

M&T techniques reduced gas consumption at the Merseyside Maritime Museum by 24.6% in seven months.

## MONITORING AND TARGETING REDUCES CARBON EMISSIONS

With growing demands on organisations to manage and reduce their energy consumption, Monitoring and Targeting (M&T) is rapidly becoming more important within the public and private sectors. There are basic M&T principles that can be applied within any organisation, which can lead to significant cost savings and reductions in carbon emissions, writes Paul Martin, Managing Director of TEAM (Energy Auditing Agency Ltd).

M&T refers to the collection, interpretation and reporting of information on energy use. Its role within energy management is to measure and improve performance and identify opportunities for reducing energy consumption and cost. It has been proven that between 5% to 20% energy savings can be achieved with little or no capital outlay through M&T techniques.

The objectives of M&T are to achieve:

- Better accountability
- Better control and allocation of cost
- Reduction in waste
- Improved performance
- Improved productivity

Exactly how the above is achieved is determined by an organisation's type. A multi-site organisation would focus

on billing information, where as a large site would normally use sub-meter data and a campus based site would use a combination of both. See Diagram 1.

By looking at examples from each organisation type it is possible to understand some of the key benefits of M&T.

### Multi-site organisations

The utility bill is a great source of information and can be used for the M&T of multi-site organisations. Once a number of bills have been processed, data such as energy consumption trends can be identified.

Collecting this data also enables site profiles to be developed and benchmarking to take place. For instance, it is possible to group sites according to function and categorise them under good, bad and typical practice to identify those which need immediate attention.

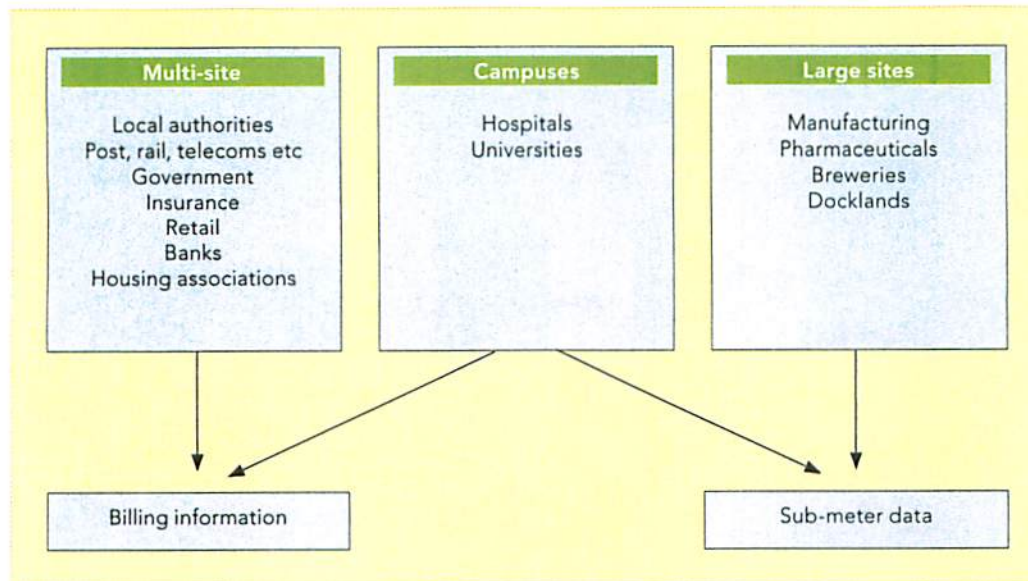


Diagram 1.

There are two ways in which this can be carried out. The first is by using software to collate, analyse and manage the data. The other option is to outsource to a Bureau service which would receive bills directly from the supplier, process them and check for errors on the client's behalf.

One example of an organisation that has benefited from a Bureau service is Royal Mail Group plc. with over 2000 sites, ranging from delivery offices to large distribution centres. As well as carrying out data collection and bill validation, other services received include the identification of problem sites, resolution of queries and assistance with producing league tables and reports. The main achievements of this M&T approach include:

- Existing and projected cost recoveries in the region of €4,528,300 equating to 2% of energy spend
- Greater visibility for setting targets and monitoring site performance
- Identified savings in energy and time
- Increased financial and energy control
- Improved energy awareness

### Large site organisations

Large sites may still only have one incoming meter for each utility supply which is a very crude level of information. For M&T to effectively take place sub-metering data is required. Merseyside Maritime Museum, part of the National Museums

Liverpool group, is an example of where this form of M&T has been implemented.

The museum had no provision for 30-minute data readings for its electricity, gas and water consumption. This meant it was not possible to pinpoint what was causing a noticeable variation in energy use. The museum commissioned an M&T software consultancy to select and manage the installation of a data logging and collection system.

The initial solution involved the utility companies replacing the meters and installing a new data logging system. The consultancy used software to analyse half-hourly data and highlighted a typical electricity demand of 400kW during the day and a high level of 280kW at night-time. This identified that the chillers, Air Handling Units (AHU's) and heating



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systems were in operation constantly in order to maintain a desired temperature level of 24°C and a relative humidity of 50% for preserving the museum's artifacts.

To investigate how the chiller should be operating, additional sub-metering was installed. It was recommended for the humidity settings to be relaxed to a band of 40% to 60% instead of 50% (where appropriate).

The report on page 109, Graph 1, illustrates site performance before and after relaxing the control regime. This has resulted in substantial utility savings and contributed to a total saving of approximately 42% in seven months, equating to a monetary value of €37,723. The total cost of the meter reading system was €11,320 and it has paid for itself within 2-3 months.

Some of the key achievements from these M&T techniques include:

- Electricity consumption reduced by 7.0% in seven months
- Gas consumption reduced by 24.6% in seven months
- Water consumption reduced by 10% in seven months
- €34,164 of electricity and gas savings achieved in seven months
- Improved heating and cooling efficiency

### Campus sites

M&T for campus sites, such as hospitals and universities, includes elements from both of the approaches outlined above. Large buildings lend themselves to sub-metering, for instance, whilst smaller remote sites could use energy bills. The next example shows how a hospital, specifically Birmingham Heartlands & Solihull Hospital NHS Trust used M&T to identify wastage and log savings.

The hospital's accounts department previously checked individual bills for the hospital's three main sites and the energy department monitored energy consumption by using an in-house computer programme. These were both manual processes and extremely time consuming. M&T software was therefore introduced to assist with producing monthly and annual energy consumption cost reports.

The software is now used for the M&T of the hospital's major consumption and cost centres for all utilities and assists with the validation of bills. It is also used to produce league tables in order to make site comparisons, compare performance against set trends and identify which sites use the most energy.

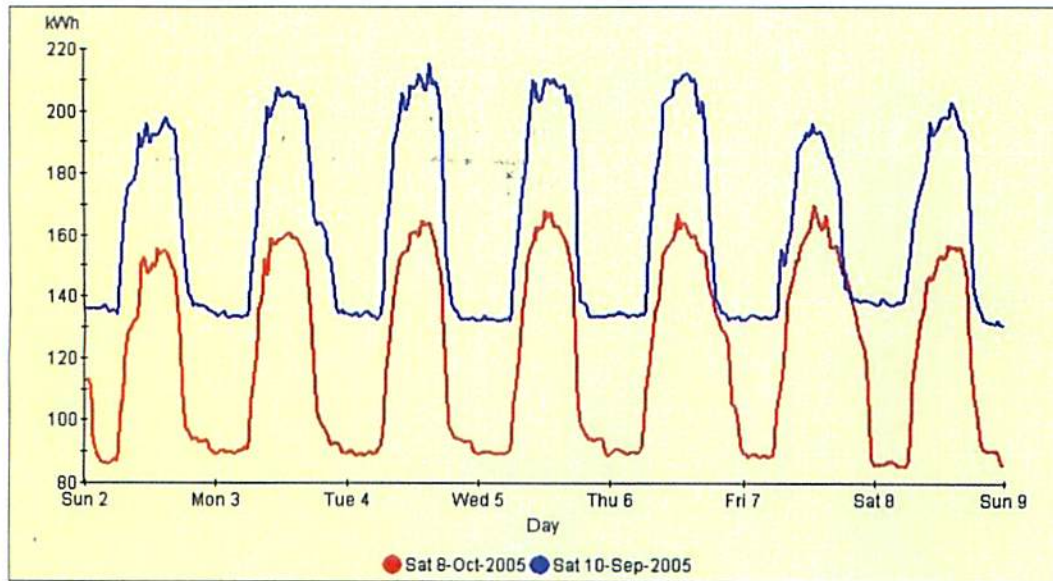
The M&T software has helped the hospital to:

- Identify savings in energy, money and time
- Improve energy awareness
- Increase financial control
- Concentrate on better fuel purchasing

The Trust has put a series of energy management measures in place and has used the software to closely monitor them. Over a period of five years, the site water consumption of the hospital decreased by 12%, despite rapid expansion. This equates to an annual saving of €57,345 for a total capital outlay of €12,000. The measures adopted include:

- Medicinal equipment being switched automatically to standby out of working hours
- Providing major water users with water meters and promoting efficient use of water
- Identification of water leaks by obtaining 24 hour consumption data

High efficiency lighting also proves a good opportunity for energy saving in hospitals. Energy savings of 50% to 55%



Graph 1.

## The utility bill is a great source of information and can be used for the M&T of multi-site organisations.

were achieved in the main theatres and the Pathology Unit by replacing the lights. Other benefits were improved illumination and new bulbs that lasted on average eight times longer than the previous ones.

A new control regime was also introduced for the theatre ventilation plant. Instead of it constantly running at full power the decision was made to switch it to half-speed outside working hours (to maintain sterile conditions). Chilling and humidity controls were also switched off during this period and temperature controls setback.

In summary M&T is an ideal cornerstone to any energy management campaign. Not only can M&T software provide a database of energy use and costs, it can automate exception reports, provide benchmarking and help identify waste that can be resolved through low cost/no cost measures.  $\Phi$

*Paul Martin is Managing Director of TEAM (Energy Auditing Agency Ltd) and has over 28 years experience in energy management. As well as being a Chartered Engineer, he has an MSc in Energy Conservation and the Environment, is a Member of the Institute of Mechanical Engineers and a lecturer for the Energy Institute. TEAM was founded in 1985 by Paul Martin and has over 300 customers from all sectors including Commerce, Industry and Government. TEAM supplies Monitoring and Targeting software, provides an outsourced energy bureau service and specialises in energy consultancy.*