

Application of HER for assessing individual units in an apartment block

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Introduction

- ❑ The following presentation is based on the results of a thesis titled: "Assessment Of The Accuracy Of The Heat Energy Rating"
- ❑ This thesis was undertaken for completion of a Master Degree in Sustainable Development
- ❑ For the purposes of this presentation I will focus on the case study of the Queen Street apartment complex



Heat Energy Rating Method

- ❑ Energy use calculation method as defined in the Irish Building Regulations 2002 Part L *Conservation of Fuel and Energy*
- ❑ The HER of a building is a measure of the annual energy use of appliances providing space and water heat for standardised room temperatures, levels of hot water use and conditions of operation



Heat Energy Rating Method

HER breakdown:

1. Overall Dwelling Dimensions
2. Rate of Heat Loss Through the Building Fabric
3. Rate of Heat Loss Due to Ventilation
4. Water Heating
5. Solar and Other Energy Gains
6. Space Heating



Queen Street Apartments



- ❑ The original apartments were constructed in the late 1960's when fuel was cheap and little attention was paid to energy consumption
- ❑ They were built with little or no thermal insulation, single glazed windows and heating systems that are grossly inefficient by present-day standards



Queen Street Apartments



- ❑ The energy efficient refurbishment of these apartments was part funded by Sustainable Energy Irelands "Houses of Tomorrow Program".
- ❑ The principal objective of the program is to generate results from funded projects, which can lead to more sustainable energy practices in Irish housing



Queen Street Apartments



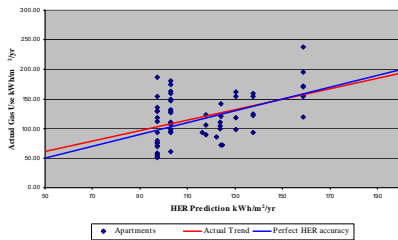
- ❑ The refurbishment involved redesigning the flats so there were fewer surfaces exposed to external, unheated space. Replacing the single glaze windows with double-glazing and dry lining the walls with pre insulated plasterboard. A new gas central heating system was installed.

Data Collection

- ❑ Gas meter data was collected for 70 apartments in total in Queen Street. This consists of 3 blocks of 15 apartments on Blackhall Parade, 1 block of 25 apartments on Marmion Court.
- ❑ The data was collected for a one year period.
- ❑ A Heat Energy Rating (HER) was developed for each of the 70 apartments in the Queen St complex.
- ❑ For development of the HER a site visit was necessary in order to collect all the necessary input data

Data Analysis – (Actual Vs HER)

Queen Street Refurbishment - Actual Gas Use Vs HER for 61 St Apartments



Data Analysis - HER

HER Values For Different Apartment Locations (kWh/m²/yr)

HER Values For Different Apartment Locations (kWh/m²/yr)					
east			west		
156.45	130.22	130.22	130.22	130.22	164.55
148.07	122.84	122.84	122.84	122.84	156.77
200.62		173.91		200.62	

% Each location differs from Average (HER data)

% Each location differs from Average (HER data)					
east			west		
6%	-13%	-13%	-13%	-13%	10%
1%	-20%	-20%	-20%	-20%	6%
26%		15%		26%	

Data Analysis – Meter Data

Actual Energy Use For Different Apartment Locations (kWh/m²/yr)

Actual Energy Use For Different Apartment Locations (kWh/m²/yr)					
east			west		
146.15	127.28	127.28	127.28	127.28	135.76
133.42	104.83	104.83	104.83	104.83	127.77
199.64		140.57		161.68	

% Each location differs from Average (metered data)

% Each location differs from Average (metered data)					
east			west		
10%	-3%	-3%	-3%	-3%	3%
1%	-26%	-26%	-26%	-26%	-3%
34%		6%		19%	

Data Analysis

- ❑ Average Energy use for whole building:
132 kWh/m²/yr
- ❑ Average HER for the whole building:
148 kWh/m²/yr
- ❑ The HER is 10% greater than the Actual Energy use



Thank you for your attention

