OPTIMISATION WITH GIS (GEOGRAPHIC INFORMATION SYSTEMS)

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GIS IS THE NATURAL TOOL TO ENSURE DATA CONTINUITY FROM PROJECT PLAN TO OPERATION AND MAINTENANCE

Ramboll has more than 35 years of experience working with district heating systems, with a constant focus on developing new methods and tools to improve procedures and results.

GIS has for many years been one of the tools applied. A recent goal has been the integration of district heating network data into a single system, in light of the fact that the result and execution of every task is directly dependent on the quality and availability of necessary information.

Success parameters (The expectations)

Benefits of district heating systems are primarily measured by the resulting heat prices, but also in terms of frequency and duration of operational downtime.

To provide lower heating prices and ensure the greatest amount of uptime requires clear and close coordination of different tasks by the parties involved.

An optimal use of GIS enables natural data continuity throughout different tasks – ensuring basic information used is always updated across the entire organisation.

Different systems (The challenge)

District heating systems are complex and distributed over relatively large geographic areas, with numerous external factors influencing the conditions of the network. Network information often extends across many different systems, since each function in the operation of the district heating network often has its own system for handling of data:

- SCADA for daily operations.
- Pipeline registration.
- Sales databases in connection with area expansion.
- Customer databases/consumer billing systems to handle existing customers.
- Maintenance systems.
- Hydraulic calculation systems.

The various systems can rarely access each other’s data, leading to unnecessary obstacles in solving tasks involving more than one system.

Single point of entry (The solution)

Using GIS as the single point of entry to different data systems offers a wide range of advantages:

- Better communication, through increased data availability.
- Improved visualisation.
- Faster response time, as it is no longer necessary to first determine which system houses the relevant information.
- Better data quality, as updates only need to be made once, after which they are available in all systems.
- Reduced downtime on the network.
- Operational savings.

Use of GIS (The tool)

Data in a GIS system can be accessed in different ways:

- Via a GIS program.
- On the internet.
- Using a mobile device.

The data to which a user has access, and the extent to which the users can manipulate data, depends on the user rights determined in the system. Thus, as an example, it is possible to design a web solution that constantly displays planned maintenance tasks or status on new connections.

When working in the field, the pipeline plans can be downloaded directly to a tablet or smartphone.

For maintenance tasks, a list of affected consumers can be created automatically, and other projects in the same area can be included to avoid unnecessary downtime.

Better district heating (The result)

Due to the long lifespan of district heating networks, and the ever changing levels of heating consumption, periodic re-evaluation and optimisation of the system design is called for.

Regular maintenance plans can predict when sections of the network need upgrading, but it is only possible to avoid errors in the scope of the maintenance plans when correlating with hydraulic analysis of the network.

An integrated GIS system improves communication across workspaces and tasks, which is a prerequisite for effective operation and maintenance of a district heating network.

GIS for district heating

GIS offers advantages in all phases of the district heating lifecycle.

Planning

Customer status integrated in GIS keeps track of the sales process, customer visits, technical reviews, and provides a thorough overview of the progress in the district heating company’s sales efforts.

Hydraulics

Hydraulic calculations integrated in GIS make it possible to ensure optimal updates of data such as pipeline registration, consumer databases and SCADA systems. This improves the connection between recorded data and the hydraulic data model.

Maintenance

GIS is a highly effective tool for use in daily operations. Pipeline and customer information such as age and heating demand can be displayed both with colours and text. This offers a good overview of the condition of district heating networks and, combined with a maintenance plan, can ensure the optimal usage of the maintenance budget.

Mobile access

With modern GIS systems, data is available on site, for example on a tablet. This allows recorded data to be accessed, and pictures and comments to be added directly, on location. Mobile access to pipeline records ensures optimal conditions for intelligent operation and maintenance of a district heating network.