



Stewart Conway, Leicester Energy Agency

## An Overview of Intelligent or Smart Metering



**National Home Energy Conference 2007**

Fuelling the debate – energy efficiency / renewables / nuclear power





# Contents of Presentation

- What is Intelligent Metering
- How does it work
- What has done for Leicester City Council / what can it do for your council?
- Why domestic properties?



# Contents of Presentation

- What is Intelligent Metering





# • What is Intelligent Metering

- Automatic collection of meter readings
- Automatic analysis of data to identify exceptions (problems)
- Simple / Graphic presentation of energy and water data
- Timely & accurate energy management information
- Better information / customised advice
- Verify savings as a result energy efficiency improvements
- Bill validation / verification
- Benchmarks





*'High-frequency consumption data is a powerful tool in the identification of avoidable energy waste'*

## Putting Automatic Meter Reading Data to Work

### Automatic Utilities Auditing

*Has enabled Leicester City Council / Leicester Energy Agency to track, analyse and report on energy and water consumption to a greater degree. This in turn has helped us to cut utility consumption and costs through effective data management and rapid waste detection.*



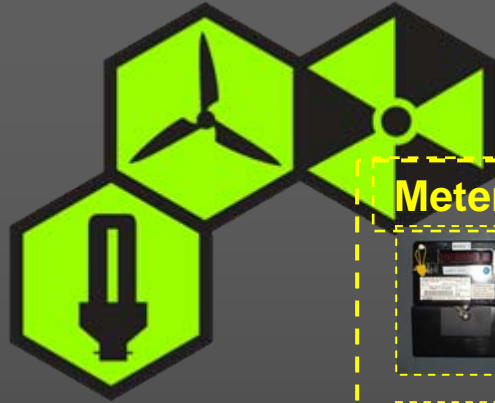


# Contents of Presentation

- How does it work



# Intelligent Metering



**Meters**



**Data Bird  
Local Logger**



**Radio  
Antenna**



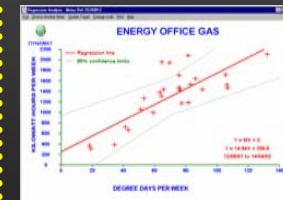
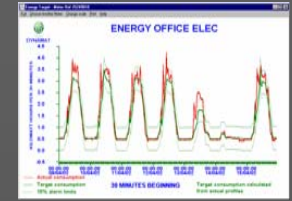
**Computer**



**Modem**



**Central Receiver /  
Data Logger**



Location	Time	Consumption	Target	Actual	Delta	Unit
Energy Office Elec	08:00-09:00	1.5	1.5	1.5	0.0	kWh
Phoenix House Water	08:00-09:00	0.5	0.5	0.5	0.0	litres
Welford House Gas	08:00-09:00	10	10	10	0.0	litres
Energy Office Gas	08:00-09:00	10	10	10	0.0	litres



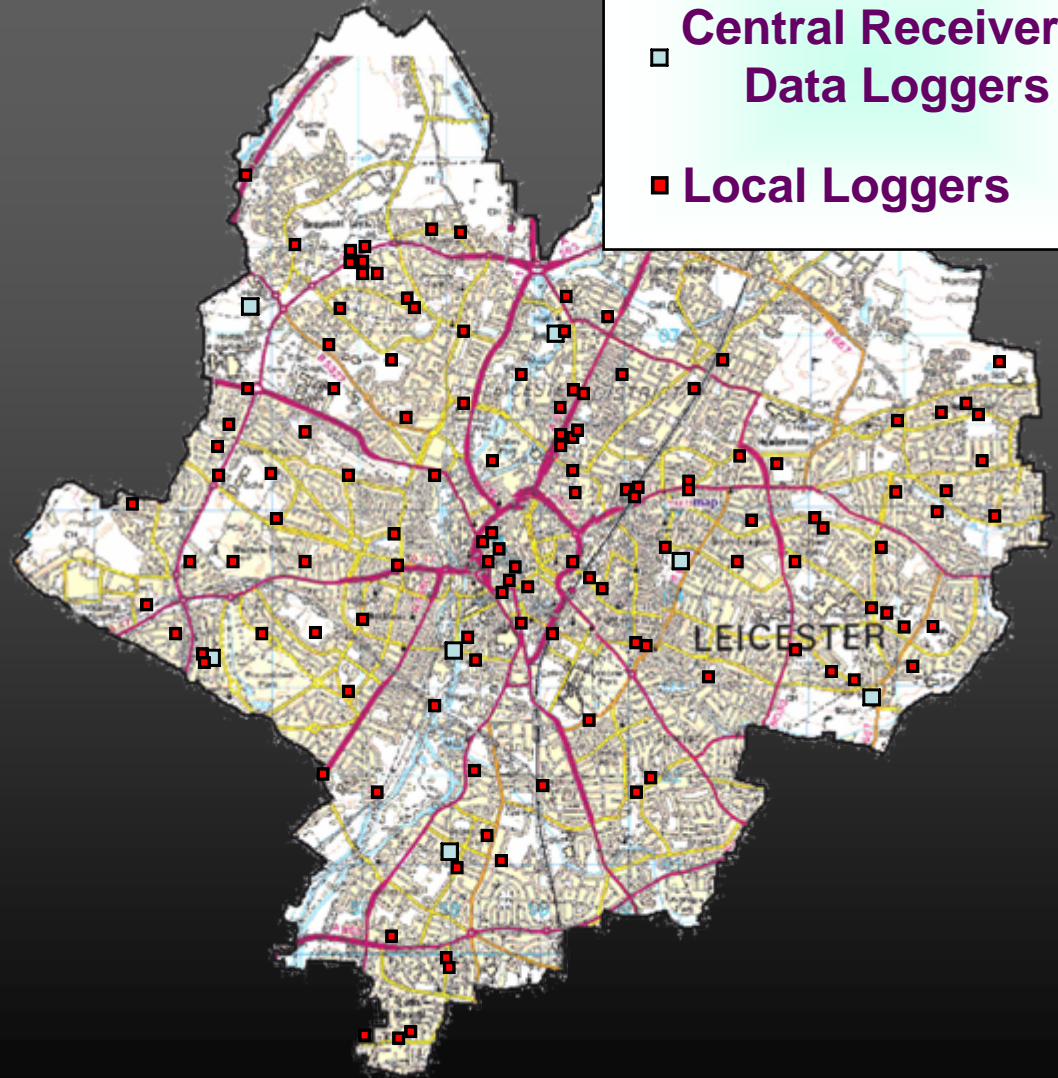


# Overview of Leicester

Council Offices  
 Sports & Leisure Facilities  
 Schools & Colleges  
 Museums & Libraries  
 District Heating Scheme  
 Community Homes  
 Business

## KEY

- Central Receivers / Data Loggers
- Local Loggers







# Types of Exceptions & Alarms



Signature Targets



Weather Dependent Targets



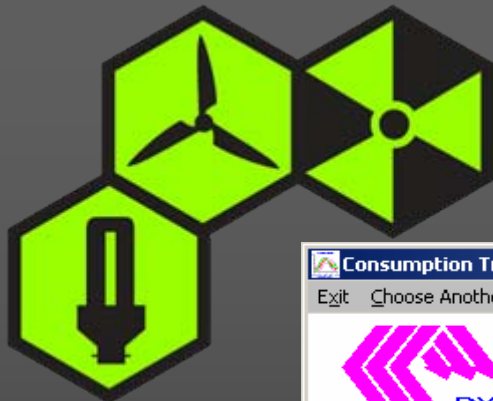
Constant Targets



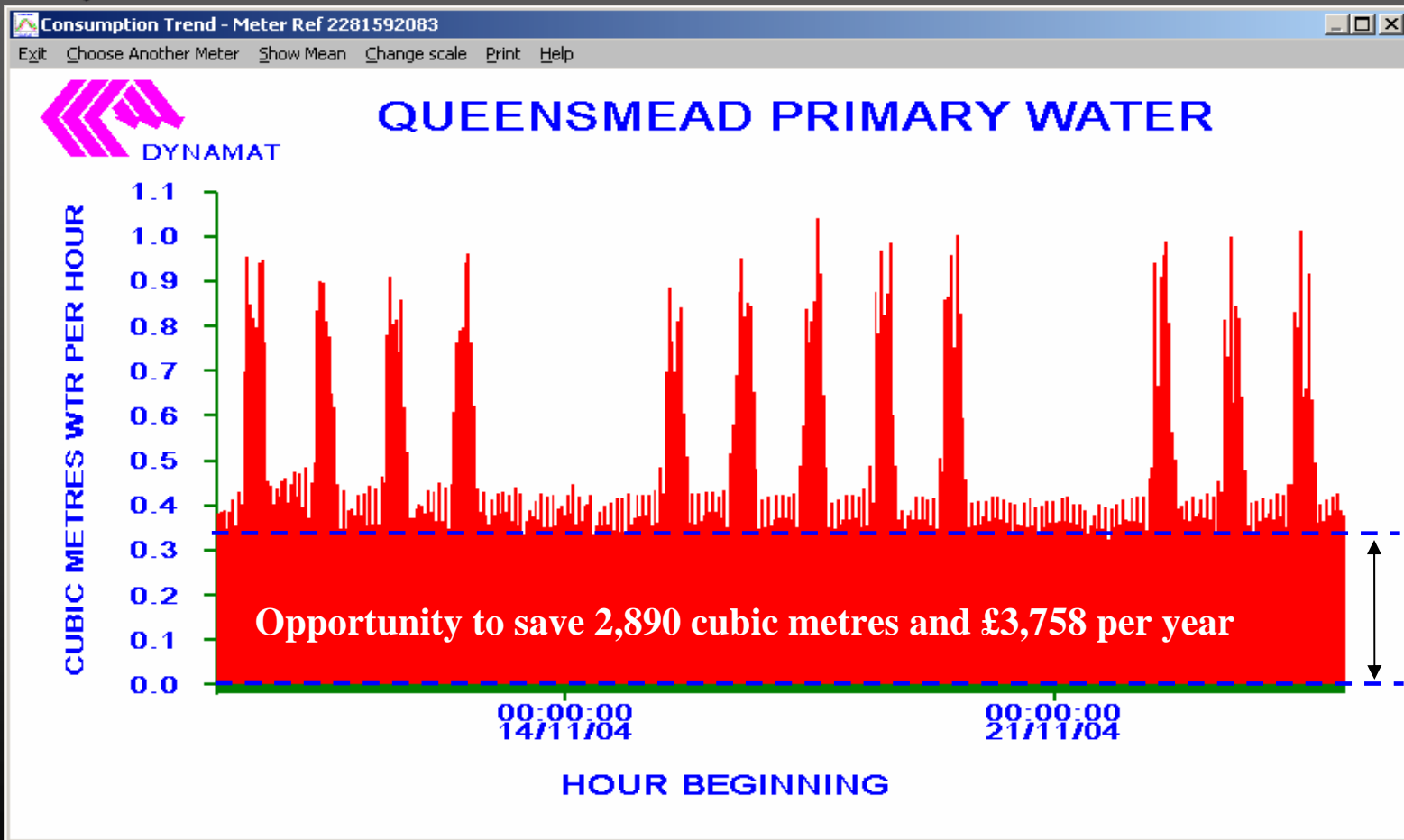


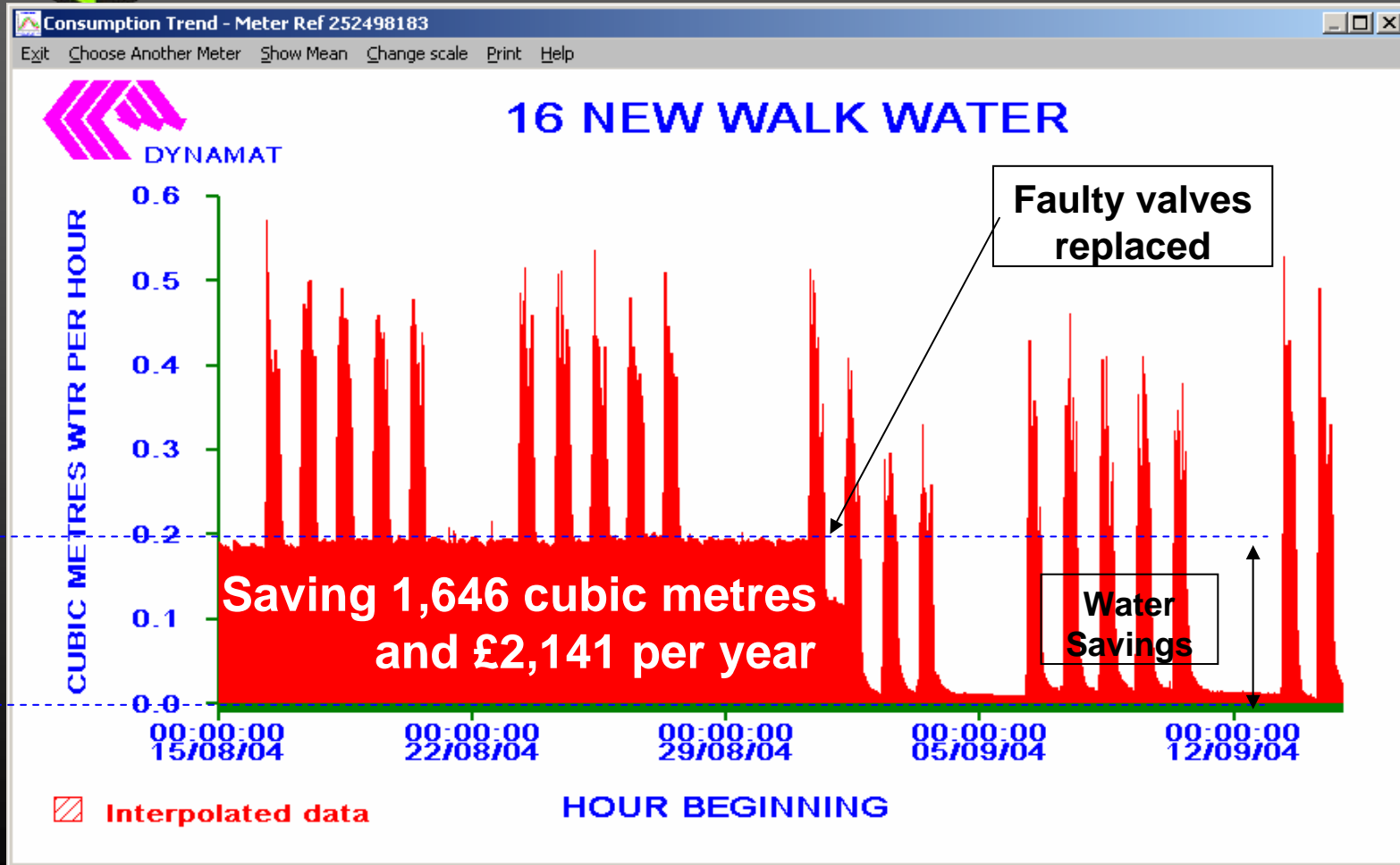
# Contents of Presentation

- What has done for Leicester City Council / what can it do for your council?



# Monitoring Water





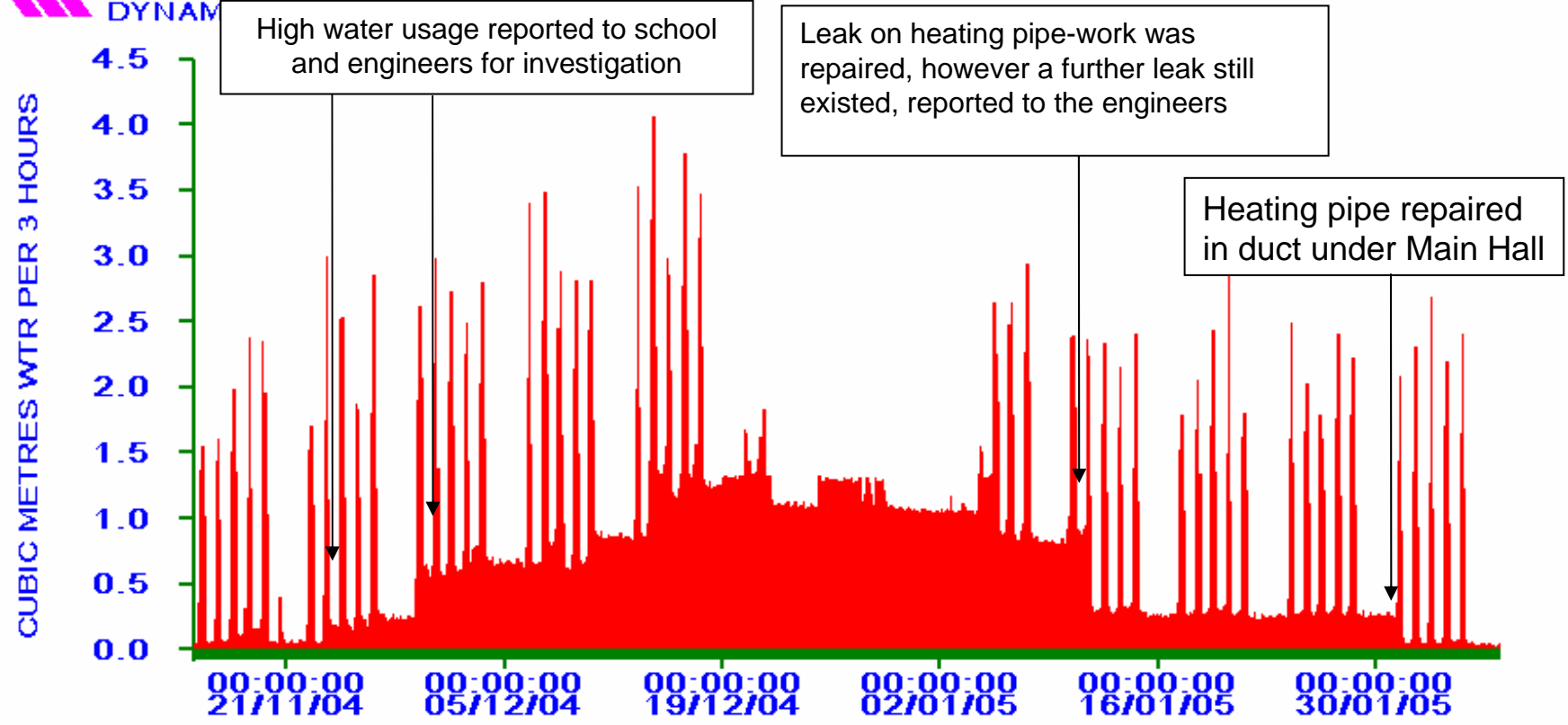


Consumption Trend - Meter Ref 200273973

Exit Choose Another Meter Show Mean Change scale Print Help

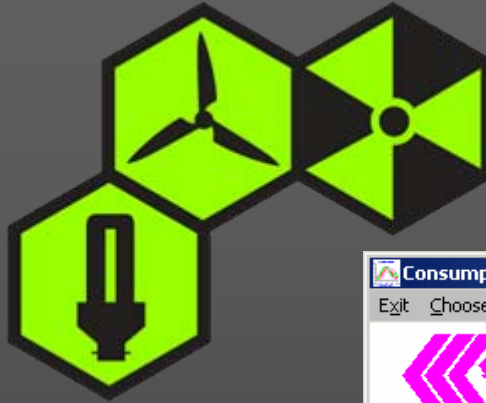


# THURNBY LODGE PRIMARY WATER



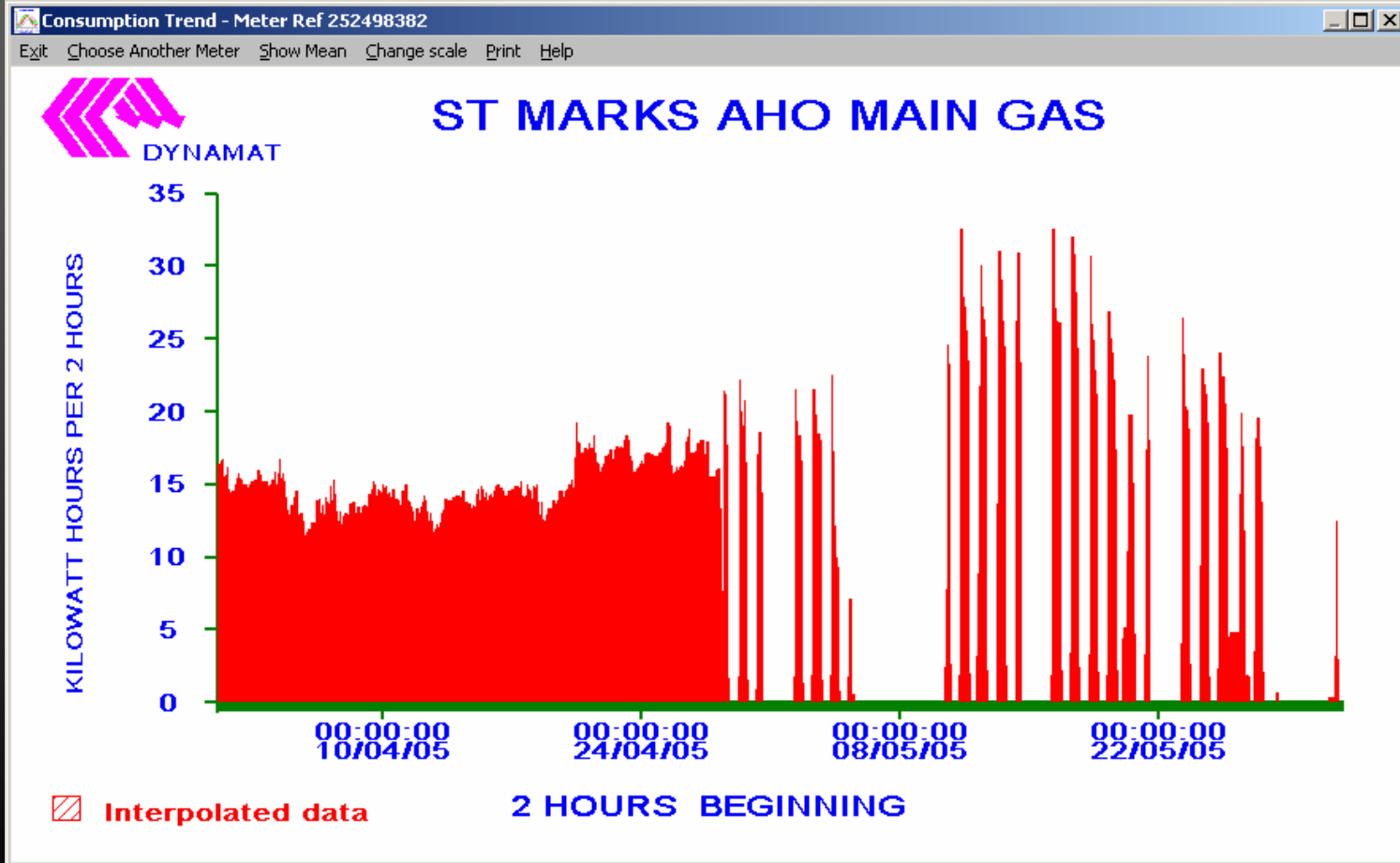
3 HOURS BEGINNING

Total Saving of £3,000 / annum



The gas usage does not reflect the buildings operational hours (Office hours). The gas usage is 'ON' constantly and never shuts 'OFF' even on holidays. **(WASTAGE)**

# Monitoring Gas



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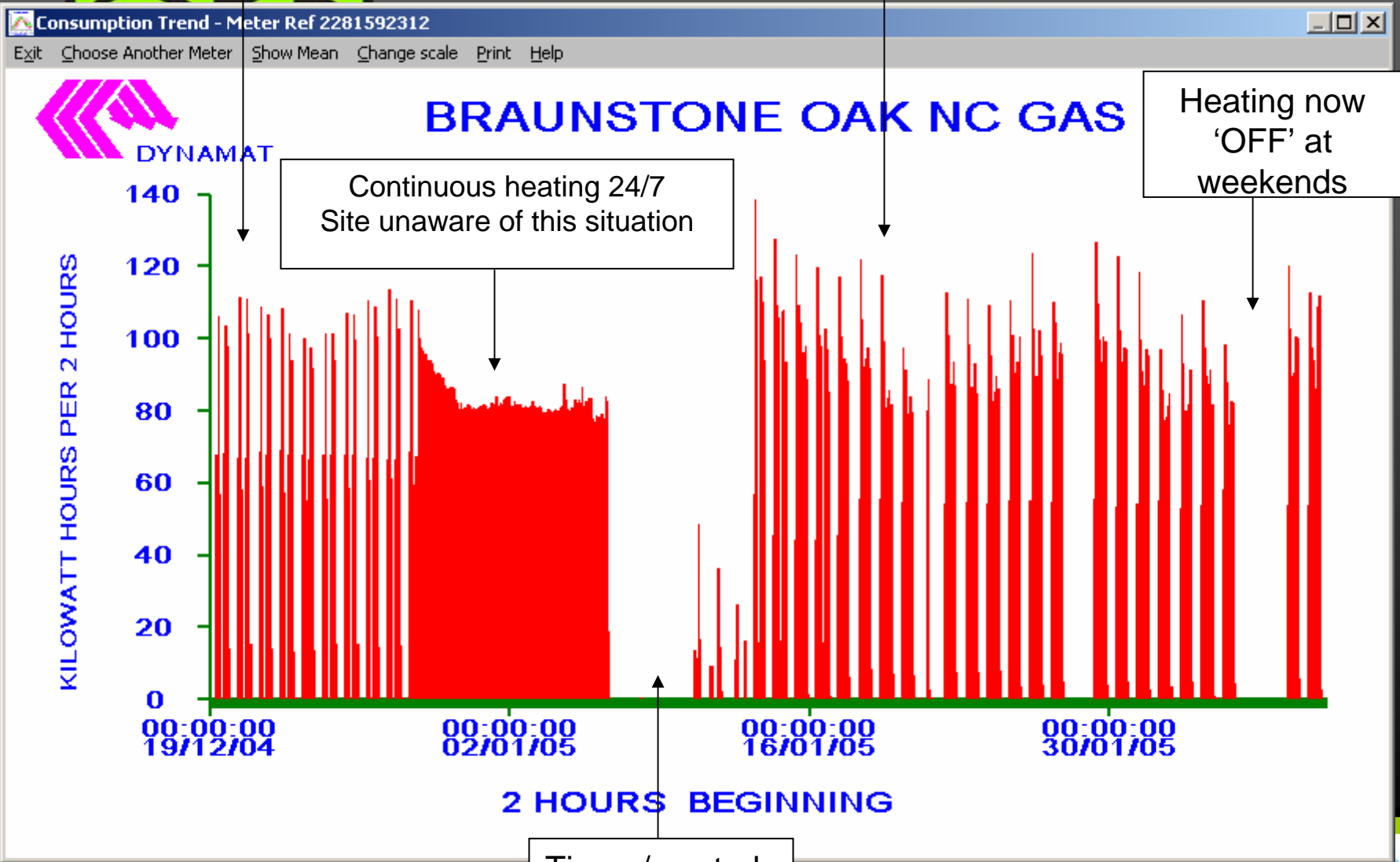
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Heating Operational 7 days a week  
Building occupied 5 days a week

New timer installed  
Still operating 7 days a week





## Monitoring Electricity

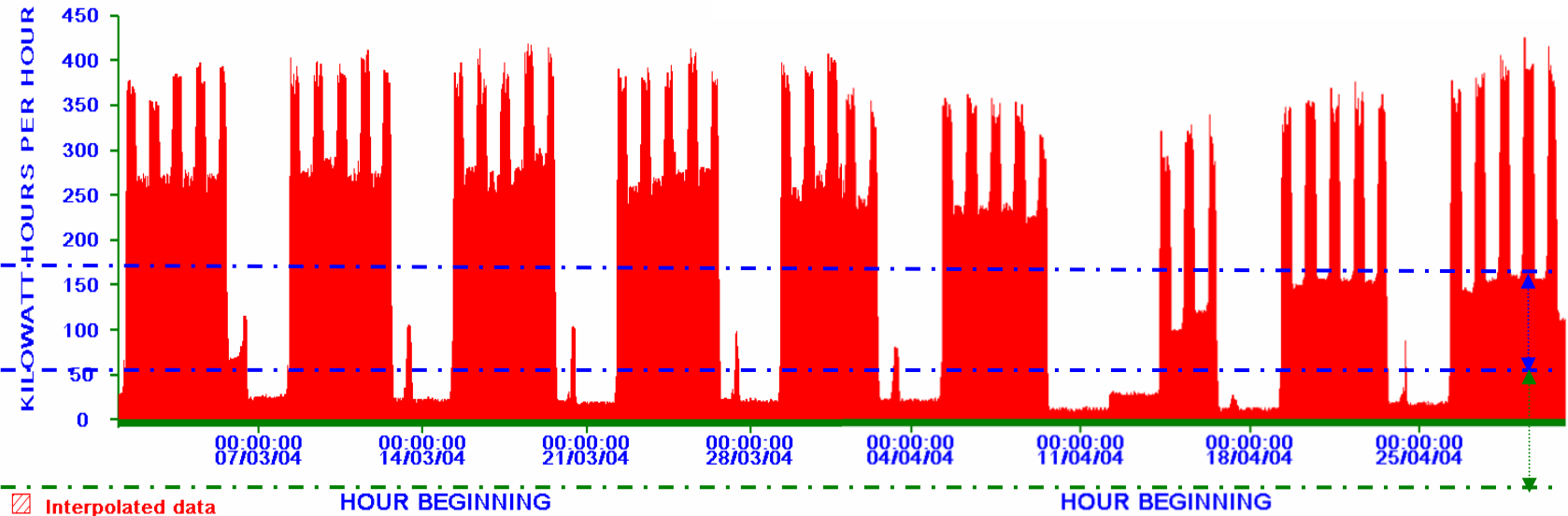
There was a constant electrical base load 270 kW/h for 13 hours (Monday to Thursday - 5pm to 6am).

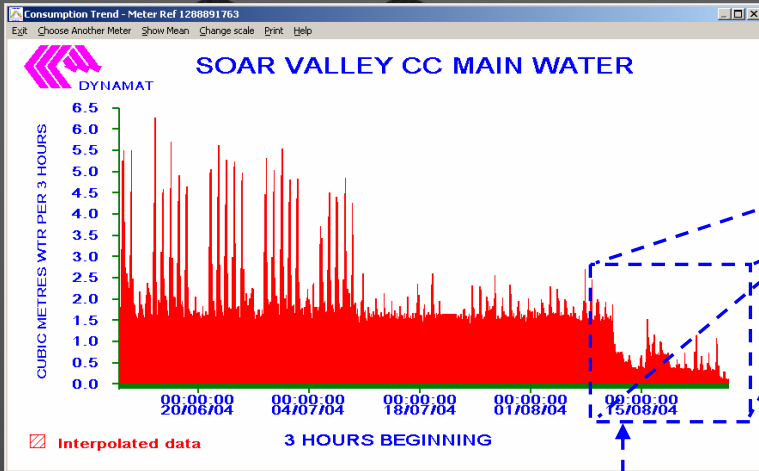
The site indicated that they left equipment 'ON' overnight, this is due to the time it took to sort out the error messages every morning. Therefore this equipment would only be switched 'OFF' over the weekend (Friday evening to Monday morning).

Following a review, some of the electrical equipment is now being switched 'OFF'. A saving of **£10,575 per annum**, has been achieved through good housekeeping - no capital investment was required. There is still an opportunities to save £254/week, £11,430 per annum.



### SHIELD ENGINEERING ELEC

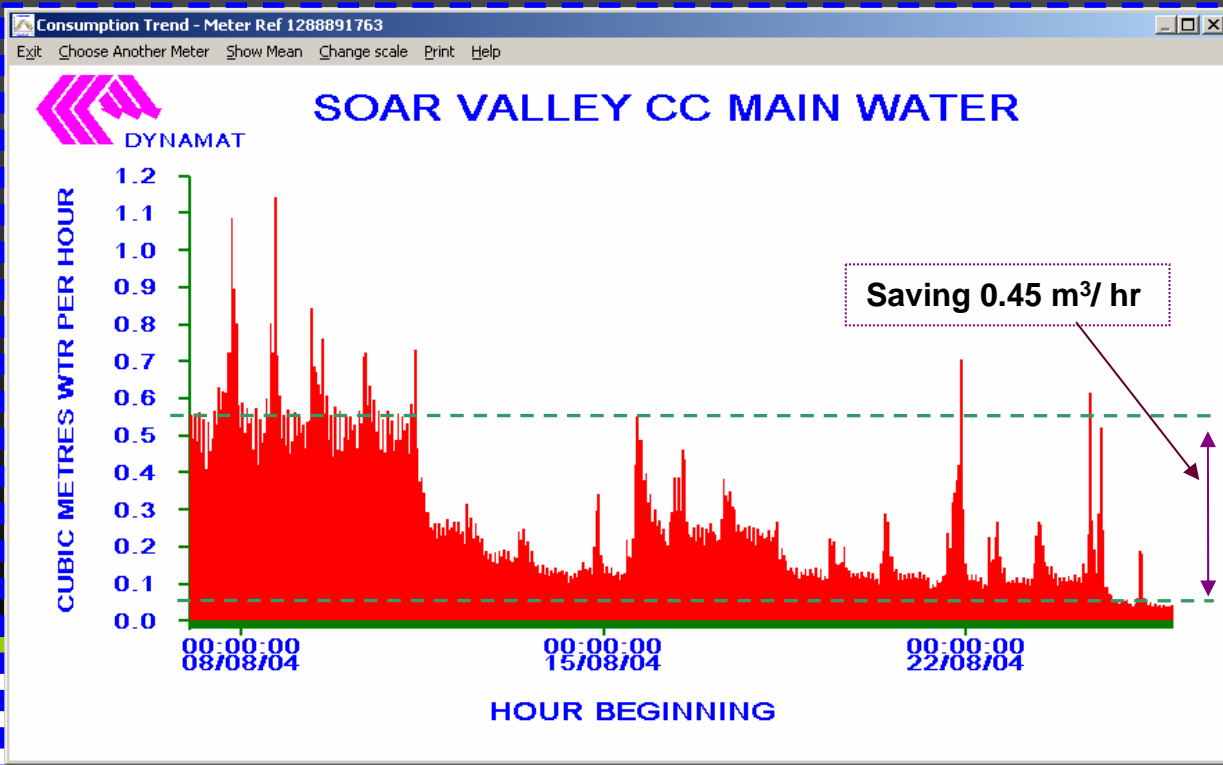




Identified that 8 Urinal Controls were faulty. These were replaced with new units at a cost of £1,820.

**Annual Savings based on investment:  
 3,943 cubic metres and £5,124**

There is still an opportunity to make further savings.



# Verifying Savings



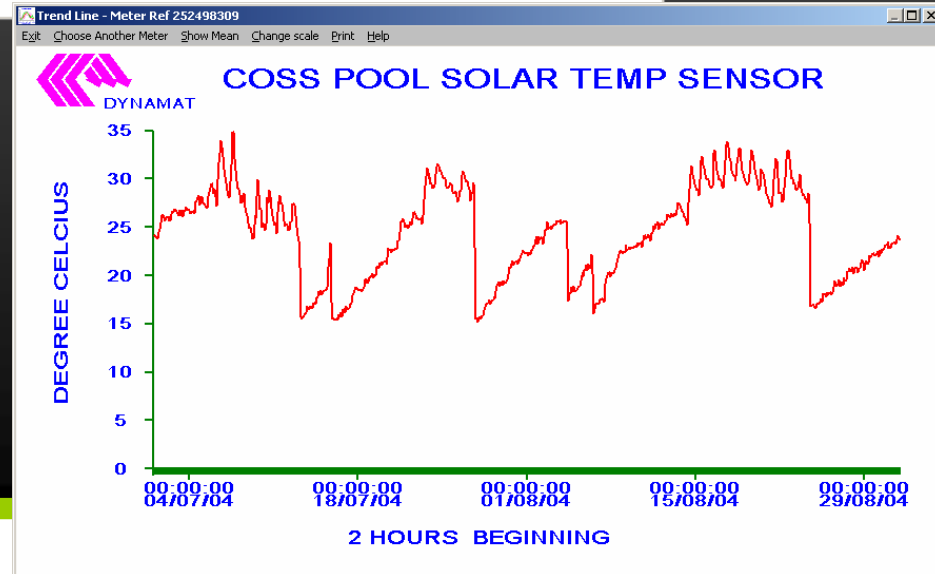
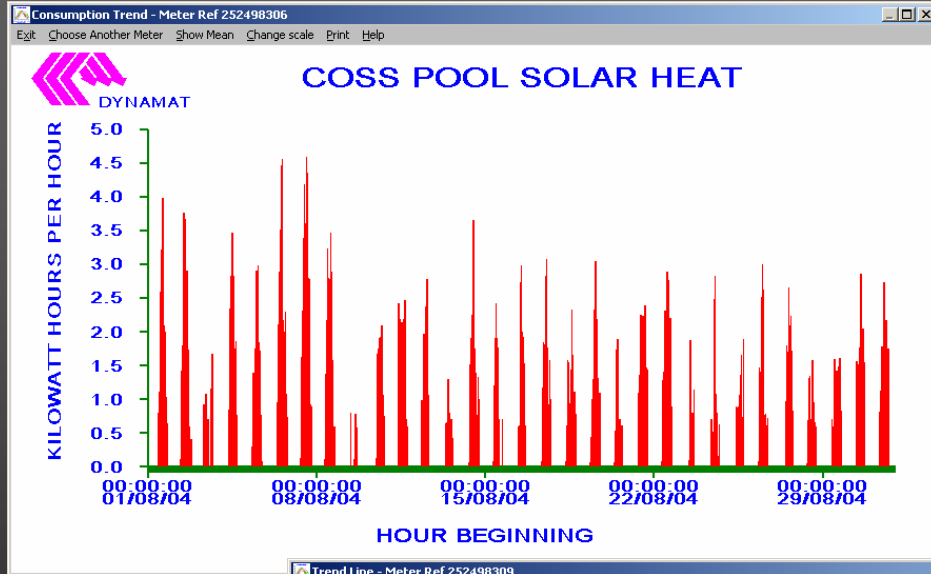
# Opportunities

- Ability to self-bill for energy and water
- Negotiate better rates for energy and water
- Identify buildings that require energy efficiency improvements
- Encourage and stimulate energy efficiency investment
- Pro-active maintenance using energy data
- Streamline our energy and water monitoring
- Change behavioral attitudes with a view to adopting a more sustainable lifestyle.

# Evaluating the efficiency of equipment



## Solar Thermal System





- European Energy Efficiency Directive

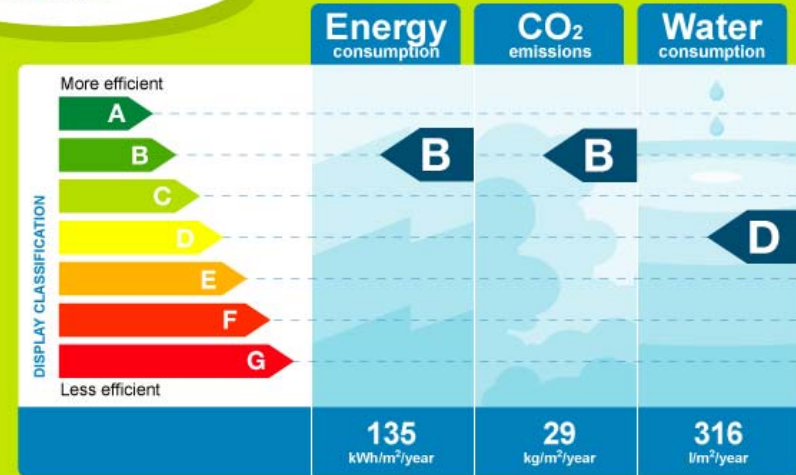


Energie-Cités' European Municipal Buildings Climate Campaign

# Wyvern First School

How does this building compare ?

2004



### Towards a class A building

#### Simple actions

YOU can help reduce the energy and water consumption in this building today by 10 % or more! Please use energy in a sensible way:

- Close doors and windows whenever possible !
- Always turn off the lights when leaving a room !

#### Improving performance by one class could annually save

the energy consumption of	the CO <sub>2</sub> emissions of a car going	water for
4 family houses	3 times around the earth	9530 showers

#### Technical solutions

- The school will be supplied with green electricity from November 2004.
- The roof's insulation reduces the school's heating needs by approximately 10 %.

### Energy Sources



For further information:

Milton Keynes Council  
 Environment Directorate - Jeremy Draper  
 Tel: 01908 25 28 52  
 e-mail: Jeremy.Draper@Milton-Keynes.gov.uk  
 www.milton-keynes.gov.uk

Official website: [www.display-campaign.org](http://www.display-campaign.org)



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# Contents of Presentation

- Why domestic properties?





# UK Energy Review

- Consumers need
  - better information about the amount of energy used
  - "smart metering"
  - clearer energy bills
  - more information on home energy efficiency



## Energy Services Directive (2006/32/EC), article 13(1):

By 2008, all European Member States have to implement the ESD that states that Members shall ensure that, in so far it is technically possible, financially reasonable and proportionate in relation to the potential energy savings, final customers ... are provided with competitively priced individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use.



## "Smart meters" – a catch-all phrase

- No single definition of smart metering;
- however, all smart-meter systems comprise an electronic box and a communications link.
- At its most basic, a smart meter measures electronically how much energy is used, and can communicate this information to another device that allows the customer to view how much energy they are using and how much it is costing them.
- The key distinction between smart-meter types is determined by their communication, that is, whether there is any with the energy supplier, whether this is one-way or two-way and the data-storage capability of the meter. The combination of these features determines the extent to which the metering system can help customers reduce their energy usage.





# "Smart meters" – a catch-all phrase

## Remotely read

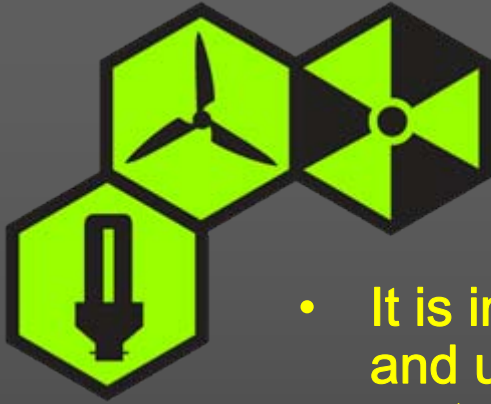
- Do away with meters readers. Information is sent automatically to the energy supplier - either via the power cables or a short-range radio link.
- Meaningful displays:
  - Display consumption in monetary terms, making it more relevant to people. A display can also be positioned in places where the homeowner can see it more easily.



# "Smart meters" – a catch-all phrase

- Internet meters:
  - The "smartest". It allows people to closely monitor where energy is being consumed in their homes, and where it is being wasted; for example, devices left on standby. All of this data can be accessed over the internet.
  - Two-way communication between energy suppliers and the meter to make it possible to switch tariffs, or pay as you go (pre-payment) provisions remotely
- Users can see the costs and benefits immediately





## Potential Barriers

- It is important, particularly in the liberalised UK energy and utility metering markets, that all smart metering systems in the future are interoperable.
- Standardisation - currently there is a range of different technologies being used.
- This means that, if an energy supplier installs one type of smart system into a property, the basic functions of the meter at the heart of the system can be used by a different supplier if the customer chooses to change.
- Cost of metering
  - Who carries that cost
  - Utilities have no guarantee of supply once IM installed



# Real Time Monitors

- Interim measure
- Users can see immediately what impact their behaviour has, not just in terms of money but in terms of carbon as well.





# Ontario commitment – an example

- to install smart electricity meters in 800,000 homes by 2007 and in every home in Ontario by 2010
- Responsibility given to each of 13 Local Distribution Companies
- Costs recovered through distribution rates



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# Knowledge is Money!

## Thank you for your attention

### “If you can't measure it you can't manage it” !

