

ERDF Social Housing Energy Management

Executive Summary of the Pre-Works Report

This is the Pre-Works report for the Social Housing Energy Management project, as funded by the European Regional Development Fund (ERDF). This project is based around insulating hard to treat prefabricated homes which are used for social housing, and monitoring in depth before and after to understand the levels of improvements created. The project also supports Small to Medium Enterprises (SMEs) in the North East of England, although this Pre-Works report focuses on the energy efficiency measures.

North East England has the second highest levels of fuel poverty in England¹. As a result, the National Renewable Energy Centre (Narec) formed a project consortium with South Tyneside Homes and Homes for Northumberland to undertake thermal energy efficiency improvements in almost 400 socially rented hard-to-treat (off-gas or non-traditional construction) properties. The consortium has received €4.5m investment from the European Regional Development Fund (ERDF).

The detailed analysis of pre and post work data of buildings will, allow the fuel poverty and financial improvements for residents to be quantified. This Pre-Works report details the work carried out in assessing, testing and monitoring the buildings prior to any improvement being carried out. As the building work is completed, further monitoring and analysis will take place resulting in the Post-Works report due in summer 2013.

The measures carried out, and buildings used are shown in Table 1:

Partner	Properties	Technologies
South Tyneside Homes	132 dwellings in total in 3 high-rise blocks of flats in Jarrow, Tyne & Wear	<ul style="list-style-type: none"> • Solid wall insulation • Replacement glazing • Lighting • Replacement central boiler • Connection of Elson Tanks to district heating system • TRVs in flats
South Tyneside Homes	136 Tarran Newland Houses in Marsden, South Shields	<ul style="list-style-type: none"> • Photovoltaics • Replacement glazing • Solid wall insulation • Lighting • High efficiency boilers
Homes for Northumberland	53 houses in Blyth, Northumberland	<ul style="list-style-type: none"> • Solid wall insulation • Lighting • Secondary heat exchange • Voltage optimisers

Table 1: Summary of works

¹ "Annual report on fuel poverty statistics 2012," National Statistics & DECC, 2012.

All residents were given a questionnaire about their use of heating and comfort levels. 10% of the properties were monitored using temperature data loggers, and the residents of these properties filled in more detailed questionnaires on their energy usage.

Thermal imaging of the properties was carried out in December 2011 to see where heat was escaping from the homes. Air pressure tests were done to see how leaky the houses were during summer 2011.

Results from these tests and tenant questionnaires showed various issues with the buildings:

- Gaps around windows measuring several millimetres
- Incredibly high air change rates making some buildings impossible to heat with the present heating systems
- Thermal bridging
- Thermal loss from perpetually open vents on high rise flats

Thermal modelling of the buildings was carried out using Integrated Environmental Solutions <Virtual Environment>.

The test data and models are provided in chapters 14 and 15 of this full report.

The major findings of the project to date are:

- Fuel poverty is a major problem amongst the residents of homes in South Tyneside Homes and Homes for Northumberland
- The air change rates are up to $19.26 \text{ m}^3(\text{h m}^2)$ @50pa, which is twice that allowed under the 2010 Part L building regulations, and ~7 times that allowed for new build social housing in the UK under the Code for Sustainable Homes
- Approximately half of residents are dissatisfied with the heating systems in their homes
- According to the questionnaires, ~70% of residents turn off their heating systems to save money
- The worst case of fuel poverty in this project showed properties where residents (if they heated their home adequately) would spend 25% of their income on energy bills.
- One fifth of the Tarren Newlands residents, if they heated their homes adequately, would spend over one fifth of their income on energy bills.
- Some residents have heating bills per year of £2,500 – suggesting approximately 90MWh of heat, six times the amount that should be required for their property type.

In the Post-Works report, these findings will be compared with data taken after the building work has been completed to understand the improvements in thermal performance.