

Merseyside Maritime Museum

Introduction

With the rapid rise in wholesale gas and electricity, there is a growing demand to reduce the expenditure on energy. National Museums Liverpool are firmly committed to their social responsibility policy, part of which recognises the importance of reducing their impact on the environment. National Museums Liverpool comprises of eight venues: World Museum Liverpool, the Walker Art Gallery, Merseyside Maritime Museum, the International Slavery Museum, the National Conservation Centre, the Lady Lever Art Gallery, Sudley House and the forthcoming Museum of Liverpool, currently under construction and due to open to the public in 2010. The following case study focuses on Merseyside Maritime Museum which opened in 1980 and is one of Europe's largest maritime museums covering seven acres of Liverpool's prestigious Albert Dock. The museum has outstanding collections of maritime history and reflects Liverpool's importance as a gateway to the world.

National Museums Liverpool's Objective

Museums are often by their very nature historical buildings. As such, the existing infrastructure within, offers no facility for the collection and management of energy data, other than that provided by the site management team in the form of monthly readings. The Merseyside Maritime Museum's gross floor area is 10,234m² and it has an annual electricity consumption of 2,508,450kWh and gas consumption of 1,792,480kWh consumed by air conditioning, heating and lighting.

Merseyside Maritime Museum



National Museums Liverpool's key objective was to introduce an energy management scheme that would enable them to monitor and ultimately micro - manage the energy consumption across the site. This could be achieved by the automated collection of half hourly data which could then be processed in order to identify erroneous consumption profiles and areas of potential energy wastage. Minimal disruption to the museum, was important given that the work needed to be carried out during opening hours.

The Solution

By using Enercom's Automatic Meter Reading (AMR) System in conjunction with a high end energy management software provider (Team – Energy Auditing Agency Ltd) National Museums Liverpool were able to collect the required half hourly data and manage the energy across the site. The AMR System consists of a series of Multilog data loggers strategically placed throughout the building collecting pulses from the relevant energy consuming plant and equipment.

Data Provision for Energy Management

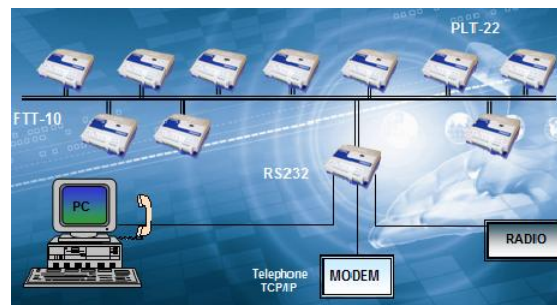
The Multilog units receive meter pulses (from any type of meter: gas, electric, water, oil, heat etc.), convert the pulse count into a kWh energy usage figure for each half hour (or other programmed unit and time period) and stores the time-stamped values for up to 60 days, continuously updating the most recent sixty days worth of half hourly figures in readiness to repeat/download this data when requested by the host PC.

Multilog controller software running on the host PC initiates regular automatic downloads of the half hourly data and copies it into easy to use CSV/ASCII files for interpretation by Team M&T Sigma Software (or any proprietary M&T Software) or into a Building Management System (BMS) for analysis. This allows the software to check that meter data arrives in unbroken order and to re-initiate a download if communication is incomplete. The system has proven to be resilient and reliable in operation. The Multilog system also provides useful raw meter data such as instant meter readings, time-stamped readings, energy use profile charts and the means to easily view, analyse and copy data from a Web-Browser application into Microsoft applications such as excel.

Convenient and Clean Installation

Multilog units are equipped for communication over a variety of media including existing single or multiphase mains cables using an in-built PLT-22 Powerline interface and twisted pair using an in-built LONworks communications chip. This means that installation is clean and local, there is no requirement to drill walls and lift carpets and floorboards to lay extra cabling, there would be no disruption to power supplies and also any work can be carried out during opening hours.

Where network components or host PC are remotely situated, communications are extended via the internal telephone network or PSTN using dial-up modem or via TCP/IP Ethernet LAN interface to a Multilog "gateway" unit. Given that there was a requirement for minimum disruption to the clients. The Multilog system is easily expanded or altered to allow for changes at the site, or where continuous plant operation necessitates a phased approach to implementation.



The Outcome

Upon analysis of the data collected, it was found that during the summer significant amounts of energy was used by the chillers and boilers to cool the air and then re-heat to de-humidify the air before supplying to the building. Operating at a higher relative humidity in the summer can reduce the amount of energy used. In the winter when the cold external air is heated before delivery to the building its relative humidity falls, this air then needs to be humidified before delivery to the building. Operating at slightly lower temperatures and humidity means less humidification is required, thus less gas is required in the boilers and less water is used in the humidifiers. It was also found that 3 Air Handling Units (AHU's) serving the museum was operating continuously even during times of closure.

In the first instant by installing temperature and humidity sensors to monitor external conditions it was found that by relaxing the chiller and humidification systems that the need for the air conditioning systems to operate to such tight limits was not required, ultimately making significant savings on energy and water. Additional energy savings were made by running the AHU' only when required.

In terms of energy savings, in 7 months electricity consumption was reduced by 7%, gas consumption was reduced by 24.6% and water consumption was reduced by 10%. As well as having a much improved heating and cooling system in the first 6 months, **£22,633** of energy savings were achieved. The Estate Management Team of National Museums Liverpool has also been awarded Energy Efficiency Accreditation from 'The Carbon Trust'.

Testimonial

National Museums Liverpool is committed to complying fully with environmental legislation and promoting environmental management policies and practices across the organisation.

An integral part of our environmental strategy is to continue to reduce the consumption of fossil fuels and to incorporate long term strategies for energy efficiency into planning and development through the conservation of energy and the introduction of new technology.

Enercom's Automatic Meter Reading (AMR) System in conjunction with a high end energy management software provider (Team – Energy Auditing Agency Ltd) has taken us a step closer to achieving this goal.

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