Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Executive summary of the synthesis report

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date.

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.

ETI Executive Summary

Programme:	Buildings
Project Name:	Optimising Thermal Efficiency of Existing Housing
Deliverable:	BU1001 / D5.5 – Synthesis Report (Customer Value)

Introduction

UK Residential buildings account for ~27% of the UK energy production, ~26% of CO_2 emissions and 23% of GHG emissions. 82% of the energy consumed in the UK residential buildings is for space heating and hot water. If the demand on the UK energy system from housing can be reduced then this will have a significant impact on CO_2 emissions and reduce the level of low CO_2 energy generation required.

The number of domestic dwellings in the UK is expected to rise to 32 million by 2050 from 26 million currently, of which 21 million are expected to remain in 2050. The refurbishment of existing dwellings is therefore a significant factor in achieving the 2050 target CO_2 reduction target.

This project is focussed on the refurbishment of the existing UK housing stock to improve its thermal efficiency and to investigate ways the refurbishment process can be accelerated at a national level.

The key outputs from the project are:

- A model capable of running "what if" scenarios for a range of UK house types showing the retrofit technologies required to optimise CO_2 reduction, minimise cost and maximise comfort/value to the customer
- A model capable of running scenarios at the local, regional and national level to identify the CO_2 impact and cost of various mass retrofit plans
- Defined delivery mechanisms (policies, supply chain requirements etc) for retrofitting the domestic housing stock at a sufficiently high rate to impact national climate change targets

The project is divided into 6 work packages to better enable it to address the outputs required above:

Work Package 1: Understanding thermal performance of the housing stock at an individual dwelling level.

Work Package 2: Impact of thermal efficiency measures on the UK housing stock.

Work Package 3: Developing retrofit solutions to improve thermal performance of our national housing stock.

Work package 4: Developing a sustainable supply chain to deliver whole house retrofit on a national scale.

Work Package 5: Understanding customer value & maximise the take up of retrofit.

Work Package 6: Developing the policy and regulatory framework to manage, support and encourage whole house retrofit.

Work Package 5 is focused on the customer experience and requirements of domestic retrofit, it is a fundamental strand of the overall OTEoEH project in that it defines who the customer for domestic retrofit is. This in turn has provided a 'specification' against which a retrofit 'product' can be developed.

There are 5 deliverables within Work Package 5, these are:

D5.1   Defining the Customer: Engaged key UK stakeholders (those with experience or a stake in current or future retrofit) to better understand customer value in this field. Through this, a list of value metrics was produced to guide further research

D5.2   Customer Segmentation: Developed a hypothesis segmentation model, using data from Experian and consortium expertise. The ten segments that arose from this work formed the basis of the engagement strategy for the primary research stage

D5.3   Customer Engagement Exercise 1: Engaged UK customers that had gone through retrofit or were now living in a retrofitted home. Semi-structured interviews gained qualitative insight and key lessons from their experiences.

D5.4   Customer Engagement Exercise 2: Formed the majority of the primary research of this work package. Through a mass survey, focus groups and interviews, UK customers were engaged to understand their values regarding retrofit

D5.5   Synthesis Report (Customer Value): Summarises the findings from the work package as a whole.

Basis of Designs

The structure of Work Package 5 is highlighted in figure 1:
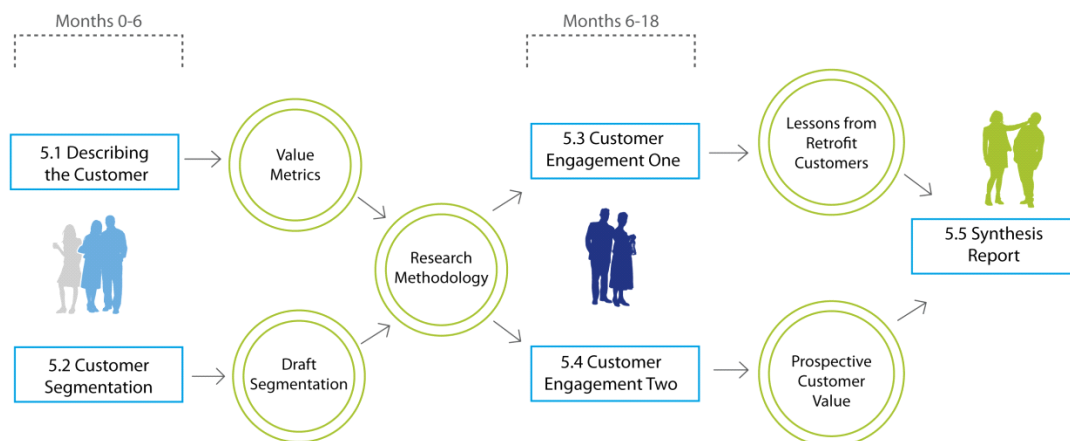

Figure 1: Work Package 5 Schematic

The initial two deliverables sought to lay the base for the customer work by building an understanding of the key value areas and defining the lines of enquiry (5.1) and producing an early breakdown of the UK customer marketplace (5.2). This would allow the primary research stage to interrogate segments that were likely to hold different views and values.

The primary research stage was then broken down into two separate work areas – firstly engagement with customers who had undertaken retrofit already (5.3), building an understanding of their experiences and understanding their value profiles; secondly – engagement with the wider UK public, focusing on our customer segments (5.4), to gain first-hand experience and understanding of their values.

Through close working with the wider project team, particularly Work Packages 3 (Technical Solutions), 4 (Supply Chain) and 6 (Policy and Regulation), the measures, value propositions, supply chain designs and policy interventions proposed by these Work Packages were able to be tested with customers and fed back to the consortium.

Deliverable 5.1 – Defining the Customer

Deliverable 5.1 sought to gain an understanding of customer value from the stakeholders currently (or expected to be in future) delivering retrofit.

After identifying key stakeholders (through a consortium workshop), a series of 1:1 interviews were conducted, either on the phone or in person. The questionnaire was

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developed with input from consortium partners and focused on the organisations' current and future role in retrofit as well as determining key issues for customers.

Stakeholders included government departments, housing providers, advice providers, retailers, local authorities, trade representative/accreditation bodies and energy suppliers.

A final side-element of the work was to engage with consortium contacts in France and Germany to identify any lessons from these countries' delivery of retrofit.

Key findings

Overall, most stakeholders interviewed viewed retrofit to be a small part of their current business with very low customer interest/demand but one that would grow in importance and prominence over the next decade;

There were mixed opinions about the best way to deliver retrofit in the future – both in terms of who should deliver it (local businesses, energy suppliers, etc.) and how to approach retrofit (street-by-street, on demand or a hybrid);

Recommendations from stakeholders included:

- The need for a mass programme of training and skills development;
- Greater regulation on the private rental sector;
- Consolidation of policy, advice and funding streams;
- Developing a link between asset value and energy performance;
- Providing a role for a single-point-of-contact project manager to co-ordinate whole-house works;

Lessons from France show that despite a range of existing pro-retrofit policy and funding initiatives (tax credits, VAT reduction and interest free loans), take up remains low;

Germany has seen a much greater level of take-up of retrofit with their federal government funding and advice. Furthermore, energy efficient properties in Germany typically sell for a higher value, demonstrating better-developed customer value in energy efficiency.

Value Metrics

The values described by stakeholders were analysed, weighted and grouped into seven key value areas. The value areas are, in descending order of importance to customers:

- Economic values (e.g. cost, impact on asset value);
- Physical values (e.g. comfort, aesthetic changes to the home);
- Process values (e.g. disruption, duration of works);
- Product values (e.g. trust in brand, quality of product);
- Through-life values (e.g. ease of maintenance, usability);
- Social values (e.g. social status, use of local labour);
- Related values (e.g. environmental concerns, competing priorities).

Deliverable 5.2 – Customer Segmentation

Deliverable 5.2 sought to develop a segmentation hypothesis on which to design the primary research strategy. The segmentation needed to identify key segments of the UK population that were likely to present different values and needs with regard to retrofit.

An initial desk-based approach identified a number of existing segmentations for related issues such as environmental attitudes and behaviours, but none that were designed specifically for retrofit as per the needs of the project. As such, it was decided to work with a customer data specialist, Experian, to develop a draft segmentation based on the parameters identified by the consortium.

A cross tabulation of Experian's Mosaic Public Sector segmentation (69 UK segments – categorising individuals according to income, age, social status, etc.) against their GreenAware segmentation (10 segments – categorising individuals according to their environmental awareness, attitudes and behaviours) yielded 690 potential permutations which helped identify significant correlations. From this, 10 segments were identified.

The segmentation was further developed during and following the primary research phase. For a more detailed summary of the segmentation, see Chapter 4 of this report or the full methodology in the main 5.2 deliverable report.

Deliverable 5.3 – Customer Engagement 1

Deliverable 5.3 sought to understand the experiences, values and behaviours of individuals who had already undergone a retrofit. Building on the value metrics, the research tool gained a qualitative understanding of retrofit from the customer perspective.

It was agreed with the consortium that the best way to conduct the research for this deliverable would be through semi-structured interviews with customers. The research tool (the interview script) was developed to cover the key value metrics but also structured around the logical progression of events from the customer perspective, allowing them to tell their own stories of their experiences whilst covering the key lines of enquiry.

Three networks of participants were identified:

- The Old Home, SuperHome network: Managed by the Sustainable Energy Academy, this network is made up of owner-occupier individuals who have undertaken deep retrofit works to their homes. Members are encouraged to hold open days and share their knowledge and passion for retrofit with the general public. 26 interviews were conducted with "SuperHomers";
- Retrofit for the Future: A TSB-funded programme to retrofit social housing properties to low carbon (80% reduction target) standards. As part of this programme, a series of post-occupancy interviews were to be undertaken by the Energy Savings Trust. It was agreed to combine efforts to develop a research tool to fit the needs of both projects and avoid duplicating work. 19 interviews were conducted with social housing tenants living in retrofitted homes;

- Bristol Green Doors: A network of residents who shared knowledge to carry out, in most cases, less intensive retrofit works to their homes; selected to contrast with the more scattered examples in the other two networks.

Regrettably there were no apparent networks that covered private rental properties. As such, this research could not engage landlords or tenants that had undergone retrofit.

Key findings

Owner-occupier interviewees were typically individuals with mid-to-high incomes, high levels of education and exceptional levels of environmental engagement and motivations (which typically dominated over economic reasons for retrofit);

Most owner-occupiers project-managed their own retrofits and chose local trades to carry out the works. Most were also highly satisfied with the works, despite most suffering high levels of disruption, delays and scope change. The wider findings suggested that this satisfaction may be linked to the high level of ownership that participants took over the process – thus being more accepting and understanding of arising problems;

Social rented tenants were typically satisfied with the end-product but unsatisfied with the process – most of which involved delays, disruption and other scope changes;

Advice provided by the installers or professional services, in almost all cases, was perceived to be poor. Either too little (or none at all) or too much at once. It was recommended that advice should be concise, easy to refer back to, and explained at appropriate times;

Other key recommendations were to design out delays, consider a reduction in VAT on retrofit works, design supply-chain solutions that focus on delivery by trusted local trades and design for minimal maintenance.

Deliverable 5.4 – Customer Engagement 2

Deliverable 5.4 represented the largest package of work in Work Package 5 and focused on conducting quantitative and qualitative primary research activities to understand customer value from the wider UK public who have not, in the main, experienced retrofit.

The methodology followed was as follows:

- A mass survey – targeted at 20,000 UK individuals, 2,000 from each customer segment, the survey focused on obtaining qualitative data on retrofit values. The survey was delivered by post or electronically according to likely preferred channels of engagement for the segment in question. 932 responses were received in total, representing a 4.7% response rate;
- A series of focus groups – using the segmentation hypothesis, ten focus groups (one per customer segment) were planned in locations that held significant populations of each customer segment. Each focus group was to last two hours and focus on a small number of key lines of enquiry to generate discussion amongst the group. All focus groups were well-attended by participants that matched our segment profiles;
- A series of semi-structured interviews – using the 5.3 research tool as a base, a new research tool was constructed to interview a small number of customers in their

home. This time, interviews were planned to cover the top house-types in each region (five in England, four in Scotland, three in Wales and three in Northern Ireland) with an even spread of customer segments as a secondary criteria. Each interview was planned to last approximately 90 minutes;

Key findings

As suggested by the stakeholder findings of 5.1, economic values remain the most important factor in customer value for retrofit. Particularly the upfront costs of the works versus the expected savings were important to all segments;

Comfort (mainly thermal, but also air quality and noise) was the other highly ranking value demonstrated by participants. In limited cases, during focus groups with older customer segments, comfort marginally outranked economic concerns;

A limit of £10,000 emerged from discussions across all segments as a threshold beyond which works would be deemed as too expensive;

Awareness of retrofit was typically poor across all segments. Whilst most segments were aware of measures such as loft insulation, cavity wall insulation and generation technologies like solar photovoltaic, almost all research participants were unaware of solid wall insulation;

There were a significant proportion of individuals who perceived that they had already completed the necessary upgrades to their home. When questioned on this, it emerged that this typically involved having had loft insulation installed (in many cases, less than 300mm), double glazing and a recent installation of an efficient gas boiler. Overcoming this perception that works aren't needed is seen as critical to the roll-out of retrofit;

All segments resisted the idea of works that required them to move out of their home and works that took more than two weeks;

Trust remains a critical issue, with many customers feeling distrustful towards the building trades and energy suppliers who are likely to be crucial in delivering retrofit. The most trusted individuals to advise customers on retrofit, across the segments, are typically friends and family;

Key findings

The work package has created a segmentation approach based on the propensity to adopt retrofit.

Money and comfort remain the primary foci of all customer segments with regard to retrofit – no segment is significantly motivated by carbon savings

Those who have already conducted retrofit on their homes typically align with the four early adopter segments identified in this research

Widespread mistrust of the trades remains a significant barrier to the roll out of mass retrofit

Early adopter segments are similar enough to design retrofit roll-out solutions that will appeal to all four – focusing on local trades and improved advice

Many customers (particularly early adopters) believe they have already retrofitted their homes due to small-scale energy efficiency improvements

Ten customer segments have been identified:

CUSTOMER GROUP	AGE	MAIN TENURE	INCOME	COVERAGE %*
Young Starters	< 30	social or private rent	< 30k	2.9 – 8.8
Greener Graduates	25 - 40	private rent or owner occupier	20 - 40k	0.8 – 5.5
Early Entrepreneurs	25 - 45	owner occupier	20 - 60k	2.5 – 10.5
Unconvinced Dependant	25 - 45	social rent	< 20k	2.3 – 4.7
Urban Constrained	40 - 60	social rent or owner occupier	< 30k	4.9 – 7.7
Middle Grounders	40 - 60	owner occupier	30 - 60k	2.7 – 6.9
Successful Ruralites	40 - 60	owner occupier	60k +	2.6 – 7.6
Transitional Retirees	55 - 70	owner occupier	< 30k	1.5 – 2.9
Stretched Pensioners	65+	social rent or owner occupier	< 15k	6.6 – 8.8
Older Established	65+	owner occupier	> 15k	3.8 – 6.7

(*coverage is defined as an estimated proportion of the UK population with a range stretching from higher accuracy (lower number) to moderate accuracy (higher number))

Table 1: Summary of Consumer Segments

Details of each of the characteristics of each of the segments may be found in section 4.2 of the D5.5 report, this takes account of their demography, attitudes towards retrofit, energy perceptions and behaviours and key value proposition considerations

Four key segments emerged as early adopters. These were:

The three eldest segments:

- Older Established;
- Stretched Pensioners;
- Transitional Retirees;

And the younger segment:

- Early Entrepreneurs.

Section 5 of the report provides detailed profiling information for each of the early adopter segments. As these segments demonstrated a greater level of receptiveness and interest, it was agreed to further investigate the survey data for these segments with a view to developing value propositions that might be more successful in meeting the needs of these segments. Through developing and proving a market with early adopters, it is anticipated that it will be easier to connect with more disengaged segments in future.

This additional research highlighted that, although different, the early adopter segments shared similarities in terms of their preferred value propositions for retrofit, particularly:

- Common top-three motivations for retrofit – namely "to reduce the energy bill of my home", "to make my home more energy efficient" and "to make my home more comfortable";
- Shared preferences for advice – "better information on television and radio" and "talking to an energy professional" with the latter coming from an independent/impartial energy advice service;
- Common attitudes toward the most suitable time for works to be carried out – either "during major refurbishment works" or "when buying a new home" but not "when selling my home";
- A clear preference for local trades to carry out the work, as the most popular option across all four. There was further variation in each segment regarding other potential suppliers, such as energy companies but none scored close to the top preference of local trades;

Key areas of learning across the project include:

- Cash (and comfort), not carbon – economic concerns (upfront cost, potential financial savings, etc.) remain of the highest importance for customers of all segments, followed closely by cost. No segment is sufficiently motivated to retrofit by carbon reduction or "green" concerns;
- Early adopters align with existing retrofit customers – the early adopters that emerged from the 5.4 research stage closely match, by profile, those owner occupiers that have completed retrofit works, interviewed in 5.3. They differ in that those who have gone through retrofit are often more highly educated, more affluent, more motivated by a cause (climate change, peak oil, etc.) and with a deeper personal attachment to their homes;
- Trust in the trades – trust in trades remains low across all segments. This impacts on motivation to commission works and to allow works to be carried out without the presence of the customer in the home. Building on local trust networks of friends' and family's recommendations is key to overcoming this;
- Perception that works have already been done – a common theme, particularly among early adopter segments, is that works have already been done, making energy-efficiency a less attractive or interesting concept. In almost all cases, these works are of a small-scale nature and not a full-house retrofit. Overcoming this perception in a careful way is key to engaging the early adopters on retrofit.

The key recommendations, therefore, for roll-out are:

- Advise and engage – improve advice streams through television and radio; boost accessibility and availability of independent energy advisors; focus the message on cost savings, comfort gains and energy performance; raise awareness on benefits of unfamiliar measures and whole-house retrofit;
- Deliver best value – Focus on reducing cost to provide the most affordable, highest quality solutions; design solutions that can be delivered at the most convenient times for the customer; provide policies, frameworks and funding streams that support

customers; focus on whole-house solutions that do not need further improvement works in future years;

- Keep it local – design supply chains that enable local delivery from local trades; exploit the trust networks of local friends and family; ensure policies and strategies are relevant to local communities and local needs; build trust through local-level application of consistent standards but tailored advice and delivery.

Further work

Following the work in Work Package 5, the following concerns and knowledge gaps remain:

- Assumptions and findings are based on customers' perceived notions of their potential actions – i.e. how they say they will respond may not be the same as how they actually respond;
- Customers exhibited low awareness and mixed attitudes towards unfamiliar technologies such as solid wall insulation and ventilation technologies. Further understanding of customers' perceptions, and the effect of information regarding the measures, would help develop value propositions;
- Accurate energy behaviour information (including heating and ventilation patterns) across a broad spectrum of the UK public is lacking. Better information will improve the ability to make more accurate modelling assumptions on energy savings and predict the impact of packages of measures;
- The segmentation remains a basic tool to predict consumer behaviour with regard to retrofit. A more thorough investigation of the segments, particularly understanding variations within segments depending on different factors, particularly regional/geographical differences, would help make the segmentation more useful.

Suggestions for further work therefore include:

- A large-scale field trial – to test the predicted and customer-perceived actions in a real setting;
- Development of the segmentation – to understand a wider range of variables and attitudes held by each segment as well as any variations within segments presented by other factors (e.g. location or region);
- Greater investigation of specific technical solutions – testing specific measures such as solid wall and floor insulations and ventilation technologies with customers to understand how better to sell these as part of a retrofit package;
- Planning scenarios – considering and proposing how the segments and customer value market may change over the timescales of a full roll-out of retrofit (i.e. 20 – 30 years);
- Understanding of applicability to wider systems – investigating how the solutions proposed by this project integrate with wider energy system solutions, such as power, transport and heat distribution;