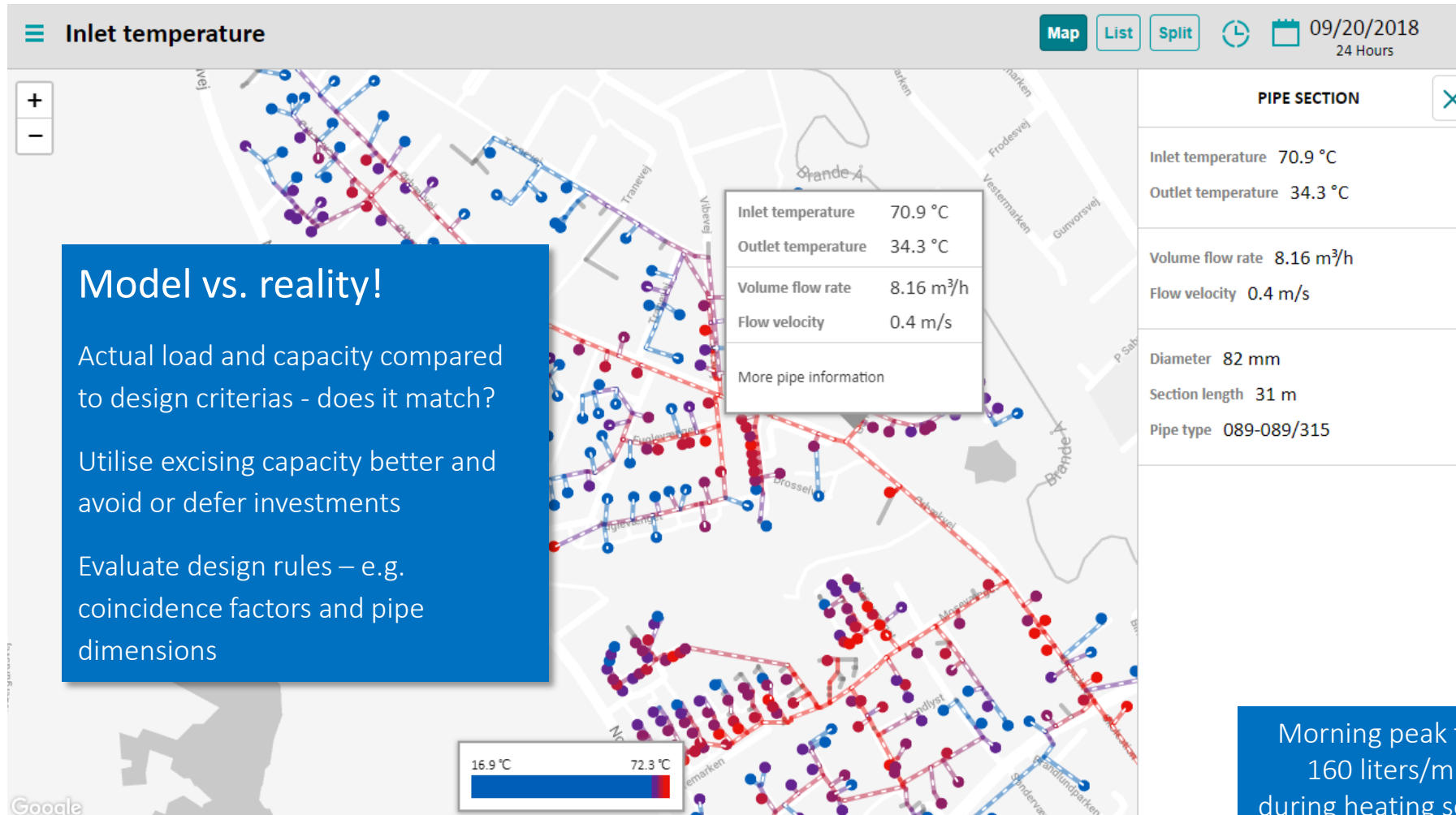
Temperature deviations disappears after new service pipes are installed

After new service pipes are installed ..

→ Forward temperature goes up

→ Flow reduced

How is the actual load in the distribution network?



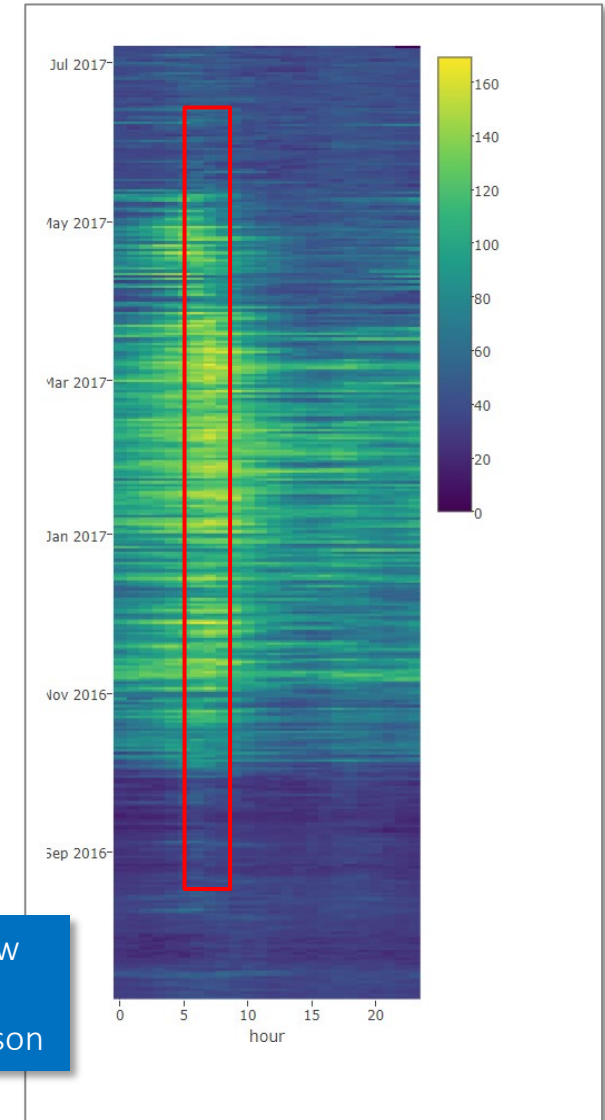
Model vs. reality!

Actual load and capacity compared to design criterias - does it match?

Utilise excising capacity better and avoid or defer investments

Evaluate design rules – e.g. coincidence factors and pipe dimensions

Morning peak flow
160 liters/min
during heating season





Do we need end-user consent to collect data?

Because smart meter data is personal data, processing it raises the question of the need for individual customer consent ...

... especially when meters are read more frequently than required for billing purposes and consumer information, e.g. on hourly basis

Knowing that end-user consent is an administrative burden

Knowing that lack of consent will have a negative effect on the data-based optimisation – not just for a specific building but also for the planning and distribution



The Danish interpretation of Article 6 of the GDPR

The Danish Energy Agency and Department of Justice has looked into whether legal basis for processing smart meter data can be found in Article 6 of the GDPR: **Lawfulness of processing**

They state that **processing of personal data is lawful to the extent** that:

(e) processing is necessary for the performance of a task carried out in the **public interest** or in the exercise of official authority vested in the controller;

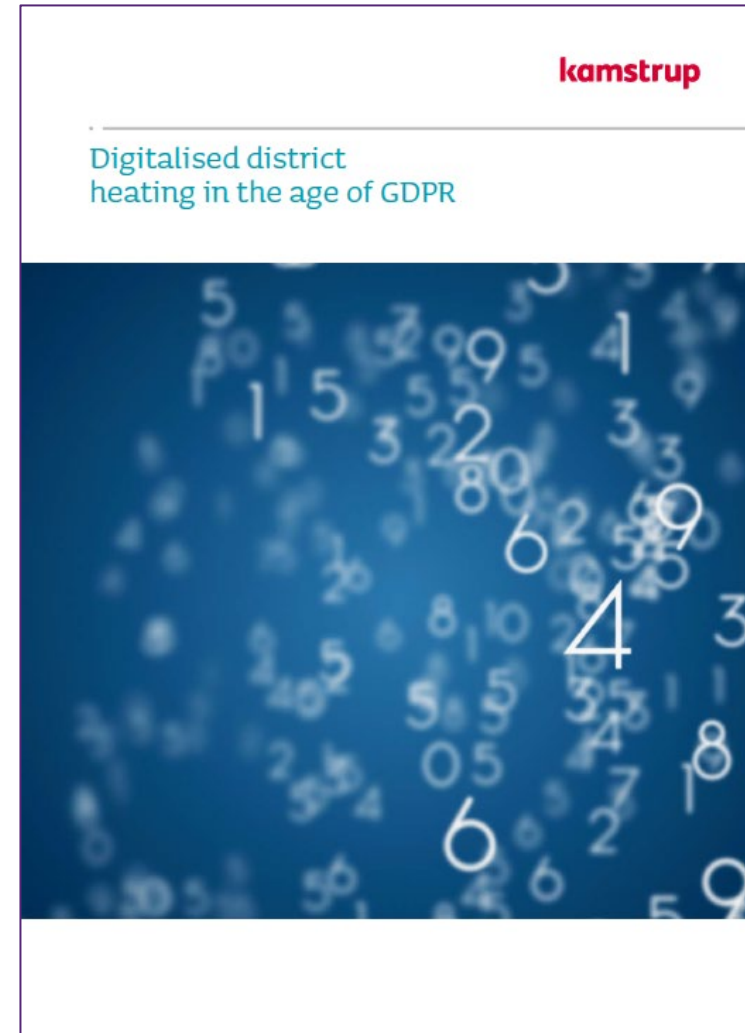
(f) processing is necessary for the purposes of the **legitimate interests** pursued by the controller or by a third party (...)



In conclusion, the official Danish position states that frequent data collection from heat meters **can be done without customer consent** ..

... as long as the energy supplier uses that data either in the interest of the public to save energy and **minimise energy losses**, or for the legitimate purpose of **improving the energy efficiency** of its operations

... may only take place if providers of smart metering solutions also **comply with the fundamental principles set out in Article 5** on processing of personal data.



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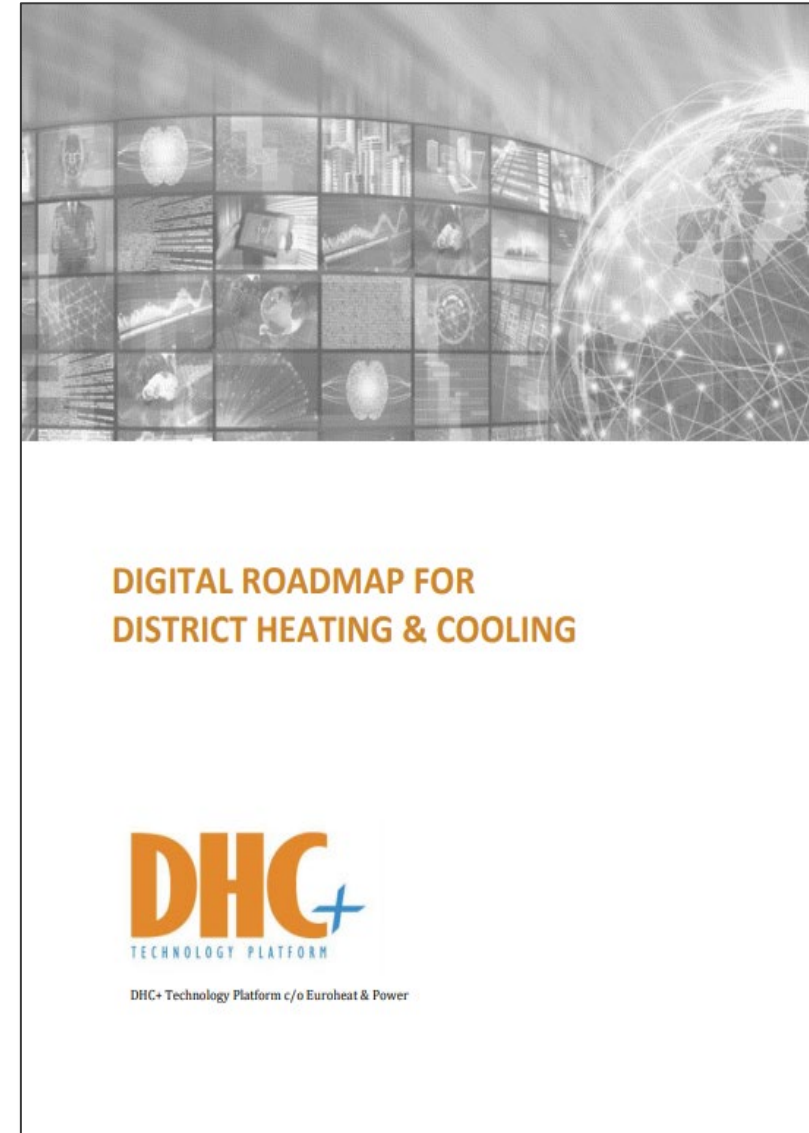
• Digitalisation in the DH industry is much more than new customer services or consumer apps

Digital technologies hold the potential to make the entire energy system both more efficient, reliable and intelligent

The roadmap provides a comprehensive overview and nuanced insight into digitalisation

Describing digitalisation on six different levels:

- Production
- Distribution
- Building
- Consumption
- Design and planning
- Sector coupling



Think forward!

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