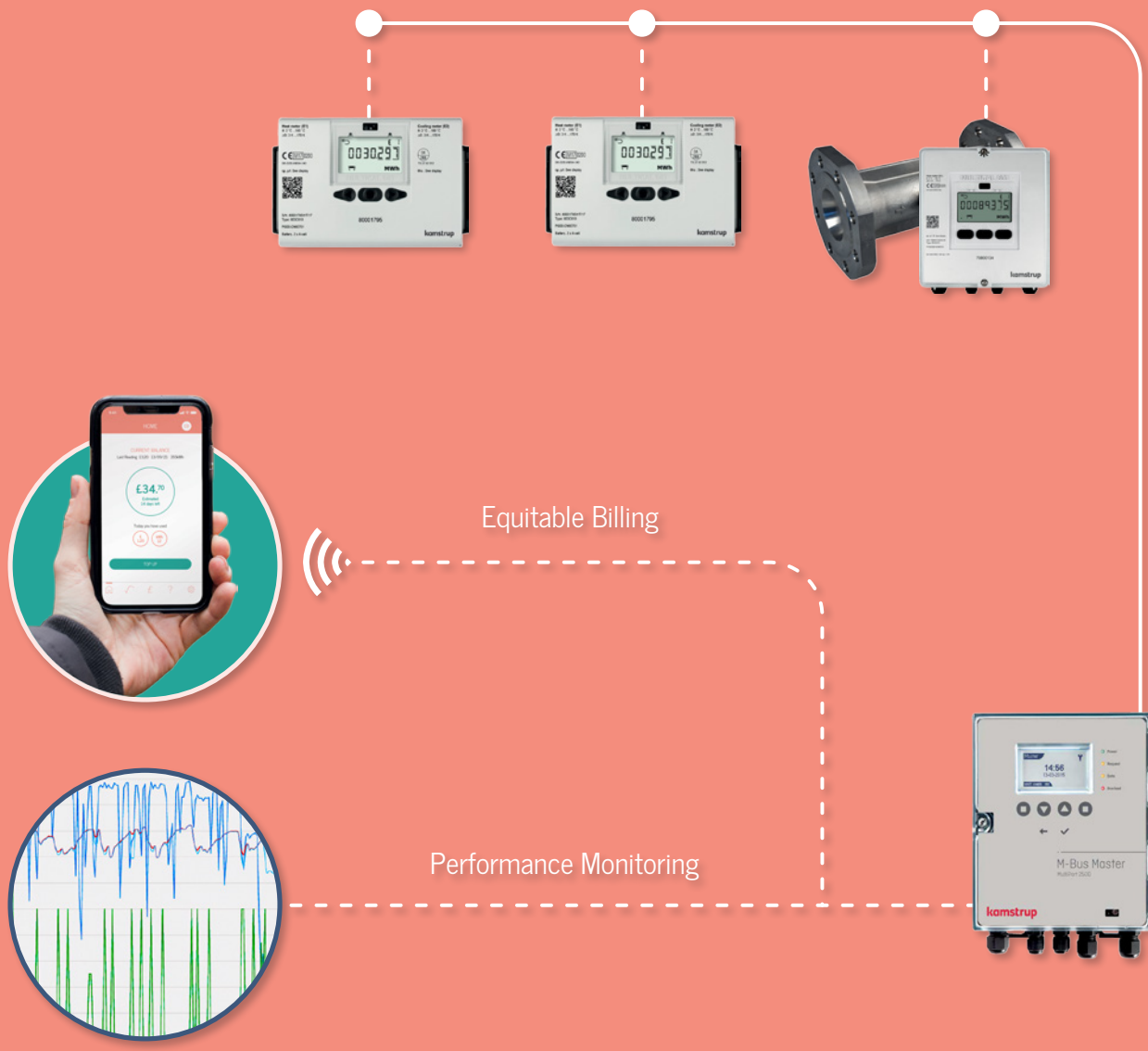
KURVE

THE SMART CHOICE

Equitable Billing and Performance Monitoring Infrastructure



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HEAT NETWORKS CODE OF PRACTICE (CP1): DESIGN STAGE REQUIREMENTS

OBJECTIVE 3.8:

To define a metering strategy and select heat metering, prepayment and billing systems that are accurate and cost-effective

3.8.11 *A smart metering or 'pay as you go' (PAYG) system shall be specified/ installed. The system shall give residents/customers a local display to monitor their energy consumption and provide good quality AMR and a range of payment options, including prepayment. This will improve the customer experience, help residents/customers to manage budgets and help the scheme operator to manage risks around bad debt. Smart metering systems include: an in-home display, half-hourly automatic meter reading and PAYG functionality (including emergency credit and friendly disconnection). Customers shall be provided with a number of options for making payment, including online, mobile phone and cash payment options. Any additional CapEx or replacement expenditure (RepEx) for the smart metering system shall be taken into account in the overall financial assessment.*

3.8.13 *AMR systems shall be capable of reading an extended heat meter register, including total volume and temperatures. This information should then be used during commissioning and ongoing operation to identify poor performance in the secondary/tertiary heating systems.*

3.8.19 *The AMR and/or smart metering system shall be capable of providing feedback to customers on their heat use compared with norms and giving advice on how to manage their consumption. For non-domestic customers the monitoring of heat demand profiles on a half-hour basis can enable both parties (customer and heat supplier) to identify control modifications that would reduce peak demands or change the timing of peak demands for the benefit of the heat network and hence result in lower cost for the customer.*

Best practice would be to:

BP3.8a select an AMR or smart metering system from a vendor that provides an open-protocol interface, in order to provide futureproofing around the choice of data collection and billing providers. The choice of metering equipment should not tie the operator to a particular customer service and billing provider.

HEAT NETWORKS CODE OF PRACTICE (CP1): CLIENT OBJECTIVES

OBJECTIVE 1.1

To commission the project in accordance with the Code of Practice:

"The client organisation will wish to procure a heat network that will provide a high level of service for customers and be safe, reliable and cost-effective."

OBJECTIVE 1.2

To develop contracts that are fair and equitable for consumers:

"At an early stage in any heat network project, it is important to set out the future contractual intentions to ensure customer satisfaction."

OBJECTIVE 1.3

To define appropriate service levels for the heat supply:

It is important that the service level for the heat supplied is defined as ultimately this will determine the design and hence the costs of delivering the heat.

OBJECTIVE 1.4

To develop a detailed CP1 monitoring plan and feasibility study brief:

"The ultimate objective is to build a heat network that operates correctly and performs to the client's requirements. This monitoring also plays a vital part in achieving high levels of customer satisfaction."

MAKING HEAT NETWORKS AN INVESTABLE ASSET

Heat networks should be designed for a 20-year lifespan. During this time, a heat network must reliably provide low-cost, low-carbon heat. And so, to keep operational and replacement expenditure as low as possible, it will require a high-quality monitoring and equitable billing platform using as little hardware as necessary – ideally direct data reading should be obtained using an open protocol M-Bus communication infrastructure, as per the 2020 Heat Networks Code of Practice.

M-BUS

M-Bus (Meter-Bus) is a standardised European communication protocol developed for the automatic meter reading (AMR) of water, gas, and electricity meters.

THE OPEN METERING SYSTEM GROUP

The Open Metering System (OMS) Group is a non-profit organisation and interest group of meter manufacturers, utilities and communication firms. The OMS Group define the M-Bus standard across Europe to achieve a low-cost, universal, and totally open-protocol metering infrastructure compatible with any meter, datalogger and software.

CLIENT BENEFITS

M-Bus Infrastructure

- ✓ Any Meter
- ✓ Any Datalogger
- ✓ Open Protocol
- ✓ Reliable Data Capture
- ✓ Low Power Consumption
- ✓ Any Software
- ✓ Low Cost

M-BUS INFRASTRUCTURE

MONITORING AND BILLING INFRASTRUCTURE USING M-BUS

Using an M-Bus infrastructure will allow the remote reading of individual dwelling, distribution and energy centre equipment meters for both billing and energy monitoring. Inherent to an M-Bus network is that the meter data can be freely accessed by all relevant parties throughout the lifespan of the Heat Network.

TRADITIONAL CREDIT BILLING

Where an M-Bus network has been installed, data for traditional credit billing will always be easily available.

KURVE

KURVE is an equitable billing platform and consumer Web-App. KURVE offers the Heat Network owner additional flexibility to bill via either Pay as You Go (PAYG), Credit as You Go (CAYG) or credit billing.

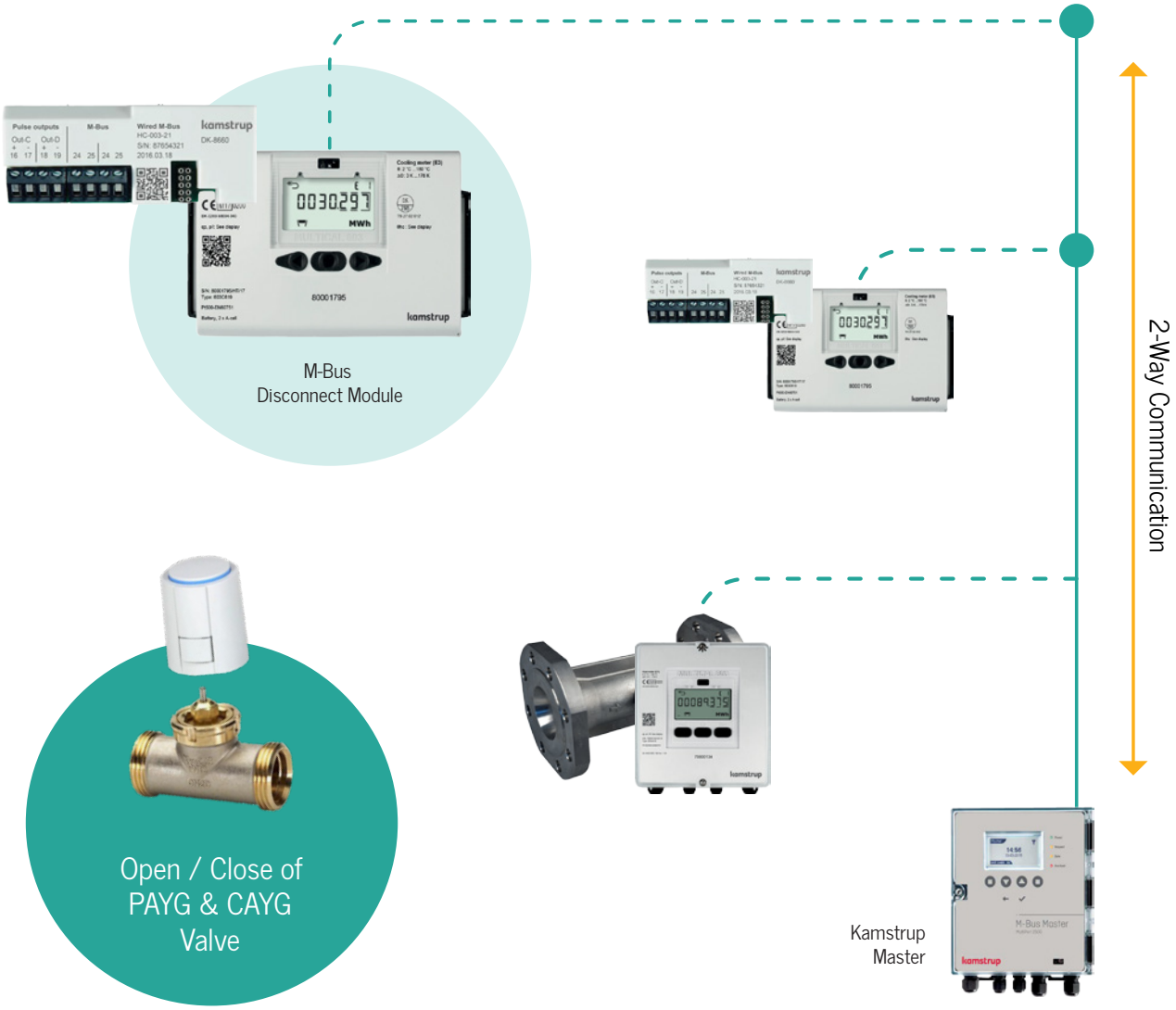
EnergiRaven

EnergiRaven is an energy monitoring, management and Heat Network optimisation platform utilising AMR data.

M-BUS COMMUNICATION

TRADITIONAL AND EQUITABLE BILLING INFRASTRUCTURE

Traditionally, M-bus has been used as an infrastructure simply to request data from the energy meters. This data, which is freely available to all key stake holders, can be used for billing either via email or by post. Using an M-Bus disconnect module (within the energy meter) and the Kamstrup Master, the M-Bus infrastructure can be enhanced to take advantage of the bidirectional or 2-way network, which presents the opportunity for new types of equitable billing. The KURVE equitable billing Web-App gives heat suppliers the ability to remotely switch between CAYG and PAYG depending on their preference, or in response to individual consumer circumstances.



PAY ON THE GO

TRADITIONAL AND EQUITABLE BILLING INFRASTRUCTURE

READY DISCONNECT

Utilising Kamstrup software with the M-Bus disconnect module allows for credit billing with the option for remote manual disconnect. This can be used in the event of debt to help get consumer engagement and to prevent debt from growing.

CREDIT AS YOU GO

CAYG is a hybrid equitable billing solution that combines the benefits of both credit billing and PAYG by setting a cut-off limit below £0, such as -£100. This allows customers greater freedom to pay in arrears whilst the heat supplier still has a set and managed debt risk level.

PAY AS YOU GO

PAYG offers the resident full autonomy and control over their energy consumption and payment.

- **Flexibility:** PAYG energy billing provides customers with more flexibility and control over their energy usage and spending. Customers can choose to top up their energy account with credit as often or as infrequently as they want, depending on their energy needs.
- **Budgeting:** PAYG energy billing can also help customers budget more effectively for their energy expenses. Since customers pay in advance for their energy usage, they can plan their spending and avoid being surprised by high bills. This can be particularly helpful for low-income households or those on a tight budget.
- **Energy conservation:** PAYG energy billing can also encourage energy conservation and efficiency, as customers can see in real-time how much energy they are using and how much credit they have left.
- **No disconnection by the heat supplier:** Since PAYG energy billing requires customers to pay in advance for their energy usage, there is no risk of the heat supplier having to disconnect the customer due to unpaid bills.

REDUCING HEAT NETWORK COSTS WITH KURVE

KURVE
THE SMART CHOICE

59% LOWER CAPEX

- Heat Interface Unit (HIU) pre-wired by SAV with minimal on-site installation requirements
- Only energy meter with M-Bus disconnect module required
- Mobile Web-App with no in-home display required
- Standard wired and low-cost M-Bus network

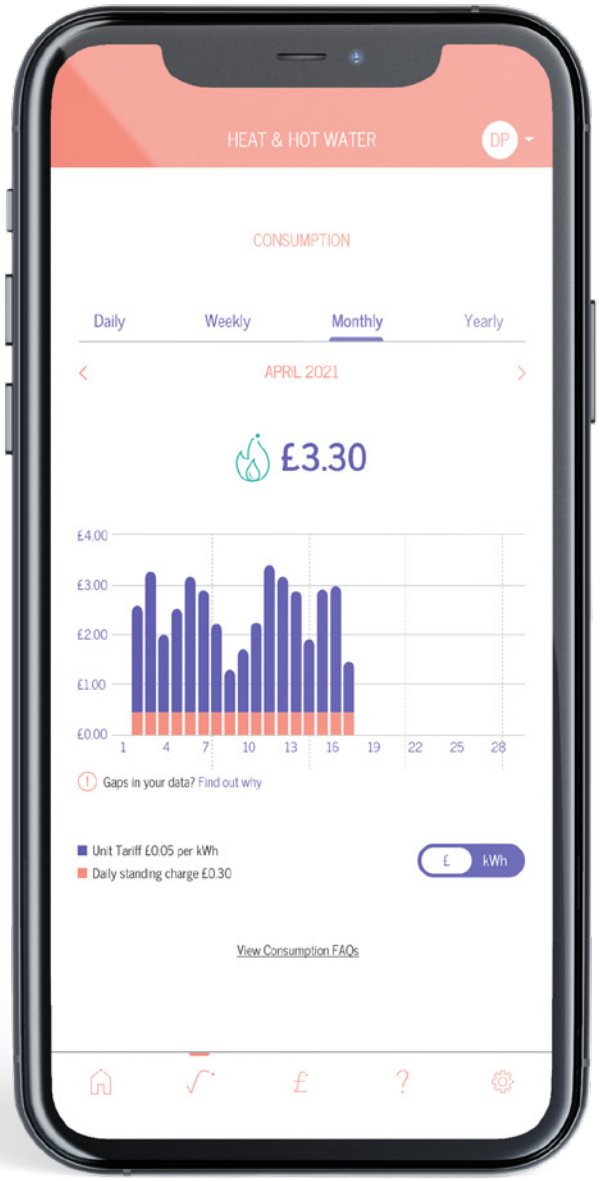
19% LOWER OPEX

- Robust M-Bus infrastructure with minimal maintenance requirements
- 50% lower Software as a Service (SaaS) fees compared with market leading PAYG solutions.

97% LOWER REPEX

- Reduced asset replacement due to no in-home displays

24%
Lower energy consumption for PAYG customers vs credit billed



DEBT RISK MANAGEMENT

18X LOWER DEBT

PAYG billing can significantly help reduce the debt risk for the Heat Network owner or heat supplier. Recent data has shown that KURVE PAYG customers have 18x lower accumulated debt compared to customers with traditional credit billing.

RELIABLE DATA CAPTURE

Outdated in-home displays and prepayment meters can have a significant impact on accrued debt due to the units being out of communication. In such cases, tariffs can't be updated, and data required for billing may not be made available. The hard-wired M-Bus infrastructure used by KURVE will mitigate this risk and significantly reduce the debt contingency fund required.

PAY BEFORE YOU CONSUME

With KURVE PAYG billing, customers pay for the heat in advance. This ensures that the heat supplier receives payment upfront, minimising the risk of customers defaulting on their payments or accumulating significant debt.

AUTOMATED SELF-CUT-OFF

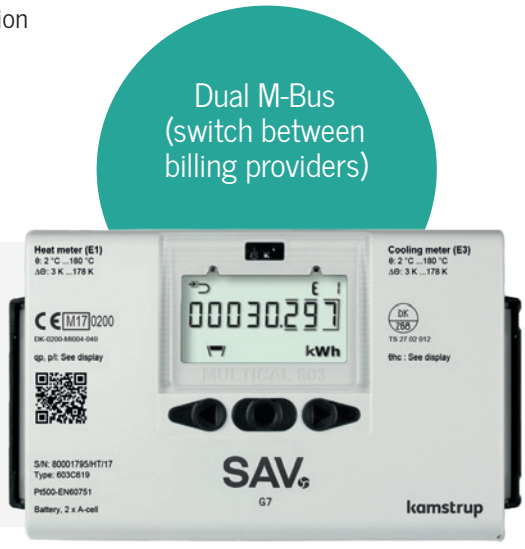
In cases where customers exhaust their prepaid credit, and unless friendly or emergency credit has been activated, KURVE will automatically cut off the heat supply. This encourages customers to maintain sufficient credit on their accounts. By promptly disconnecting non-paying customers, the heat supplier can mitigate the risk of accumulating significant unpaid debt.

FINANCIAL TRANSPARENCY

KURVE provides the customers with transparent and easily accessible information about heat consumption and costs. This transparency promotes better energy and financial management, reducing the likelihood of customers falling into arrears and ultimately minimising the debt risk for the heat supplier.

PEACE OF MIND

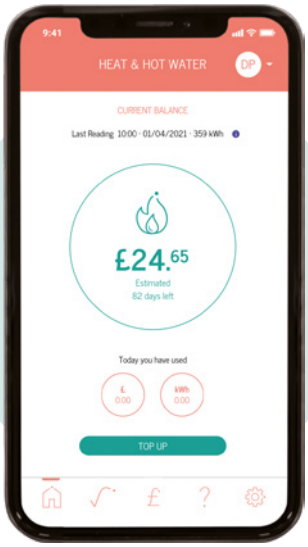
Over time, relationships change, so making sure that a contingency is set in place, and the billing infrastructure is future proofed will help bring peace of mind. The Kamstrup Master datalogger 603 energy meter features dual M-Bus functionality to allow for simply and cost-effectively switching between billing providers.

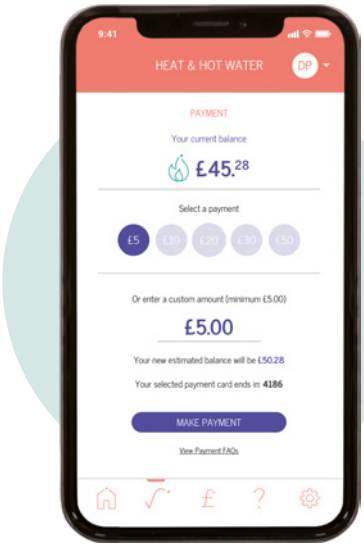


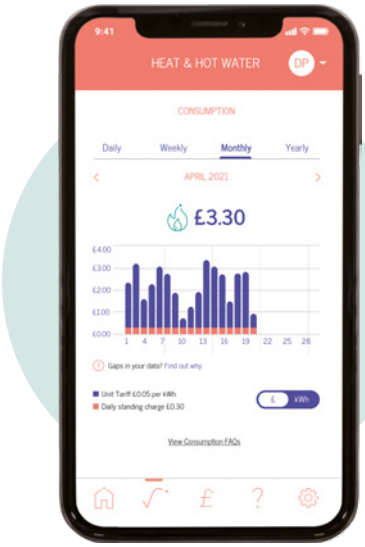
FOLLOW YOUR KURVE

KURVE FOR RESIDENTS

Integral to the design of the KURVE equitable billing Web-App is end-user engagement, support, and improved energy awareness.







HOME PAGE YOUR BALANCE

- View current balance (£)
- View current day's usage (kWh)
- View and activate emergency credit
- View latest meter reading
- Traffic light colours to highlight current status
- Manage your heating and cooling from one account with dual utility

MAKING A PAYMENT

- Helpful prompts to maintain supply ON
- Top-up via the KURVE Web-App
- Top-up at PayPoint outlets
- 24/7 secure phone payment service
- Stored payment card option
- 4-click quick-pay process
- Payment history viewable in Web-App

CONSUMPTION AT YOUR FINGERTIPS

- Daily, weekly, monthly and yearly views
- Historical data access
- View energy usage (kWh)
- View energy spend (£)
- Promotes conscientious energy usage
- Reduced spend
- Current tariffs displayed in Web-App
- Energy benchmarking vs industry standard

MOTIVATIONAL TARIFFS

Continuous performance monitoring is required for applying an equitable billing platform. One of the key performance indicators of a heat network is the temperature of the water returning to the energy centre – and every degree counts. Higher return temperatures increase heat losses, reduce plant efficiency, shorten pipe lifespans, and raise overall running costs. Conversely, lower return temperatures improve the economy and longevity of the entire system, allowing operators to invest in upgrades and pass savings on to customers.

However, while operators dictate their supply temperatures, the return temperatures are determined by the individual users. In an ideal scenario, dwellings receive hot water at around 60-70°C, extract as much heat as possible, and return it at a modest 30-40°C. The difference between the supply and return temperature, Delta T, is a critical number operators continuously seek to increase by driving return temperatures down.

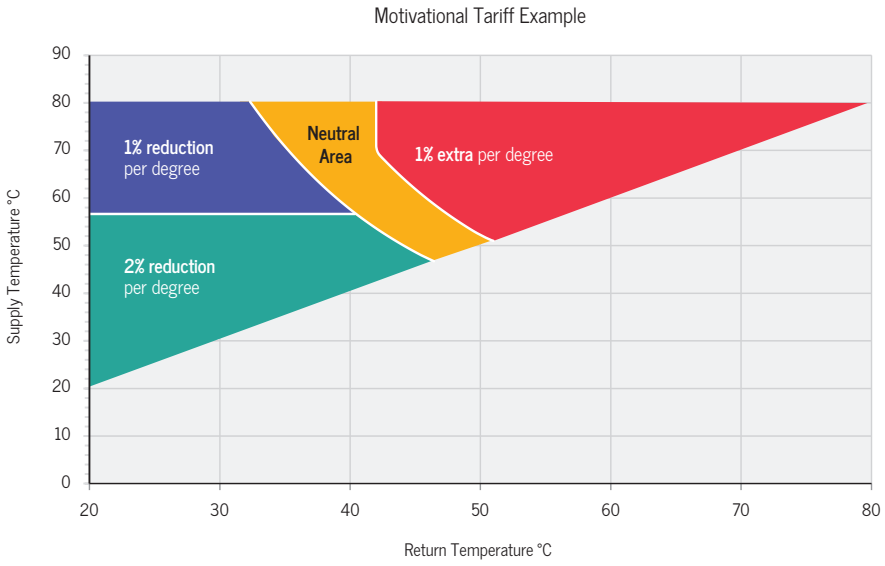
In response to this challenge, some heat networks have introduced motivational tariffs - a relatively new concept in the UK, but one with tremendous upside. These tariffs minimise costs and emissions via a two-pronged approach: penalising customers for higher return temperatures while offering discounts for lower return temperatures. Operators may also include separate charges for water volumes drawn from the network and peak demand charges based on maximum m^3/h. The result of these combined elements is a more transparent and equitable network for all users.

Under a motivational tariff model, a network operator may set an average annual return temperature of 35°C. Then, a customer averaging 30°C would receive a discount (based on total megawatt-hours consumed), while another averaging 40°C would receive a penalty charge – and a clear incentive to improve their efficiency. Through digital metering, both customers and operators can access real-time temperature data and cooperate to make upgrades that benefit the entire network.

In addition to enhancing performance, motivational tariffs are cost-effective for operators, who can use penalty income to fund discounts for more efficient customers. In the spirit of fairness, the operator may also choose to cap pricing variations so that bills cannot rise or fall by more than a set percentage.

Motivational tariffs may be new to the UK, but they've already proven highly successful abroad. For example, in Denmark – often the poster child for social innovation – motivational tariffs have been used for over 20 years, during which time average return temperatures have dropped by an incredible 10°C. In one case, an operator paid out €270,000 in annual tariff payments but realised more than €679,000 worth of efficiency gains, illustrating the incredible value of uniting customers in a common goal.

Today, some 64% of Danish households are connected to district heat networks, and around 60% of operators utilise a motivational tariff.



ENCOURAGING HEAT NETWORKS TO FLOURISH

RAVENRESIDENTIAL

RavenResidential utilises the myEnergiRaven software portal which collects, converts, and breaks down traditional energy consumption data into user-friendly metrics for the whole Heat Network, down to the individual dwelling, distribution and energy centre equipment meters.

This approach using comparative data, pinpoints the worst performing dwellings, as well as allowing the operator to scrutinise and improve network and central plant efficiency.

HEAT NETWORK MONITORING

- **Identify energy usage patterns:** Identify opportunities for energy and cost savings, such as optimising equipment operation or implementing spot pricing (switching to cheaper heat generation).
- **Pinpoint energy waste:** Identify areas where energy is being wasted, such as leaks in the heat network or inefficient equipment.
- **Improve system efficiency:** This might include upgrading equipment, adjusting system settings, or optimising maintenance schedules.
- **Facilitate preventative maintenance and repairs:** This information can help locate and prioritize maintenance activities and reduce downtime due to equipment failure.

EnergiRaven

ACCOUNTABILITY FROM DESIGN THROUGH TO USE

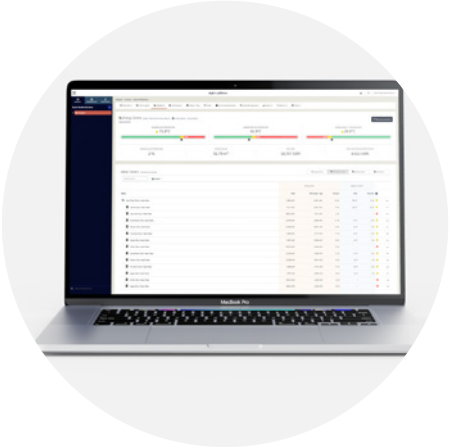
Energy Monitoring is a prerequisite for keeping the cost of heat as low as possible and will help to ensure that a Heat Network remains an attractive asset throughout its lifespan. The RavenResidential platform is designed to help Heat Networks deliver their promise, which is to reliably provide low-cost, low-carbon heat. RavenResidential offers the heat network owner an audit trail of performance throughout the lifespan of the heat network.

INSTALLATION AND COMMISSIONING

Problems arising from incorrect installation or substandard commissioning will typically first become evident during actual operation. This may result is poor efficiency of the network and high operational costs.

VERIFICATION AND HANDOVER

Final acceptance for whether the scheme is as desired may be difficult to determine without being sufficiently informed. Being able to prove that the Heat Network performs as designed and according to CP1 Best Practice should therefore be a requirement by the owner.



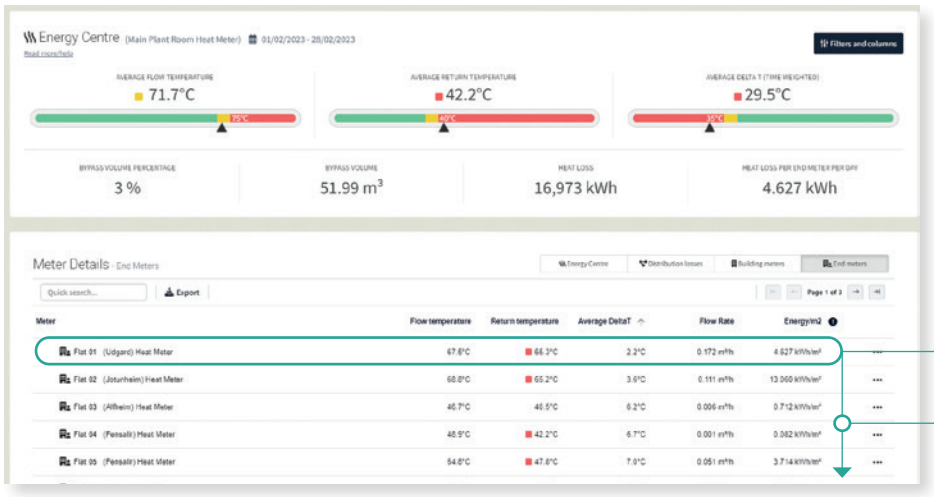
ONGOING USE

To keep Heat Network tariffs as low as possible, continuous monitoring of the network is required. The Heat Network owner and operator should have an audit trail of the energy performance from building level down to the individual dwelling, distribution and energy centre equipment meters.

KEY FEATURES

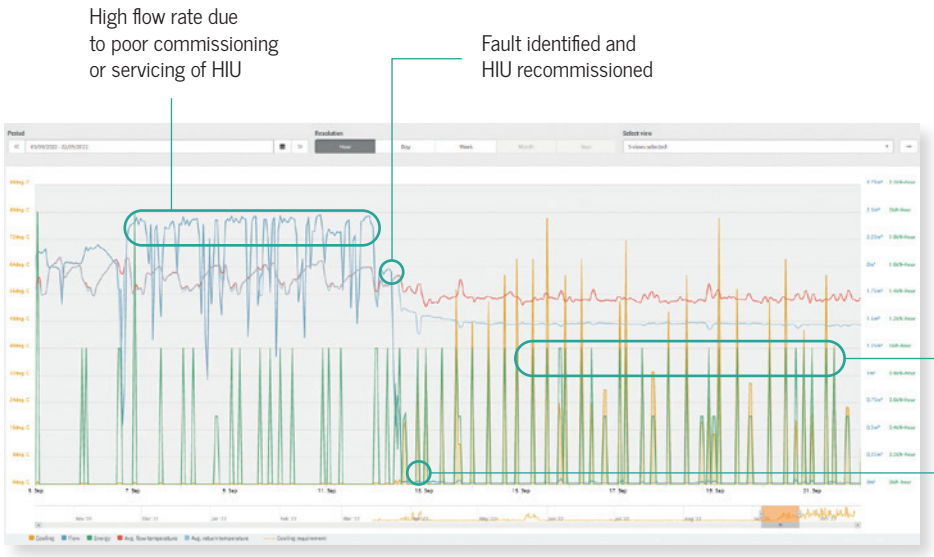
PERFORMANCE BASED SERVICING

Offers continuous improvement of performance through benchmarking of key metrics from building level down to the individual dwelling and sub-meter.



REAL TIME DATA

Intuitive and simple drill down to locate faults i.e. by block, building and dwelling. View in real time when faults have been fixed.



CASE STORY IRONWORKS, MILL ROAD

Despite accurate commissioning, ongoing or performance monitoring can uncover potential hidden savings from network inefficiencies. Cambridge Investment Partnership (CIP) embarked on a transformative journey three years ago. Collaborating with SAV, they sought a platform that would effectively monitor energy consumption in their communal heat networks. This case story focuses on their partnership and the unexpected revelations that emerged after implementing the RavenResidential energy monitoring platform in a new build project, Ironworks, Mill Road.

Read the full case story here:

Flexible Billing

KURVE
THE SMART CHOICE

Energy Metering

kamstrup

Performance Monitoring

EnergiRaven

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