



MANCHESTER
CITY COUNCIL



SAVE ENERGY EU CIP Grant agreement no.: 238882
Part funded by MCC's Carbon Innovation Fund

The Art of Green: Encouraging Energy Efficiency through Behavioural Change

Manchester Art Gallery is being supported by **SAVE ENERGY**, an EU project, the City of Manchester's **Carbon Innovation Fund** and **Renaissance North West** to install and implement a programme of energy saving at the gallery. Together the projects aim to demonstrate how energy savings can be made by behaviour transformation and utilising the latest developments in lighting technology.

Manchester's Climate Change Action plan – Manchester A Certain Future sets out some tough challenges for communities to help the city reduce its Carbon emissions by 41% by 2020. This includes the development of a long term programme for retrofitting public and commercial buildings across the city. One of the aims is to make a key contribution to this programme.

The Save Energy Project in Manchester

Funded under the Competitiveness and Innovation Framework Programme (CIP), the SAVE ENERGY project is funded by the EU and is working in five European cities: Lisbon, Portugal; Leiden, Netherlands; Lulea, Sweden; Helsinki, Finland and Manchester, UK. The consortium of 15 partners includes public authorities, public agencies, universities, research institutes and SMEs aiming to use a combination of real time energy consumption information and serious games to influence behaviour. It is a 30 month project, completing in August 2011.

Each city has a pilot building known as a "living lab". In the UK the pilot building is Manchester Art Gallery. Owned and run by Manchester City Council, Manchester Art Gallery is one of the region's most popular cultural destinations, attracting over 400,000 visits each year. In 1998 it underwent a four year £35million refurbishment and expansion programme, transforming the venue. Manchester Digital Development Agency – MDDA, (part of Manchester City Council) is working alongside the University of Salford's Centre for Construction Innovation – CCI and the art gallery to implement the UK pilot.

Monitoring Technology

Supported by the Carbon Innovation Fund, the core technology employed to store and collect data is the Elmo monitoring system manufactured by Hanwell Instruments Limited. The company offers a range of monitoring equipment using radio communications. This is ideal for a sensitive and historic building since no additional wiring is required on site. Additional work has been necessary to ensure coverage due to the size of the dimensions of the building.

Most of the sensors are CT clips on the power cables. There are a small number pulse gas / water meters, along with temperature and relative humidity detectors and door monitoring sensors. The sensors transmit consumption data wirelessly to a Network Radio Gateway (NRG) which in turn is connected via the network to computer at MAG running the Hanwell Radiolog software. The Radiolog software performs calculations on the retrieved data and populates a database with time-stamped half hourly kWh and m3 readings. Real time data from the door sensors is stored separately in a different format. A server at MDDA further processes the data to generate display information which is returned to the gallery via the internet and a local wifi network.

Energy Use at the Gallery

Energy efficiency is an economic as well as environmental necessity and as a listed building (Grade I & II), where aesthetics are key, the gallery is challenging. It has a Display Energy Certificate (DEC) rating of "G/212". The rating is based on comparison with a notional public exhibition building and does not take into account the additional energy requirements of a historic art gallery. Half of the annual running costs of £800K are spent on energy.

The SAVE ENERGY project is monitoring energy use in four distinct areas of the gallery:

- **Lifts** - The concept is to engage lift users in understanding the consequences of their decision to use either the lift or the stairs. Lifts are used by the public (visitors) and staff.
- **Catering** - The intention is to engage staff in a team performance contest where they are attempting to beat realistic target consumptions. There may be non-financial team rewards for good performance.
- **Atrium** - Although it is not possible to attribute heating, cooling and humidification loads to opening doors in the Atrium, it can be seen from BMS displays that there is an impact and therefore the working assumption is that excessive door opening should be avoided. The door open times will be measured by the system and messages will be displayed at the reception desk. Behavioural change will be evaluated by comparison of door open times over many days.
- **20th Century Gallery** - supported by Renaissance NW, the gallery is being fitted with new lighting as part of developing the case for low energy lighting. This will significantly reduce electrical consumption directly and indirectly by reducing the impact of the lighting heat load on plant. The aim is to use different scenarios to understand visitor reaction to LEDs.

Information Display and the Serious Game

The display screens are in a HTML format and use a tablet computer such as the ARCHOS 10.1. The serious game (a computer game designed for a primary purpose other than just entertainment) will be accessed via the web and made available in the gallery foyer for visitors. The game will provide a model of the energy usage of the building and aims to educate users.

Follow Up Information

Workshop Slides

<http://www.slideshare.net/shakamie/the-art-of-green-011010-v2-0>

Further Information

SAVE ENERGY Project: www.ict4saveenergy.eu

Renaissance North West: www.mla.gov.uk

Manchester's Climate change Action Plan, "Manchester: A Certain Future" - www.manchesterclimate.com

Hanwell Energy Monitoring: www.hanwell.com

Manchester Art Gallery: www.manchestergalleries.org

Manchester Digital Development Agency: www.manchesterdda.com

Centre for Construction Innovation: www.cci.com

SAVE ENERGY Serious Game: <http://greenmyplace.net>

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