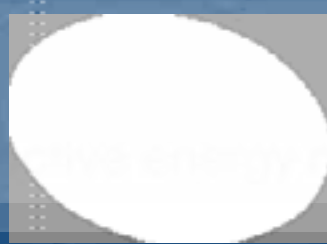




**aM&T + Control =  
pro-active energy management**

Building Energy Management  
Equipment Condition Monitoring

Reduces Carbon Footprint  
Reduce Cost



# Energy Management in Practice...

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**Director**

**t-mac Technologies Ltd**

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**Featuring:**

Energy Management Systems,  
legislation compliance & The City of  
Liverpool Council

# Energy Management in Practice...

## Featuring...

- Benefits
- Assisting with legislation compliance (DEC & CRC)
- The City of Liverpool Council's experiences
- Educating stakeholders

# Energy Management Systems...

## 1. INTRODUCTION

## Need to know more than kWh...

**aM&T (*automatic monitoring & targeting*)** devices have quickly become the must-have monitoring accessory for business, but knowing your kWh is only the first step in energy management.

## Influencers of energy consumption...

The crucial key to pro-actively reduce energy use & cost is to **identify** external influences on consumption

*e.g.. HVAC&R performance, lighting & temperature levels.*

Once identified, these should be continuously **controlled** to reduce energy consumption!

## Setting & meeting targets...

Research shows, buildings in the UK account for half of the country's carbon emissions

Government legislation & requirement to meet reduction targets is putting pressure on business to actively reduce energy consumption

TARGETS: 20% by 2010 and 60% by 2050

LEGISLATION: EPC, DEC & CRC

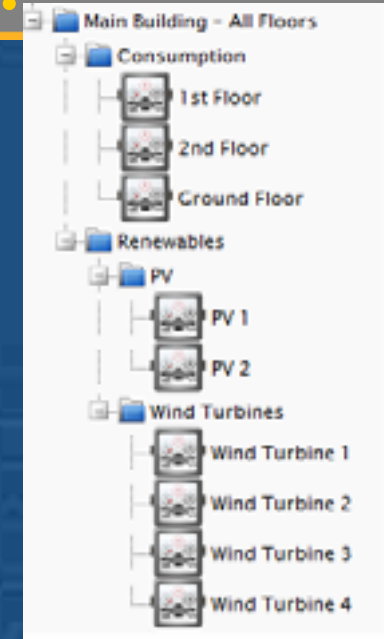
It's the measures & tactics we employ, which will be of utmost importance

# Energy Management Systems...

## 2. BENEFITS

# Energy Management Systems...

1. Identify the main culprits in energy consumption – energy intensive equipment & activities (*i.e. heating, ventilation & lighting*)



Can... leak energy without being detected, or run in conjunction with each other, (boilers & a/c) or be left on out of hours.

# Energy Management System Benefits...

## 2. Manage high energy use equipment!

To reduce emissions & minimise energy waste... business has to manage excessive energy use & identify improvement Opportunities.

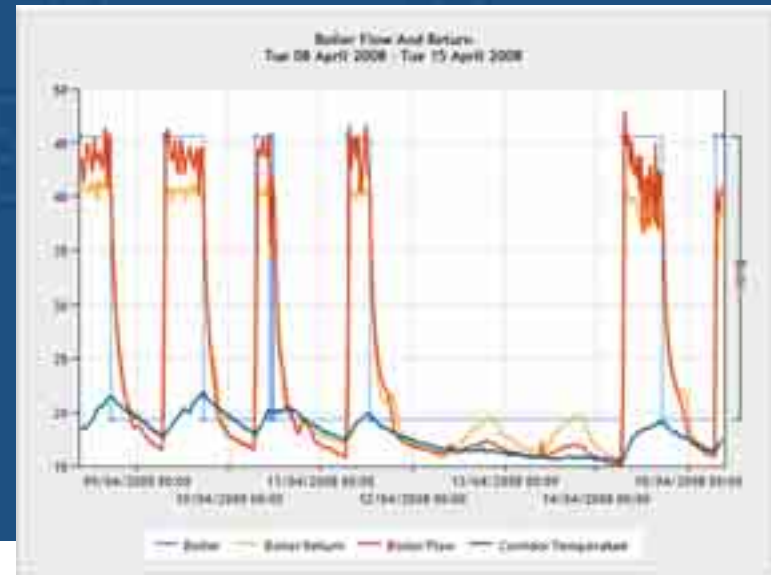
Water Name	Minimum Cost/£h	Maximum Cost/£h	Average Cost/£h	Total Cost
Building 1 - Main Supply	00.00	01.79	00.00	0000.00
Building 2 - Building 2 Inroom	07.74	09.72	03.44	07.819.00
Building 2 - Main Supply	00.00	01.87	00.01	0000.00
Building 4 - Main Supply	01.00	01.00	01.00	01.00
Consumption - 1st Floor	00.00	00.00	00.00	00.00
Consumption - 2nd Floor	00.00	00.00	00.00	00.00
Consumption - Ground Floor	00.00	00.00	00.00	00.00
PI - PI 1	0-0.20	00.00	0-0.00	0-0.00
PI - PI 2	00.00	01.00	00.00	00.00
Wind Turbines - Wind Turbine 1	00.00	00.00	00.00	0-0.00
Wind Turbines - Wind Turbine 2	00.00	00.00	00.00	0-0.00
Wind Turbines - Wind Turbine 3	00.00	00.00	00.00	0-0.00
Wind Turbines - Wind Turbine 4	00.00	00.00	00.00	0-0.00
<b>ICMPS - Periodic Start-up</b>				<b>12,242.00</b>



# Energy Management System Benefits...

## 2. Control high energy use equipment!

To effectively manage & reduce energy use, business needs to *control* equipment performance & site-based activities.



## The business drive...

With escalating energy prices, business is embracing such energy management / reduction techniques & strategies.

But it's not just 'cost' that's driving industry to look at, & manage its energy consumption & carbon

# Energy Management Systems...

## 3. LEGISLATION

## **Meet government legislation..**

There is constant & increasing pressure for business to conform to government legislation.

Hence.. The requirement for more energy management protocols, logging systems & reports to assist in compliance.

## Business needs to consider..

- Display of Energy Certificate (DEC),
- Energy Performance Certificate (EPC),
- Carbon Reduction Commitment (CRC),
- ISO 14001

...energy management systems can help!

*CRC: Announced in Energy White Paper 2007, it will apply mandatory emissions trading to cut carbon emissions from large commercial & public sector organisations. Covering 10% of UK economy wide emissions, & providing incentives for organisations to save money through energy efficiency*

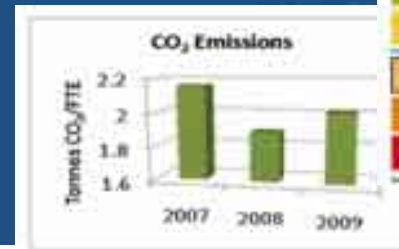
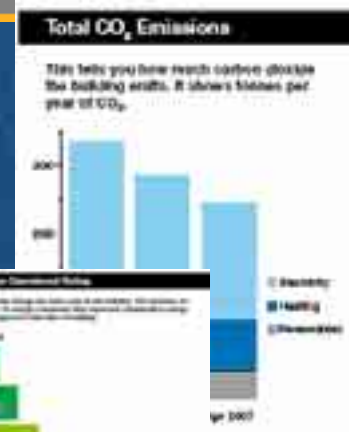


# Help with government legislation...

Metering 24/7 & monitoring site-based activities provides business with ...

- (i) Operational rating
- (ii) Carbon emission calculations

Helping business...



# Energy Management Systems...

## 4. LIVERPOOL CITY COUNCIL CASESTUDY

## In practice...

Liverpool City Council & t-mac  
Technologies Ltd:

**A perfect partnership to compliance:**

## Liverpool City Council (LCC)...

LCC aims to cut energy waste from its buildings, ultimately making them 'greener'!

Using t-mac, installed in One Stop Shops (OSS), LCC access raw energy data from its many buildings located throughout the city.

## Liverpool City Council...

The Energy Showcasing Dashboard presents each outlets energy results helping LCC effectively evaluate & target energy use.

Designed for LCCs in-shop touch-screen kiosks, the Dashboard also helps to showcase

## A-G rating...

One of LCCs key requirements was be the first to display its building's A-G rating - live & online - providing an interim real-time Energy Performance Operational Rating certificate.

The rating changes monthly in accordance

## The Council's dashboard & A-G rating...

Working interactively over the Internet, the Dashboard displays live & historic energy data over 3x main pages...

- (i) Map of the city & location of the OSS
- (ii) Breakdown of site's energy data & rating

# Energy Showcasing Dashboard

THE CITY OF LIVERPOOL  
City of Liverpool Energy Department

One Stop Shops

ENERGY COMMISSION  
 ENERGY AUDIT INFORMATION & DETAILS

ONE STOP SHOPS  
City of Liverpool Energy Department

Key

- 1 kWh/month
- 1 kWh/day
- 1 kWh/week open

	1 kWh/month	1 kWh/day	1 kWh/week open
Belle Vale	6,92	11	24
Broadway	0	0	0
Single	4,56	6	25
Old Swan	4,70	6	25
Warrington		25	46
		15	34
		9	27

1 kWh consumed last month

1 kWh consumed last month per sq ft of the building floor area

1 kWh consumed last month per hour the building was open

ONE STOP SHOPS  
City of Liverpool Energy Department

Belle Vale

Inside: 25°C    48 Lux    26% RH    Current: 17 kW  
 Outside: 5°C    1,954 Lux    75% RH    Total: 1,062 kWh

Energy Rating: 4

Internal & External Temperatures

Reducing CO2 emissions by 17.5t CO2 equivalent to 573 litres of a family car

HOME

## The Council's dashboard & A-G rating...

The t-mac Dashboard has provided a perfect tool for LCCs OSS sites to showcase their energy saving efforts to stakeholders & the people of Liverpool.

The Dashboard helps the Council show its

# Energy Management Systems...

## 5. EDUCATING STAKEHOLDERS

## **Educating stakeholder & the public...**

Monitoring, managing & controlling energy consumption is imperative if business is to reduce energy consumption, cost & its impact on the environment.

Achieving public & stakeholder buy-in can help.

The t-mac online software & Dashboards provide

## Educating stakeholder & the public...

How is this achieved?

- Simple, easy to use software accessed by all interested parties
- Eye-catching, graphical dashboards that answer business critical questions

# Easy to use online software...

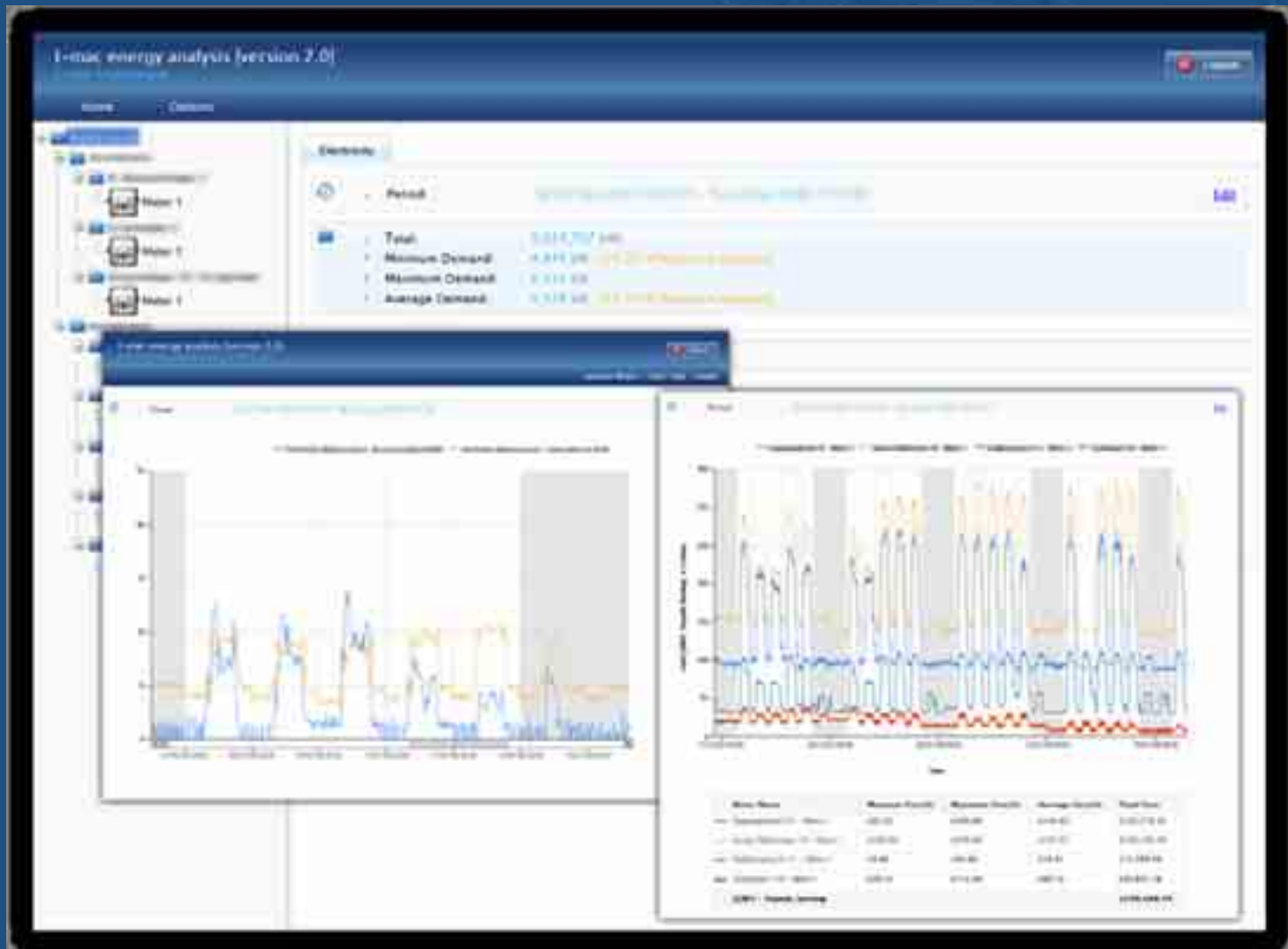
View all that you are monitoring and set parameters (ideal conditions)

The screenshot shows a BMS software interface for 'Head Office'. On the left is a navigation menu with categories like 'Head Office', 'Server Cabinet', 'Mobile demo units', 'Brandside Demo', 'Reports', 'Views', 'Users', 'Contacts', 'LCUs', 'Dashboards', and 'Downloads'. The main area is titled 'STATUS' and shows a 'Snapshot taken on 08/01/2008 12:27:43'. Below this is a table of monitored parameters with their current values and setpoints.

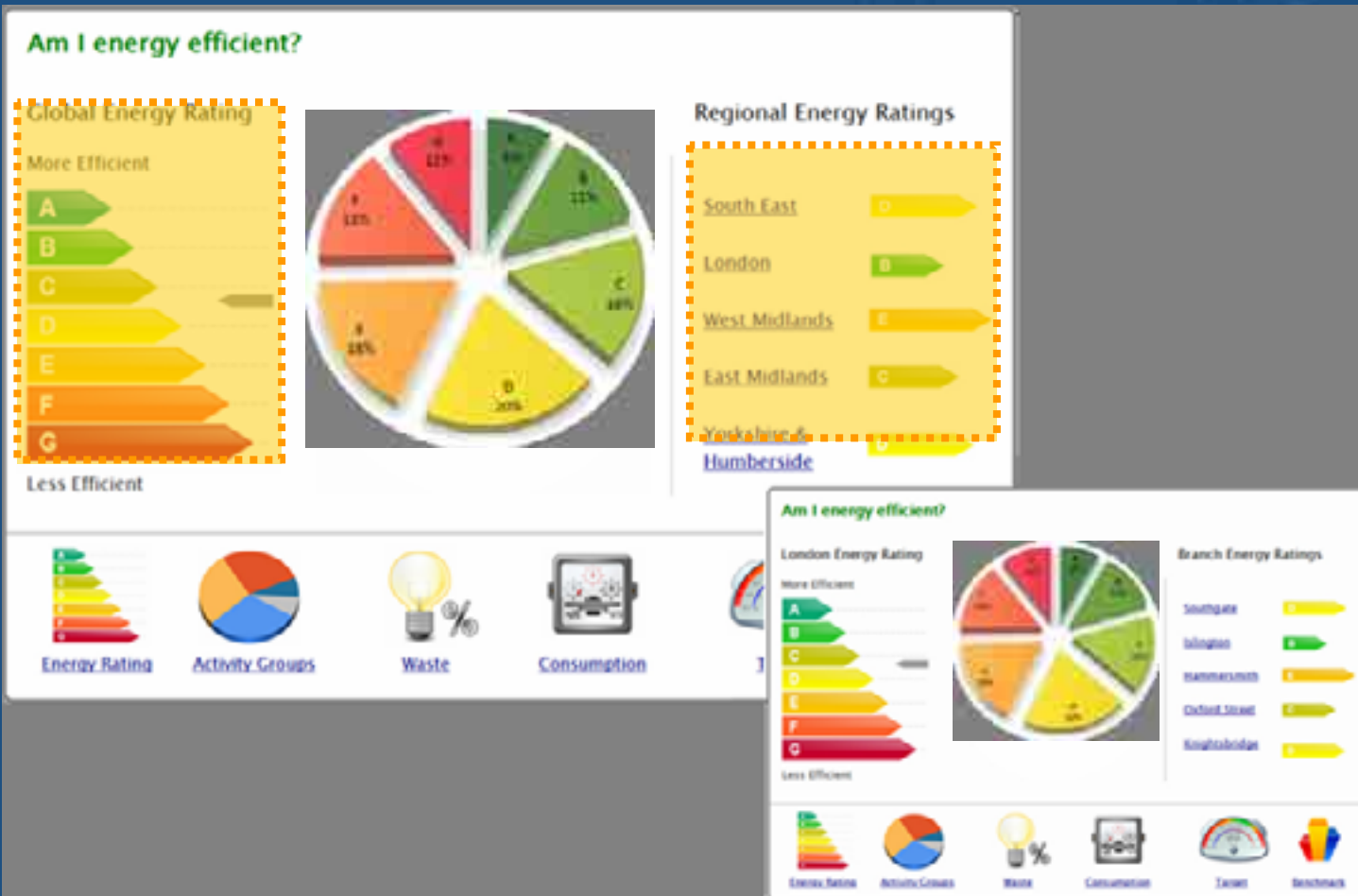
		Current	Setpoints	
			Low	High
[1011]	Server Room Temperature	22.91°C	-	-
[1022]	Design Suite Temperature	23.20°C	-	-
[1002]	Outside Temperature (South West)	15.25°C	-	-
[1004]	Boiler Return	25.55°C	-	-
[1006]	Corridor Temperature	24.35°C	-	-
[1007]	Office Temperature	23.33°C	-	-
[1008]	Server Room Humidity	47.00%	-	55
[1000]	Design Suite Lux Level	81.52Lux	-	-
[1017]	Red Phase Cling	55.3A	-	50
[1010]	Blue Phase Cling	10.4A	-	-
[1019]	Server Room Temperature	24.42°C	-	30
[1001]	Ambient Temperature	22.01°C	-	-
[1021]	Electricity Meter Input	68.48W	-	-
[1023]	Electricity Meter Reading	370314.090Wh	-	-
[1005]	Time Variable	1	-	-
[1003]	Door Switch Counter	277	-	-
[1009]	Water	Idle	-	-
[1007]	Outside Light	Off	-	-
[1012]	Front Door	Closed	-	-



# Eye-catching graphical dashboards...



# Highlight inefficiencies & showcase improvements...



# Showcase consumption & legislation conformance...

Know your environmental impact & target energy reduction in line with legislation demands

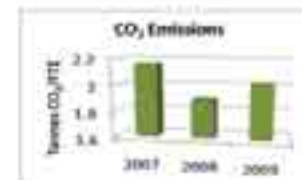
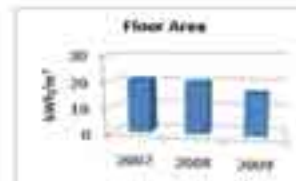
## Will we achieve our reduction target?

### Global Energy Reduction Target



## What is our environmental impact?

### Global Environmental Overview



- Belgium
- France
- Netherlands
- United Kingdom



# Energy Management Systems...

## 6. CONCLUSION

## Conclusion...

It is the way which we reduce our energy consumption & the measures & tactics that we employ, which will be of utmost importance.

However , the problem we face is that many people aren't employing the correct measures to reduce or even monitor energy consumption.

## Conclusion...

Being energy efficient is more than just switching off the lights at night & turning off the computer at the end of the day – *in isolation these simple measures are not enough.*

The main culprits in energy loss from commercial & residential buildings are high energy using equipment, such as boilers & air conditioning units.

## Conclusion...

In order to reduce carbon emissions from buildings to cut costs & reduce carbon footprint, owners & managers need to devise energy management practices & techniques.

The installation of energy management systems can aid in this energy plight for cost reduction, environmental improvements & conforming to