

Micronics Press Release

FAO: The Editor

Effective Metering, AMR & aM&T

aM&T (automatic Monitoring & Targeting), the correct selection and application of meters combined with AMR (Automatic Meter Reading) and M&T (Monitoring and Targeting) is a key element in Best Practice Energy Management.

Micronics has combined its considerable experience in the Clamp-On - Ultrasonic metering field with its Reseller Partners expertise in AMR & aM&T to prepare this introduction or refresher paper for Energy Managers, which covers the fundamentals of developing an effective energy and water metering strategy, AMR communication options and an overview of the functionality and associated benefits of an effective aM&T system.

An aM&T system can be considered in three logical parts, which are

- Meters
- AMR (Automatic Meter Reading)
- M & T (Monitoring and Targeting)

Meters -

Meters are the foundation blocks of an effective aM&T system, they are the primary measuring element and as such are fundamental to the accuracy of the overall system. They provide the basic data, which needs to be accurate and reliable. So the starting point when considering an aM&T system for an existing site or building is a Metering Audit to establish the extent and quality of the current meter installation. The Audit can be a daunting task but it is an essential first stage and may require the installation of temporary non-invasive, portable measurement devices to establish the quality of the existing meters. Temporary measurement instruments include Clamp-On Ultrasonic flow meters for liquid flow or heat/cooling energy measurements or Clamp-On CT's for electricity measurements.

Having established the scope and suitability of the current meter installation both Primary and Secondary the next step is to develop an aM&T plan which supports the management objectives and operational needs of the organisation. This will identify Energy Accounting Centres (EAC's) and the key water and process measurements required to manage the Energy and Water consumption for the building or site, which in turn will highlight the meter shortfall and new meters required.

The Audit has profiled the current meter installation and the aM&T plan has identified the additional metering requirements. Selecting the new meters is the next step and the first stage is to establish a specification for each metering point including the accuracy, range, repeatability, reliability and connectivity options required. There is a wide range of options available for measuring energy and water utilising different technologies. Selecting the correct meter for each measurement point will require professional guidance from a consultant and or advice from a range of suppliers or suppliers who offer a wide range of metering alternatives. There will be price/performance tradeoffs for different options and it will also be important to consider the installed price for a particular option, installation disruption and lifetime maintenance and service issues

costs. For example in some applications the supply price of a Fixed Ultrasonic Clamp-On meter may be more expensive than a more traditional in-line mechanical meter, but the installation cost, installation disruption, life time maintenance and in-line energy cost will be considerably less with substantial savings!

AMR (Automatic Meter Reading) -

A meter that cannot be automatically read and recorded is not worth having because experience shows that it's very unlikely that it will be read and if it is manual reading and logging of meter readings is open to error! All modern meters have some form of connectivity or means to connect them to some form of AMR (Automatic Meter Reading) system or data logging device. However, whilst most existing meters will have or can be adapted for remote reading for some it will not be possible or cost viable and this should be identified in the Audit.

Having established that all meters should have the facility for connectivity to an AMR system or have on-board data logging the connectivity can take many forms. These range from a basic 1/2-hour pulse or analogue typical 4 to 20mA signal for continuous recording of actual flow or consumption to smart meters where all the meter information is available in a digitally encoded form for AMR by various means. The latter is preferable as it reduces the possibility of an error between the actual meter reading and the AMR signal; however, it is more expensive and not available on all meter types.

Given suitable connectivity there are AMR systems with a wide range of communication options including

1. A Twisted Pair of wires connecting all the meters together often termed a Daisy Chain. Each meter will have an integral communication ability e.g. smart or add-on interface unit, which will be linked via the Daisy Chain back to a master data-collector/logger. There are many variants with M-Bus a European AMR standard being the most sophisticated.
2. Internal and external PSTN networks where the telephone system provides the communication link.
3. Ethernet based systems where each meter is a LAN node on the network
4. Low power - licence exempt radio communications where each meter or small group of meters via a local data collector has a radio transceiver on a local network.
5. GSM - mobile radio communications where each meter or small group of meters via a local data collector has a GSM link to a master data-collector/logger.
6. Web enabled systems where a cluster or group of meters is read and the data is automatically transferred to an Internet service provider for remote access.

The above is not an exhaustive list and the actual AMR system for an individual Building, Campus (multiple buildings on a site) or organisation estate will depend on many factors and in most cases the best solution will be a combination of the above.

For some smaller site applications a Portable Clamp-On metering device such as the Micronics Portaflow 300 or similar may be sufficient to establish consumption trends and profiles of water and water based heating systems when combined with appropriate Clamp-On temperature sensors.

M & T (Monitoring and Targeting) -

Having gathered the meter reading data e.g. 1/2-hour through whichever form of AMR system the next step or task is to automatically convert the data and that's all it is at this point into useful information and exception reporting!

Current aM&T systems encompass a vast range of application programs including Monitoring and Targeting, which manipulate, analyse and convert the vast amount of metering data gathered by the AMR system into useful information.

These systems will be multitasking, multi-user utilising standard operating systems. The databases employed may also be standard or in some cases proprietary and the systems are often scalable from a desktop PC to an Internet server. Your aM&T plan will have clearly defined your requirements in this respect.

Generally provided programs will include

- Meter Profiles or Reports
- Virtual Meters or Group Profiles or Reports
- Utility Shadow Billing & Automatic Billing
- Benchmarking
- Budget Reports
- Bar Charts
- Cusum
- Pie Charts & Tables
- Period on Period Comparisons
- Degree Day Monitoring
- Environmental Report
- Climate Change Levy Reports
- M & T - Weather, Occupancy, Production variables, Signature, Theoretical
- Custom Management Reports
- Exception Reporting

At first site the above can appear rather daunting and it would be fair to say that the top end M & T software associated with some aM&T systems is over flexible and consequently over complex in the set-up and configuration. It's important to strike the correct balance between flexibility or individual customisation and ease of use. And of course the IT skills or level of Energy Managers varies so the ideal solution is a system that offers a wide range of ready made templates or pre-configured reports but with the option for customisation of reports etc by the individual as and when required.

To conclude this brief introduction, aM&T systems are a valuable tool, which when designed and applied correctly will deliver the essential visibility and measurement information required for effective Energy, Water and Cost management!

Ends

Note to Editors: For further information or graphic images to support this paper please contact David Leigh on 01579 321750 or email microncis@leighandersonassociates.com.

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