Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Initial costing model in the ETI thermal efficiency model

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. This deliverable is number 2 of 7 in Work Package 2. It presents the initial approach to the costing methodology for thermal efficiency improvements to be employed by the project and incorporated into the computer model being developed. Accurate cost information for retrofit interventions is key to ensuring the identification and development of the optimum solutions for each housing archetype previously identified in deliverable D2.1.

Context:

This project looked at designing a supply chain solution to improve the energy efficiency of the vast majority of the 26 million UK homes which will still be in use by 2050.It looked to identify ways in which the refurbishment and retrofitting of existing residential properties can be accelerated by industrialising the processes of design, supply and implementation, while stimulating demand from householders by exploiting additional opportunities that come with extensive building refurbishment.The project developed a top-to-bottom process, using a method of analysing the most cost-effective package of measures suitable for a particular property, through to how these will be installed with the minimum disruption to the householder. This includes identifying the skills required of the people on the ground as well as the optimum material distribution networks to supply them with exactly what is required and when.

energy technologies institute

The ENERGY ZONE CONSORTIUM:

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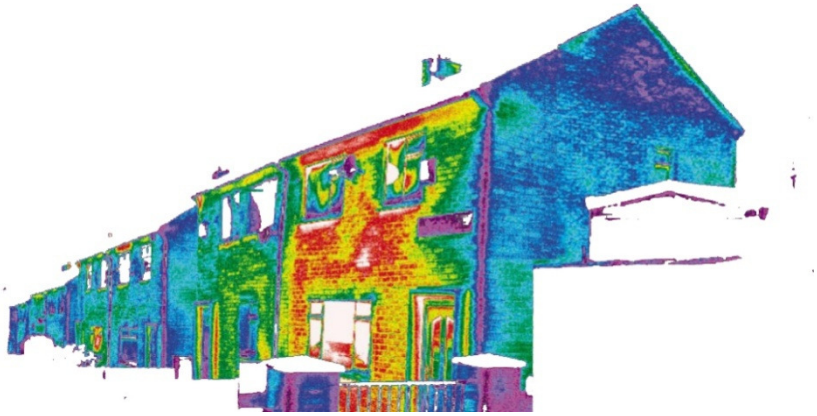

Optimising Thermal Efficiency of Existing Housing

Initial costing methodology in the ETI-TE model (WP2.2a)

REPORT

Submitted by BRE on behalf of the
ENERGY ZONE CONSORTIUM

March 31, 2011

Initial costing methodology in the ETI-TE model

INTRODUCTION

This note outlines the initial approach to the costing methodology for thermal efficiency improvements as incorporated as part of the ETI TE computer model. This work is the initial stage of this process, and will be developed into a fuller methodology as part of WP items 2.2b and 2.2c. The route for the development of more detailed costs through the development of WP item 2.2 is also outlined in this document.

This note forms deliverable WP2.2a of the project in conjunction with the functionality present within the model itself (which allows initial calculations of the cost of improvements),

DEVELOPMENT OF THE COSTING METHODOLOGY

Estimates of costs for installing Thermal Efficiency measures are essential to be able to understand the feasibility of a large scale retrofit programme. Realistic costs are required to provide estimates of the resources required for such a programme at both the national level and for any particular sub-section of the stock. Costs are also essential to carry out the appropriate cost-benefit analysis for particular retrofit solutions.

Initial consideration of the costs of retrofit looked at those recorded for particular retrofit exemplars. However, it was considered that exemplars would not normally be subject to the same budgetary constraints which would be required by a mass retrofit programme, and indeed would often not have the same aims. Exemplars are typically produced to demonstrate a particular technology, to act as a mechanism of finding and highlighting problems for follow-on projects, and to attempt to achieve a particular target (e.g. zero carbon refurbishment). As a result they often have less regard to the cost of improvements than would be required for a mass retrofit programme. Furthermore, they would not be able to benefit from the economies of scale that a mass retrofit would be able to achieve. Whilst the technical lessons from exemplar projects will be of great use to the project as a whole, our initial costing methodology uses an approach based on costing from first principles.

This approach uses the twelve dwelling types and characteristics as identified in the dwelling archetypes document (WP item 2.1a). A range of costs are being provided for each of these types by Wates team of costing experts. These costs attempt to include estimates for the major variables which affect costs in each of the types, and as indicated by the archetype work. For example, when costing for a pre-1919 terrace house costs will consider how costs will vary with and without bay windows. These costs, and the functionality to produce final estimates of costs which include this variability, will be incorporated into the stock model which is currently under development (WP item 2.3).

Costs of two types are currently being considered:

a) Unit costs
b) Other fixed costs

Unit costs are expressed as a cost per unit area (e.g. cost per square metre of loft insulation). Fixed costs include all other costs associated with installation of the item. By splitting up costs in this way, it allows the savings in fixed costs which occur when multiple measures are installed at the same time to be accounted for. For example, there are likely to be 'access cost' savings (scaffolding etc.) when installing new double glazing at the same time as solid wall insulation. This scenario can be simulated in the model by adjusting (or removing) fixed costs when particular measures are installed together. This function is currently performed manually by the user, but the eventual model will incorporate an automatic mechanism of adjusting fixed costs where overlaps exist.

The actual costs themselves are still under development by Wates and BRE, and should be available for the next iteration of the costing methodology (WP item 2.2b) in June 2011.

We are also considering how operation and maintenance costs and discounting (if appropriate) should be incorporated. These costs will be included as appropriate as the modelling and costing methodology develops.

CURRENT MODEL FUNCTIONALITY FOR COSTING

The computer model which is being developed for the ETI already includes the initial functionality to allow the consideration of fixed and unit costs, ahead of the actual costs themselves as being developed for WP item 2.2b.

Costs are able to be input for:

a) Loft insulation
b) Cavity wall insulation
c) Hot water tank insulation
d) Floor insulation
e) Replacement windows

These are input by the user directly into the model, as shown in Figure 1 below.

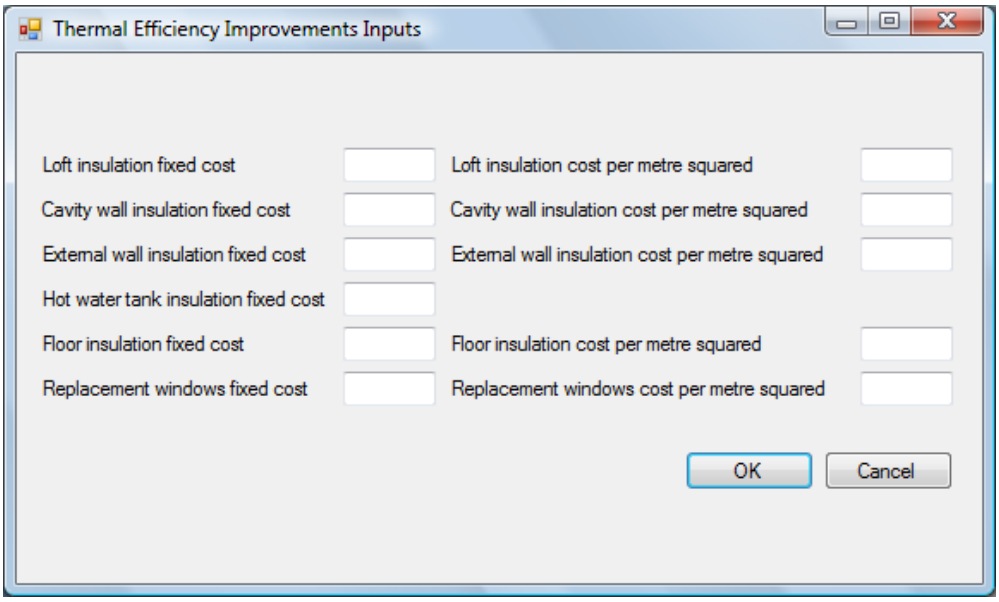

FIGURE 1: THE COST SPECIFICATION SCREEN IN THE ETI-TE MODEL

The model also includes the capacity to adjust fuel prices to allow lifetime savings in running costs to be compared to capital costs of measures.

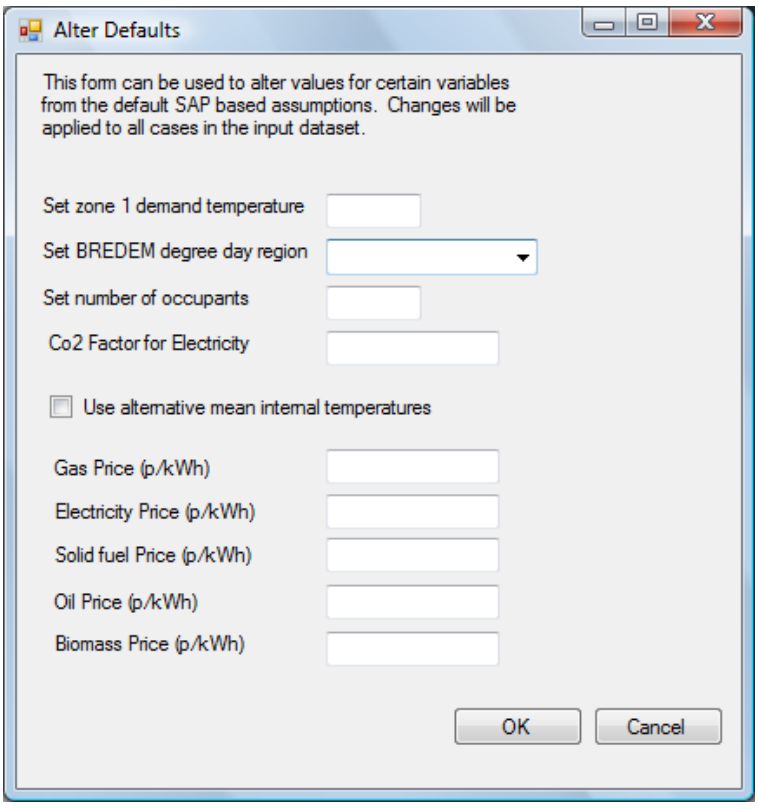

FIGURE 2: THE ETI-TE MODEL USER INPUT SCREEN ALLOWING FUEL PRICES TO BE SET BY THE USER

Users are currently able to set their own costs for installation and fuel prices to investigate scenarios. The costs being produced by Wates will ultimately form the default costs, but users will retain the ability to adjust the inputs as required.