Low Carbon Heating & Cooling

Phase Change Materials **(PCM)**

IERC International Energy Research Centre

Project Acronym: PCM

Project Details: Compact Thermal Energy Storage Unit & Heat Exchanger System

Start Date: December 2011

Duration: 29 Months

End Date: May 2014

Heat Storage and CHP in the NIMBUS building, CIT

Project Description

The project team aimed to design, prototype, test and demonstrate a full scale novel phase change material based thermal energy storage heat exchanger.

A key challenge was to address cost effectiveness. The team worked on this by practicing extensive Design For Cost practices and improving heat transfer within the system based on well-established phase change materials.

The on-site demonstration forms part of Cork Institute of Technology's 'National Sustainable Building Energy test bed' for whole building power and energy management at the NIMBUS centre in CIT, Cork.

Project Achievements & Impacts

The project team has developed and successfully demonstrated a full scale thermal energy storage heat exchanger. The following have been some of the key achievements from the research:

1. The use of the PCM tank has resulted in the Combined Heat and Power (CHP) plant operating in a more continuous way (run times increased from 20 to 210 minutes) with resultant benefits of greater system efficiency, improved system reliability and improved return on investment.

2. At temperatures above 60°C, the PCM tank stored 6.5 times more energy than an equivalent sized water tank.

3. When not in use, the PCM tank holds its temperature much better than an equivalent capacity water tank. In measurements, the PCM tank lost 2.2°C versus 27°C for the water tank over a 24 hour period.

Finally the demonstrator remains in place and field performance data continues to be gathered. This is a useful resource for the IERC member companies and for future research work led by the IERC.

Participating Research Organisations	Contact
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