Hear how innovative GPRS remote monitoring solutions could revolutionise your industry.

Introduction

Effective maintenance of equipment, plant procedure and buildings is crucial to avoid costly shutdowns and keep production operating at optimum levels

Introduction

Preventative maintenance increases plant production, operation capacity and boosts profitability

Introduction

With effective monitoring and control this statistic can be almost eradicated with benefits going straight to the bottom line.

Introduction

Rising energy prices, more stringent regulation, and a demand to save labour, operational costs and time are challenging every type of business. Accurate measurement and accounting for energy consumption within plant, equipment and buildings is at the heart of effective management.

t-mac

Introduction

GPRS enabled monitoring and control systems which can wirelessly link information from multiple sites
- are rapidly changing and advancing the world of maintenance, plant processes and facilities management.
Safeguard production and the bottom line

1. Monitoring the machine

Preventative monitoring systems:

- Help us meet energy management regulations
- Save our staff time and stop costly engineer call outs

1. Monitoring the machine

Preventative monitoring systems:

- Help us be proactive when it comes to maintenance
- Prevent issues before they occur
- Let us ‘communicate’ with our machines

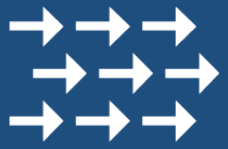
1. Monitoring the machine

t-mac - An early warning system for monitoring critical equipment. Can monitor assets, energy, equipment, volume, temperature, in fact anything that can be measured electronically, these systems can monitor.

1. Monitoring the machine

temperature

pressure



flow

volume

energy

2. But how do these innovative GPRS remote monitoring and control devices work?

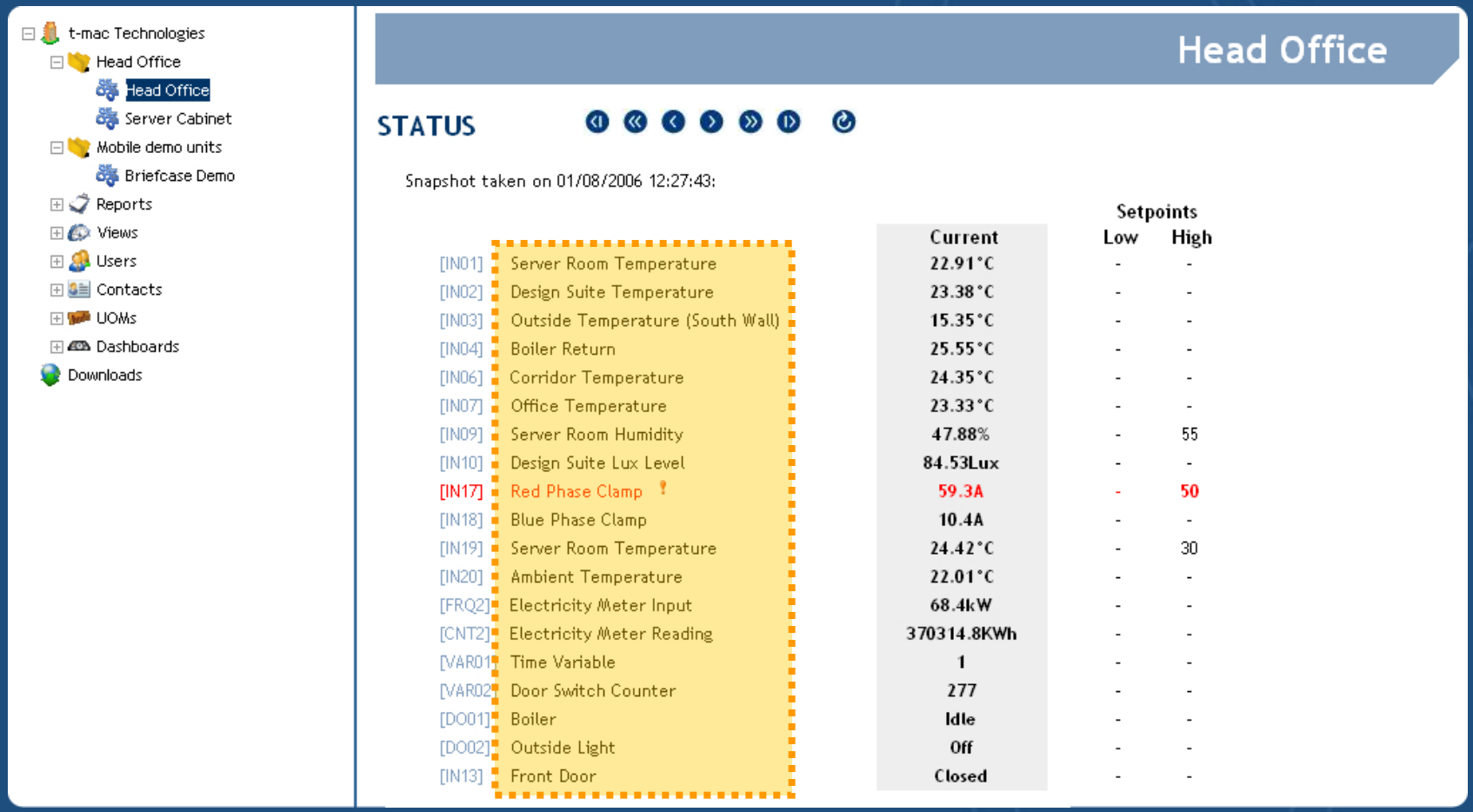
Identify what it is that you need to monitor

For example:
Monitor the workings of particular piece of equipment that your plant cannot function without

2. But how do these innovative GPRS remote monitoring and control devices work?

Condition monitoring devices can monitor just about anything

2. But how do these innovative GPRS remote monitoring and control devices work?



2. But how do these innovative GPRS remote monitoring and control devices work?

- Chlorine levels
- Fluid use
- Oil / battery levels
- CO2 / gas / toxin levels
- Weight
- Volume
- Vibration
- Wind speed
- Inside and outside temperature
- Energy consumption
- Machine temperature

2. But how do these innovative GPRS remote monitoring and control devices work?

GPRS enabled remote monitoring devices can:

- Identify inefficient performance of factory equipment, plant or key systems, such as compressors
- Assess when they're working; coping with demand; and running at peak efficiency
- Accurately assess faults or leakage rates and alert the user at the earliest possible stage

2. But how do these innovative GPRS remote monitoring and control devices work?

Those which can be accessed over the internet are rapidly gaining ground in the UK and overseas meaning the human interaction element of monitoring is fast becoming a thing of the past.

2. But how do these innovative GPRS remote monitoring and control devices work?

EG: t-mac works by being installed within, on or beside the asset, and works in three ways

(i) by remote monitoring of data

(ii) remote logging

(iii) remote process control

2. But how do these innovative GPRS remote monitoring and control devices work?

1. Configure the t-mac device to ***monitor*** the item of plant, HVAC&R or metering equipment, recording critical level criteria

2. From continuous monitoring, t-mac will send ***alerts*** to managers, via SMS/email, if levels fall outside pre-set criteria, e.g. if a leak occurs or temperature/loads exceed desired limits

2. But how do these innovative GPRS remote monitoring and control devices work?

3. Instant notification allows users to immediately take ***remedial action***, such as turning equipment or systems off or on, either automatically / pre-programmed through t-mac.

2. But how do these innovative GPRS remote monitoring and control devices work?

4. Through continuous monitoring of sensors connected to analogue and digital inputs, t-mac can action complex ***control*** tasks to assist in the control of plant equipment and HVAC&R.
   Tasks require no programming knowledge, they're simply linked together to form complex control schemes based on any of t-mac's inputs and outputs.

2. But how do these innovative GPRS remote monitoring and control devices work?

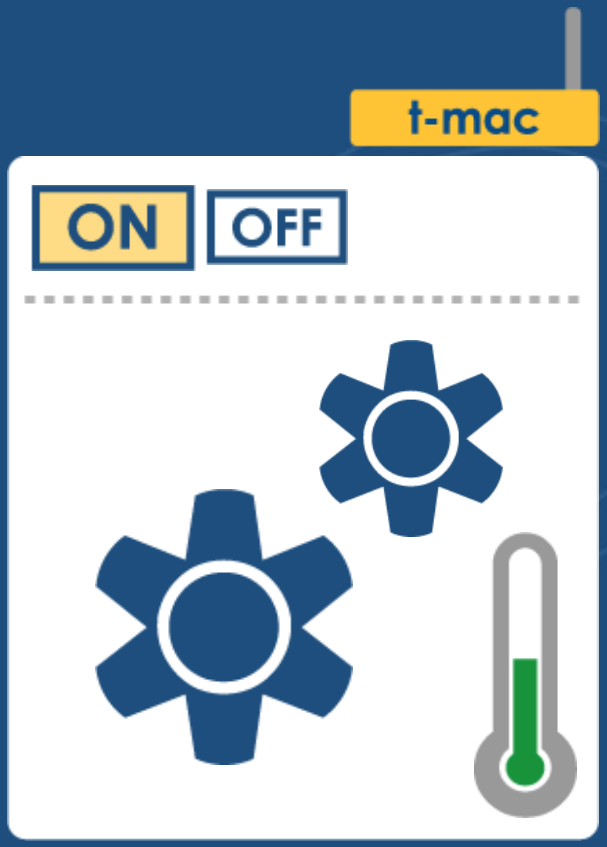
NB: Third-party equipment connected via a ***serial protocol*** (MODBUS) can also allow for seamless monitor and control EG:

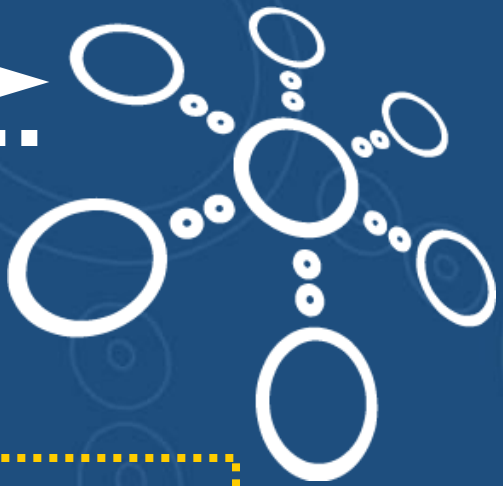
t-mac

2. But how do these innovative GPRS remote monitoring and control devices work?

- Remote automation of machines and assets
- Pre-set ability
- Remote diagnostics
- Change settings

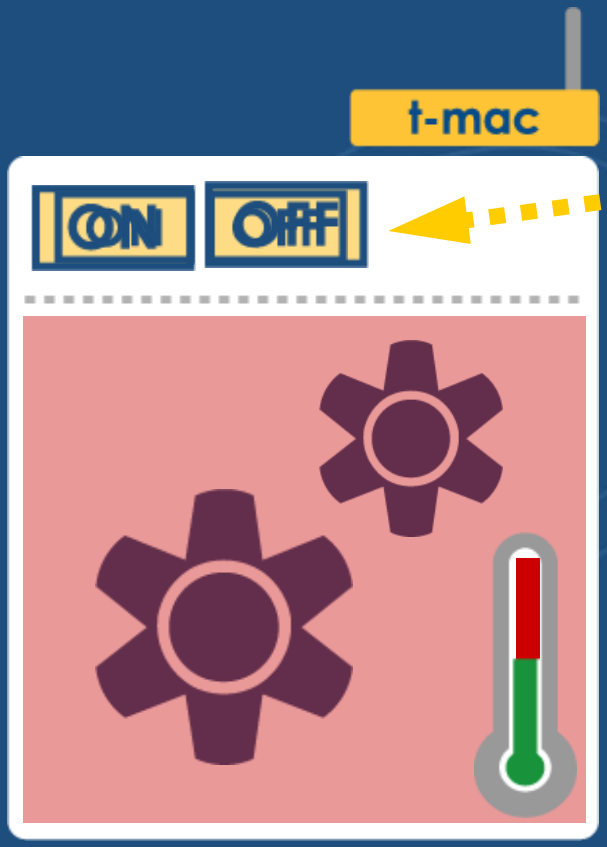
2. But how do these innovative GPRS remote monitoring and control devices work?

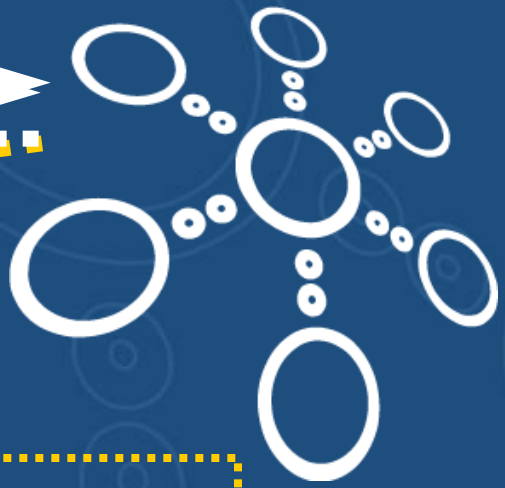




24/7 Monitoring

2. But how do these innovative GPRS remote monitoring and control devices work?





Remote Control

24/7 Monitoring

2. But how do these innovative GPRS remote monitoring and control devices work?

Live & Historic Activity Logging

2. But how do these innovative GPRS remote monitoring and control devices work?

Benefits

- Early warning system so faults can be rectified ASAP and in some cases, remotely
- Collect accurate and up-to-data status data about faulty equipment

2. But how do these innovative GPRS remote monitoring and control devices work?

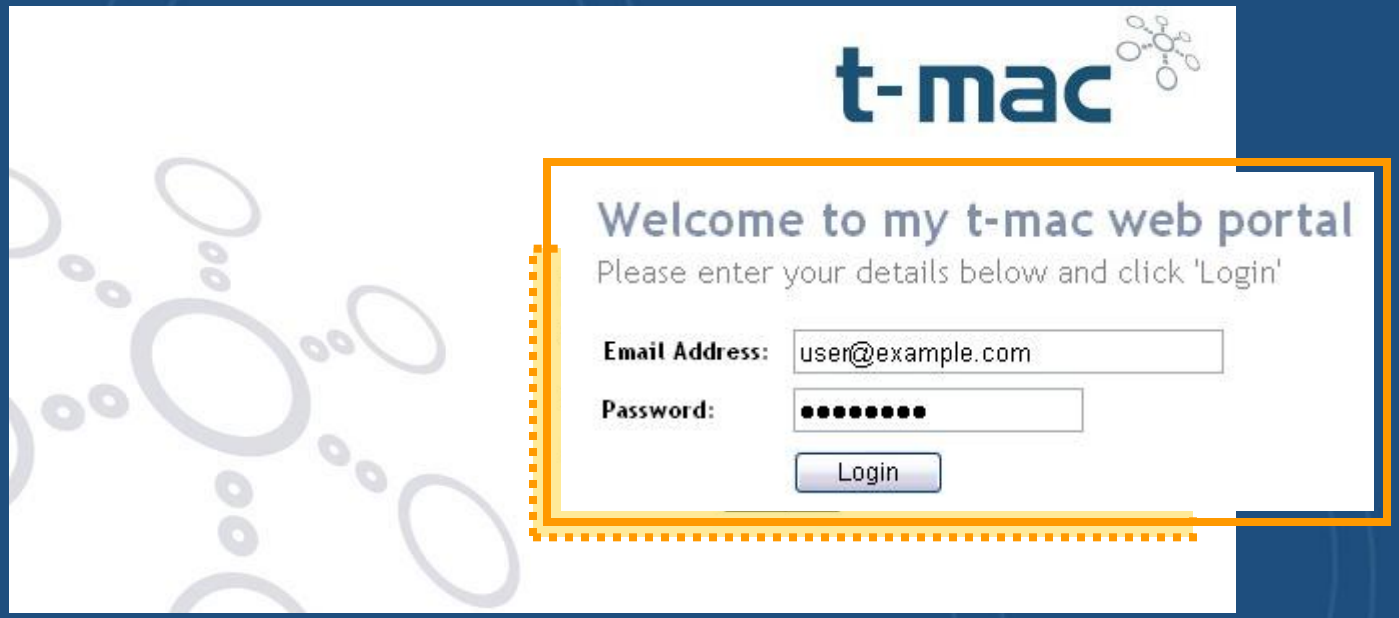
Benefits

- Monitor and control via analogue and digital inputs, outputs and RS-232/485 serial communication channels
- Wireless (GPRS) transmission of data off site to a central managed server

2. But how do these innovative GPRS remote monitoring and control devices work?

Benefits

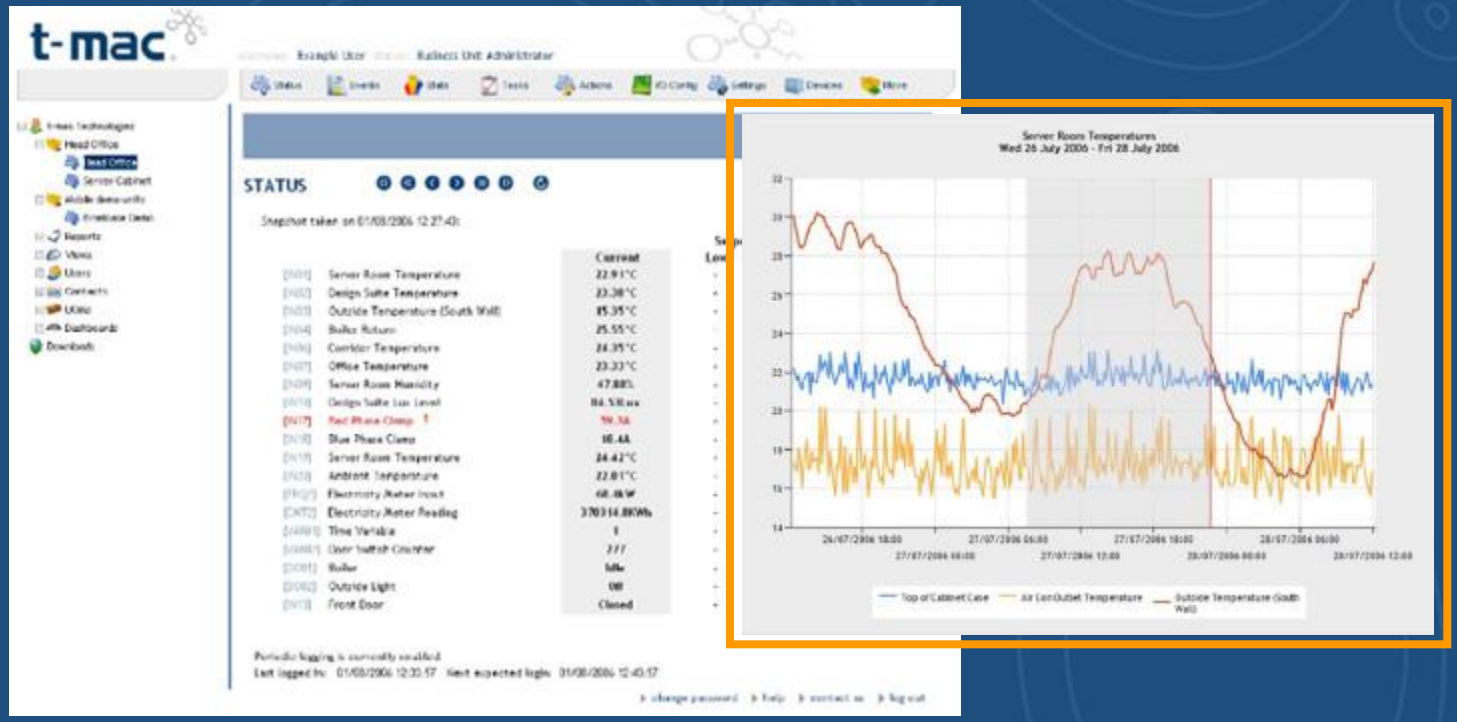
- Dedicated web-page log-in facility over the internet



2. But how do these innovative GPRS remote monitoring and control devices work?

Benefits

- View data as interactive tables and graphs



2. But how do these innovative GPRS remote monitoring and control devices work?

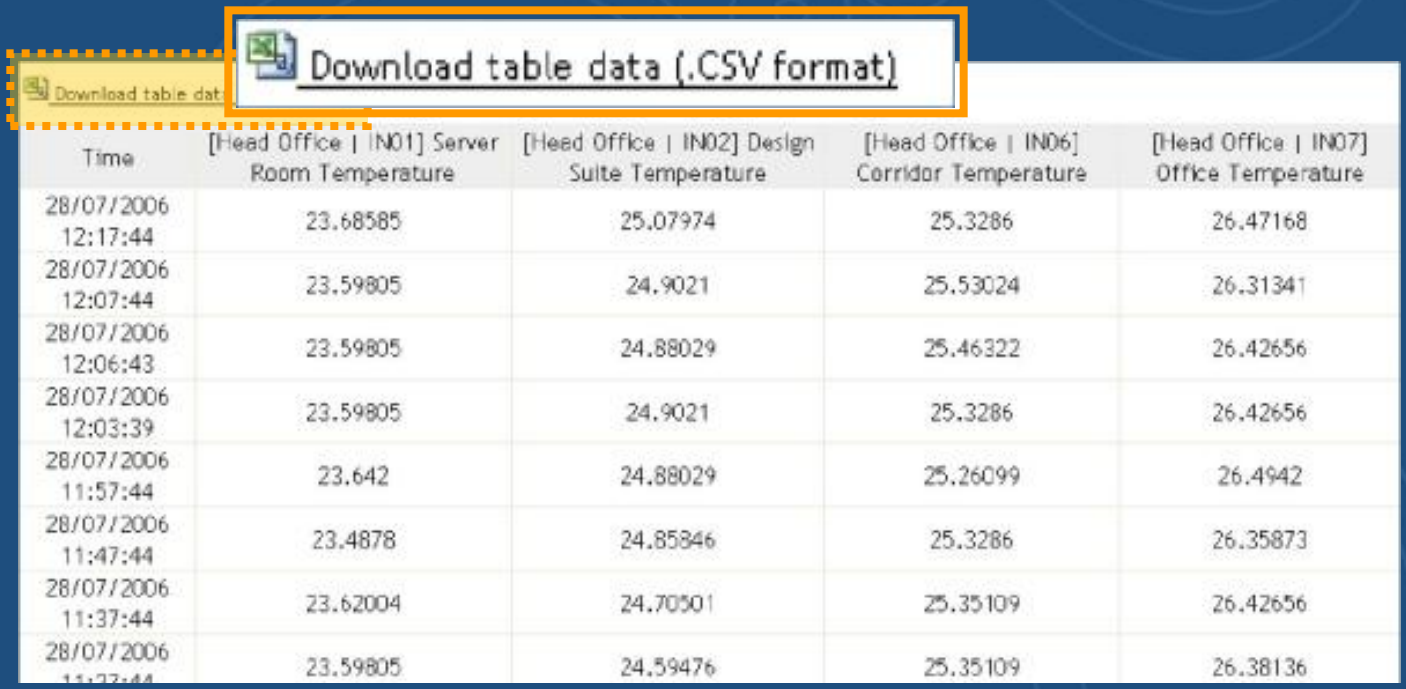
Benefits

- No costly software required
- No static IP addresses

2. But how do these innovative GPRS remote monitoring and control devices work?

Benefits

- Easy management reporting



Time	[Head Office | IN01] Server Room Temperature	[Head Office | IN02] Design Suite Temperature	[Head Office | IN06] Corridor Temperature	[Head Office | IN07] Office Temperature
28/07/2006 12:17:44	23.68585	25.07974	25.3286	26.47168
28/07/2006 12:07:44	23.59805	24.9021	25.53024	26.31341
28/07/2006 12:06:43	23.59805	24.88029	25.46322	26.42656
28/07/2006 12:03:39	23.59805	24.9021	25.3286	26.42656
28/07/2006 11:57:44	23.642	24.88029	25.26099	26.4942
28/07/2006 11:47:44	23.4878	24.85846	25.3286	26.35873
28/07/2006 11:37:44	23.62004	24.70501	25.35109	26.42656
28/07/2006	23.59805	24.59476	25.35109	26.38136

2. But how do these innovative GPRS remote monitoring and control devices work?

Key Features

- Remote monitoring
- Remote data logging
- Remote process control
- Always on GPRS transmission
- Managed central server
- Customised front-end
- View all assets from a single domain name

3. Energy management

GPRS enabled condition monitoring devices can help:

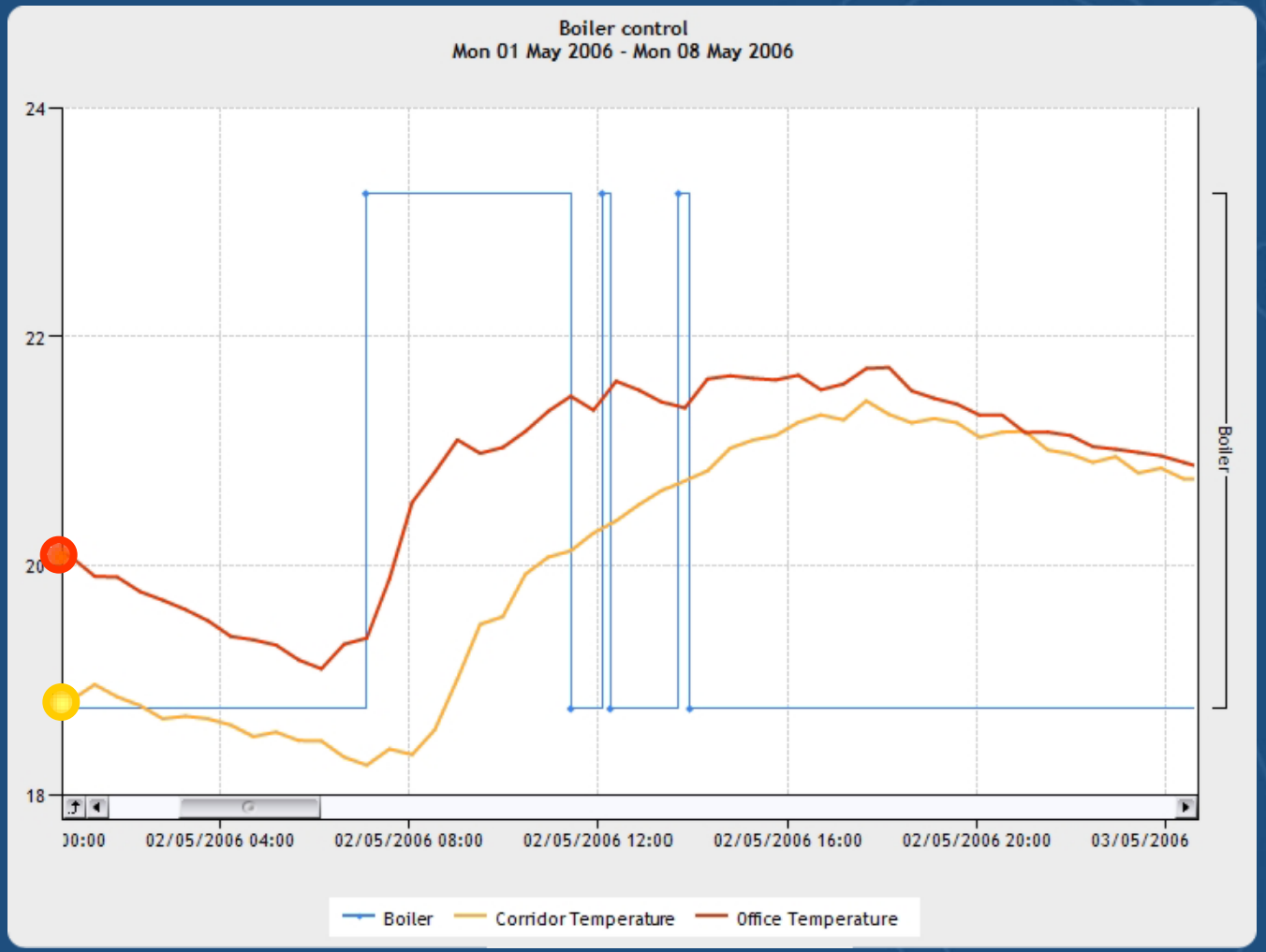
- Analyse and produce valuable management information, relating to equipment condition; associated wastages, energy and asset inefficiencies and cost
- Determine and measure where and how much energy is being used over a specific period of time and compare it to annual targets

3. Energy management

GPRS enabled condition monitoring devices can help:

- Identify opportunities to make substantial savings on running costs
- Undertake energy audits to help identify authentic and often unusual energy saving opportunities

3. Energy management



3. Energy management

Condition monitoring devices can also:

- Log meter and sub-meter total gas, electricity, water and oil consumed within a building
- Read meters remotely from any location at any time
- Measure and manage heating/cooling
- Monitor run efficiency
- Measure run hours of equipment

4. Analysis Software

- An interface between the user and the equipment being monitored, it details, through on-screen customised or generic graphics, the sites, assets, machines or metering being monitored
- Creates a real-time view of the area being monitored pictorially, showing the activities on site, live data and statistics instantly

4. Analysis Software

- Gain live information not only on energy use (metering) for example, but also on those factors and activities which contribute to their total energy bill. Once they can see their usage patterns and those contributors, energy managers become empowered and, using accurate data, can formulate energy reduction plans

4. Analysis Software

t-mac's energy analysis dashboard can:

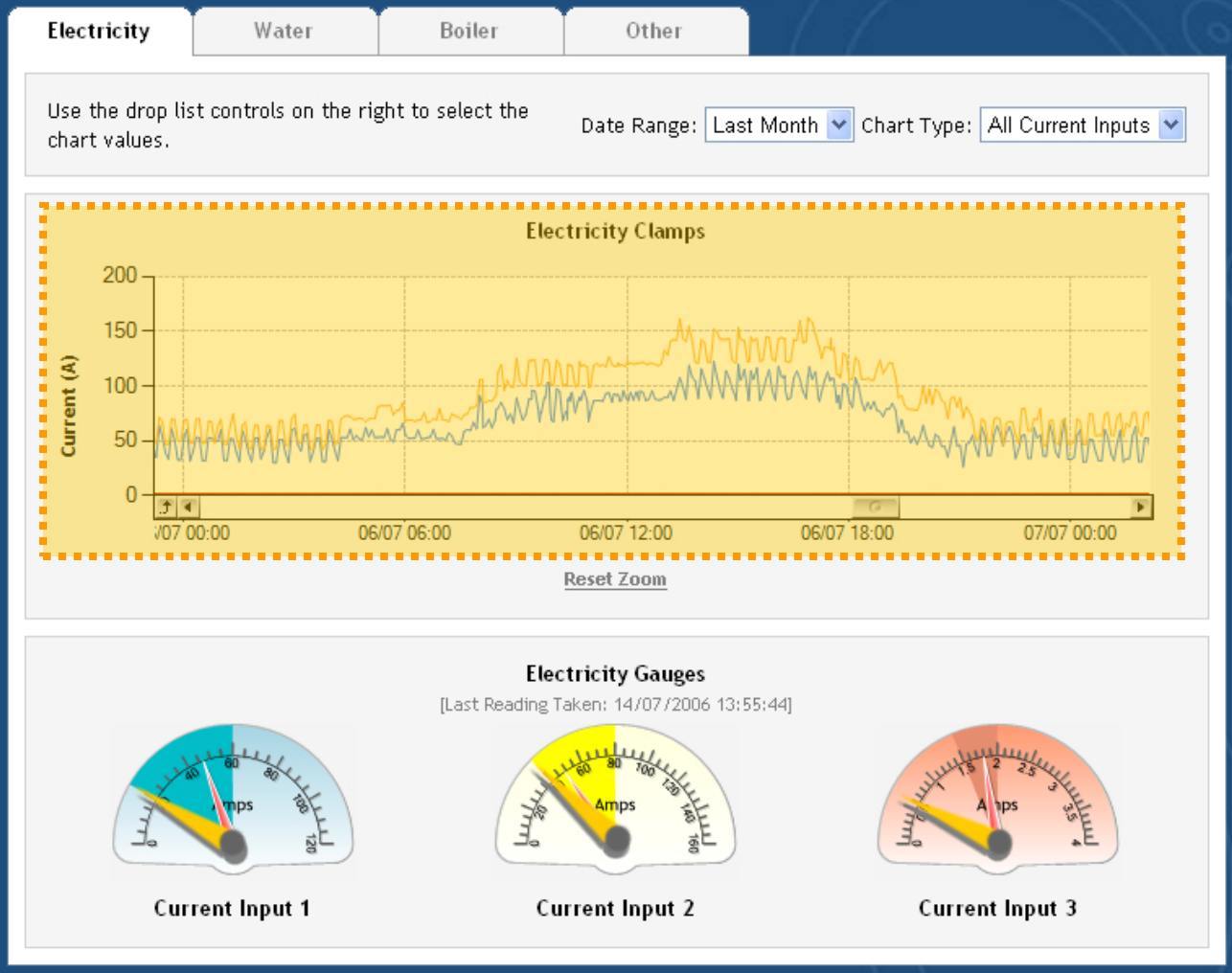
- Quantify and also showcase their energy consumption patterns and targets
- Provide information on permanent display
- Give live displays of plant/factory equipment or a building's energy use, reduction targets, benchmarking or efficiency practices

4. Analysis Software

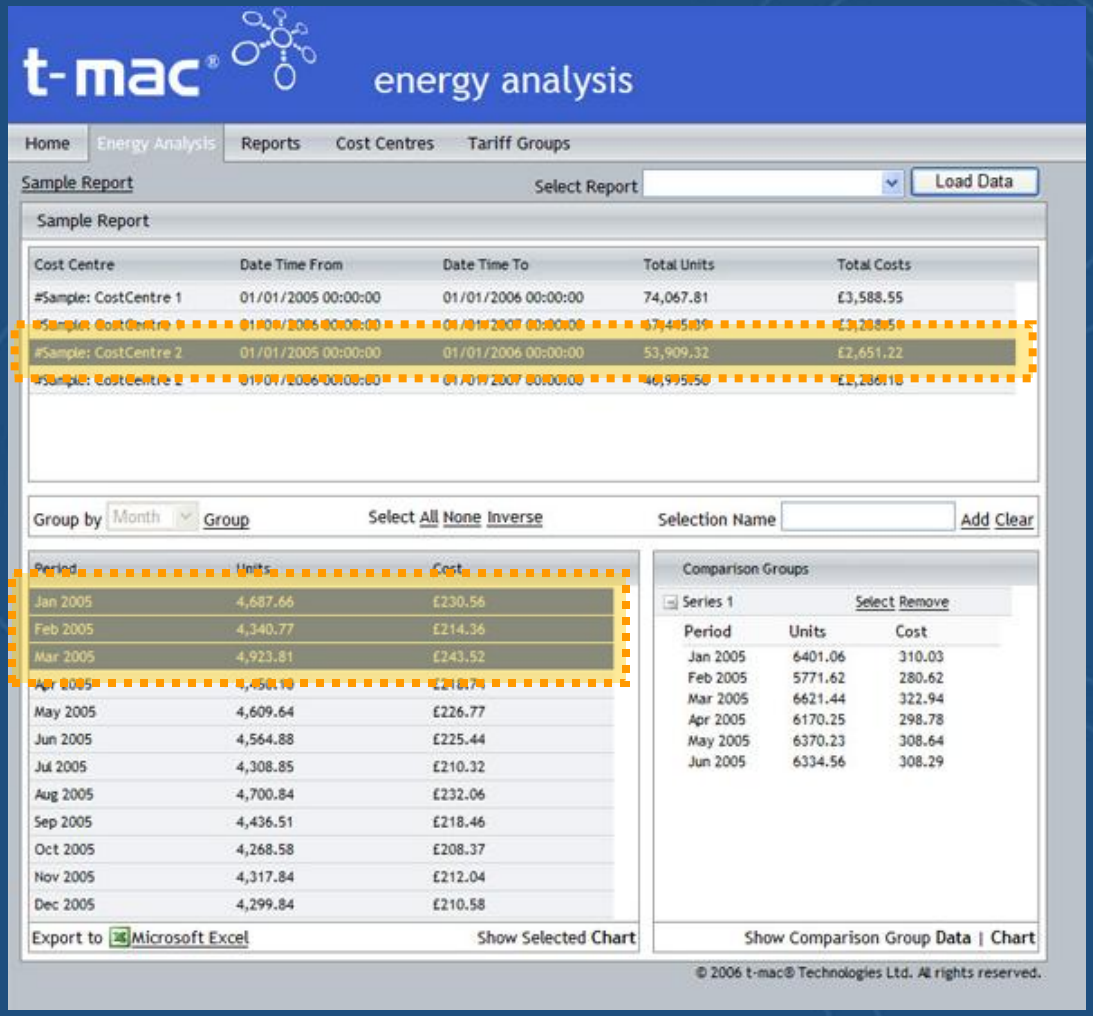
t-mac's energy analysis dashboard can:

- Convert collected data into a more recognisable form,
  e.g. converting raw energy readings into meaningful business data, such as money saved, or indicating industrial machine vibration as high, medium or low alert for ease of viewer reference.
  It can also calculate how much energy is being used by each site, and draw comparisons on cost and energy savings easily.

4. Analysis Software



4. Analysis Software



4. Analysis Software

Monthly energy report - July 2006

t-mac

Lowest energy consumers

Site	kWh	+/- last month
Portsmouth	2264	+23
Wolverhampton	2390	-151
Leicester	2787	+84
Exeter	3255	-257
Bath	3401	-201

Highest energy consumers

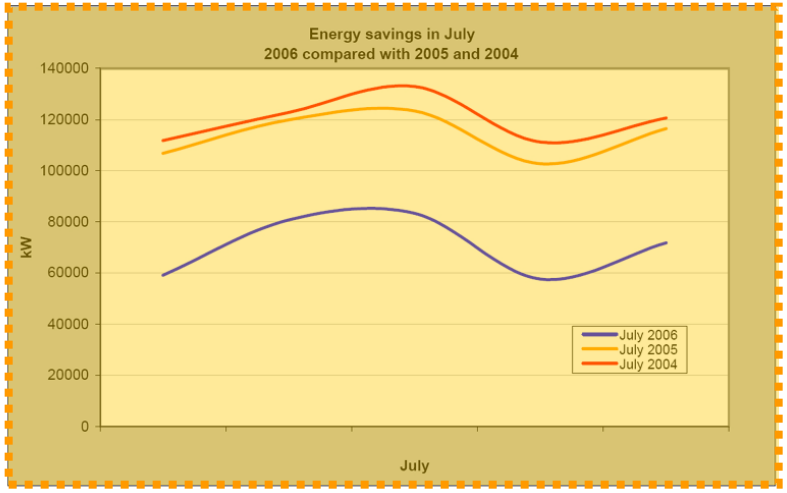
Site	kWh	+/- last month
Hereford	13097	-1064
Salford	12880	+2307
Edinburgh	12341	-167
Ripon	10670	-479
Canterbury	9853	+106

Comparison with June 2005

	kWh	
Total usage (June 2005)	569230	
Total usage (June 2006)	352810	
Saving	216420	(38%)

Comparison with June 2004

	kWh	
Total usage (June 2004)	599344	
Total usage (June 2006)	352810	
Saving	246534	(41.1%)



4. Analysis Software

Ignoring the need to accurately monitor and analyse equipment conditions will inevitably incur more cost
in terms of energy consumed, shorter equipment life-cycle and will be detrimental to the environment.

5. Monitoring and controlling using serial protocols

High quantity and variety of manufacturer's machines, equipment and meters.

With MODBUS devices like t-mac can now read and record a large number of machines EG: Plant and meters; monitoring up to 256 registers via a single serial port.

5. Monitoring and controlling using serial protocols

By monitoring and controlling equipment in this way, in addition to or as opposed to standard inputs & outputs, business can achieve greater monitoring and control, gathering information from third-party equipment including embedded controllers and energy metering.

5. Monitoring and controlling using serial protocols

For energy management, the MODBUS protocol is key in helping businesses to improve their power factor; and also gain more information on their metering and sub-metering.

'reading' more than simply kWh and take more than a simple pulse-output, it can now 'read' kVAh, kVArh, kW, kVA, kVAr, individual phase currents and power factor.

6. Benefits

- Maximum efficiency
- Ensure energy legislation compliance
- Management of consumption and energy use
- Identify faults/remote diagnostics
- Prevent downtime/stoppage/breakdowns
- Damage limitation
- Reduce running costs

6. Benefits

- Machine condition monitoring
- Reduce wastage
- 24/7 live information
- Tailored settings/alerts
- SMS and email alerts
- Simple reporting
- Ease of use

6. Benefits

Specifically

- Provide improved/intelligent maintenance and reports which help business comply with building regulations and engineers know the nature of a fault before arriving on site
- Help conserve energy
- Minimise machine downtime
- Extend machine lifecycle

6. Benefits

Specifically

- Provide energy management of individual equipment and entire sites to help identify opportunities for energy reduction
- Monitoring equipment effectively
- Identify inefficiencies instantly and fix any issues, before they occur

6. Benefits

Specifically

- Helps reduce energy consumption and extend machinery life-cycle
- Effective maintenance can reap immediate financial returns, it can also boost energy and time savings and allow greater control

7. Condition monitoring in practice Case studies

Lets now look at some examples of the t-mac condition monitoring device in practice:

7. Condition monitoring in practice Case studies

Process industry

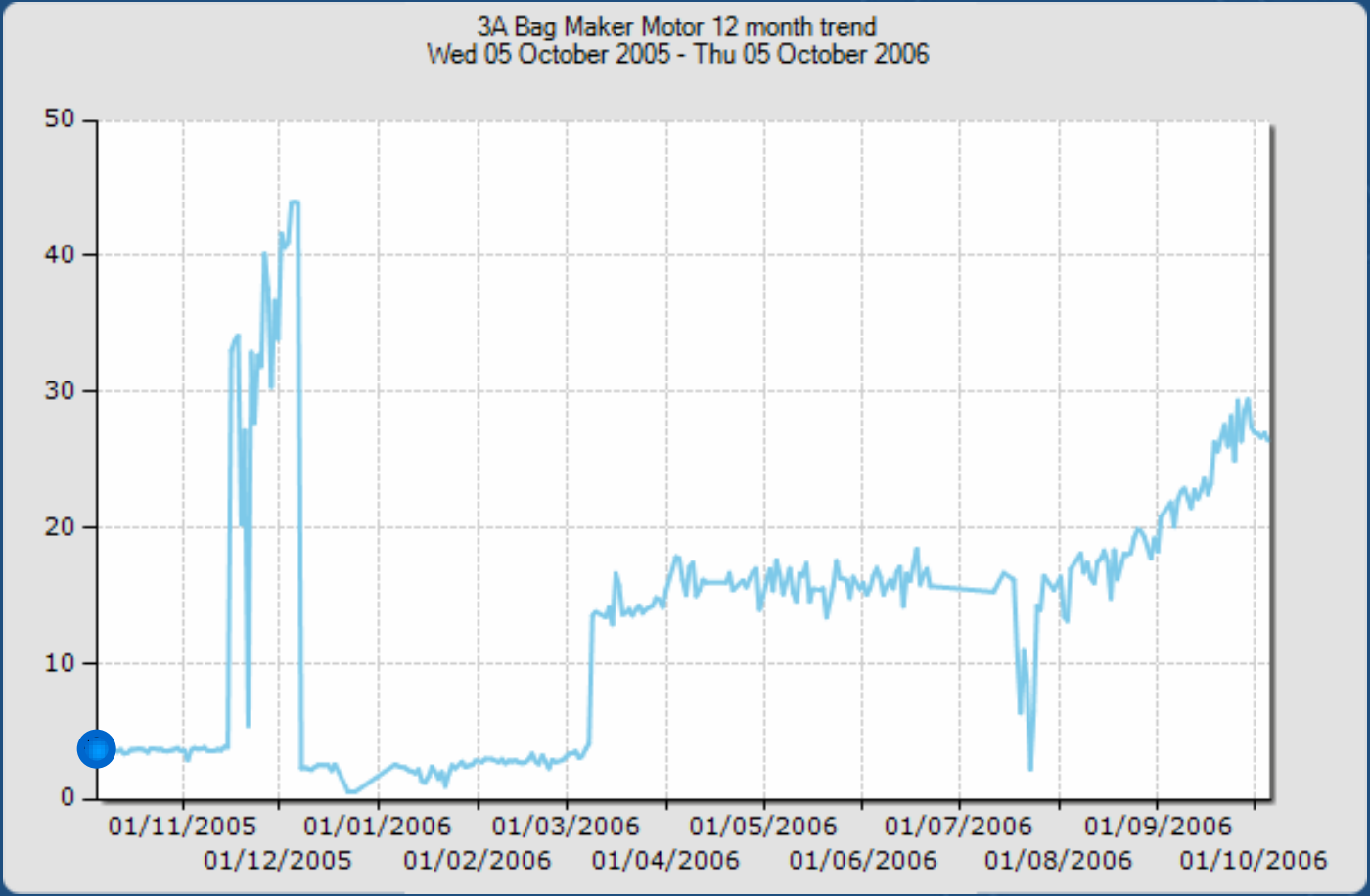
Aim:

t-mac was installed within a leading UK teabag manufacturer's factory to monitor the vibration of the tea bag machine

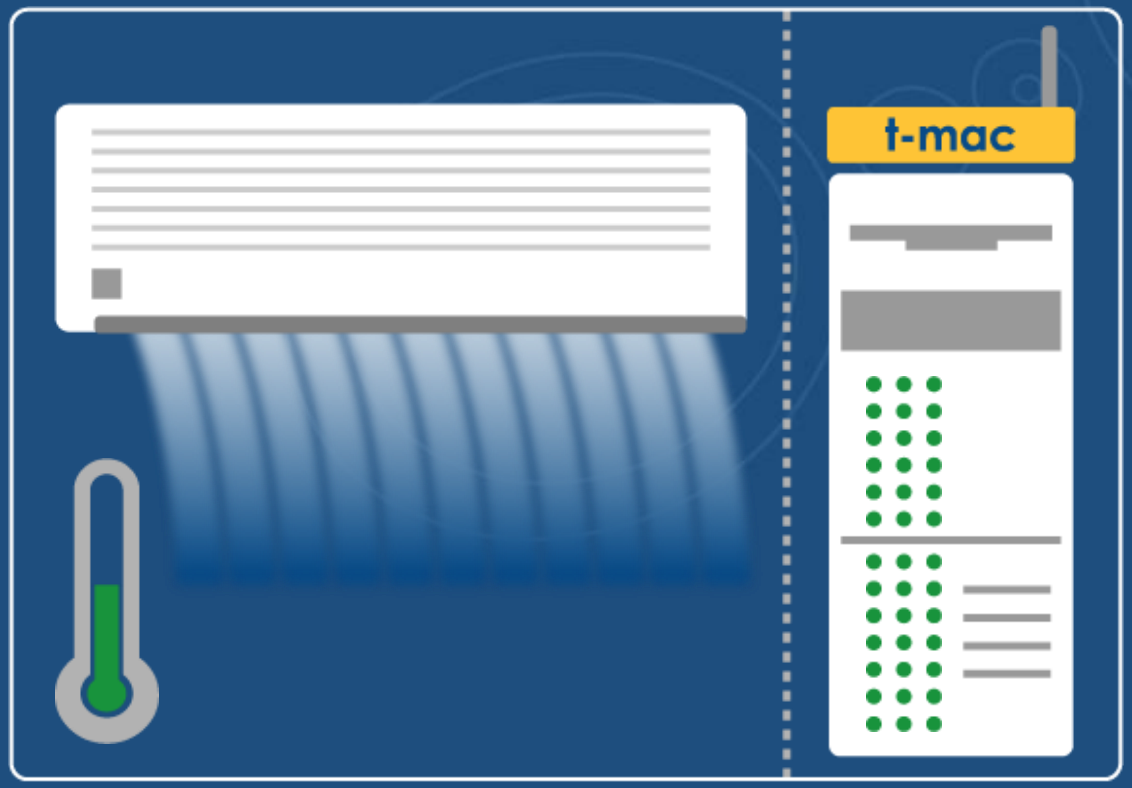
7. Condition monitoring in practice Case studies

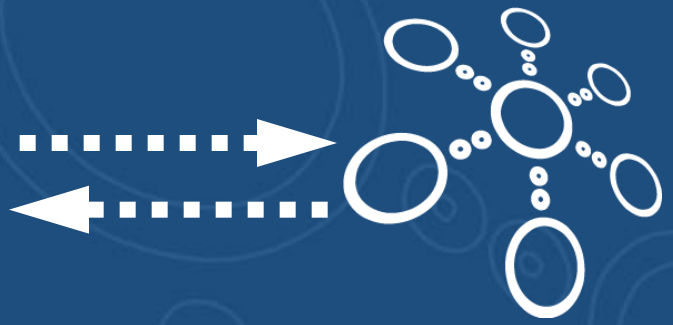
t-mac identified two faulty bearings. Early identification resulted in the manufacturer altering its maintenance procedure, instead of replacing the machines bearings every four weeks.

7. Condition monitoring in practice
Case studies



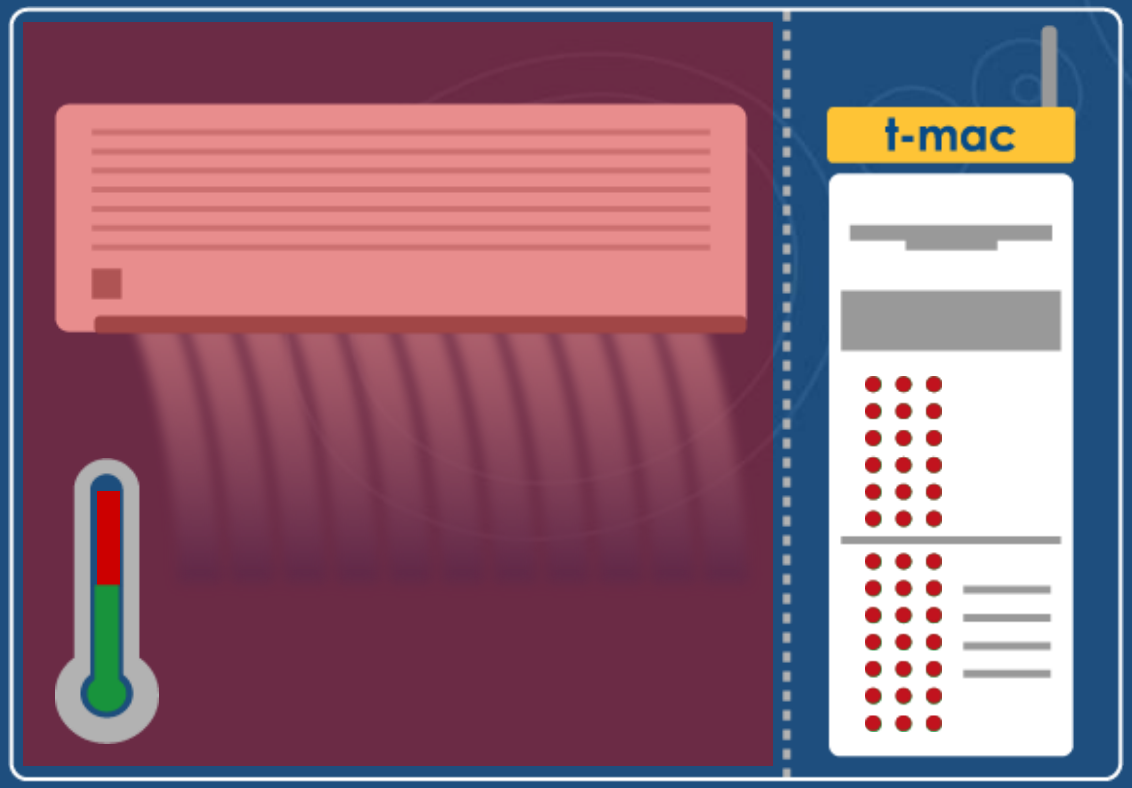
7. Condition monitoring in practice
Case studies / Facilities management

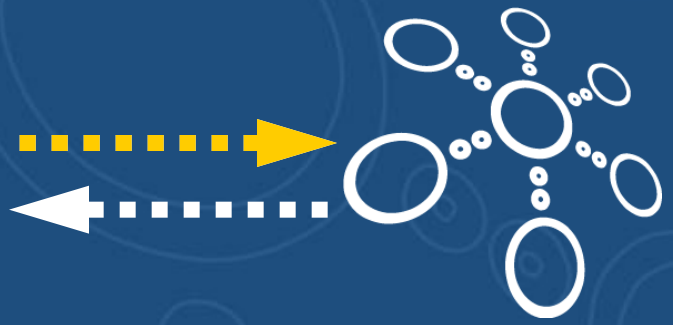




24/7 Monitoring

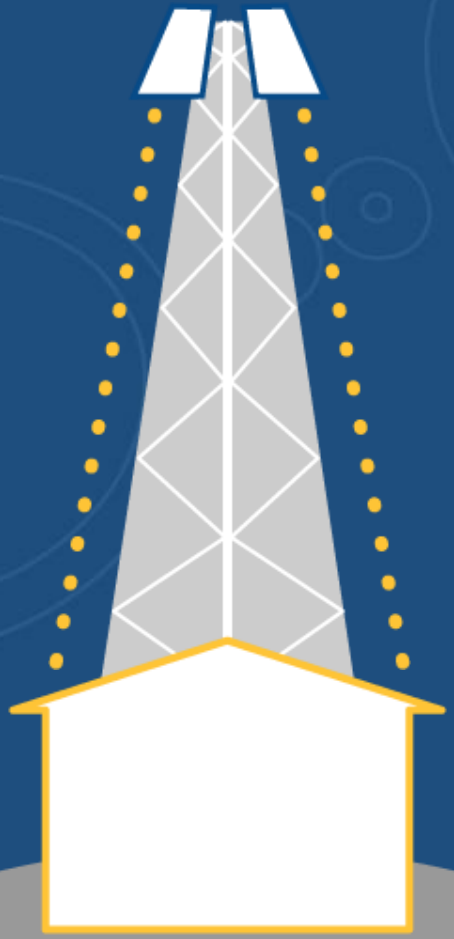
7. Condition monitoring in practice
Case studies / Facilities management





7. Condition monitoring in practice
Case studies / Facilities management

7. Condition monitoring in practice
Case studies / Telecommunication



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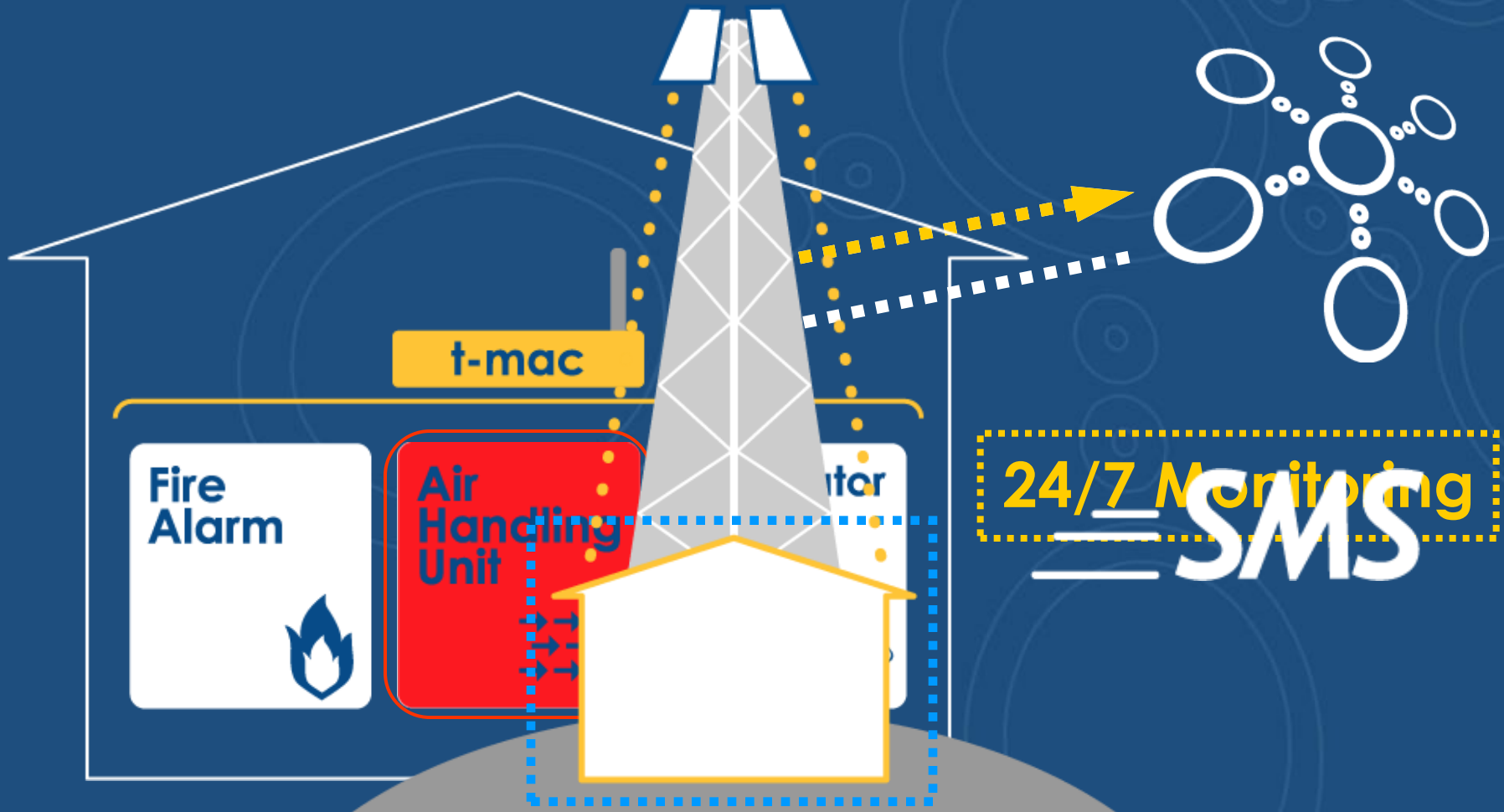
Case studies / Telecommunication



7. Condition monitoring in practice
Case studies / Telecommunication

8. The solution!

MAXI and MINI t-mac

Benefits compared to similar devices

- GPRS
- Managed central server
- Accessible over the internet

8. The solution!

Digital dashboard and energy analysis dashboard

Benefits compared to other similar software

- Online
- Customisable

8. The solution!

Identify inefficiencies in equipment or plant instantly.
Fix any issues often before they occur or before an engineer needs to be called.

Business needs to be more proactive when it comes to energy management.

9. Conclusion

Reap immediate financial returns, but condition monitoring devices can help you be more energy efficient, meet legislation, be more productive, and help safeguard the bottom line.

wireless and internet based
monitoring and control

t-mac

MINI t-mac

MAXI t-mac

t-mac **1U**