



AND EVERYTHING FLOWS



SAM DISTRICT ENERGY

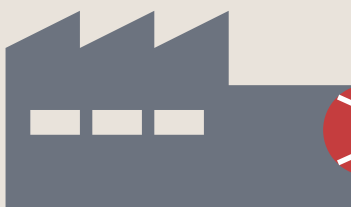
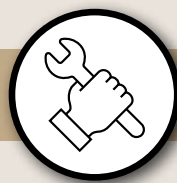
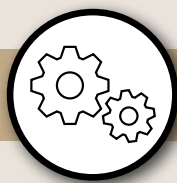
The Digital Solution for Local Heat Supply and District Heating Networks

SAM[®]
DIGITAL

AT A GLANCE

SAM DISTRICT ENERGY is a web-based solution for managing, controlling and optimizing heating and cooling systems. All key data on connected controllers, utility meters, PLCs and electric actuators are saved at one central location. Gateways are used to record the energy consumption and make the associated data available on the SAM DISTRICT ENERGY platform.

Meter IDs and consumption data are clearly assigned to one another so that the heat consumption and billing information are logged correctly for every customer. Making trips to read meters on site becomes a thing of the past. The large amount of logged data allows you to analyze your local and district heating networks, increase their efficiency and achieve better system transparency.



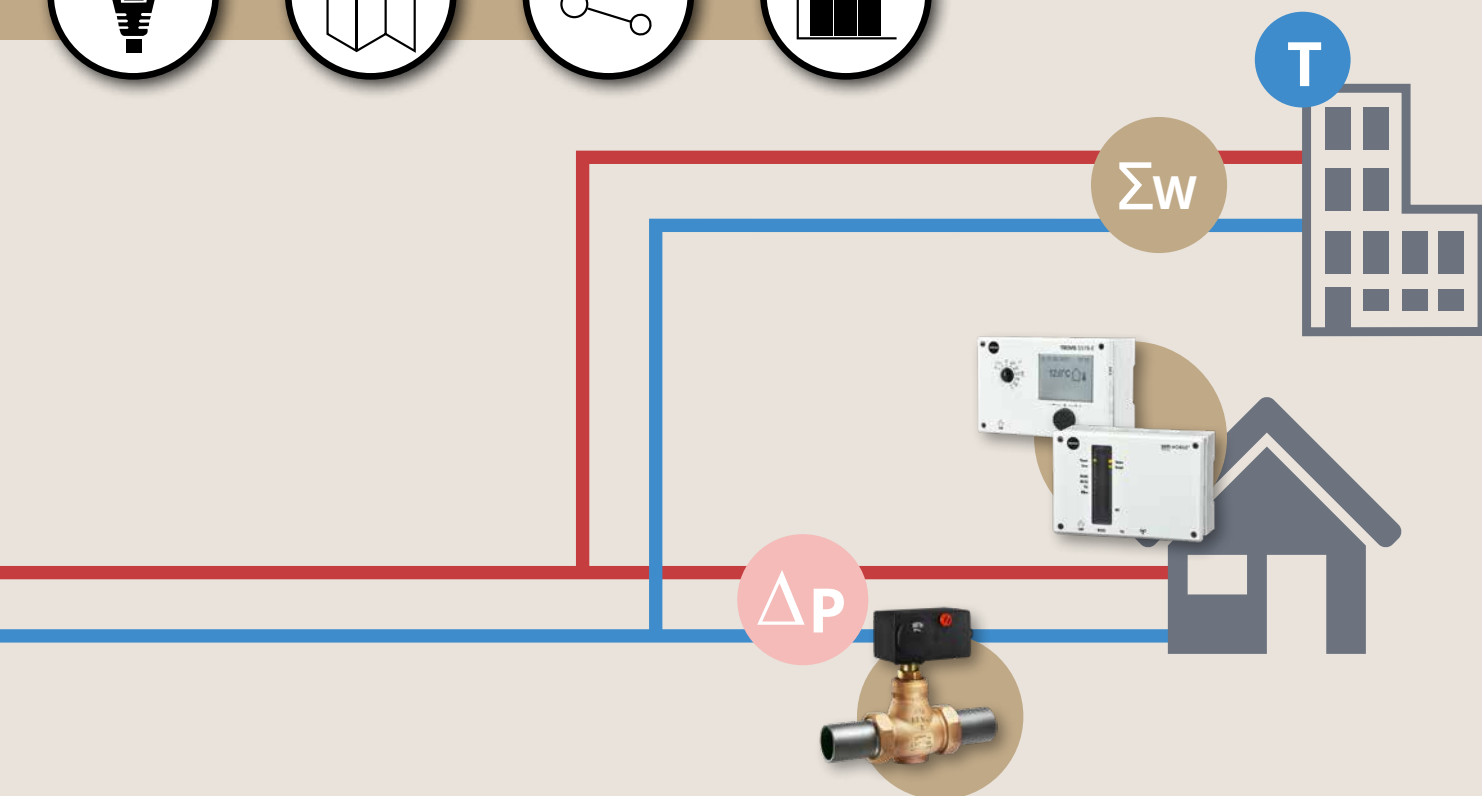
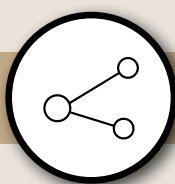
APPLICATION AND MARKETS

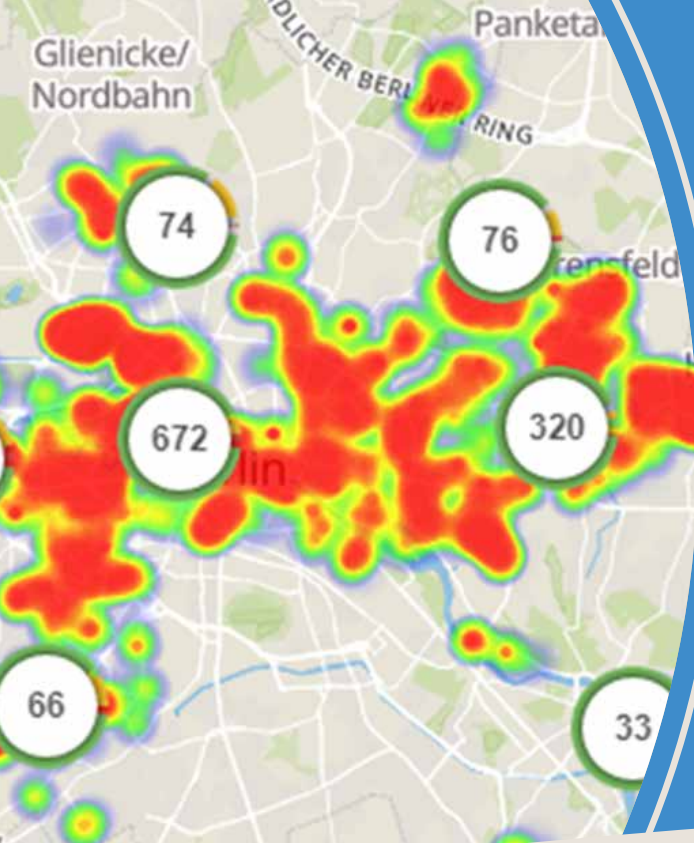
Energy suppliers and network operators

- Detailed analysis of the district heating network
- Information on water flow times and routes
- Reduced operating temperature, resulting in lower fuel cost and CO₂ emissions
- Data pool for analysis and operational plans

Property management companies and service providers

- Support in setting, optimizing and monitoring systems
- Assistance in planning service jobs
- Strengthened customer loyalty through improved service
- Early alarm notification in the event of malfunctions





ADDED VALUE AND SECURITY

Visual network analysis

- Heat map in time-lapse mode
- Dynamic detection of a network's point of worst efficiency
- Route management
- Theoretical and actual hydronic balancing of the district heating network
- Connection of pressure sensors for upstream and downstream pressures, safety-instrumented function and pumps

The bigger picture

- Lower temperature in the district heating network by reducing the safety margin
- Fewer network losses
- Optimized customer support
- Easy isolation and opening of entire pipeline sections
- Improved utilization of network pumps through the use of flexible pressure sensors
- Thermal power limitation

Unlimited scalability

- Unlimited number of users
- Unlimited number of stations
- Integration of existing plants
- Integration of stations away from the existing infrastructure
- Centralized overview

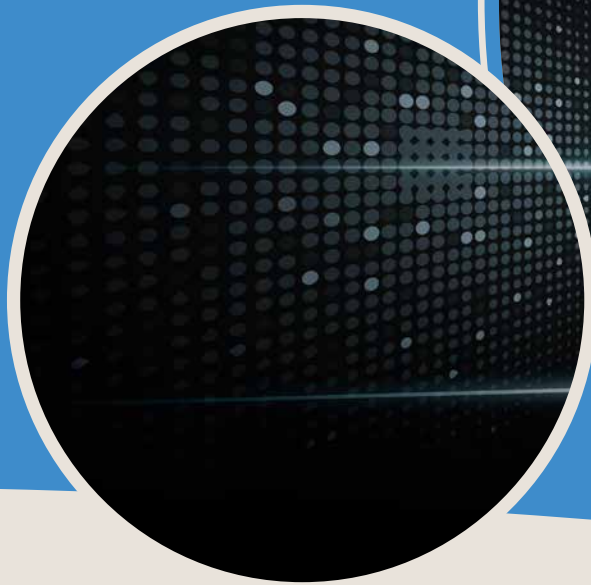
Open and transparent

- Interfaces for data import and export (e.g. meter data)
- Addition of plant schemes
- Historical data for documentation, certification and analysis
- Heat consumption of individual meters or entire branches recorded by virtual devices
- Sensor sharing

Optimization

- Smart Detection function for fast analysis
- Smart Temp function for reduced heat demand
- Automatic controller backup saved in the cloud
- Automatic reports (as CSV or PDF files)
- Alarms (e-mail, text message or webhooks)
- Sensor sharing

DATA SECURITY

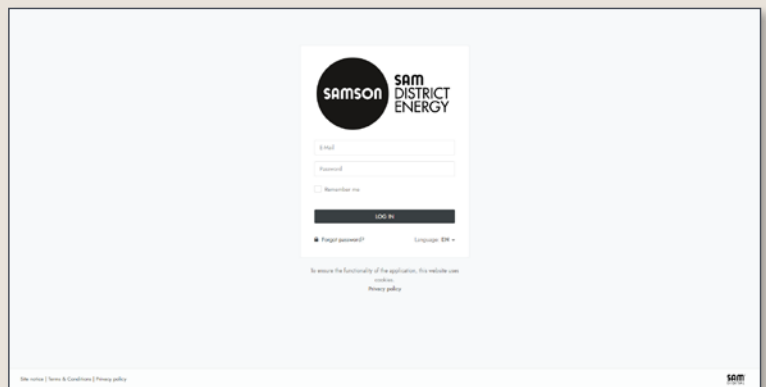


Data security by design

A holistic approach was adopted for SAM DISTRICT ENERGY to enhance the protection, redundancy and security of data through security procedures.

Holistic data security

- Professionally managed data center certified according to ISO 27001, ISO 27017, ISO 27018 and ISO 9001
- Hosted in Germany and according to German law
- Fully encrypted data transfer
- Personal accounts protected by strong passwords and two-factor authentication
- Continuous penetration tests
- Compliance with the EU General Data Protection Regulation (GDPR)
- System certified according to ISO 27001
- Constant further development to meet increasing requirements, such as NIS2, CRA, RED-DA etc.
- State-of-the-art technology

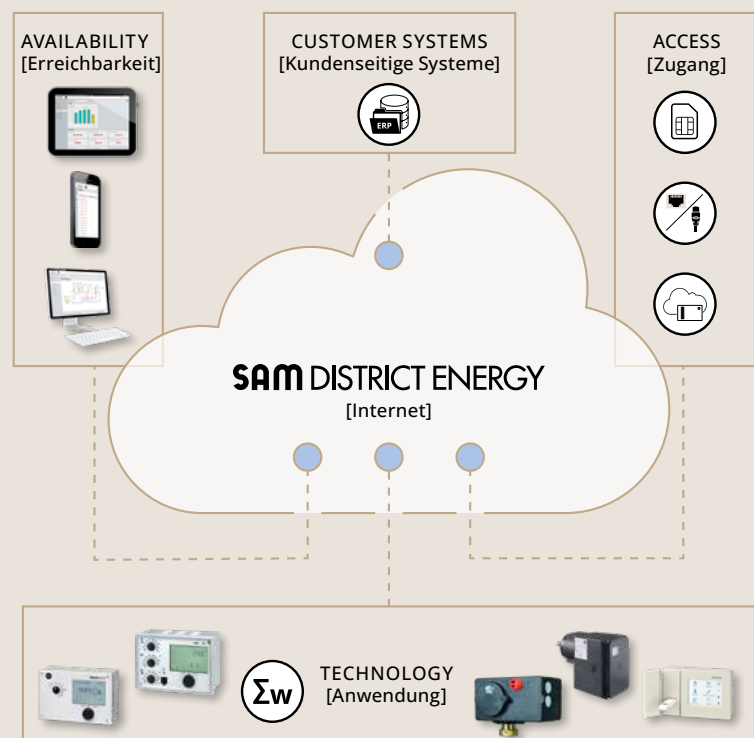


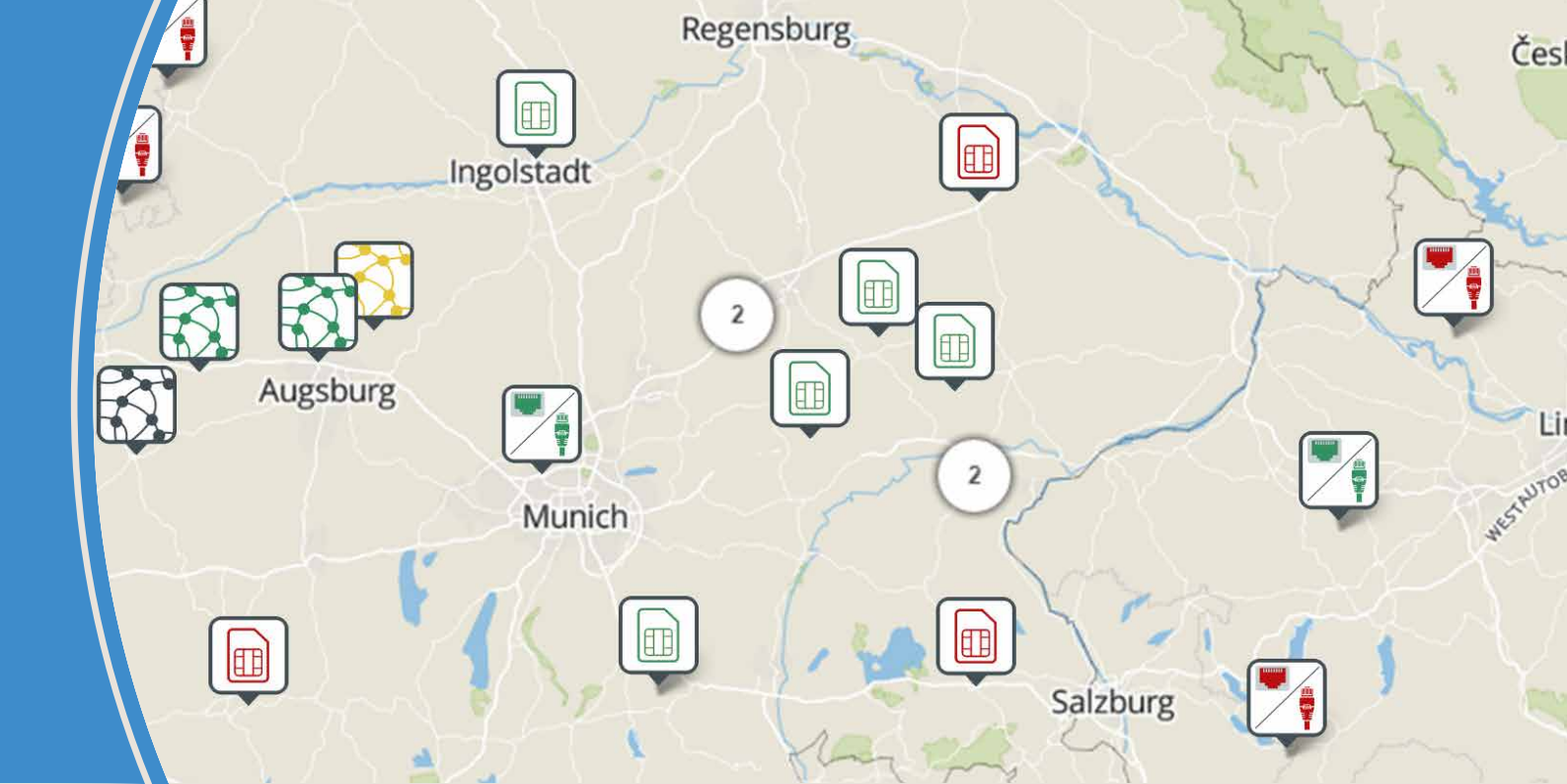
CONNECTIVITY

- Systems integrated into SAM DISTRICT ENERGY over the Internet
- Browser-based app with responsive web design (suitable for all devices, e.g. notebooks, computers and smartphones)
- Link existing systems over web services (API)
- Flexible connection to the web portal
- Combination of various connections within a system
- Connection of all relevant devices in a station, such as controllers, actuators, heat meters, differential pressure meters, pumps, safety circuits, door contacts etc.
- Versatile use of heat meters, e.g. for temperature monitoring
- Rent instead of buy: SAMSON offers attractive rental models as part of an all-included service package for the term of contract.

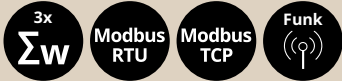
SAM VM Gateway

- Installation of software on any computer
- Continued use of existing infrastructure
- Migration to SAM DISTRICT ENERGY in a few hours





SAM VM Gateway



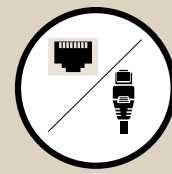
- Software (Windows)
- Controller firmware updates
- Up to 240 controllers per license
- Meters connected to the controllers
- Executable file in automatic startup



SAM MOBILE+ Gateway



- Modern mobile network standards (LTE-M, NB-IoT, GPRS)
- Modbus communication using RS-485 and RS-232 or TTL
- Physical inputs:
 - 4x 0 to 10 V, Pt1000 or DI binary input (optional)
 - 1x Pt1000 or DI binary input (floating contact)
- Meter bus interface (maximum three M-Bus loads according to EN 13757)
- Firmware updates of connected controllers over the gateway
- Buffer to temporarily store data while the system is offline for a maximum of 14 days (saved in one-minute cycles)
- Compliance with the Delegated Regulation of Radio Equipment Directive
- SIM cards available to provide best coverage in mobile phone networks and EU roaming



SAM HOME Gateway



- Fixed infrastructure (DSL/LAN)
- Modbus communication using RS-485 and RS-232 or TTL
- Physical inputs and outputs (two digital inputs, one digital output, one analog input)
- Meter bus interface (maximum three M-Bus loads according to EN 13757)
- Firmware updates of connected controllers over the gateway
- Buffer to temporarily store data while the system is offline for a maximum of 14 days (saved in one-minute cycles)

SMART DETECTION

SAM DISTRICT ENERGY identifies potential for optimization in your heating networks.



Algorithm-based recommendations show you how to get the most out of your network

Digital heating stations:

- Smart Detection identifies which networks can be optimized.
- Targeted recommended action and possible sources of errors are shown.
- The smart system continuously monitors networks and their components.
- The unique function is specifically designed to optimize heating networks.

Examples:

- Batteries in a utility meter running low and need replacing
- Risk of legionella
- Return temperature frequently above the limit
- Centralized overview

| Name | Status | Recommendation | Start Date | Last Date |
|-----------------------|--------|--|------------------|------------------|
| 01 0100 Schönbühl 101 | High | Pressure sensor Battery low. Please replace. | 11.08.2022 16:41 | 11.08.2022 17:47 |
| 01 0100 Schönbühl 102 | High | Pressure sensor Battery low. Please replace. | 11.08.2022 16:41 | 11.08.2022 17:47 |
| 01 0100 Schönbühl 103 | High | Pressure sensor Battery low. Please replace. | 11.08.2022 16:41 | 11.08.2022 17:47 |
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| 01 0100 Schönbühl 148 | High | Pressure sensor Battery low. Please replace. | 11.08.2022 16:41 | 11.08.2022 17:47 |
| 01 0100 Schönbühl 149 | High | Pressure sensor Battery low. Please replace. | 11.08.2022 16:41 | 11.08.2022 17:47 |
| 01 0100 Schönbühl 150 | High | Pressure sensor Battery low. Please replace. | 11.08.2022 16:41 | 11.08.2022 17:47 |



Smart software tailored to your network

Smart Detection:

- Expert know-how that is easy to understand
- Machine learning based on algorithms created specifically for district heating systems
- Customer requirements and station specifications included in the analysis
- No configuration required: the system automatically learns right from the start.

Optimize your network operations

SAM DISTRICT ENERGY helps improve:

- Transparency
- Clarity
- Understanding
- Quality of customer support

TROVIS 5578 AS PILOT SYSTEM

GASAG Solution Plus GmbH (GSP): specialist for custom supply solutions in heating and cooling systems based on a contracting model
Supplies approx. 410 GWh heat to residential areas, industrial plants, office buildings and hospitals



Industrial sector/application

- District heating/contracted heating systems for residential areas
- Heat generation and distribution, control of heating circuits in existing systems

Objectives

- Lower flow and return temperatures to make the supply to heating and cooling systems more efficient
- Smaller CO₂ footprint
- Automatic and continuous adaptation

Challenge

- Limited optimization achieved by changing parameters manually (temperatures lowered by 10 K at the maximum)
- Achieve further energy savings without affecting the security of the energy supply
- Sensor sharing

Products used

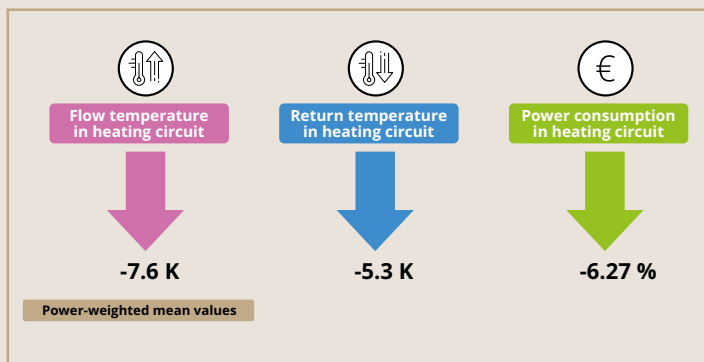
- TROVIS 5500 Heating and District Heating Controllers (e.g. TROVIS 5578 E)
- SAM DISTRICT ENERGY cloud solution for AI-based data-driven optimization

Result

- Automated optimization of heating systems
- Stable and reliable energy supply to heating and cooling systems
- Less energy consumed

Solution by SAMSON

- AI-based machine learning integrated into SAM DISTRICT ENERGY processes real-time data, data history and weather forecasts for auto-adaptive optimization of set points
- Automatic and continuous adaptation prevents insufficient supply and responds faster than non-adaptive optimization, especially between seasons
- Pilot implementation phase: results
 - Temperatures lowered further by up to 8 K
 - Reduced consumption ~6 % depending on the outdoor temperature
 - No complaints from tenants. No manual intervention required



SAM DISTRICT ENERGY AT SWE ENERGIE GMBH

SWE Energie GmbH

Supplies electricity, gas and district energy to more than 100,000 customers

Supplies over 600 GWh district heating energy annually to more than 1700 domestic substations and 50,000 residential units

Industrial sector/application

- DISTRICT ENERGY and building automation
- Digitalization of district heating networks
- Introduction of digitalization level 4 for the smart domestic substations (iHAST)

Objectives

- Full digitalization of Erfurt's district heating network
- Improve billing transparency and operational efficiency
- Drive forward the energy transition and expansion by 2045
- Increase the number of domestic substations supplied from 1,700 to around 7,400
- Optimize the system and processes through digitalization

Challenge

- Legal obligation to introduce a municipal heat plan by 2026 (German law)
- Different temperatures and pressures throughout the 200-km-long network
- Necessity to increase efficiency and cut costs

Products used

- SAM DISTRICT ENERGY cloud solution
- Integration of around 2400 heat meters and 350 TROVIS controllers

Solution by SAMSON

- Digitalization level 4 to allow remote polling, set point changes and remote control
- Use of buffer storage capacities serving as temporary decentralized heat storage
- Alarms and limits used for automated monitoring
- Systematic detection of inefficient customer systems and long-term optimization

Result

- Almost 100% digitalization of the meter-to-cash process
- Compliance with legal transparency requirements (consumption data on a monthly basis)
- Considerable work, time and monetary savings throughout the billing process
- Improved troubleshooting and more efficient use of primary energy
- Customers benefit from greater transparency leading to a wider acceptance of the energy transition



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