Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Customer Engagement Exercise 2

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. This deliverable is number 4 of 5 in Work Package 5. The aim of work package 5 is to ensure that any mass scale retrofit mechanism designed by the consortium addresses the key needs of the end customer, the building occupant. This deliverable is the second of 2 customer engagement exercises and provides a summary of 15 one to one interviews, 10 focus groups and a survey of 20,000 people (932 responses) carried out by the consortium. This revealed that cost is the primary issues when people consider whether to adopt retrofit, an upper limit of £10k seems to exist above which potential
customers will not be interested. The work also allowed 4 consumer segments to be identified with whom a successful retrofit engagement is most likely, this information has been shared with the teams working on Work Packages 3 and 4 to allow suitable retrofit packages and associated delivery mechanisms to be developed.

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.

Customer Engagement 02

Large-Scale Survey, Workshops and Virtual Refurbishments

Optimising Thermal Efficiency of Existing Homes

Deliverable 5.4 Project Report

Sebastian Junemann, Rokia Raslan, Kirsten Burrows and Paul Davies

Table of Contents

Executive Summary

Work Package 5 of the Optimising Thermal Efficiency of Existing Homes Project seeks to focus on the customer experience and requirements of domestic retrofit. This deliverable represents the main programme of customer engagement, focusing on social research with members of the UK public who, for the most part, are yet to go through a domestic retrofit.

The research focuses on three separate, but complimentary activities:

- **A mass customer survey** – sent to 20,000 people across the UK through a mixture of postal and electronic delivery;
- **Focus groups** – ten groups, one for each of our previously identified customer segments, across the UK, each comprised of 10-12 participants;
- **Virtual Retrofits** – one-to-one interviews with fifteen householders defined according to the most common housetypes in each nation.

The research focused largely on identifying characteristics and differences between customer types from the segmentation developed in deliverable 5.2. To ensure the segmentation was fit for purpose, an exercise was conducted to develop and validate the segmentation further. This exercise highlighted the need to drop one segment (Busy Starters) and replace with a new segment, **Young Starters**. This process is detailed further in the main report body.

Results of the research

Referring to the value metrics proposed in deliverable 5.1 and developed again in 5.2, the results of each strand of research were considered and compared with consideration to their relevant metric. Some of the key observations are identified below

Economic values

- Across all research strands and across all segments, **economic concerns are the most important to customers**, primarily the barrier of upfront cost versus perceived potential savings on energy bills;
- **Information about cost is deemed essential** at all stages of the retrofit process, from initial engagement, through survey to installation;
- However, some segments (Early Entrepreneurs, Stretched Pensioners, Unconvinced Dependants and Transitional Retirees) indicated at the focus groups that **they may prefer maximising energy performance over minimising upfront cost**;
- General consensus indicated that **retrofit should be heavily subsidised by government or made free;**
- In depth discussions with customers at interview stage indicated that any **retrofit costing more than £10,000 was likely to be prohibitively expensive for customers.**

Physical values

- **Comfort (particularly thermal comfort) was consistently second only to cost** in customers' values;
- Whilst customers typically perceive that a retrofitted home will be warmer, more comfortable, healthier and cheaper to run, **there was a lack of certainty as to whether retrofit would be beneficial or detrimental to the aesthetic or the value of the home** (Successful Ruralites, in particular being concerned about these two factors);
- Early Entrepreneurs indicated an **above average likelihood to perceive energy-efficiency problems/opportunities** with their current home;
- Lower income groups were most likely to suffer from condensation or damp in their home.

Process values

- All segments indicated good awareness of basic measures (loft insulation, double glazing, etc.) and energy-saving behaviours, but **poorer awareness of measures such as solid wall insulation**;
- There is a wide perception across all segments that customers have **already retrofitted their homes** (typically an unspecified amount of loft insulation and potentially a recent boiler replacement and double glazing);
- **Friends and family** are typically the **most trusted** source of information and recommendation for retrofit, followed by **government agencies, energy/consumer advice bodies** and **energy companies**;
- The most important pieces of information for customers needed to aid customers' decisions on retrofit would be **better information from the energy provider** and **seeing an example of a retrofitted home**;
- Disruption and time taken was widely perceived as an important issue by all customers. However, there were indications that **customers would be willing to tolerate higher levels of disruption if this reduced upfront costs**;
- All segments **disliked the idea of moving out of their home whilst works took place;**
- Acceptable length of time for a whole-house retrofit was **typically 1-2 weeks;**

Product values

- **Trust remains of critical importance** to consumers when considering retrofit – many customers have negative associations with builders/tradesmen ("rogue traders" or "cowboy builders");
- **Desirability is consistent with perceived energy saving potential**. I.e. the most desirable measures are those that customer perceive will

save the most energy – particularly double glazing, loft insulation and draught proofing;

- **Customers dislike the idea of fixed retrofit packages** where they perceive a lack of flexibility and choice. They typically prefer the ability to opt in and opt out of measures;
- **Local trades are the most widely preferred delivery agents** for retrofit.

Through-life values

- Customers are less concerned with through-life issues compared to many of the issues raised above. There is widespread perceptions that a retrofitted home wouldn't present new challenges to live with;
- **Warranties were raised by many segments** as being important in order to protect them from problems post-retrofit;

Social values

- Many customers feel that retrofit should be something that has **a local feel and delivery,** citing local trades and local authorities as key players in a potential roll-out, promoted through local media;

Related values

- **Competing priorities** were perceived as a major barrier by many customers, particularly Young Starters (who show no interest in retrofit at all);
- The best opportunities during which to carry out a retrofit (trigger points) are perceived as **when moving into a new house** or **when changing a heating system**;
- Whilst many customers indicate a desire to conduct works to their home in the next three years, this is dominated by small works and

decorations providing **limited opportunity to integrate retrofit with larger work plans**;

- **Environmental concerns** were noted by all segments but **never significant enough to play a role** in driving people to conduct retrofit.

Impact on other Work Packages

Some key findings relevant to work in other work packages include:

Work Package 3

- Loss of architectural features is a concern particularly for those living in older homes, where the heritage is valued;
- Rigid packages are unpalatable for most customers. Flexibility and the choice of opting in or out of specific measures is important to gain customer trust and interest;
- Similarly, existing measures should be factored in to the design of packages so as not to suggest replacing, for example, an efficient boiler installed within the last two years;

Work Package 4

- Customers expect a retrofit package to be delivered in under two weeks and cheaper than £10,000 whilst still delivering substantial energy savings;
- There are significant and widespread trust issues regarding builders and the trades with past experiences or preconceptions leading to worries of poor quality or failure to meet customer expectations. A particular distrust of *subcontractors* was mentioned by many customer segments;
- There is a major preference for local delivery from customers, particularly owner-occupiers;

- Customers from all segments are resistant to move out of their homes for retrofit works to take place.

Work Package 6

- A high proportion of customers would expect retrofit to be organized by, and heavily subsidised by government;
- Customers most favour incentives that are financial – such as flexible finance or a reduction in VAT;
- A council tax banding scheme was universally unpopular as it was felt that this would most heavily impact vulnerable people on low incomes;
- Customers generally rejected the idea of restrictions ("sticks") being used to drive retrofit.

Potential early adopters

The research indicates that, of our identified segments, four customer segments are likely to be interested enough and be motivated by our proposals that we could target them as potential early adopters.

These segments are the three eldest segments – **Older Established, Stretched Pensioners** and **Transitional Retirees** – as well as the younger segment, **Early Entrepreneurs.**

Ongoing discussion with the other Work Packages will consider the potential in developing delivery models and value propositions that target these segments (which represent 15-30% of the population) but remain attentive to the need for wider appeal to the other segments, which may be more open to the idea of retrofit once a widespread roll-out is in effect.

Engagement plans for these target segments and others will be detailed in the next deliverable – 5.5 – Synthesis Report.

Next steps

The final deliverable in Work Package 5 is **5.5 – Synthesis Report.**

This deliverable will draw together and report on the work package as a whole. It will return to the initial findings from stakeholders, discuss the future of the customer segmentation and compare learning from our UK-wide customer research strands (5.4) with the experience of those who have gone through it. 5.5 also will aim to:

- Return to the survey data to re-interrogate based on specific questions from the consortium;
- Summarise each customer segment – what we know about them now;
- Develop recommendations for engagement plans for early adopters;
- Make recommendations for marketing retrofit;
- Consider the role of social marketing techniques in rolling out retrofit;

Peabody are also keen to include any additional items that the consortium or the client feel would be beneficial to the project or the wider programme of research being developed by the client.

1.0 - Introduction

Deliverable 5.4**, Customer Engagement Exercise 02: Large-Scale Survey, Workshops and Virtual Refurbishments**, continues the research work undertaken for Work Package 5 of the Optimising Thermal Efficiency of Existing Homes Project. This Work Package seeks to focus on the customer experience and requirements of domestic retrofit for those customers who have not yet undertaken deep retrofit works.

Deliverable 5.4 builds upon previous work in this area through the undertaking of the following work tasks:

- Implementation of a large-scale UK customer survey to identify the key values, drivers and influencing factors for the future retrofit market. This will provide quantitative results for Customer Value metrics across key customer segments.
- Organisation of regional customer group workshops to test the householder value metrics in detail across the UK.
- Identification of customer value (i.e. scoring) of retrofit through virtual a refurbishment exercise testing customer acceptance of feasibility stage designs with a range of householders.

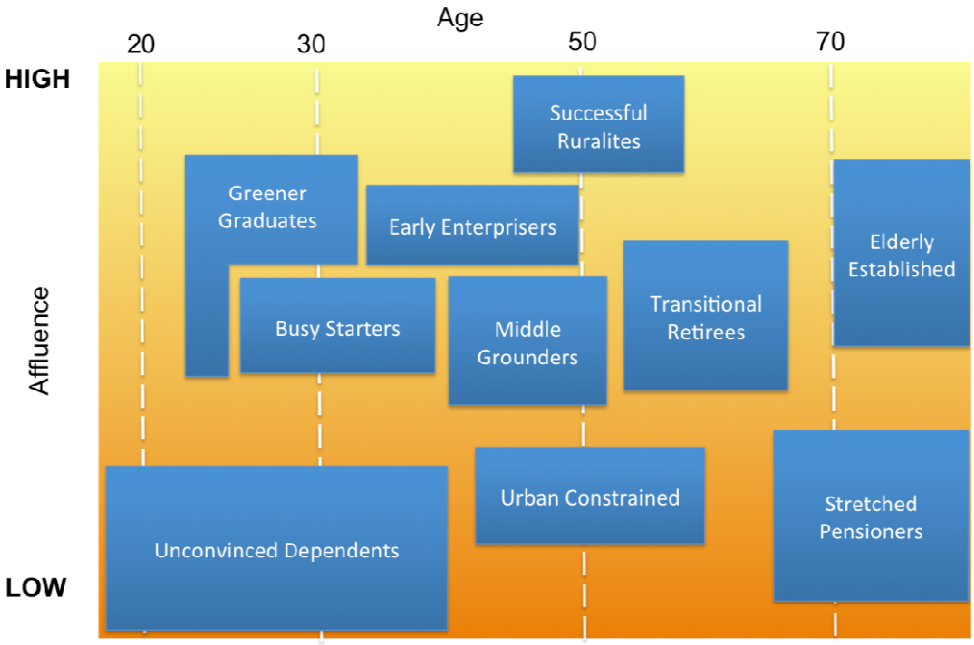
The following document presents an overview of the key findings from the different research areas.

2.0 - Customer Segmentation Update

2.1 - Introduction

Deliverable 5.2 produced a customer segmentation hypothesis based on a basic level interrogation of Experian data from a crosstab of two datasets (Mosaic Public Sector and GreenAware). Ten UK customer segments were identified as a primary function of their age and affluence with secondary considerations of tenure type, location type (e.g. urban, rural?) and awareness and engagement with energy efficiency and other related issues.

The ten initially identified segments can be summarised in the following chart:



These initial segments helped structure the development of early value propositions in Work Package 4 (Supply Chain) and were to be used to inform the targeting of the population for this deliverable.

However, before committing too much resource against this hypothesis it was decided to conduct some further analysis on the segmentation.

2.2 - Further work on the segmentation

In collaboration with Customer Insight at EDF Energy, BRE and Total Flow, an initial workshop was done to re-categorise the crosstab data into a smaller number of "bins". The initial crosstab featured 69 rows (Mosaic Public Sector) and 10 columns (GreenAware) – a total of 690 potential combinations. This was reduced to 5 "green" columns and 6 "Income/age" rows (30 bins) as defined below:

Green Groups	Description
A	Highly educated, active green actions, low home ownership
B	Medium to high education, takes green action & high likelyhood to owns house
C	Low education, taking some green actions, high home ownership
D	Highly educated, not intrested in green actions, high home ownership
E	Low education, non green, low home ownership

Age Flag	Age Range	Gross Household Income	Gross Income Range
Y	<=35	L	<=30k
M	35 to 60	H	>30k
O	60+		

Leading to:

Income/Age
HY
HM
HO
LY
LM
LO

Redefining the crosstab according to these 30 combinations provided the following data:

Age Wealth Flag	Insight Green Group A	Insight Green Group B	Insight Green Group C	Insight Green Group D	Insight Green Group E
1 HY	363,087	275,070	57,522	17,680	140,932
2 HM	1,333,325	2,552,299	1,848,005	1,674,638	472,106
3 HO	12,136	442,057	107,781	179,927	3,797
4 LY	811,117	576,925	144,420	89,910	2,135,857
5 LM	463,148	1,397,701	283,738	279,089	3,014,951
6 LO	121,430	3,769,133	352,873	703,340	669,379

The cells highlighted in yellow indicate that one or more of our previously identified segments fit within that bin. The sum of these seven bins amounts to 61% of the UK population.

This exercise highlighted a number of important findings:

- The segmentation hypothesis was, broadly, very accurate and validated by the exercise. Only some small changes were needed to take the segmentation forward with the research (summarised below);
- Some of our segments (notably Greener Graduates and Unconvinced Dependants) are older than previously thought, with the dominant populations fitting into the 35-60 age bracket. As such, under-35s are under-represented in our segmentation;
- Specifically, "non-green" under-35s earning less than £30,000 (LY-E) are under-represented with no associated segments. As this combination accounts for over 2 million UK households (9%), this suggests that a useful segment might exist in this bin;
- As the segmentation spread to cover more of the population, the Busy Starter segment and the Early Enterpriser segment became harder to distinguish from each other.

The latter two points led to the conclusion that Busy Starters and Early Enterprisers should be merged into **Early Entrepreneurs** (retaining the segment definition of Early Enterprisers) and that a new group – **Young Starters –** should be created.

It was also requested, from the consortium that the segment named **Elderly Established** be renamed **Older Established** as a practical consideration when

using two letter abbreviations so as to avoid confusion with Early Entrepreneurs. This change is also to be integrated into further elements of the research.

2.3 - New Group – Young Starters

"lower-income, young people living in poor quality rental accommodation"

Household type	Young singles and couples with no children
Age	Under 35
Tenure	Private rental or social rental
Property type	Urban terraces or flats
Income	Quintiles 1 or 2
Vulnerable?	Mixed

- Unemployed or working in low-paid service jobs;
- Few qualifications;
- Low technology access;
- Small terraced homes close to town centres;
- Many disadvantaged by drug or alcohol dependence;
- Disengaged with local community / low wider social engagement
- Low environmental impact due to low access to personal transport and high fuel bills;

- Transient population, rarely staying in the same home for long periods

2.4 - Impact on the Research

Coverage

Including the new group, 8 of the 30 bins are covered by segments, representing 70% of the population. It can, therefore be said that our segmentation covers **70% of UK households at a medium resolution.** The table below demonstrates this coverage (greyed out cells represent populations under 5% of the total population and where there is no segment defined):

Age Wealth Flag	Insight Green Group A	Insight Green Group B	Insight Green Group C	Insight Green Group D	Insight Green Group E
1 HY					
2 HM	5%	11%	8%	7%	
3 HO					
4 LY					9%
5 LM		6%			12%
6 LO		16%		3%	

Returning to the full crosstab of 690 permutations, the segments cover 32 of these 690, representing **31% of UK households at a higher resolution.**

The only major bin currently not covered by the segments is the LM-B group – representing 6% of the population. Further investigation of the detailed crosstab indicates that there is no significant peak within that bin to identify a definable segment (particularly considering close demographic matches to our Unconvinced Dependant and Urban Constrained Groups). Furthermore, it was felt that the ten segments we currently have provide broad enough coverage for the purposes of this project not to necessitate a further segment.

Refined segment definitions

The exercise also allowed a review of the definitions of the original segments. As previously noted, some of our segments, upon further interrogation of the data, appeared older than previously thought. For the purposes of selecting research candidates for 5.4 and for connecting the segments to BRE data being utilised for Work Packages 1 and 2. Whilst green attitudinal data remained largely unchanged, demographic data was refined somewhat. These alterations are expressed in the table below (NB: for the "coverage" column, figures expressed are estimates in terms of the range from higher to medium resolution as described above):

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	20 - 40k	0.8 – 5.5
Early Entrepreneurs	25 - 40	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

These changes to the original definitions of the segments are, in practice, of negligible impact to project work carried out on the hypothesis as they do not alter our fundamental understandings of the groups and their attitudes/behaviours.

Replacement of Busy Starters with Young Starters

The removal of the Busy Starters group and addition of the Young Starters has a higher impact but is also, ultimately, of low impact. As this research will show, the new group are currently a low priority group for pursuing for retrofit. Furthermore, previous work considering Busy Starters has closely

matched Early Enterprisers and, therefore, the merging of these groups into Early Entrepreneurs will present no problems to the wider project.

The overall impact of these changes to the segmentation is a positive one – allowing the project to more clearly understand the segments and more confidently express the coverage of the segmentation as the work streams converge to produce customer implementation plans for these segments.

3.0 - Customer Survey

3.1 – Introduction

To engage with a wide sample of the UK public, a targeted mass survey exercise was planned. The purpose of the survey was to gather broad data, primarily quantitative, as a precursor to the focus group and Virtual Retrofits, which would aim to gather qualitative data.

3.2 – Methodology

[A more detailed academic methodology and appraisal is included in Appendix A]

Delivery of the survey was the responsibility of three members of the consortium:

- **Peabody** – General coordination and oversight;
- **UCL** – Development of survey questions and in-depth analysis;
- **BRE** – Administration of the survey – design and preparation, distribution, collection, data-cleaning and early analysis;

The experience of the expert members of the consortium involved in this research stream, validated by conversations with partners at DECC suggested that a purely paper-based survey (as originally intended at the contract stage) would be ineffective at engaging a balanced sample, particularly younger customers.

As such it was agreed to revise the plan from 20,000 paper surveys to 10,000 each of paper and electronic.

Furthermore, it was agreed to target the surveys at specific customer segments as defined by our "high resolution" crosstab data from Experian (see

Section 2). Targeting 2,000 of each segment would ensure that we not only obtained responses from a broad spectrum of the UK population, but that we would also be able to further understand and analyse each segment.

The weighting of paper and electronic surveys was varied for each segment according to Experian data on preferred communication channel and a first run of surveys was sent out.

A cash incentive of a draw of £500 and five runner-up prizes of energy monitors (provided by EDF) were provided to promote higher response rates, particularly from customers with lower interest in the topic of energy efficiency.

Following early poor responses from certain segments (particularly Early Entrepreneurs, Unconvinced Dependants and Greener Graduates) a second survey run was carried out to boost responses in those segments.

Response rates are detailed in the table below:

	Segment	Total Responses	Paper Based Responses	Web-based Responses
1	**Older Established**	176	176	0
2	**Stretched Pensioners**	153	153	0
3	**Transitional Retirees**	81	70	11
4	**Early Entrepreneurs**	79	22	57
5	**Urban Constrained**	72	43	29
6	**Greener Graduates**	79	31	48
7	**Unconvinced Dependants**	61	45	16
8	**Middle Grounders**	71	28	43
9	**Young Starters**	77	65	12
10	**Successful Ruralites**	83	34	49
	Total	**932**	**667**	**265**

Our target response rate was 5% of the 20,000. As such the total response of 4.7% represents only a very slight deviation from target. Furthermore, the response rates are significant enough across all segments to allow conclusions

to be drawn from the sample population and for each segment (See Appendix A for more detail).

3.3 - Survey Results and Analysis

The following presents the key findings of the survey, the full results of which are included in Appendix E of the accompanying Appendix document. Survey response data on which these findings were inferred are discussed in the following sections and-where relevant- are included in tabulated and/or graphical form.

The findings are based on a combination of results which were grouped into sections predominantly defined by the structure of the survey question sets. It is important to note that original questions numbers are maintained to facilitate referencing.

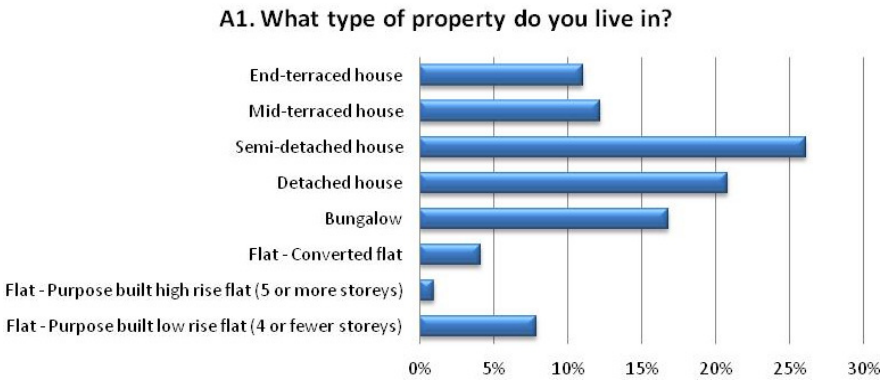
Household Types and Occupant Profile

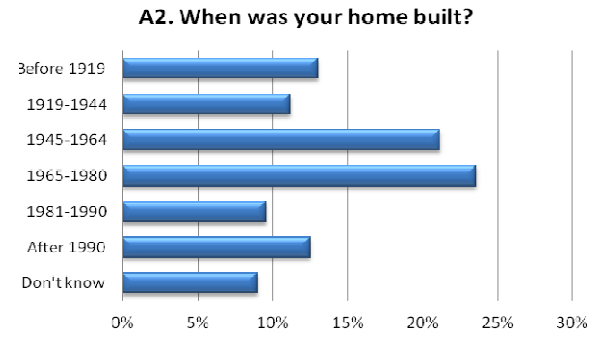
The key findings of this section can be summarised as:

- Semi detached houses were the predominant house type for survey respondents and the percentage of home ownership of respondents was around 75%, which generally conforms to the expected pattern
- The vast majority of homes in the survey had gas-fuelled, centrally heated systems.
- A significant percentage of homes used alternative fuel sources such as electricity and oil which was especially common among Successful Ruralites
- A high number of detached and bungalow type dwellings were present in survey respondent population. A cross-tabulation of survey segments shows that occupants of these two typologies belonged to the "Older Established" and "Successful Ruralites" segment categories.
- The higher response rate from these two segments may suggest a particular interest in the energy efficiency and retrofit agendas.

House Types

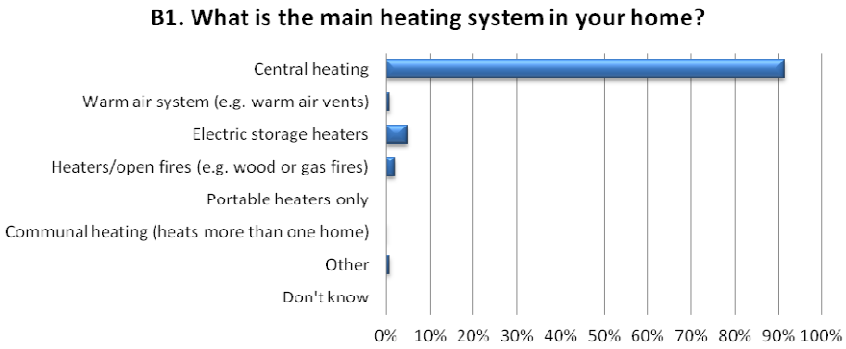
The results of the survey show that the majority (26%) of respondents lived in semi-detached houses. Houses age bands were predominantly 1945-1964 & 1965-1980 (21% and 23%, respectively) and were in general in reasonably good condition (see question B11). These findings conform to the expected pattern, with semi-detached dwellings being the most frequently occurring house-type in databases such as the English Housing Survey (EHS)(DCLG 2011).

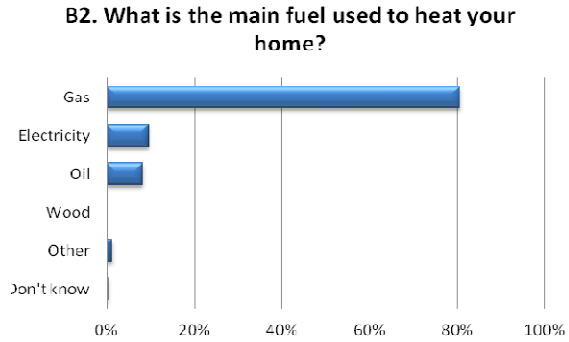




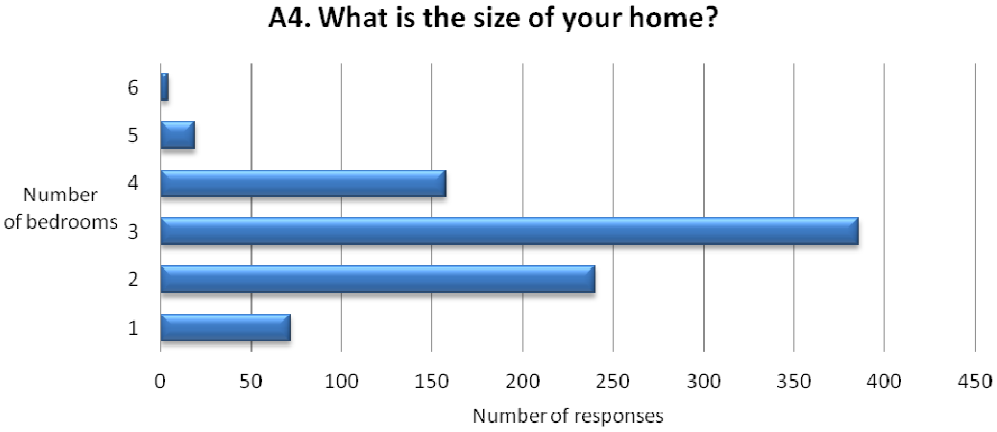
The vast majority of homes in the survey had gas fuelled (80.5%), centrally heated (91%) systems. Some (very limited) use of electric storage heaters (~ 5%) and open fires (~2%) occurred. However, there was more diversity in fuel use with a significant percentage of homes using alternative fuel sources such

as electricity (9.5%) and oil (~8%) which was especially common among segment 10 “successful ruralites”.





As illustrated below, it should be noted that there was an over-representation of respondents who lived in 3 bedroom houses (~41%). Furthermore, there were a high number of detached and bungalow type dwellings (approximately 21% and 17% respectively) compared to the relatively low frequency of these house-types in the overall UK domestic stock.


A4. What is the size of your home?
Number of bedrooms
6
5
4
3
2
1
0
50
100
150
200
250
300
350
400
450
Number of responses

Occupant Profile

The results of the survey show that the percentage of home ownership of respondents (who either owned their properties outright or through a mortgage) was around 75%, which although high compared to other tenancy types, is comparable to the general trend of around 70% recorded by the UK Housing Review 2004-2005 (University of York 2003).

As previously mentioned, a high number of detached and bungalow type dwellings were present in survey respondent population. Tenants who occupy these two house-types are usually typically more financially able, older and may live in more sub-urban/rural locations.

A cross-tabulation of survey segments (below) against detached/bungalow house type responses mostly confirms this assumption, with most occupants belonging to the "Older Established" and "Successful Ruralites" segment categories. The higher response rate from these two segments may suggest a particular interest in the energy efficiency and retrofit agendas that should be taken into consideration.

	Segment	Number	Percentage
1	**Older Established**	92	26.4%
2	**Stretched Pensioners**	51	14.6%
3	**Transitional Retirees**	51	14.6%
4	**Early Entrepreneurs**	52	14.9%
5	**Urban Constrained**	5	1.4%
6	**Greener Graduates**	2	0.6%
7	**Unconvinced Dependants**	3	0.9%
8	**Middle Grounders**	31	8.9%
9	**Young Starters**	5	1.4%
10	**Successful Ruralites**	57	16.3%

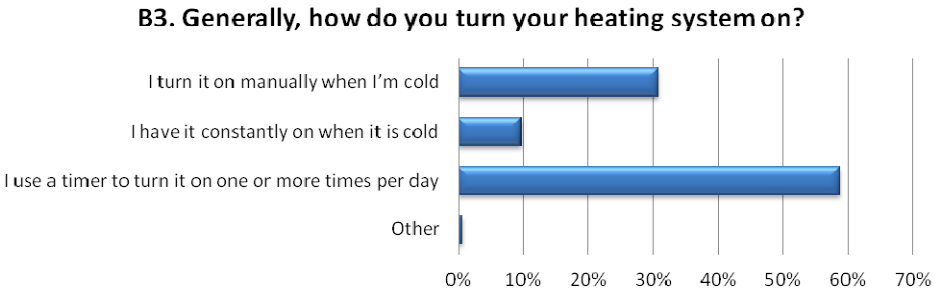
Consumer Habits and Behaviour

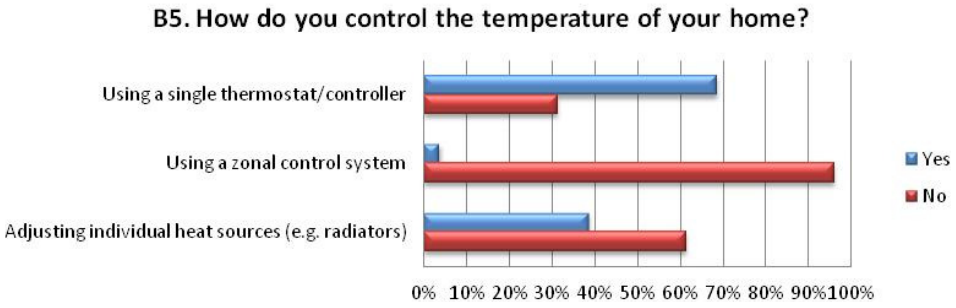
The key findings of this section can be summarised as

- Timers were the most popular heating control method, with manual controls the second most popular choice. Single zone thermostat/ controllers were the most popular choice for temperature control, while zonal control systems were very rarely used.
- A significant percentage of respondents constantly have the heating on when it is cold. Approximately 50% of those who chose this option were from the older age-band segments (Older Established or Stretched Pensioners)
- The mode (most frequent) thermostat temperature setting was 20^{o}C with about 30% of all participants stating that this was their preferred setting.
- Statistical analysis methods employed to determine any association between the various segments and much higher or lower temperature settings showed no trends confirming a relationship.
- While there was little variation of heating hours on weekdays between segments, statistical analysis methods highlight the variation in heating hours on weekends.
- Heating hours during weekends were the least for Greener Graduates, Urban Constrained and Unconvinced Dependants and longest for Stretched Pensioners and Older Established.

Heating/Temperature Control Methods

Timers were the most popular heating control method recorded in the customer responses, with just under 60% of those sampled selecting it. Manual controls were the second most popular choice (~30%).





A significant percentage selected "I have it constantly on when it is cold" (~10%). A simple cross-tabulation of the data, shows that approximately 50% of those who chose this option were from segments Older Established or Stretched Pensioners.

For temperature control, single zone thermostat/ controllers were the most popular choice (~70%). Zonal control systems, which enable different

temperatures to be set for different zones or rooms within a house were very rarely used.

Heating Patterns: Temperature and Duration

The table overleaf provides the summary statistics for responses to the two main questions that can be used to describe prevalent heating patterns in the survey data. These questions are:

- B4-Approximately, how many hours a day in the winter do you heat your home (weekdays and weekends)?
- B6-Generally, what temperature is your thermostat/heating set to?

Variable	Mean Value	Mode Value	Standard Deviation
Temperature patterns	20.2^{0}C	20 ^{0}C	3.764
Winter Heating Hours (Weekday)	9.06 Hours	8.00 Hours	5.606
Winter Heating Hours (Weekend)	10.54 Hours	8.00 Hours	5.321

The summary statistics used here are the mean and mode values[1] for each of the variables, in addition to the standard deviation[2].

Temperature patterns: The mode (most frequent) thermostat temperature was 20^{o}C (closely aligned with the mean value of 20.2^{o}C), with about 30% of

[1] The **mean** is the arithmetic average of a set of values, or distribution, while the **mode** is the value that occurs most frequently in a data se. The mode and mean may be very different for strongly skewed distributions.

[2] **Standard deviation** is a statistical measure of variability or diversity that shows how much variation or "dispersion" there is from the average (mean, or expected value). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data points are spread out over a large range of values

all participants stating that this was their preferred setting. Some variance was observed in the responses with a recorded range of between 10°C – 30°C. Further analysis to determine any underlying factors or specific association between the various segments and the much higher or much lower temperature settings was carried out via a cross tabulation of results and the implementation of an ANOVA test .

This aimed to answer questions such as:

- *Is the small but considerable ~2.2% of valid responses that recorded a 30°C setting from older age segments such as Older Established or Stretched Pensioners?*
- *Are the lower temperature settings associated with lower income band segments?*

The result of the test[3] can be interpreted as that the variation between segments was not significant and therefore specific trends cannot be identified either between or within segments to confirm the previous assumption (Field 2005). By analysing the cross-tabulated data, no trends confirming a relationship were observed.

It should be noted that over 30% of responses to this question were invalid (question not filled in or temperature selected beyond reasonable range). This should be taken into account when considering the overall interpretation of the results of the statistical test and may imply that many respondents were not aware of their temperature setting (when applicable).

Heating Hours: While there was a difference of approximately 1.40 hours in the mean value of the winter heating hours for weekdays and weekends, the mode value for both was 8.00 hours. An ANOVA was carried out for both

[3] The test result here is expressed as F=2.656 df=9, where the significance level sig=0.005. It should be noted that all unfilled responses (2.9% and 5.6%) were discounted from this analysis.

periods[4]. This results of the test suggest that while there is no significant variance between segments during weekdays, it is more significant during weekends. Further analysis of the cross-tabulated data shows that the mean heating hours on weekends were the least for segments 5-7 and highest for segments 1-2. The invalid response rate was much lower than that in the question concerning temperature setting.

[4] The test results are expressed as for hours/weekday F=6.46 df=9, where the significance level sig=0.000 and hours/weekends weekday F=1.675 df=9, where the significance level sig=0.195. It should be noted that all unfilled responses (2.9% and 5.6%) were discounted from this analysis.

Consumer Perceptions and Expectations

The key findings of this section can be summarised as

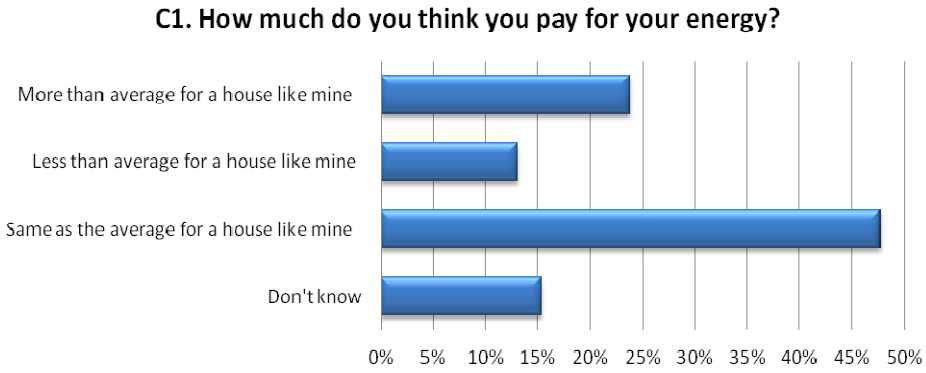
- Over 45% of those surveyed believed that both their energy consumption and energy cost were comparable to the average amount of a similar house. Over 20% of respondents thought they used less energy, but over 25% thought that they paid more than average.
- Almost all those surveyed stated that they employed some sort of measure to reduce their energy consumption (e.g. switch off lights or wash at 30^{o}C).
- There was a general agreement that an energy efficient home was more comfortable, warmer, healthier and with lower energy use and bills than a regular home. However, there was some spread in opinion concerning the impact of energy efficiency on property appearance and value.
- Results indicate a relationship between the most desirable energy efficient measures (glazing, loft insulation and draught proofing) and their perceived energy saving potential.

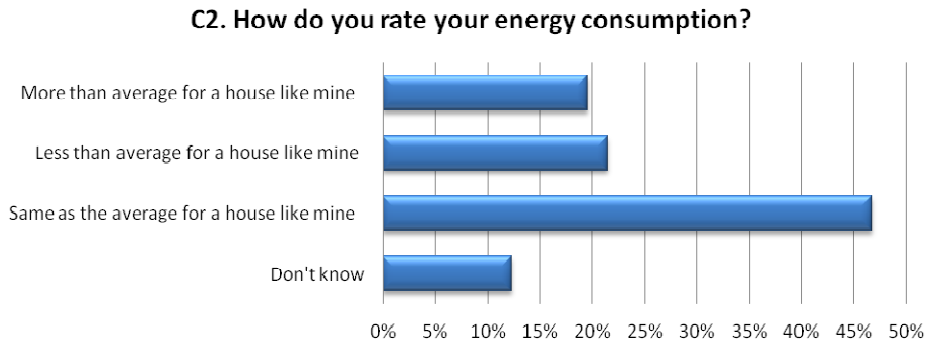
Perceived Energy Consumption and Cost Levels

In general, just over 45% of those surveyed believed that both their energy consumption and energy cost were comparable to the average amount of a similar house.

Almost all those surveyed stated that they employed some sort of measure to reduce their energy consumption (e.g. switch off lights or wash at 30^{o}C) (See question C3), and over 20% of respondents thought they used less energy. Despite this, over 25% thought that they paid more than average for a similar house.

Another important observation concerns the number (between approximately 10-15%) of respondents who did not know how their energy consumption or cost levels compared to other consumers. Further analysis showed that around 40% of those who did give this answer were from the Older Established and Stretched Pensioner segments.



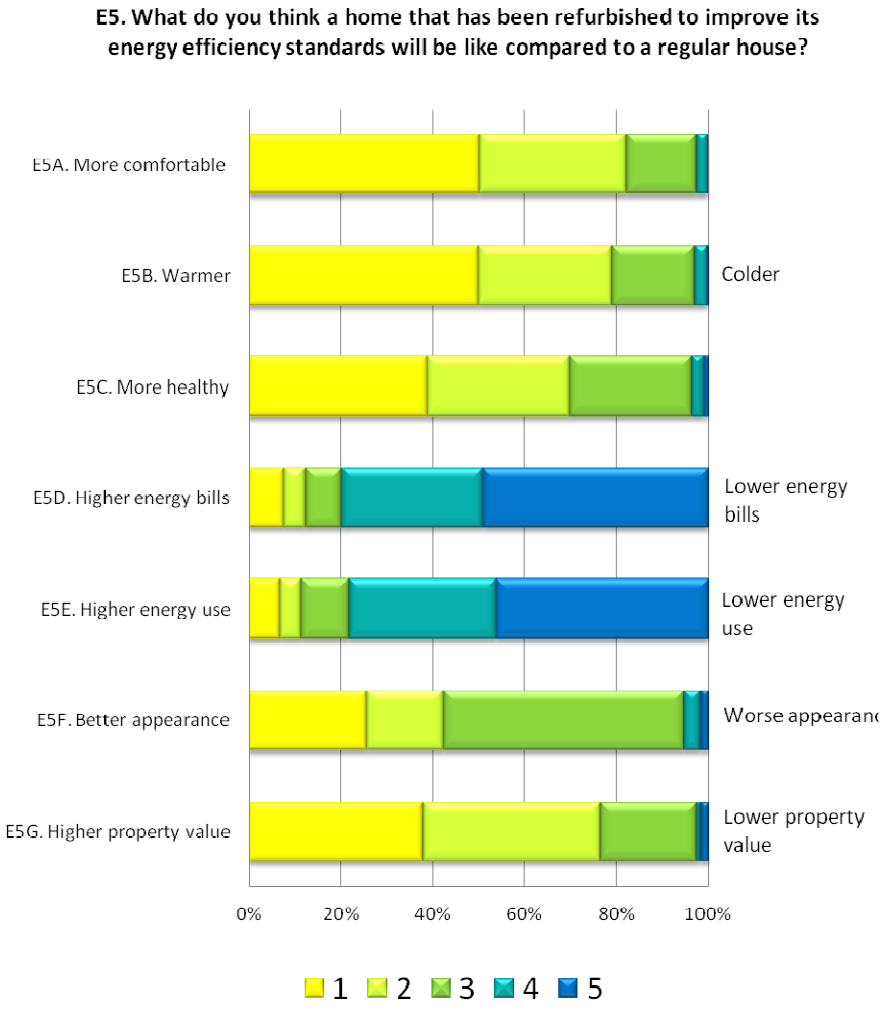


Perceived Value of Energy Efficiency

there was a general agreement between those surveyed that an energy efficient home was considered to be more comfortable, warmer, healthier and with lower energy use and bills than a regular home.

However, there was some spread in opinion concerning the impact of energy efficiency on property appearance and value as follows:

- Approximately 44% of those surveyed believed that the appearance of an energy efficient house was no different (or not improved) compared to a regular house.
- Approximately 18% of those surveyed believed that the value of an energy efficient house was no different (or not higher) compared to a regular house.



Key

Parameters	1	5
Comfort	More comfortable	Less comfortable
Temperature	Warmer	Colder
Health	More healthy	Less healthy
Energy bills	Higher	Lower
Energy use	Higher	Lower
Appearance	Better	Worse
Property value	Higher	Lower

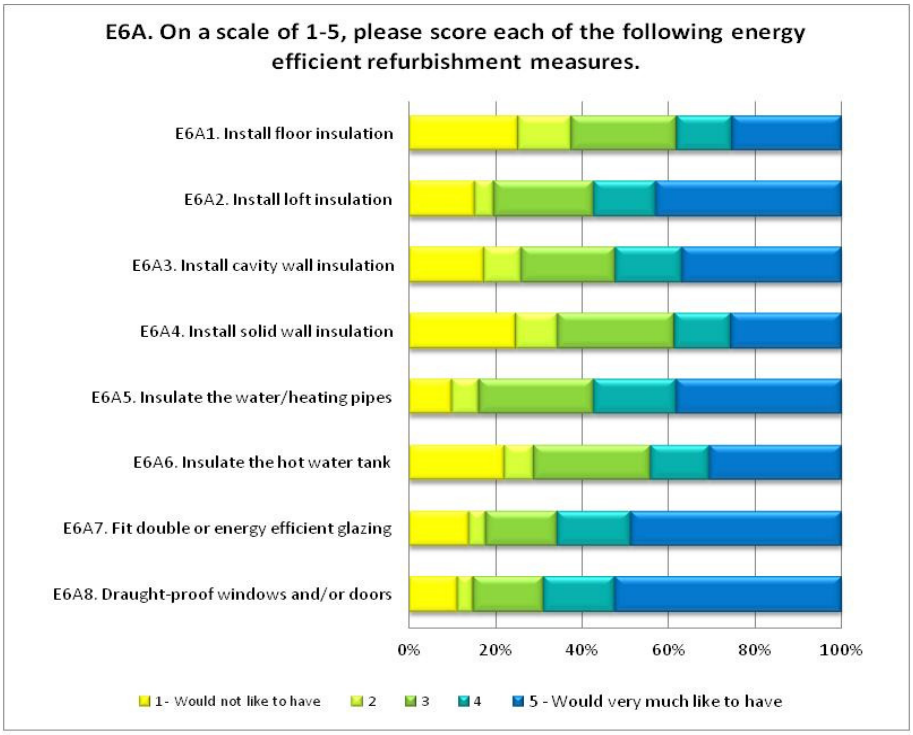
To gauge consumer perception as to the desirability and perceived energy saving potential of various measures the following question was included in the survey:

- *On a scale of 1-5, please score each of the following energy efficient refurbishment measures.*

  Would like to have *(1= Would not like, 5= Would very much like)*

  Would save energy *(1= Saves no energy, 5= Saves a lot of energy)*

These indicated a relationship between the most desirable energy efficient measures (glazing, loft insulation and draught proofing) and perceived energy saving potential, showing the importance of financial drivers/ incentives in the promotion of retrofit.



Drivers and Barriers for Retrofit

The key findings of this section can be summarised as

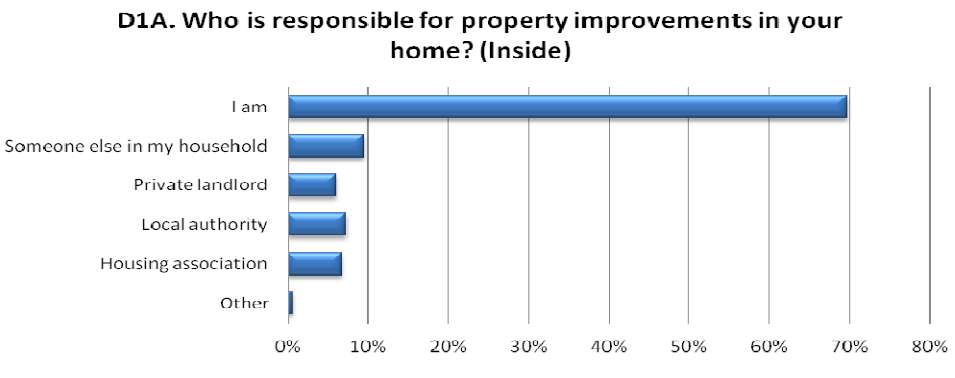
- Over 75% of homes had had improvement works carried out in the past 3 years. It is important to consider this as both an opportunity where the momentum for improvement could be built upon and as a potential factor in timing works.
- Information has an important role to play in the retrofit process, however ease of access to information varied between segments. For example, almost half of Older Established respondents perceived that information was "very difficult" for them to obtain, while the majority of Unconvinced Dependant respondents believed that it was "very easy".
- Highly trusted sources include family and friends, consumer advice and energy advice organisations. The least trusted sources include private

landlords and advertisements (especially for older age band segments).

- Better information from energy suppliers of energy saving products and seeing examples of improved homes was considered to be especially relevant and effective in making a decision
- The three main factors highlighted as "very important" for undertaking energy efficient improvements were increasing comfort (anthropocentric), increasing energy efficiency (eco-centric) and reducing bills (financial). In terms of the decision-making process the financial factors were considered to be most significant.
- General trends suggest that moving into a new house and replacing a heating system can be considered as prime opportunities to encourage or enable the undertaking of works, selling current property was considered to be an unfavourable time for most segments. Younger age-band segments and more financially stretched segments do not in general prefer to have works during changes in family circumstances.
- For the implementation of retrofit, local trades people were by far the most likely to be engaged by older age-band segments.

Opportunities for Integration: Home Improvement Works

For the majority (~70%) of respondents, responsibility for carrying out interior improvement works and repairs for the property lay with mostly themselves. Responsibility for exterior works was also similar with over 60% of respondents taking on tasks. Various other stakeholders tended to be involved at approximately the same level for interior and exterior works.



Over 75% of homes had had improvement works carried out in the past 3 years. This points to an increased interest in improving the quality (e.g. through redecoration works) as well as energy efficiency and comfort (e.g. through installing new boilers and insulation) of homes within various consumer segments.

It is important to consider this as both an opportunity where the momentum for improvement could be built upon and as a potential factor in timing works (tenants who have recently completed improvements may be reluctant to initiate works in the near future).

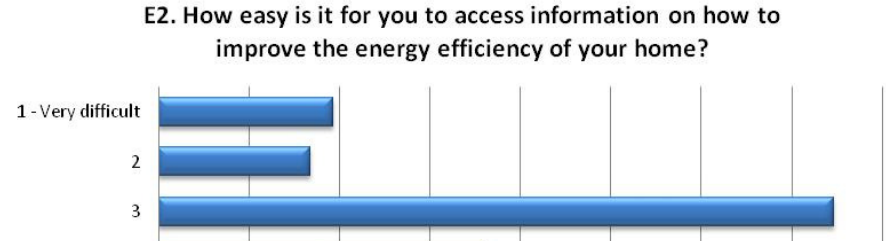
In terms of planned works, a smaller (but still considerable) 40% of respondents had indicated that they were planning to undertake home improvements. These in general were decoration and building works, with energy efficient measures not being a main priority. Planned works excluded some very popular energy efficiency works such as loft insulation (where 39% of respondents have had it installed in the past 3 years). This indicates a short term market saturation for various measures which should be considered in planning future retrofits.

	Completed In the Last 3 Years	Planned within next 3 Years
	Valid Percent	Valid Percent
No	23%	33%
Don't know	3%	27%
Yes	**74%**	**40%**
General decoration/building works	69%	69%
Installed new boiler/heating supply	36%	17%
Fitted double or energy efficient glazing	25%	12%
Draught-proofed windows and/or doors	12%	12%
Installed solid wall insulation	6%	3%
Installed cavity wall insulation	23%	7%
Installed loft insulation	39%	13%
Installed floor insulation	3%	3%
Installed renewable heating technologies	3%	3%
Installed renewable electricity technologies	3%	7%
Other	7%	11%

The Decision-Making Process: Retrofit Information

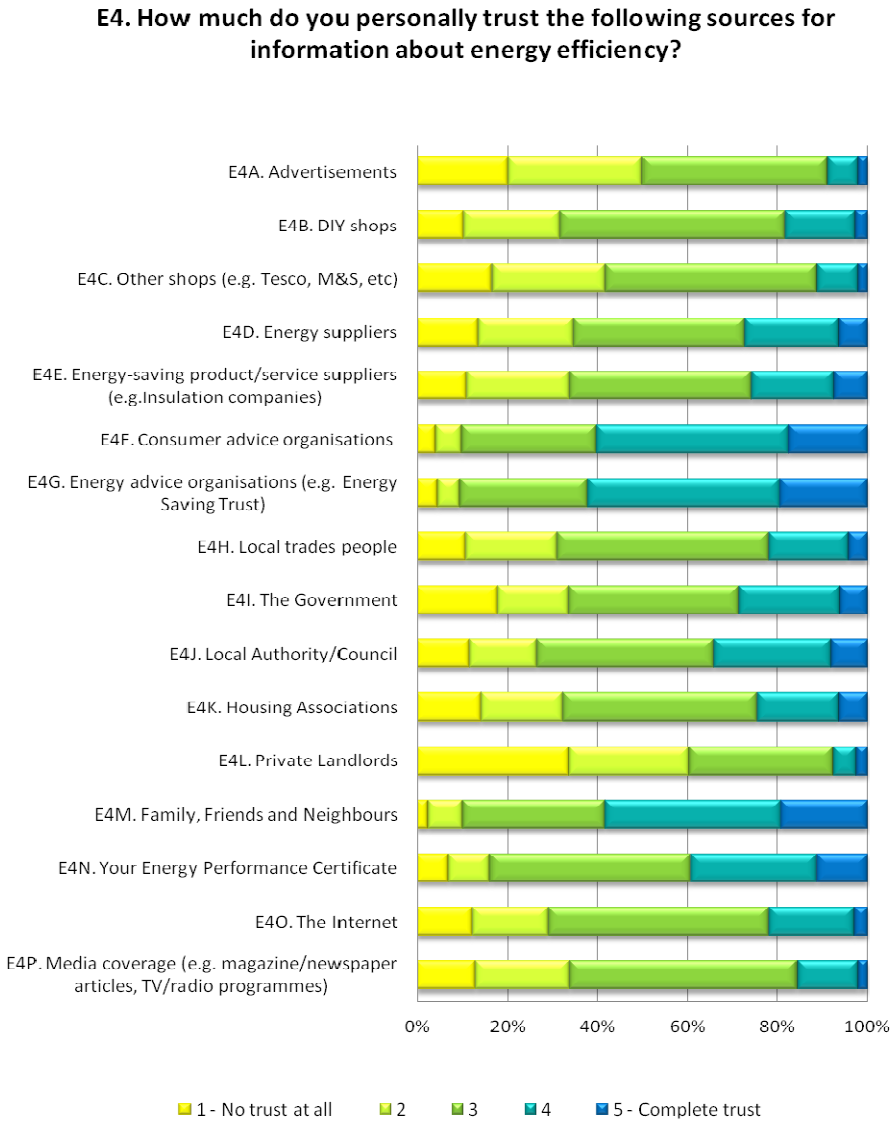
Ease of access: In terms of the provision of improved information concerning energy efficiency, ease of access to information was in general considered to be moderately easy by ~ 37% of those surveyed and very easy by ~27%.

A further analysis of the cross-tabulated data for various segments indicates a relationship between segments and perceived ease of access. For example, almost half of segment 1 respondents perceived that information was "very difficult" for them to obtain, while the majority segments 7 respondents believed that it was "very easy".



Segment		Very Difficult	Difficult	Moderate	Easy	Very Easy
1	**Older Established**	46%	12%	20%	4%	17%
2	**Stretched Pensioners**	33%	6%	17%	8%	36%
3	**Transitional Retirees**	33%	18%	18%	16%	15%
4	**Early Entrepreneurs**	17%	19%	38%	16%	10%
5	**Urban Constrained**	18%	13%	26%	13%	31%
6	**Greener Graduates**	23%	12%	20%	20%	25%
7	**Unconvinced Dependants**	9%	6%	23%	13%	49%
8	**Middle Grounders**	27%	18%	22%	16%	16%
9	**Young Starters**	12%	9%	24%	15%	39%
10	**Successful Ruralites**	15%	14%	38%	14%	18%

Trusted sources of information: Highly trusted sources include family and friends as well as consumer advice and energy advice organisations as well as were the most trusted sources of information about energy efficiency. The least trusted sources include private landlords and advertisements. This suggests that independent non-commercial/ governmental organisations could play a vital role in conveying the importance of retrofit.



Further analysis of this data against various consumer segments was carried out. The mode (most frequent) value (1=no trust at all, 5=complete trust) was tabulated for each segment. Some key highlights include:

- Older age-band segments have the least trust in advertisements.

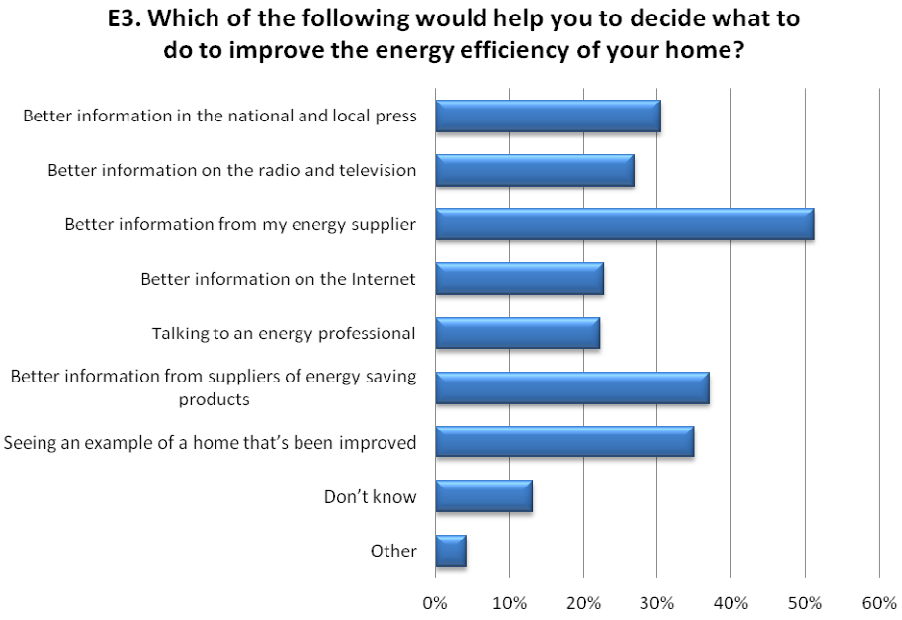
- Consumer advise agencies were in general highly trusted by all segments.

	1-Older Established	2-Stretched Pensioners	3-Transitional Retirees	4-Early Entrepreneurs	5-Urban Constrained	6-Greener Graduates	7-Unconvinced	8-Middle Grounders	9-Young Starters	10-Successful Ruralites
Advertisements	1	1	3	3	3	3	3	3	3	3
DIY shops	3	3	3	3	3	3	3	3	3	3
Other shops (e.g. Tesco, M&S, etc)	3	3	3	3	3	3	3	3	3	3
Energy suppliers	3	3	3	3	3	4	3	3	3	3
Energy-saving product/service suppliers (e.g.Insulation companies)	3	3	3	3	3	3	3	3	3	3
Consumer advice organisations	4	4	4	4	4	4	3	4	4	4
Energy advice organisations (e.g. Energy Saving Trust)	3	4	4	4	3	4	4	4	4	4
Local trades people	3	3	3	3	3	3	3	3	3	3
The Government	3	1	3	3	3	4	3	4	3	3
Local Authority/Council	3	3	3	3	3	3	3	3	3	3
Housing Associations	3	3	3	3	3	3	3	3	3	3
Private Landlords	1	1	1	3	1	3	3	2	2	3
Family, Friends and Neighbours	3	4	4	4	3	4	4	3	4	4
Your Energy Performance Certificate	3	3	3	3	3	4	3	3	3	3
The Internet	3	1	3	3	3	3	3	3	3	3
Media coverage (e.g. magazine/newspaper articles, TV/radio programmes)	3	3	3	3	3	3	3	3	3	3

Key:

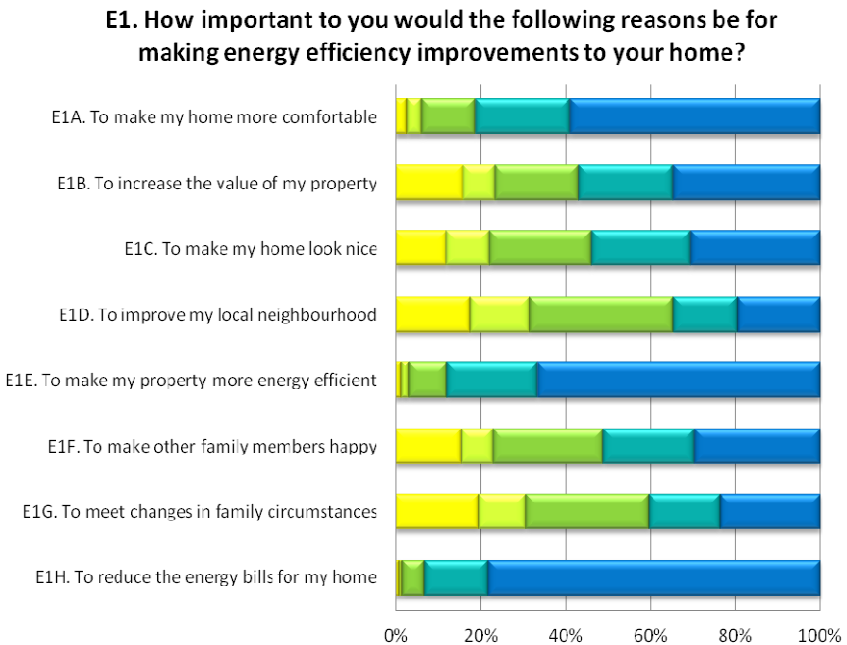
1=No trust at all, 5=Complete Trust

Areas of improvement: Areas where better information was considered to be especially relevant and effective in making a decision included better information from energy suppliers (~50%), suppliers of energy saving product (~35%) and seeing examples of improved homes (~35%).



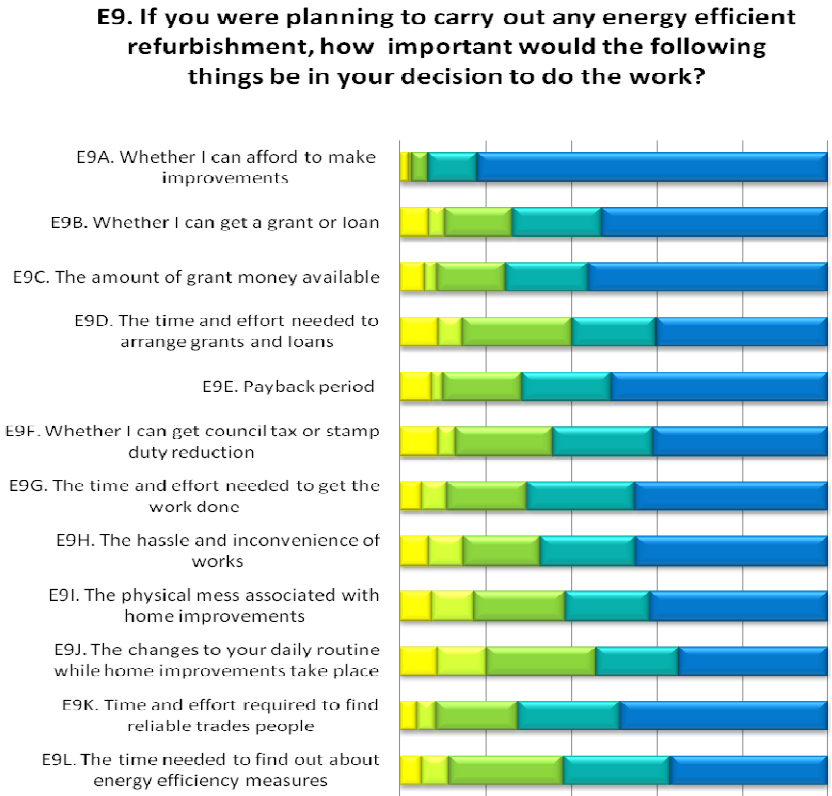
Process Drivers and Barriers

Significant factors: The factors highlighted as being the main reasons for undertaking energy efficient improvements varied . The three main factors highlighted as "very important" were increasing comfort (anthropocentric), increasing energy efficiency (eco-centric) and reducing bills (financial).



In terms of the decision-making process the following financial factors were considered to be most significant:

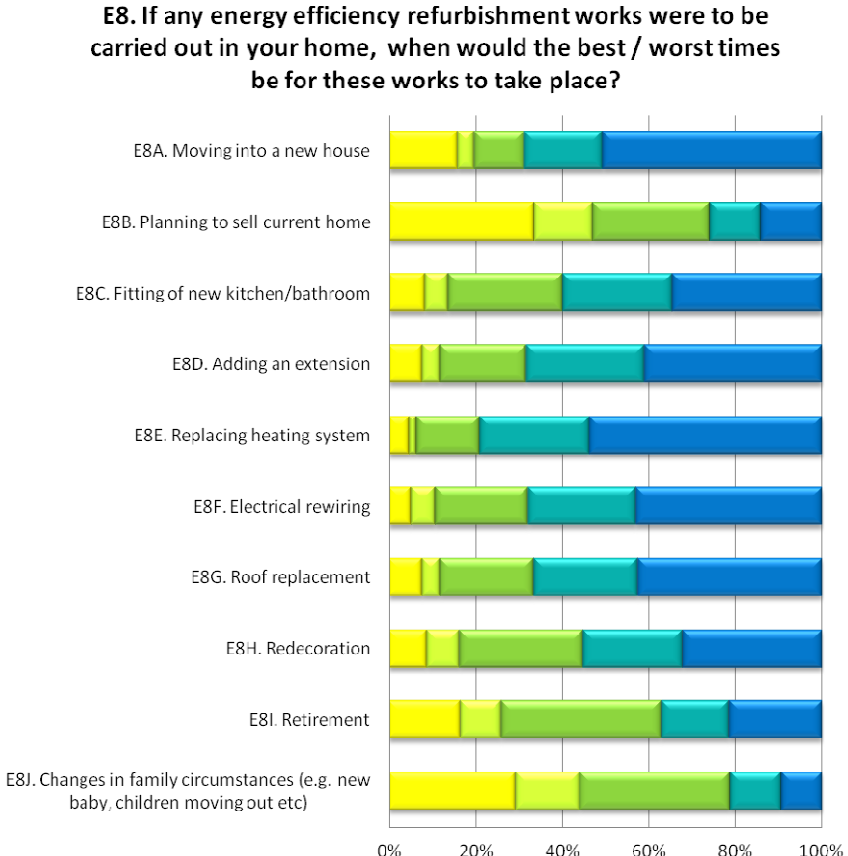
- ***Affordability*** *"Whether I can afford to make improvements":* This was considered to be the most important factor with over 75% of those surveyed stating that it was very important.
- ***Access to grants and loans*** *"Whether I can get a grant of loan" and "the amount of grant money available:* Almost half of those surveyed stating that this was a very important factor in their decision to undertake retrofit.
- ***Return on investment*** *"Payback period":* The time taken for the return on investment for the retrofit (or of various technologies installed) was a major factor with over 40% stating that it was very important.



In addition, significant non-financial factors that were highlighted include:

- ***Time and effort required to find reliable trades people***
- ***Reduction in interior space***
- ***The ability to choose which home improvements you wanted***

Timing of works: General trends suggest that moving into a new house and replacing a heating system were preferred by a large number of those surveyed and could therefore be considered as prime opportunities to encourage/enable the undertaking of works.



The table below illustrates the further analysis of this data against various consumer segments. The mode (most frequent) value (1=Worst Time, 5=Best Time) was tabulated for each segment. Some key highlights include:

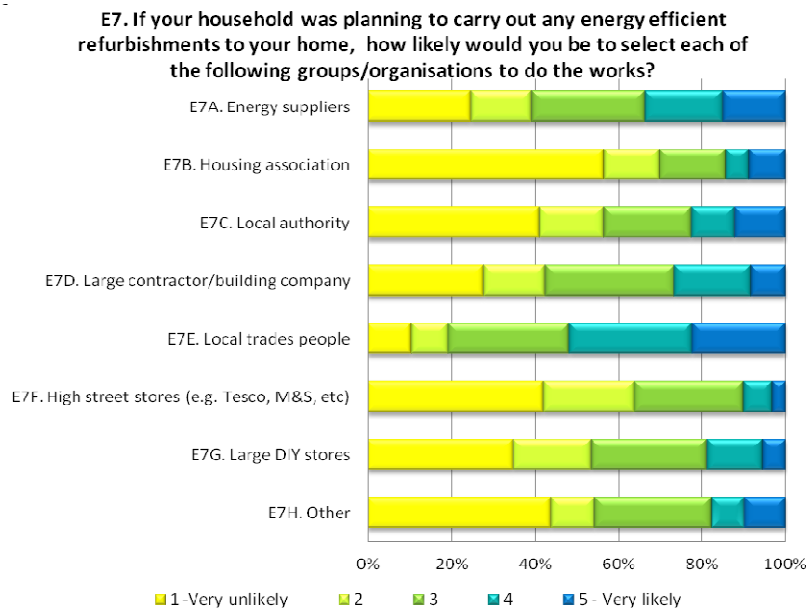
- Younger age-band segments (e.g. 6, 7 and 8) and more financially stretched segments (e.g. Stretched Pensioners) do not in general prefer to have works during changes in family circumstances, which was a more acceptable timing for other segments. In addition
- While moving house was in general a preferred time by all segments, selling current property was considered to be an unfavourable time for most segments.

	1-Older Established	2-Stretched Pensioners	3-Transitional Retirees	4-Early Entrepreneurs	5-Urban Constrained	6-Greener Graduates	7-Unconvinced Dependants	8-Middle Grounders	9-Young Starters	10-Successful Ruralites
Moving into a new house	5	5	5	5	5	5	5	5	5	5
Planning to sell current home	1	1	1	3	1	3	5	1	3	1

Fitting of new kitchen/bathroom	5	5	4	5	5	4	5	4	3	4
Adding an extension	5	5	5	5	5	5	5	5	4	5
Replacing heating system	5	5	5	5	5	5	5	5	5	5
Electrical rewiring	5	5	5	5	5	5	5	5	4	5
Roof replacement	5	5	5	5	5	5	5	5	4	5
Redecoration	5	3	3	4	5	4	5	3	3	4
Retirement	3	3	3	3	3	3	5	3	3	3
Changes in family circumstances (e.g. new baby, children moving out etc)	3	1	3	3	3	1	1	3	1	3
Key										
1=Worst Time, 5=Best Time										

Implementation of Retrofit

The organisation carrying out the retrofit is an important element to consider in assessing the drivers and barriers to the process. In general, local tradespeople were recognised as the most likely option for the implementation of retrofit. This indicates that a degree of familiarity or trust is important



The table overleaf illustrates the further analysis of this data against various consumer segments. The mode (most frequent) value (1=Very Unlikely, 5=Very Likely) was tabulated for each segment. Some key highlights include:

- Local trades people were by far the most likely to be engaged by older segments;
- Local authorities were preferred by less financially able segments;
- Energy suppliers were more likely to be engaged by “Greener Graduates”;

- As potential newcomers to the field of energy efficiency, high street stores were less likely to be engaged.

	1-Older Established	2-Stretched Pensioners	3-Transitional Retirees	4-Early Entrepreneurs	5-Urban Constrained	6-Greener Graduates	7-Unconvinced Dependants	8-Middle Grounders	9-Young Starters	10-Successful Ruralites
Energy suppliers	3	1	1	3	3	4	3	4	3	3
Housing association	1	1	1	1	1	1	1	1	1	1
Local authority	1	5	1	1	1	1	5	1	1	1
Large contractor/building company	1	1	3	3	3	3	1	3	3	4
Local trades people	5	5	4	4	3	4	3	3	4	4
High street stores (e.g. Tesco, M&S, etc)	1	1	1	3	1	1	3	1	1	1
Large DIY stores	1	1	1	3	1	4	3	3	2	1
Other	1	1	1	3	1	3	1	3	1	1
Key										
1 Very unlikely - 5 Very likely										

3.4 – Closing comments

The findings in this chapter represent the first interrogation of the survey data for emergent findings from a large and valuable dataset. The following deliverable (5.5) presents a further opportunity to return to the data to answer specific questions posed by the wider project or reflect on emerging findings from the synthesis of deliverables 5.1-5.4. This second opportunity for data analysis ensures that further value can be extracted from this exercise.

A detailed summary of conclusions, comparing the above key findings with the qualitative findings of the focus groups and Virtual Retrofits is included in chapter 6 of this report.

4.0 - Focus Groups

4.1 - Introduction

To complement the research undertaken in the survey, a series of focus groups were carried out across the UK. The purpose of the focus groups was to gain a more in-depth, qualitative understanding of the attitudes of our customer segments and facilitate discussions around key areas of retrofit.

4.2 - Methodology

It was agreed that a practical direction for the focus groups would be to conduct one group per customer segment, spread out across the UK. The agreed format for the focus groups was:

- **Two hours** - the first hour exploring customer's existing perceptions and awareness of retrofit; the second exploring their responses to key elements of our developing proposals;
- **10-12 individuals** – enough to ensure a broad range of discussion but not too many to make the session unwieldy;
- **Incentivised** – attendance was incentivised (£60) to attract individuals whether or not they were interested in the subject.

These restrictions and decisions were validated by the partners involved in the research (Total Flow, Wates and BRE) and also validated through consultation with our expert recruitment agency (see below).

A detailed breakdown of the Focus Group structure can be found in Appendix F.

Use of a Focus Group recruiter

To ensure a good quality of candidates it was agreed that we engage a third-party organisation who specialise in recruitment for market research and focus

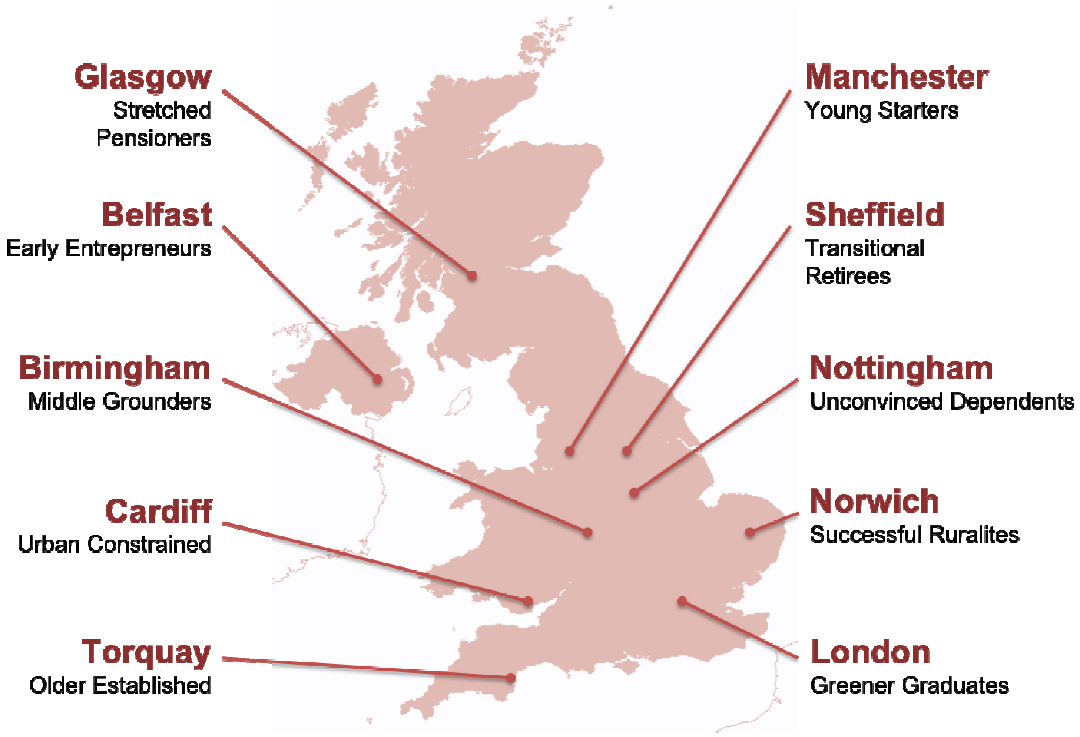
groups. Upon advice from our contact at DECC we sought out an agency registered with the Market Research Society and Association of Qualitative Research.

Upon obtaining quotes from multiple agencies and gathering references, it was agreed to select **Focus Groups UK** to conduct recruitment for the research.

FGUK developed screeners (recruitment tools), in partnership with us, to ensure that the right individuals were selected when their field operatives recruited participants by phone and in person. A copy of a sample screener can be found in Appendix G.

Determining Focus Group Locations

Utilising Experian data relevant to our customer groups, some typical customer locations were identified:



A combination of consortium offices (PRP – Manchester; Peabody – London) and external conference venues were used to host the events.

4.3 - Focus Groups Results

Section 1 – You and Your Home

The key findings of this section can be summarised as:

- All segments indicated a good knowledge of basic retrofit measures (e.g. loft insulation and double glazing) and energy conservation behaviours, but poor awareness of measures such as solid wall insulation;
- There is a high awareness of solar photovoltaic, with all-but-one group mentioning this technology. This may be due to wide media coverage of the Feed-In Tariff.
- Financial savings (reduced energy bills) are the most important reason for almost all groups to undertake retrofit works – only Stretched Pensioners chose warmth/comfort over monetary savings;
- Environmental motivators are of low priority across the groups, even for Greener Graduates;
- The most common barrier to all groups is upfront cost;
- Confusion over what to do was expressed as a key barrier by Transitional Retirees;
- Many people perceive that they have already completed a retrofit upgrade to their home so perceive no need to do works. Often the works completed are basic and not to the level being considered by this project;
- Young Starters expressed no interest in retrofit and have other priorities that overcome any desire to do such works;
- Early Entrepreneurs were most likely to cite energy efficiency problems/opportunities with their current home;
- Lower income groups are the most likely to suffer from condensation

or damp in their current home.

The first thing each group was asked to do was to compile a group list of ways to make a home more efficient, illustrated below:

Successful Ruralites	**Early Entrepreneurs**	**Urban Constrained**	**Greener Graduates**	**Transitional Retirees**
Solar panels (electric) Insulate pipes Loft insulation Shower not bath Radiator reflectors Efficient boiler Lag water tank Double glazing Draught excluders Cavity wall insulation Water meter Low energy lightbulbs Turn off standby Efficient appliances Wash at 30	Solar photovoltaic/thermal Wind turbine Only heat when needed Service boiler Turn off lights Loft insulation Energy efficient lightbulbs Double glazing Close curtains Water butt Insulate tank and pipes Draught proofing Turn off standby Cavity wall insulation Turn thermostat down Wash at 30 Geothermal Buy a new home!	Loft insulation Solar PV panels Cavity wall insulation Curtains Double glazing New Heating System Draught strips Carpets Turn standby off Turn thermostat down Showers not baths Get into bed earlier Energy efficient bulbs	Loft insulation Cavity wall insulation Solid wall insulation (cladding) Efficient electrical goods Draught excluders Foil behind radiators Double glazing Solar panels Carpeting Buffer Zones Intelligent thermostat EPC rating Ground source heat pump Mechanical Ventilation with Heat Recovery Standby switch-off Energy Efficient Lighting LEDs Managing Heating system Condensing boilers	Solar PV Shower not bath Double glazing Turn off lights Standby off Heating down Loft insulation External wall insulation Cavity wall insulation Water meter Draught proofing Foil behind radiators Heating system efficient Low temperature wash Energy efficient appliances and bulbs
Middle Grounders	**Older Established**	**Stretched Pensioners**	**Young Starters**	**Unconvinced Dependants**
Loft insulation Cavity wall insulation Window coverings	Loft insulation Cavity wall insulation Internal wall insulation Switch off lightbulbs Low energy bulbs	Loft insulation Solar PV panels Double glazing New boiler No baths, just	Loft insulation Double glazing Turn thermostat down Turn off standby Close windows	Cavity wall insulation Solar PV Loft insulation Double Glazing

Boiler/heating system Lag pipes Light bulbs Solar PV panels Replacement windows Standby off Wash at lower temp Shower not bath Only heat the water you require Turn computers off	Solar PV panels Tank lagging Standby – electric A++ boiler Don't fill kettle all the way Double glazing A*** rated applicances Monitor what you use Insulate doors	showers Draught excluders Cavity wall insulation Standby off Energy efficient bulbs Floor insulation Turn down thermostat Ground source heat pump	and doors Heavy curtains Boiling water in kettle as much as you need	Efficient boiler Improve radiator setup Wood stove Carpets Turn lights off Switch off standby Energy saving bulbs Smaller house Wear a jumper Draught proofing Turn heat down

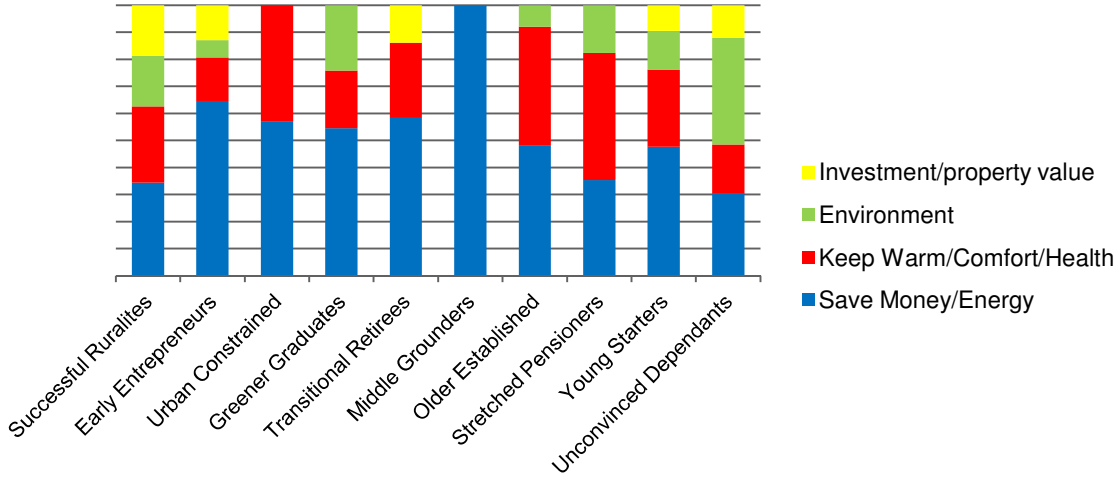
As can be noted, expected patterns are observed – with more engaged customer groups (e.g. Greener Graduates) demonstrating a much higher level of awareness than disengaged groups (e.g. Young Starters).

It is also important to note that behavioural measures (energy conservation behaviours) were widely offered by some groups and, in some cases (e.g. Young Starters) dominated physical measures.

Also widely discussed were solar photovoltaic panels, with 9/10 groups suggesting that installing these improves a home's efficiency. Conversely, solid wall insulation measures were only mentioned by 3/10 groups (Greener Graduates, Transitional Retirees and Older Established).

It can be suggested that recent media coverage of the Feed-In Tariff and solar photovoltaic for homes (with local offers of "rent-a-roof" schemes) and energy saving awareness campaigns have helped raise public awareness in the above issues. However, awareness of solid wall insulation can be considered to still be very poor and, therefore, an area that will need to be tackled to help generate a market.

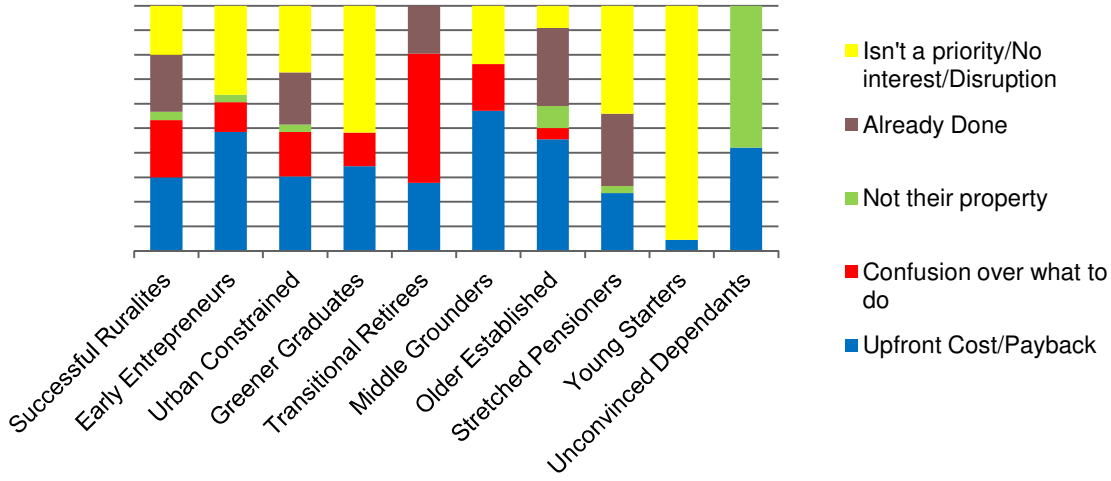
Attendees were then asked the main reasons as to *why* they would want to make their home more energy efficient and, from the group list, choose their top three responses. Responses were varied but fell into four main categories, illustrated below:



The areas ranked with the highest priority were saving money and keeping warm, all groups made the connection between thermal comfort and health, however it was the older groups that put greater emphasis on this issue.

A surprising finding is that the group that gave most weight to environmental reasons for conducting the works was the Unconvinced Dependants. This suggests that environmental motivators may still be relevant to this group. Conversely, Greener Graduates exhibited less enthusiasm for green issues than might be expected, instead indicating that financial motivators are stronger for them.

The attendees were than asked for the main reasons as to why they hadn't done it and then choose their top three from the group list. Again responses were varied but fell into the categories as the chart below

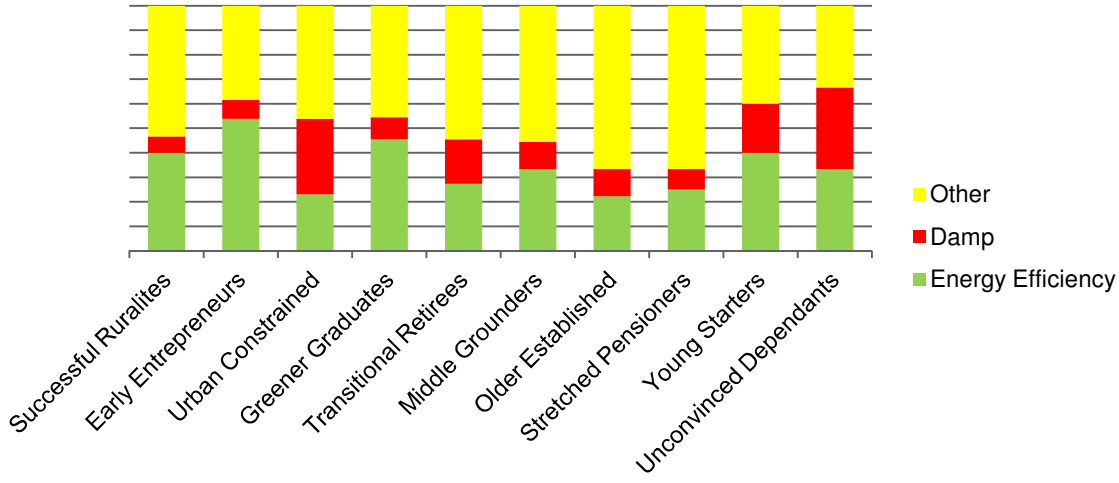


The most common barrier was the **upfront cost of works**, again demonstrating that financial concerns dominate consumer attitudes towards energy efficiency. However, another key finding is that a large number of participants perceived that they had **already retrofitted their homes**. Upon further investigation, this typically meant that they had had lofts and/or cavity walls insulated and in some cases installed a new combi boiler.

Confusion over what to do was not particularly widespread apart from with Transitional Retirees. It could be suggested that a lack of awareness for the need to retrofit might impact this finding. This assumption is supported by the previous finding that there is a widespread false perception that participants homes have already been retrofitted.

Young Starters gave a very clear message that they have no interest in retrofit works and that they have other priorities that are important to them.

The group were then asked to give examples of problems they had with their home, these were varied and have been split into those that are related to energy efficiency, damp and other e.g. size, decoration, etc.



As can be seen from the data, other problems with the home are most widespread, with participants typically identifying that non-retrofit issues are of greater importance (size, lack of facilities, electrical concerns, lack of storage, etc.).

The Early Entrepreneurs listed the most energy-efficiency relevant issues with their homes, whereas the lower income customer groups (Unconvinced Dependants, Young Starters, Urban Constrained but with the exception of Stretched Pensioners) were those most likely to be suffering from damp and concensation.

Overall, there is a clear set of perceived customer problems, across all segments, which retrofit can address.

Section 2 – Retrofit for You

The key findings of this section can be summarised as:

- The Internet and local and national media are the most popular channels for

consumers to find out more about retrofit, even older segments;

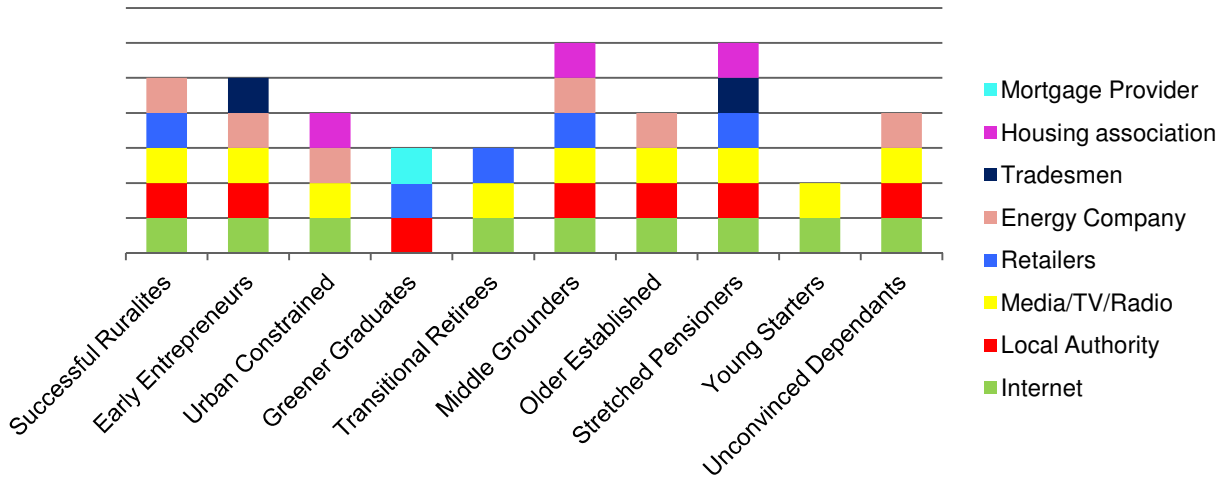
- Cost is the primary piece of information that all segments want to find out about retrofit. Next comes programme-specific information (what are you installing and when) and details of the expected energy savings;
- Availability of grants and funding is important to the wealthiest and poorest segments, but not those in the middle;
- Government bodies and energy companies were seen as the most trusted individuals for information on retrofit, followed by local authority and local trades;
- At the survey stage, there is a shift to wanting more detailed information on the installation (specification, programme details, options, etc.) than at the initial stage where cost is the most important thing;
- Successful Ruralites are the most demanding in terms of the breadth of information they want from the survey process;
- Choice is very important to most segments, with particularly the Early Entrepreneurs stating that they would rather have a menu of choices rather than a strict package;
- Local trades are the most popular delivery bodies. Large contractors are typically only favoured by those in social housing or rented accommodation. Energy companies are a close second;
- Reducing VAT was popular with most except Successful Ruralites who felt it wouldn't make much difference. Many suggested it should be 0%;
- Council tax banding was an unpopular incentive as people felt it would punish vulnerable individuals;
- Flexible Finance was generally popular across all segments;
- People have less issue with landlords being subject to restrictions on marketing their property (e.g. can't if F or G rated) than home owners, where any restriction on selling was seen very negatively;

The three proposed stages of a retrofit were explained to each group as follows:

- Step 1 – Survey
- Step 2 – Installation
- Step 3 – Through-Life Support and Maintenance

After outlining this structure and providing details based on our current trajectory, the second hour of the groups looked at key areas for consideration in developing effective value propositions for them.

First, the groups were asked to consider where they would go to obtain information on retrofit:



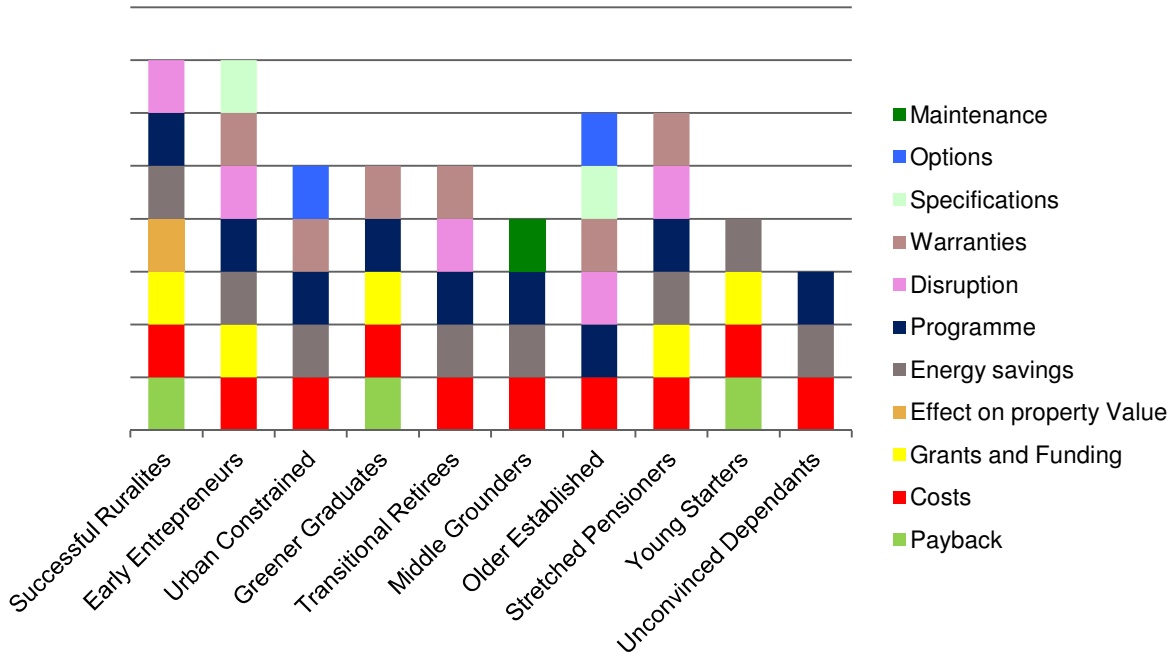
"The Internet" was often the first option offered, with all segments, including older segments, offering this as an information channel. Typically, when asked to elaborate, participants said they would visit Google and search for "energy saving" or "energy efficiency". It should be noted that although Greener Graduates did not specify "the internet", they instead listed end-points or direct sources for information including private sector organisations, the Energy Saving Trust or accredited bodies. This might suggest that this sector

feels more confident in knowing where they might find their information rather than feeling that they need to search online.

General media engagement was often the next most popular option, with groups feeling that they would like to receive information via television or radio programmes or through printed information in local or national press.

Local Authorities and Energy Companies were not cited by all, but were still significant sources for customer information across the groups.

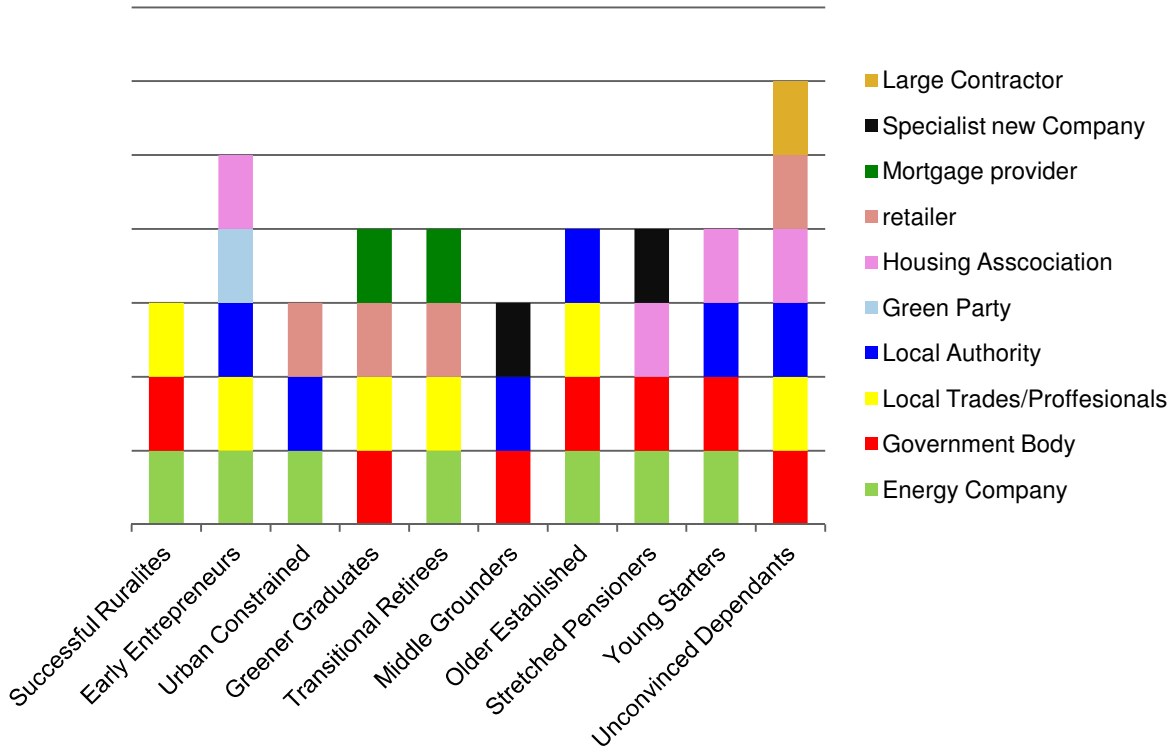
The groups were then asked to consider the type of information they would need:



Following the trends of financial concerns dominating consumer attitudes, the cost of works was the most widespread piece of information, needed by all groups. Programme-specific details such as schedule and specific measures was next most important across the groups, followed by details on the specific energy savings to be expected by the retrofit works.

Availability of grants and funding, interestingly was cited by the two extremes of our segments – our wealthiest segments (Successful Ruralites, Early Entrepreneurs and Greener Graduates) and two of our least affluent segments (Young Starters and Stretched Pensioners). Warranties was also an important concern for many.

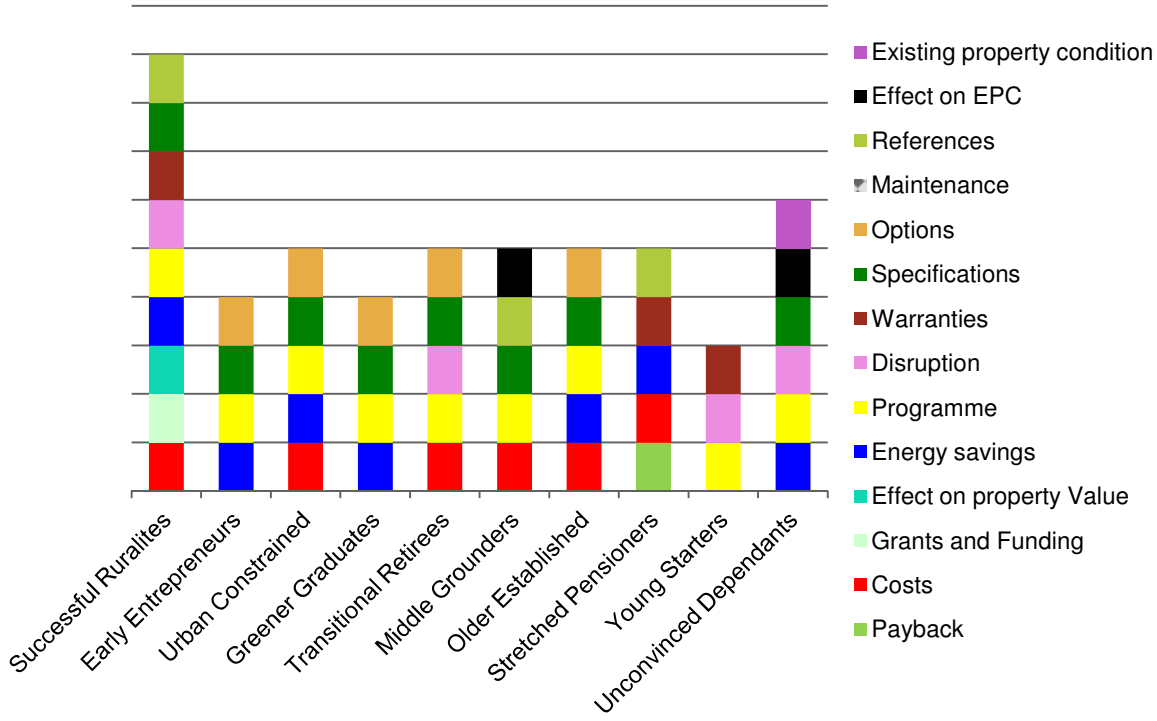
The groups were then asked who they would trust to provide this information:



Government bodies and energy companies were seen as the most trusted individuals for information on retrofit, followed by the local authority and local trades.

Two groups suggested a new organisation should be established to provide this information – "A UK Council for Retrofit" suggested by the Stretched Pensioners.

Discussion then focussed on the installation and groups were encouraged to discuss what they would need from the survey to assist in making a decision.

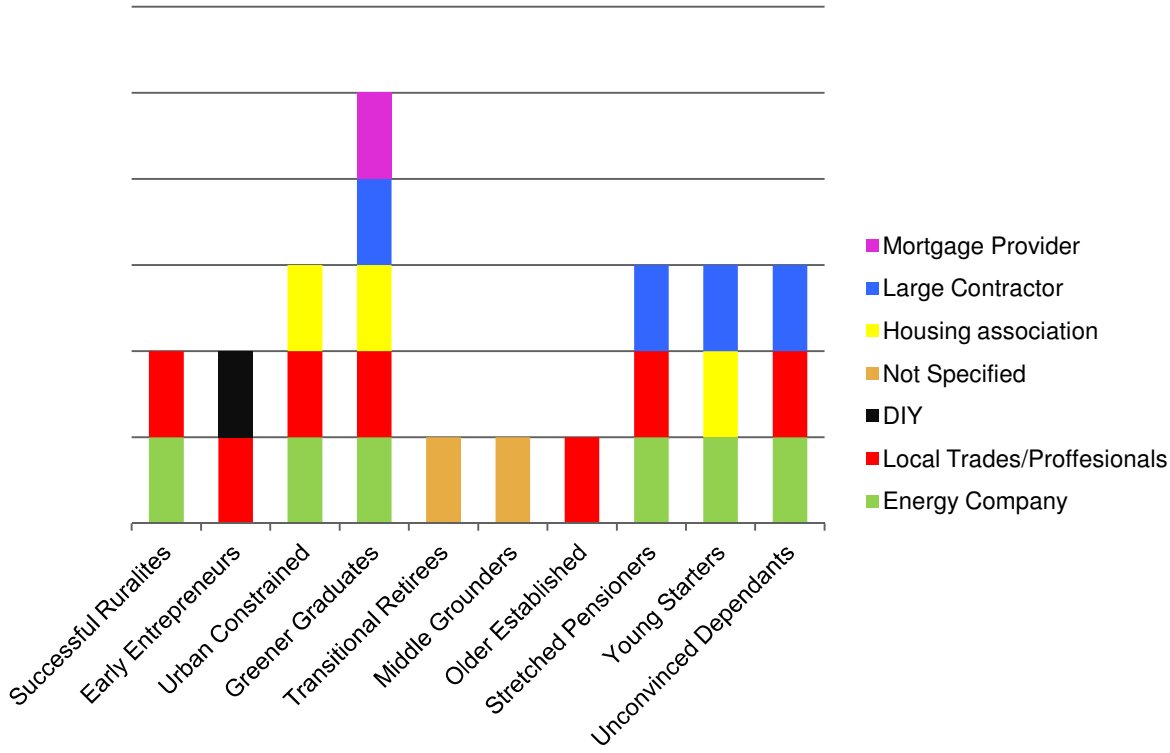


Across the focus groups, a wide and varied range of information was stated as being required by customers. In many cases this mirrored the information they would want at the outset such as cost and energy saving details. However, details on the specific programme and specifications for the measures installed proved more common at this stage.

Crucial to our current plans is the widely-held attitude that many customers want to be provided with options as to what they do and don't install. Early Entrepreneurs, in particular, insisted that they be given a breakdown of potential measures as a menu of options. This could present difficulties to a roll-out model that relies on a small number of rigid packages of multiple measures.

There was then a discussion around how disruptive the works could be and what would be an acceptable level of disruption, the attendees were asked to vote on whether they would prefer to stay in the property or move out whilst works were undertaken

Respondents were then asked what sort of organisation they would trust to undertake the works



Local trades are the most popular choice across the segments, with fewer choosing a larger contractor for the works. Typically those also answering with a larger contractor were the segments highly represented in social housing (with the exception of Greener Graduates who are typically in private rental). Energy companies are the next favoured delivery body.

The two "Not specified" bodies above are due to the groups describing the characteristics of an installer that they would trust. In the case of the Middle Grounders, they wanted a specialist, newly-established company which was government-backed and environmentally aware; in the case of the Transitional Retirees, their preference was for the same company as the survey provider with a brand they could follow all the way through. They specified the need

for a project manager, single point of contact throughout and insisted on no subcontractors.

The final section covered respondents' attitudes towards four potential "carrots" and four potential "sticks", namely:

Carrots:

- Reduce VAT to 5% on retrofit materials and labour
- Reduce Stamp Duty for efficient homes
- Reduce council tax for efficient homes
- Flexible Finance options

Sticks:

- Can't sell an inefficient home
- Can't lease an inefficient home
- Increased council tax for inefficient homes
- Increase energy bills

As to be expected, carrots were generally popular and sticks unpopular. There was little variation between segments except on the issue of VAT, where Successful Ruralites felt that this was trivial. Other segments suggested that it should be set to 0%, not 5%.

Reducing council tax for efficient homes was a popular option until participants considered that this may push up council tax for those in inefficient homes. It was typically felt across all segments that this would be something that would unfairly impact vulnerable people and was, overall, an unpopular instrument to incentivise retrofit.

Flexible finance was the most uniformly positive and popular option in terms of incentivising people towards retrofit.

Results of Focus Group questionnaires

The key findings of this section can be summarised as:

- Most people had had works carried out to their home over the last three years but this was typically general decoration and reactive building works. Loft insulation had been carried out by many people, across all segments;
- Most groups also had plans to carry out works to their home over the next three years. Plans are dominated by decoration and general building works but there is a more widespread interest in efficiency measures across the groups;
- Greener Graduates and Early Entrepreneurs are most interested in installing micro renewables, mainly for electricity but also for heat;
- Stretched Pensioners are particularly interested in improving their heating system over the next three years;
- Young Starters and Unconvinced Dependants have limited/no future plans to improve their homes;
- Across the groups, 1-2 weeks seems the preferred timescale for works although Urban Constrained are more likely to answer "as long as it takes" whereas Stretched Pensioners are more likely to answer "up to a week";
- Most people would rather stay in their home than move out for the works. Unconvinced Dependants were most likely to want to move out whereas Successful Ruralites were most likely to want to stay;
- If people did move out, staying with friends/family or going on holiday were

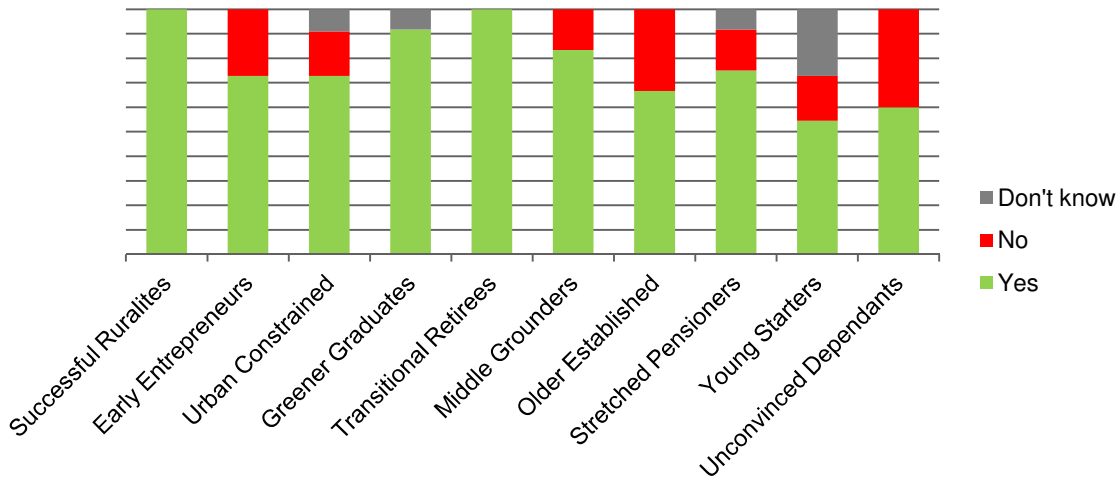
the two most popular options;

- Out of cost, performance, time, mess and customer service, cost is the majority priority across the segments. Early Entrepreneurs, Stretched Pensioners, Unconvinced Dependants and Transitional Retirees, however, would rather the final energy performance is prioritised over cost;

Throughout the course of the Focus Groups, a two-sided questionnaire was handed out and participants were asked to fill in answers to specific questions. These served two purposes – firstly they served to break up the periods of discussion and get participants thinking about the discussions coming next; secondly they provided an opportunity to gather more information in a quick and simple way.

The results from these questionnaires are summarised in the following few pages:

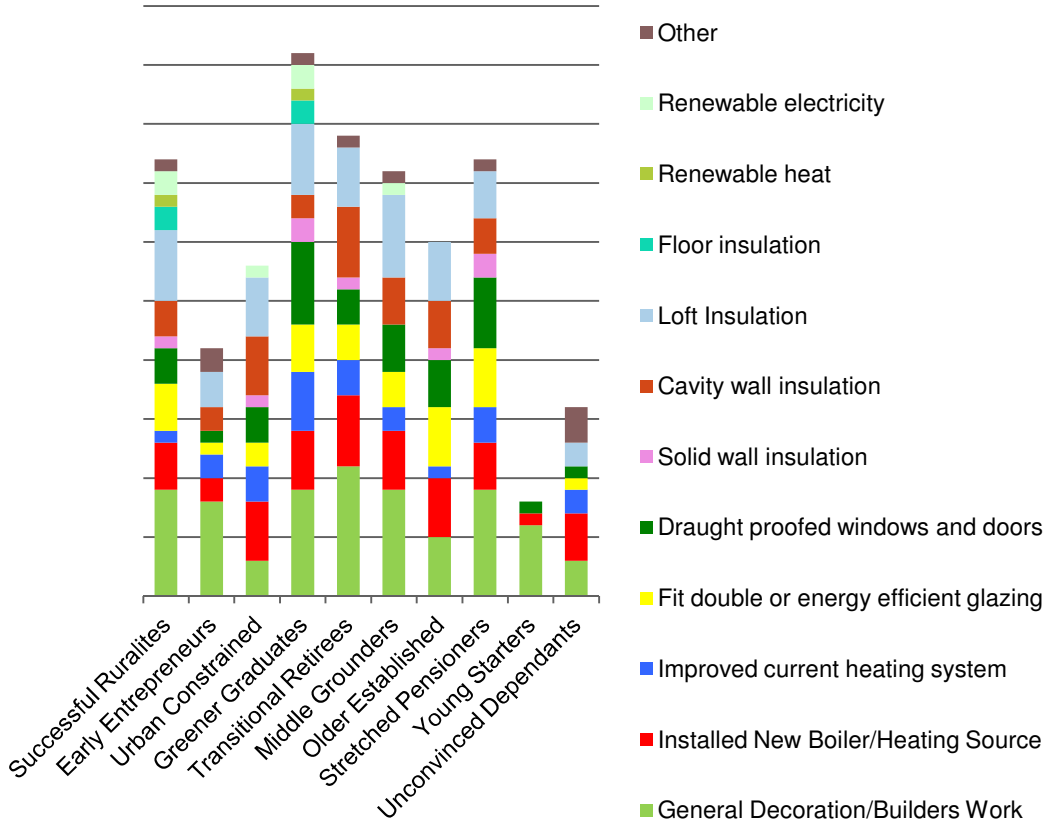
Have any works been carried out to your home over the last three years?



The majority of respondents in most groups had some form of work undertaken with the Young Starters and Unconvinced Dependants being the least likely to have had works done to their homes.

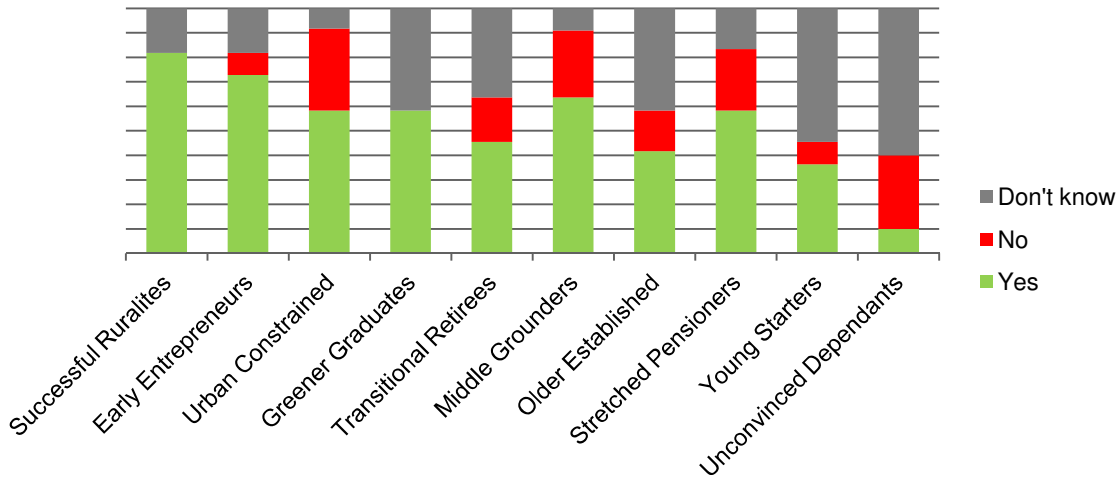
The type of work undertaken was mainly decoration and builders works. Some energy improvement work had been done but this was in the main limited to simple measures such as loft and cavity wall insulation.

Installation of a new boiler was also a common item of work across almost all segments, indicating that this may be a measure that is widespread enough to cause high refusal rates should a new boiler be included as part of a package of works. A low score for this item with Early Entrepreneurs should be considered with the knowledge that this group was based in Belfast and, therefore, many of these participants were off-gas. This may, therefore, impact their propensity to have recently changed their heating system.

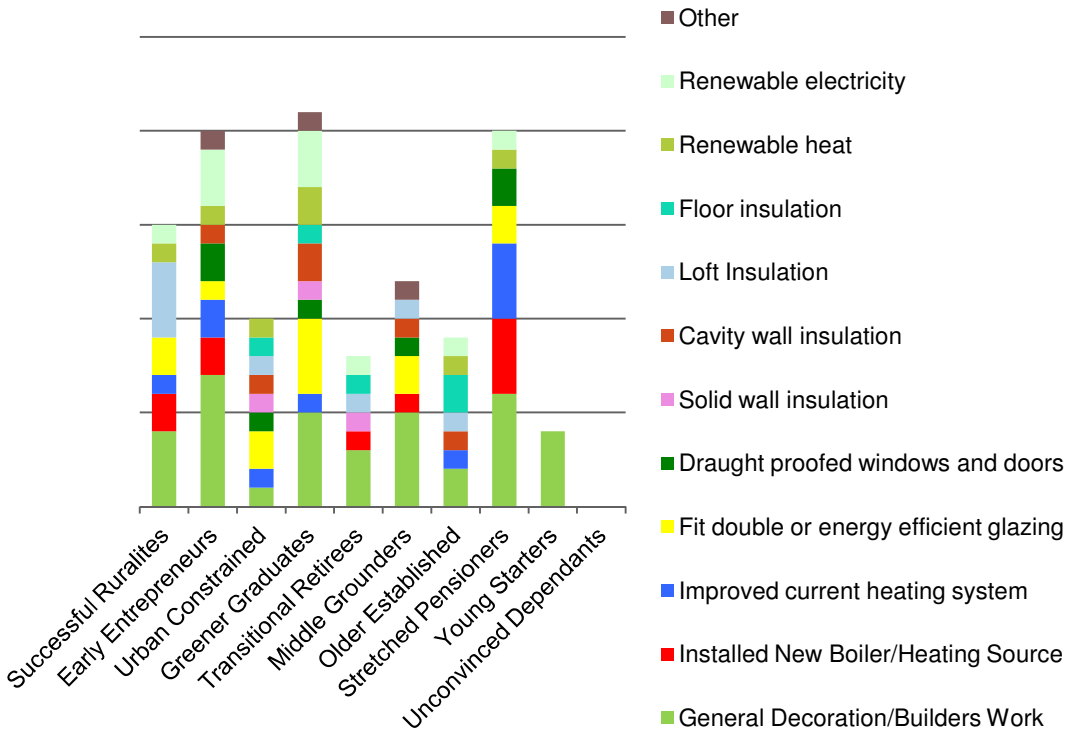


More advanced measures including renewables were seen from the Successful Ruralites and the Greener Graduates. The Young Starters were typically least likely to have had works beyond basic decorations carried out to their homes.

Are there any plans to make improvements to your home within the next three years?



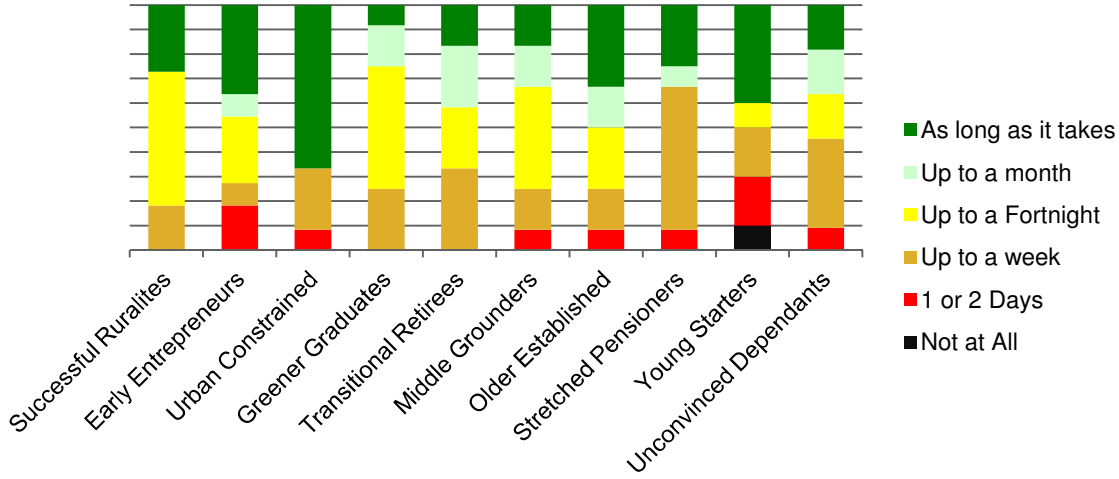
The majority of respondents in most groups had plans to undertake some form of work with the Unconvinced Dependants being the most uncertain, this is likely down to the fact that the majority were in rented accommodation and therefore not in control of improvement works.



Again the type of work planned was mainly decoration and building works. Renewable electricity (and to a lesser extent renewable heat) showed a high response in both the Early Entrepreneurs and the Greener Graduates, indicating a preference for these groups for newer, more technological solutions.

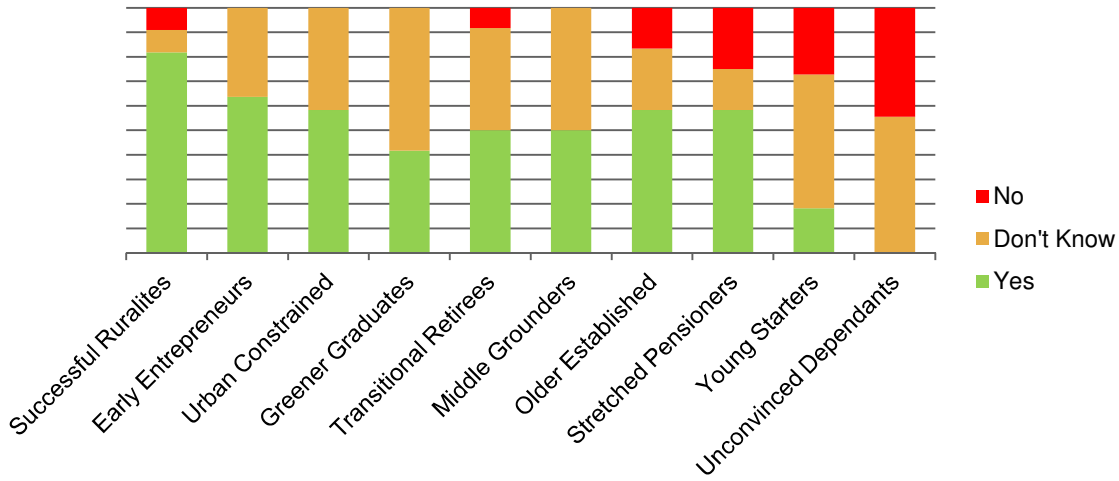
Stretched Pensioners showed a particular interest over the other groups in improving their heating system over the next three years.

If Energy efficiency works were going to take place in your home, how long would you be willing to let them last?



The most common responses across all groups were split into one week, a fortnight and as long as it takes, the majority response would favour between one and two weeks, however the Urban Constrained appear to have a more relaxed attitude towards the overall duration of works. The Stretched Pensioners were most likely to request an installation of 1 week or less.

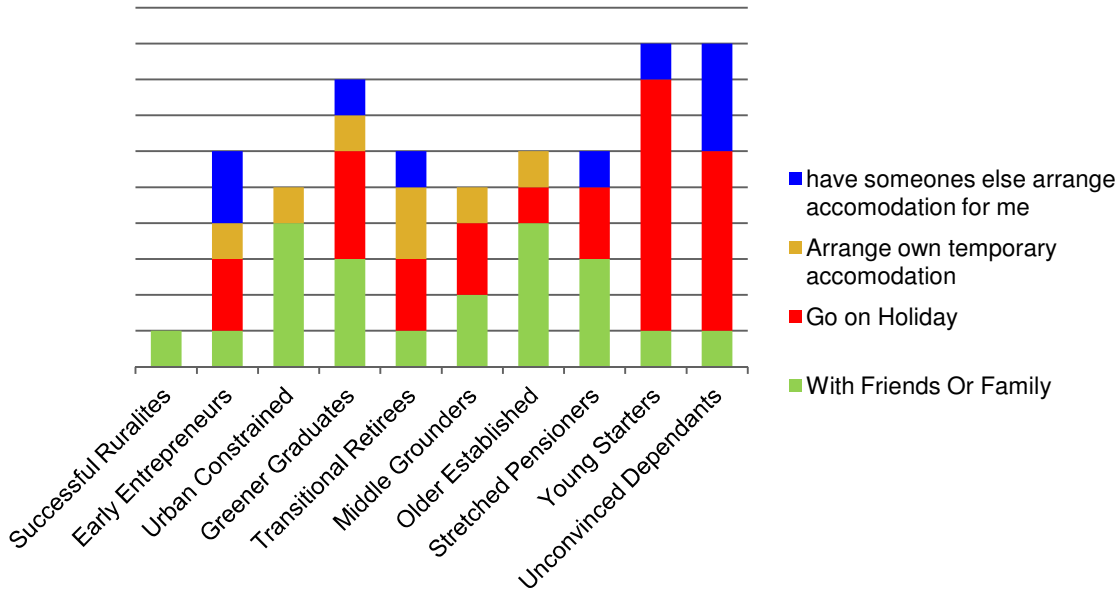
Would you want to stay in your home for the duration of the works?



There is an overall low desire to move out of the property for the duration of retrofit works, however younger segments seem to be more open to the idea

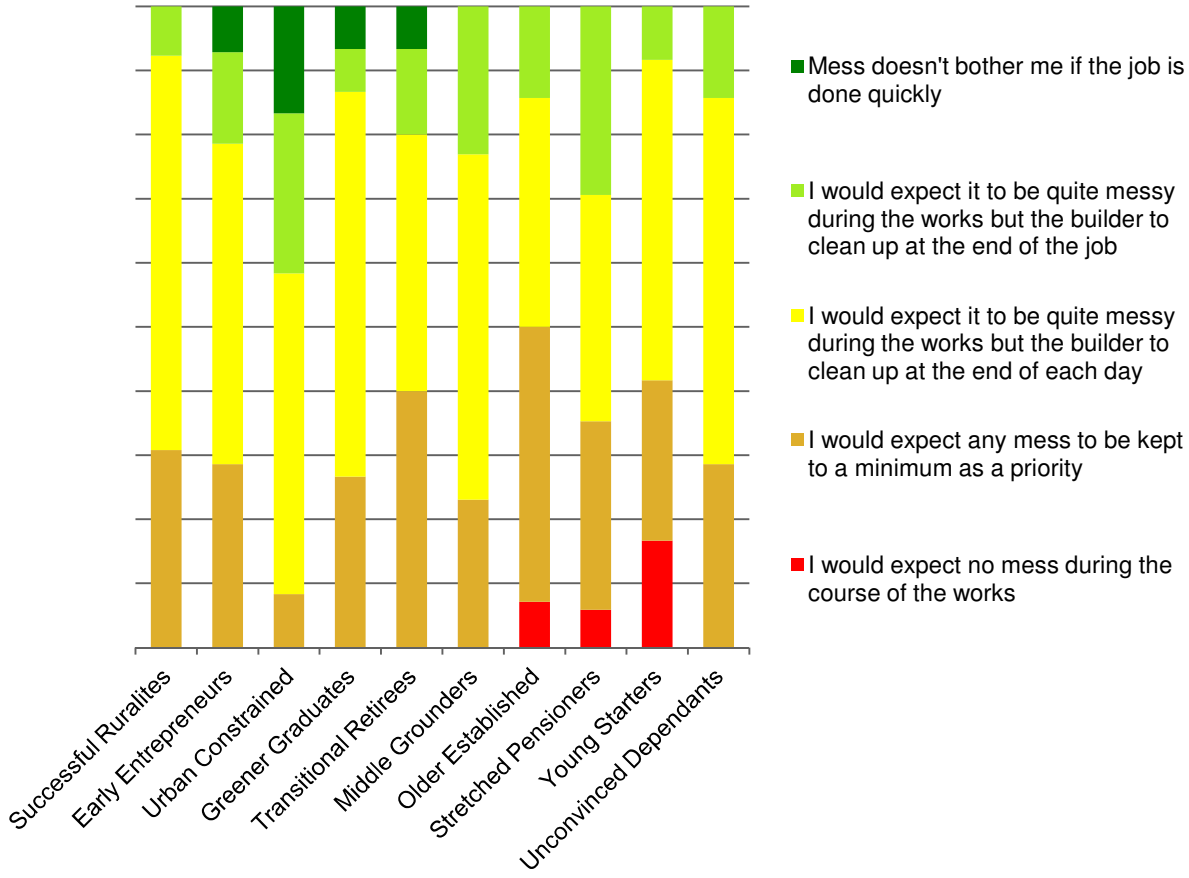
(Young Starters, Unconvinced Dependants, Greener Graduates). Successful Ruralites gave a very clear signal that they would want to remain in the home for the duration of the works.

Where would you be willing to stay?



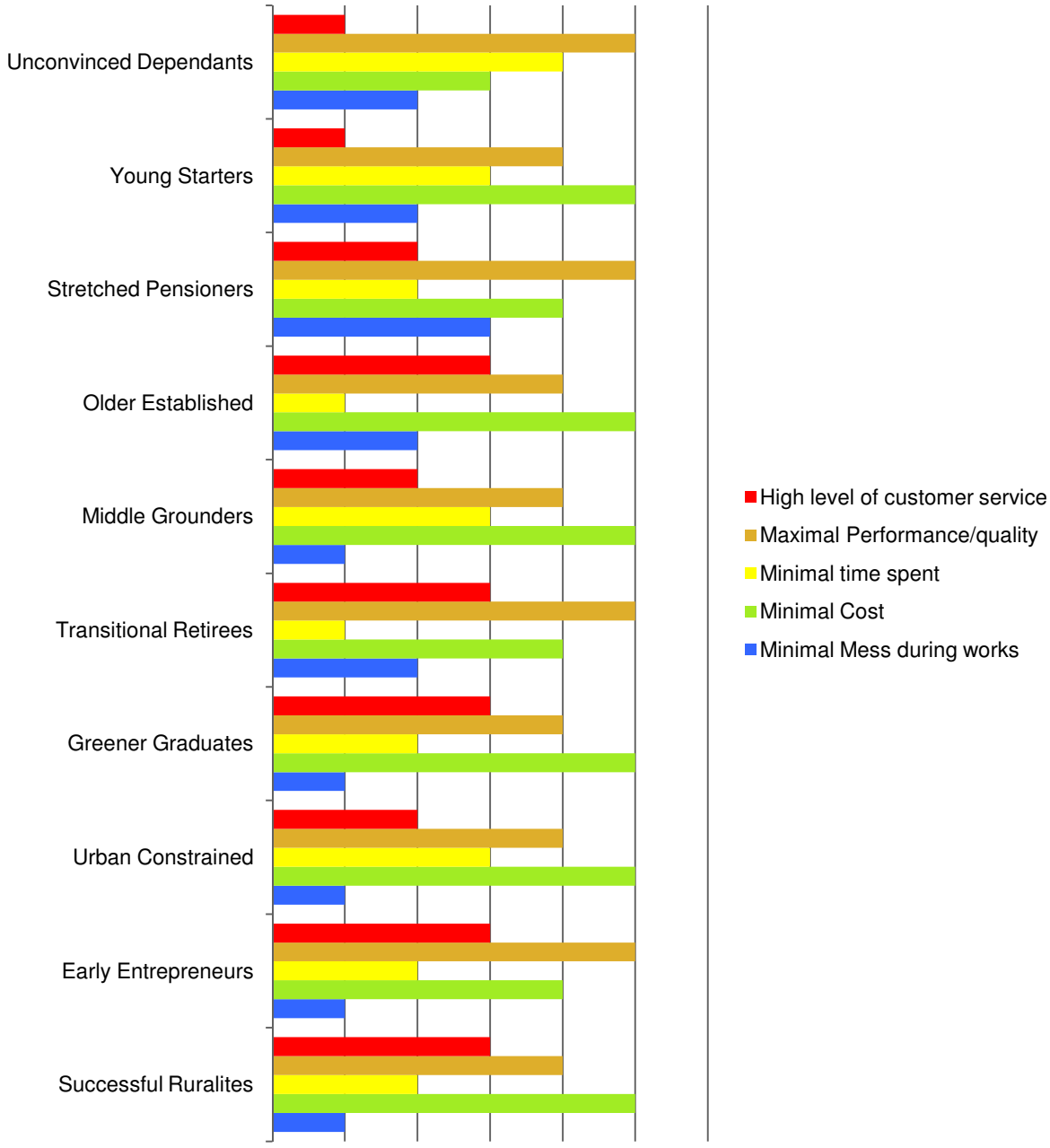
Fewer than 50% of participants responded to this section, mainly due to the low preference for moving out during the works exhibited by the previous question. Of those that responded, staying with friends or family or a holiday seemed the most popular options.

Which of the following statements would you agree with?



Across the groups, the modal response to this question appears to be that customers would expect a certain amount of mess but that this would be cleared away at the end of the day. Urban Constrained appear to show the most tolerance for mess.

Please rank the following in terms of their importance?



Across the groups, cost is the top priority for the majority, however four groups (Unconvinced Dependants, Early Entrepreneurs, Stretched Pensioners and Transitional Retirees) would prefer that performance is the top priority. Mess was typically of low comparative importance to consumers.

A detailed summary of conclusions, comparing the above key findings with the findings of the survey and Virtual Retrofits is included in chapter 6 of this report.

5.0 - Virtual Retrofits

5.1 - Introduction

The final stage of WP 5.4, the Virtual Retrofits, involved fifteen one-to-one interviews across the UK. The interviews took place in each interviewee's home in order to provide a sense of typical homes across the UK and the type of people who tend to live in them. These ninety minute one-to-one interviews were intended to give a detailed look at the thoughts and opinions regarding thermal efficiency. Interview questions addressed issues such as individual opinions on the environment and living 'green', the present comfort level and opinion of their home and acceptable levels of disruption and cost for installation work. The findings of the Virtual Retrofit interviews help to support the results of the larger survey and focus groups.

5.2 - Methodology

Following the completion of the large scale survey and medium-sized focus groups, one-to-one interviews were the final step in assessing the UK public's perception of energy efficiency in the home. Interviewees were recruited using the same organisation used for the focus groups. People were chosen by the recruiters (FGUK) based on pre-selected customer segments, house types and regions, in order to provide a large geographical spread across the UK. Regional interviews were based on an area's most common house types and divided across four countries:

- 5 in England;
- 4 in Scotland;
- 3 in Wales;
- 3 in Northern Ireland;

Each interview was also linked to a typical customer type expected for that house type, based on BRE data.

The agreed research tool for 5.4 was semi-structured interviews with homeowners across the UK. This method allowed for a flexible approach to allow participants to share their thoughts and opinions whilst maintaining the structure necessary to ensure all research questions were answered.

The fifteen interviews were conducted using questions based on the questionnaire from WP5.3 for future comparison in 5.5 (Appendix H). Interviewees were presented with real data from the BRE models for their house type, including current costs, energy savings and overall reductions in CO_2. Interviews were carried out from November to December 2011 by either one or two members of the consortium. The results were recorded and written up following the event.

5.3 - Interview Summaries

A short summary of each interview is provided below. While not every answer given is provided in detail, an overall sense of the interview is presented, including their environmental awareness, opinions toward energy efficiency and the condition of the home.

England

London: Early Entrepreneurs**,** 1919-1944 End-Terrace

- Has invested in improving his home both for the present and for future resale
- Would be interested in a government organised and regulated scheme
- Recognises the public's general lack of awareness as a significant

barrier

The first interview of the group, the interviewee is a 29 year old man who purchased the house a year ago with his fiancée. During this time he has heavily invested in upgrading the house, which was built during the 1930's. This work included the installation of central heating, a condensing boiler, electrical rewiring, installation of 10-15cm of loft insulation and upgrading to double-glazed windows. Following this work, the two-storey terrace costs approximately £240 for gas and electricity each quarterly billing period.

He was quite aware of environmental problems and integrating green behaviour into his daily life, such as using a bicycle or recycling, although he believes the impact of inefficient homes in climate change is minimal. Overall, he would be motivated to undertake work if it was through a government-supported program with approved, regulated individuals involved. Beyond the work that he has already undertaken, he identified solar panels as a potential investment if it were cost effective in the long term. He also felt that a lack of awareness was a major barrier for many people and suggested television programs as a possible solution to reaching the public.

London Two: Greener Graduate, Pre-1919 Mid-Terrace

- Green aware and educated but still primarily driven by cost
- Interested in pay-as-you save and solar photovoltaics (given high enough funding)
- Bad experiences with builders has left him wary and with low levels of trade trust

Our second interviewee is a 30 year old man living with his mother in a home they have owned for 12 years. He has done little work to the house, apart from the installation of a new boiler and a central heating upgrade, as well as loft insulation, all within the past year. He believed that gas and electricity use in the home do contribute to climate change if used unnecessarily.

Similarly to other interviewees, he has come across solar panels and considered them for installation. However, he felt the recent changes in funding for solar panels were discouraging, as the funding was initially what gauged his interest. In terms of other potential funding schemes, he said he would be interested in a pay-as-you-save scheme which would help remove the hassle of having to organise the whole process individually. In order to be motivated to undertake energy efficiency measures he thought that work would need to be a blend of how quickly it was paid back and the overall CO_2 reductions.

Bad experiences with clumsy builders in the past have made him hesitant to have people in the house. He was also worried about leaving valuables in the home or leaving the house unoccupied if he had to live elsewhere during the work.

Chigwell, Essex: Middle Grounder**,** 1980+ Detached

- The age and construction of the house means little work have been done during the 25 years she has lived there
- Unlikely to install energy efficiency measures as a result of high comfort in the home
- Largely uninformed and uninterested in saving energy or reducing bills

This post-1980's home is in a suburban neighbourhood and located on a private, gated drive in Essex. The residents, a 54-year-old woman and her 30-year-old son, have owned and lived in the home for 25 years. While the home is very well insulated as a result of its age and construction, the family had double-glazing installed when they first moved in, and a new boiler was fitted a year ago to replace the original boiler that they found too old, noisy and inefficient. As a result, energy bills have decreased since its installation. Both loft and wall insulation were present when they moved into the home.

Overall, the home is well built, and the residents find it extremely warm and comfortable. Since she has had few problems with the home, changes to the home have been the result of necessity and age of the home, rather than out of environmental or energy efficiency concerns. As such, they are unlikely to undertake energy efficiency measures unless it was likely to improve the house's resale value or involved the installation of under floor heating. Indeed, she said a lump sum grant or reduced stamp duty for energy efficient homes would be the most attractive type of funding.

Ascot, Buckinghamshire: Successful Ruralite**,** Pre-1919 Detached House

- Despite the historic nature of the home, not particularly attached to its architectural features and may be tempted to demolish it
- Feels she is unlikely to do any major work now that they have lived there for 17 years
- Old and cracked conservatory may be contributing to damp problems as a result of extensive condensation

The residents of this 1850's converted former carriage house have lived in the home for 17 years. The interviewee, a woman aged 55 and her husband, have two children, one who is away at university and the other living at home completing 6th form. One of the most notable features is a large fibreglass conservatory attached to south (rear) of house, which has numerous cracks and heavy condensation throughout. It may actually contribute to the ongoing rising damp problems in the adjacent ground floor hallway, although she did not consider the conservatory as a potential source for this.

The couple have completed considerable work on the home during their residency. However, similarly to other interviewees, she did not recognise these works as energy efficiency measures but necessary interventions for the maintenance of the home. The majority of the work was done when they first moved in and include the replacement of ground floor windows with triple glazing (while the upstairs remains a mix of single and double glazed windows), installation of storage heaters, rewiring and re-plumbing, installation of loft insulation and a new boiler. Further work is unlikely as encroaching development has resulted in growing offers from developers to demolish and rebuild. She thought that they would be more likely to make changes if they were first moving in to a house.

Interestingly, she felt that one team could do all the work rather than having different individuals for each step, which no other individual has suggested during the interviews.

Birmingham: Older Established**,** 1945-1964 End Terrace

- Extensive work completed over 45 years so the home is very comfortable

- Government needs to provide energy advice tailored to older people
- Would like to do more to save energy and for the environment but feels limited by costs

Since purchasing the home over 45 years ago, the interviewee and her husband, aged 72 and 77 respectively, have installed a number of upgrades. As such, they find the house to be extremely comfortable for their retired lifestyle. She thinks the amount they pay for heat and electricity is justified by the amount they use and since she is on blood thinning medication, she particularly feels the cold.

Measures have included the installation of central heating, installation of double glazing 30 years ago in addition to replacement panes and boiler insulation on the 10-year-old back boiler, located behind a fireplace. Cavity wall insulation was installed 7 or 8 years ago, while and loft insulation was topped up 8 years ago.

The residents have addressed most problems during their time in the home, including retiling the bathroom to deal with mould growth and the bricking up of an old kitchen door to eliminate unnecessary draughts. As a result of the current high cost of upgrades and the present comfort of the home, they are more likely to make smaller changes for cosmetic purposes than to improve energy efficiency. They felt that Package C would most likely appeal to younger people, while Package A was attractive because you could build upon this baseline in the future. They also thought the government could aid the implementation of energy efficiency measures by giving honest costs and advice, while also tailoring plans and sales to people's age. She said that older people were unlikely to undertake the proposed measures as a result of the associated upheaval.

Scotland

Glasgow: Stretched Pensioners, 1919-1945 Flat

- High gas bills are the result of noticeably high energy use in the home
- Work on the home has been largely dictated by the housing association rather than motivated by the individual
- Think that younger couples would be more motivated to make major thermal changes to their homes

The residents of this 1927 flat have lived in the flat for 20 years, although they have owned it for 15 years and are close to paying off the mortgage. The Glasgow Housing Association presently rents out the flat above. It is important to note that the flat was extremely hot, though the residents found this to be a comfortable temperature. Since they are retired and spend the majority of each day at home, the heat is one the whole day at this high temperature. While there is a timer on the boiler, the residents do not use it but rather turn the heat off in the evening. Their bills are approximately £47 gas and £49 for electric each month and although they find this expensive and believe it does have a role in climate change, it is essential to their comfort. Their largest source of heat loss is most likely through the ceiling, and it is likely that the tenant upstairs receives a lot of their heat.

Improvements to the flat have been a combination of owner-directed and housing association requirement. The housing association arranged the installation of 3 and half inches pink external wall and pebbledash cladding and a new roof 6 and a half years ago. They were required to pay for part of both projects even though the owners themselves had initiated neither. The

owners complain that the installation of wall insulation now keeps them from fitting a Sky satellite dish. The owners did install double-glazing and a new bathroom and kitchen themselves. Beyond the work that has already been completed, the couple (aged 69 and 72) are unlikely to undertake further work because of the high cost, the disruption and the hassle of requiring housing association approval. Again this older couple felt that prices would seem more reasonable if they were younger and first moving in to a house.

Glasgow Two: Early Entrepreneurs, 1980+ Detached

- Interested in solar panels but wary because of recent bad press
- Thinks that thermal improvements do not improve the home's value as they are not prioritised and are lost in the cost
- Unlikely to undertake any work on the home because of the extensive insulation and new systems already installed

The second interview in the Glasgow area was further out of the city in the suburban area of East Kilbride. Built in 2006, this is the newest home of the group, and the interviewee is the first owner since its completion. As such, the owner and sole resident, a 50-year-old man, has not had any work done in the five years he has lived there and has stated he is unlikely to make any changes in the future. Built under current Building Regulations, extensive insulation (even the internal walls between rooms are insulated) and double-glazing have been installed as standard. His currently pays approximately £46 for electricity and £63 for gas each month and during the billing period of 2010-2011 he used 8765 kWh of gas.

As one of the few interviewees to have recently moved in to their home, he was the only one to mention seeing an EPC, although he does not remember the rating for the house. He did not think that the energy efficiency of the house has added to the house's value and that EPCs presently play a minimal role because people are not very aware of them. As one of the more affluent interviewees, he was one of the few to choose the highest level of cost in order to have the lowest disruption. He also said he is more aware of energy use and thermal performance since moving into the home because his previous house did not have double-glazing.

Edinburgh: Older Established, Pre-1919 Detached House

- Very well informed regarding environmental issues and the need for improved efficiency in the home
- Unheated conservatory is favourite feature but is also the greatest source of heat loss in the home
- If gas continues to rise, she will be in fuel poverty

This 1880 detached home has undergone significant changes during the 41 years the owner has lived here. The owner, a 70 year old woman who now lives here alone, has had the heating changed several times, from a coal fire to storage heaters to a wood burning stove and finally gas central heating in 1990. The numerous changes have created a draughty kitchen, and draughts enter the kitchen and sitting room from the unheated conservatory to the rear of the property. Damp has also proved a problem since the house was built into the side of hill. The solid stone walls have kept her from installing wall insulation, while loft insulation was installed at the same time two rooms were

put in the loft. She also recently upgraded to a more efficient boiler in an effort to reduce energy consumption.

Despite keeping the temperature at a cool temperature (approximately 17^{o}C) and having the heat turn on sporadically, she still pays £80 a month for gas, while only paying £25 a month for electricity.

She is very interested in the promotion of saving energy and was quite well informed regarding environmental and conservation issues. She was going to speak to someone regarding the installation of solar panels, although she would need a sizeable grant in order to afford it.

Edinburgh Two: Greener Graduate, Pre-1919 Flat

- Motivated to undertake improvements on the home because of high energy bills and the leaky nature of the flat
- Would be willing to live elsewhere during installation work but cat is a unique consideration
- Thinks that accreditation of workers in unnecessary since what is considered valid certification changes so frequently

This home typifies the mass of pre-1919 purpose built flats across the UK. Built in 1896, the owner (a 41 year old man who has lived there for nearly 4 years) finds the flat difficult to heat, as the solid stone walls have not been insulated and the flat still has single glazed windows. The flat also lacks natural light with windows on only one side of the home, and feels quite dark.

As a result of high energy bills and the long time it takes for the house to heat up, he has considered installing energy efficiency measures, especially after

already living in the house for four years. Irrespective of time and money, he would install double glazed windows and under floor heating and insulation, although in reality he is unlikely to do anything as a result of the high costs. As such, a grant or low interest loan to renovate the flat would appeal to him most.

Like other respondents, he would be willing to leave during the week although he would likely take time off and stay nearby in a hotel in order to check-in on the builders. The other unique consideration would be where to keep his cat during this period.

Wales

Cardiff: Unconvinced Dependant, 1945-1965 Semi-Detached

- Negative experiences with local council contractors means she is reluctant to undertake further work on the home
- Extensive mould in the new downstairs bedroom is a major concern and is the result of a water leak from a poorly done boiler replacement

The most notable element of this home was the large front lawn and garden leading up to the house, not typically seen in social rented homes. The resident, a 47-year-old woman, has lived in the house for 27 years, and currently lives with one of her daughters and her 17-month-old grandson. All of the work done on the home has been carried out by the council and has been quite extensive including a new boiler (3 years ago), loft and cavity wall

insulation (8 years ago), a new kitchen and bathroom, new windows and doors and a new staircase and plasterwork. However, poor seals and draught proofing on the windows and front door have led to increased drafts, especially in the living room. She has considered replacing the windows and doors but the high price of doing it herself has kept her from going forward. She has become increasingly aware of her energy use as her benefits have been reduced. She is also more aware as a result of topping up her electricity and gas cards and seeing how quickly these run out each week. Overall, she described her experience with council elected contractors as extremely negative.

The layout of the house has changed in recent years as a result of the resident's disability and inability to reach the first floor. As such, a shower room was installed with a council grant and her bedroom was moved to the ground floor. The most noticeable problem was the extensive black mould in the ground floor bedroom as a result of a water tank leak. This has adversely affected her health, while the current heating system aggravates her asthma when it has been on too long.

Swansea: Urban Constrained, Pre-1919 End Terrace House

- Due to a chronic illness, the resident's gas will often run out for days before she is well enough to top it up again
- Poor workmanship on supposed improvements and minimal insulation means the older home remains extremely draughty and difficult to heat

The house's exposed location on a hill close to the bay definitely contributes to its cold and draughty condition. The interviewee, a 37-year-old woman, has rented the house from the council for two years and lives with her 16 year old son. The windows are extremely draughty, as a result of the new plastic cills of the double glazed windows simply being put on the original wooden cills. Even with the heat on, the house is rarely comfortable and she often puts on the gas fireplace in the sitting room, though the heat seems to leave the house instantly. There is no wall insulation, no loft insulation and there is a very old back boiler behind the old gas fireplace. In fact, she has noticed gaps between the tiles of the roof when she has looked in the attic. However, the council replaced the front door last year which has helped keep the heat in to some degree. Despite being home on disability every day, the heat is only on for an hour in the morning and an hour in the evening in order to take the chill off. The old heating system tends to dry her throat out by taking a lot of the moisture out of the air and has contributed to her lung problems.

As a result of being off sick and receiving benefits, she can only afford £15 of gas and £15 of electricity each week on her top up card, and sometimes must continue for days without heat when the card runs out. With only £50 a week in benefits, she said it was very unlikely she would undertake work herself but would be happy for the council to upgrade the house since her overall experience with them has been positive. Overall, she is not sure what she could do to fix the house and would like to know more on how to improve.

Swansea Two: Middle Grounders, 1980+ Detached House

- Has never really thought about energy efficiency or conserving energy in the home

- She is unsure of how long she will stay in the house and is therefore unconvinced that thermal efficiency measures are a worthy investment
- Process would need to be quick, simply and almost entirely free in order to convince her to undertake work on the house

The safe area in which the house is situated is initially what drew the owner, a 42-year-old widow, to the home. The modern build of the home has meant she has not had any work done during the 4 years she has lived there. Loft and wall insulation, as well as double-glazing were already installed in the house when she first moved. The home also has a thermostat to keep the house between 15 and 18^{o}C when they are at home, although it is set to change to 10^{o}C when they are out of the house.

On the topic of energy efficiency, she admits she has never really thought about it and does not know much about the topic. She felt that big companies used more energy than houses and that the government should get businesses to clean up their activities before working on homes. She would be convinced undertake energy efficiency measures if it were free and if someone was there to help guide her through the process. Her biggest fear of undertaking such measures would be having 'cowboys' do the work. She thought the energy efficiency installations would be most attractive to families just starting to develop their family home since she is not sure how long she'll be in the house.

Northern Ireland

Belfast: Unconvinced Dependants, 1980+ Semi Detached

- Downsizing from her previous home and changing from oil to gas heating has really helped to lower her energy bills
- While she likes the house, there are concerns regarding security in the neighbourhood which may cause problems when leaving building sites overnight

While this interview was intended to meet the Unconvinced Dependant customer segment, the interview more closely resembled the Urban Constrained group. The respondent, a 40-year-old woman and her 45 year old partner have lived in the rented housing association home for four years after downsizing from a five bedroom private rental. Despite liking the street and her neighbours, burglaries in the area were a problem, and her own car was broken into. However, the change in house type has led to a significant reduction in her energy bills, as the previous home was much larger and still had oil as a primary heating source. A number of issues with the house were identified, including mould and leaky windows. The couple has tackled some issues, including installing loft insulation and insulating pipes in the home. She has considered undertaking further measures, including cavity wall insulation, double glazed windows and solar panels but cost remains the number one barrier, followed by not owning the home and previous poor experience with contractors and workmen.

As such, she would require a reputable contractor with a focus on customer care for any future work, as well as guaranteed inspections during and after

work and a guaranteed complaints procedure. She would also want energy efficiency measures to be part of a centrally managed scheme with government-backed contractors and a standardised set of available work in order for the process to run smoothly and ensure quality assurance. Overall, she was very supportive of green living and thought that domestic retrofit should even be made mandatory; though she thought the government should play a role in educating people and providing incentives.

Belfast Two: Successful Ruralite, Pre-1919 Detached

- Accepting of incredibly high energy bills because of the nature of the home and high income
- Major concern regarding the loss of historic character if the home were retrofitted
- Would expect a high level of quality assurance for any work done on the home, preferably through a government organised scheme

This large historic home outside Belfast has the highest energy bills of any of the interviewees during the process, with the residents paying £4000 a year for an even split between oil heating and electric. Built in 1898, the interviewee, a 55-year-old woman and her husband, and three children have lived the home for ten years. She admitted that she disliked the amount of required maintenance and the incredibly high energy bills but that living in a historic home means accepting it 'warts and all'. While the family has installed loft insulation and double glazing in half of the house, and have also installed a new boiler, neither the walls nor the floors have been insulated and as such, it remains extremely draughty. She said that they would be tempted to do further work if a big grant was made available and that the payback period would need to be reasonable in order to be attractive. Irrespective of time or

money, she would not hesitate to make changes, such as re-roofing, installing new doors and floor insulation and technologies such as solar panels and ground source heat pumps. However, she has considered actually demolishing and rebuilding the home, as the high cost of bringing the home up to current standards may not be as cost effective as building a new home.

At present, she has been kept from retrofitting the house because of the high upfront costs and the effects of the recession, while she is also concerned about the potential loss of architectural character in the home. In addition, she is worried about 'cowboy' workers on the project and would want a government body to manage the process, including a robust accreditation or kite mark scheme.

Belfast Three: Transitional Retiree, 1965-1980 Detached

- Difficult managing the upkeep of the house now that she's on her own
- Careful with her energy use as a result of the high cost of oil
- Took advantage of free loft insulation but largely uninterested in other incentives or sources of funding

Purchased in 1975, the interviewee, a 70-year-old widow, has continued to live in the home since. While she likes the house, she finds it difficult to handle the costs and disruption involved in maintaining the property now that she is on her own. New doors and windows have been installed within the past five years, although all the doors require draught excluders and she still finds the house very cold. She also took advantage of free loft insulation, with 300mm installed the summer previous. Similarly to other homes in Northern Ireland,

her primary heating source is still oil, for which she pays between £600 and £700 per year. Her electric bill is approximately £35 each month.

Her desire to be more environmentally friendly is evident, and she is very conscientious about her energy use, including using candles in the evening for light and getting a blanket or sweater instead of turning up the heat. She said that her concern for the environment would play a role in convincing her to undertake energy efficiency measures in the home, as would the availability of funding (such as low-VAT on retrofit materials) and the home getting too cold. The majority of her answers suggested that she would be very interested in upgrading the home as long as there was a high level of reliability during the process. In addition to high upfront costs, she said one of the reasons from retrofitting her home was the possibility of rogue traders completing the work. Consequently, she would want a lifetime guarantee on parts and labour, as well as accreditation of materials and services in order to maximise her trust across the installation process.

5.4 – Analysis

The key findings of this section can be summarised as:

- Every interviewee was hesitant to install retrofit measures due to the current high upfront costs but most respondents indicated that retrofit would be desirable if the cost was right;
- Typically the costs presented to them for the packages defined according to Work Packages 3 and 4 and the modelled savings were viewed as prohibitively high. When pushed, many said that the figure should be reduced to under £10k;
- There was a dominant perception that retrofit measures should be provided

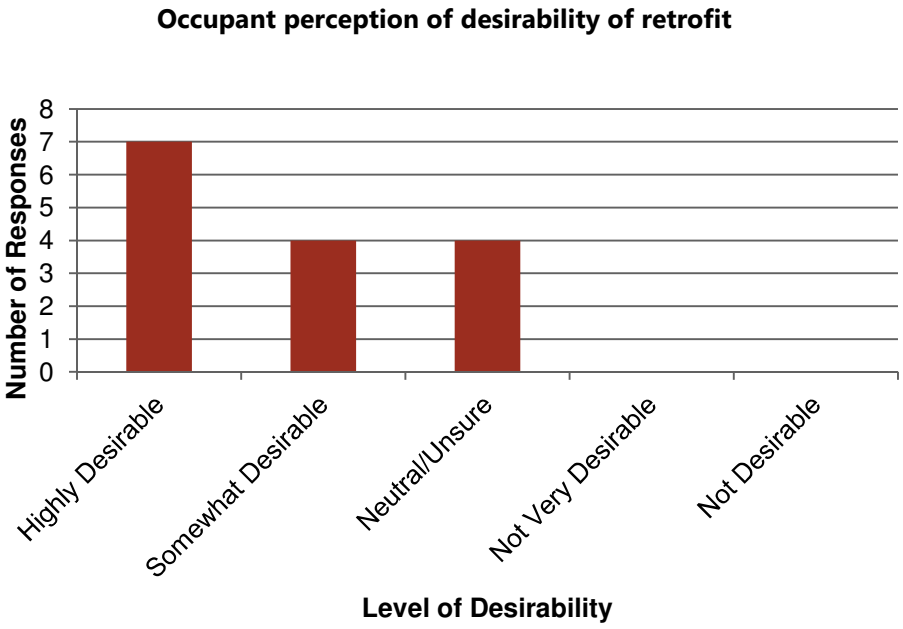
free or at high levels of government subsidy;

- Lack of awareness was perceived as a major barrier to retrofit rollout;
- Many interviewees felt that they lacked a strong understanding of home energy use and energy conservation;
- Most indicated that they would be interested in learning more about saving energy in the home although typically they would want this information to come from government or local experts rather than contractors or builders;
- Most felt that the government should play a bigger role in promoting retrofit and helping the public to better understand energy efficiency as well as funding works;
- Lump sums and grants were the most popular funding instruments;
- Criticisms of the packages presented to interviewees typically included that they were too expensive, too inflexible and that they should be able to mix and match;
- The majority of people would suffer more disruption if it reduced the cost;
- A distrust of the trades ("rogue traders" and "cowboys") was frequently mentioned across all segments, impacting their likelihood to undertake works;
- Few were willing to live elsewhere for the duration of the works – most wanted to be on site or nearby to monitor the work progress;
- The number of operatives on site did not appear to be a problem, particularly if larger workforces helped get the work done quicker and more cheaply.

While each interview and home was unique, common themes are evident upon review of the completed set of fifteen interviews. While these issues are important to consider for engagement programmes in WP5.5, they will also be useful in informing other work packages including costing exercises, forming efficient and trustworthy supply chains and dictating necessary government policy.

Cost

The most consistent, and perhaps most obvious finding, was that every interviewee was hesitant to install energy efficiency measures because of the current high cost. This was true across the wide range of incomes, from those who earn below £10,000 to those who earn over £60,000. Considering the current economic climate, it is understandable that home renovations are not priorities for many people across the UK. While the majority of people saw this work as highly desirable in theory, the high capital cost was the number one barrier to actually carrying out a retrofit project. Nearly all the interviewees wanted any work to be cost effective with a reasonable payback period.

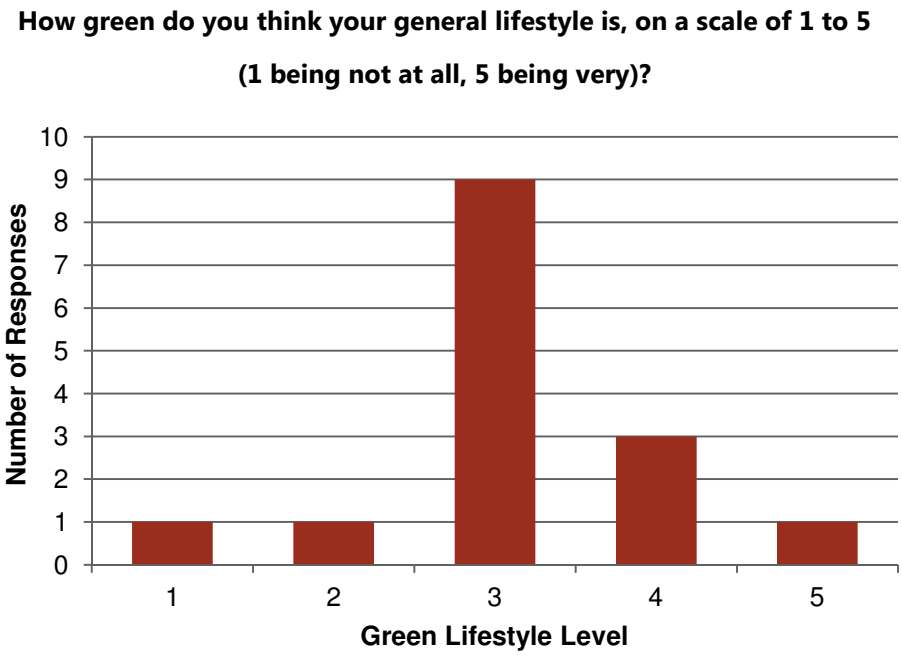


When presented with costing data from the BRE models, all individuals thought the prices for each package were too high although most could not give an idea of what might be a reasonable price. A few interviewees suggested that work would need to be reduced to under £10,000 for most people to consider taking it up. Most often individuals thought that this work should be installed for free or heavily subsidised by the government (at least 75% of the cost). This is likely the result of the widespread view that insulation

and other work are seen as necessary or standard, while installations such as solar panels are considered above and beyond basic housing requirements.

Awareness

A large number of the interviewees identified a lack of awareness as a major barrier to rolling out a mass UK retrofit. Many interviewees felt that they themselves lacked a strong understanding of home energy use and energy conservation and also felt that other people were in a similar place of ignorance. There was an overall feeling that climate change and energy conservations are major issues and that the majority of individuals incorporated basic green activities, such as recycling and turning lights off when not in use. On the whole interviewees were also careful to turn the heat off at night and have it turn off or go down when they were not home.



Nearly all the interviewees were very open to learning more about saving energy in the home. While different routes of contact were suggested, ranging from pamphlets in the mail to informative television programs, the majority of individuals felt that this information should come from an independent and trusted body. For many people, this would be the government or local people,

although others thought energy companies or groups such as the BBC would be good sources of information rather than contractors, builders or developers with a vested private interest.

Interestingly, many people did not recognize work they had done on their home previously as helping with energy efficiency. One of the first questions asked was whether or not they had previously undertaken energy efficiency measures in the home. Nearly all the interviewees said no to this question, while later in the interview it became evident that energy efficiency work had been done though they did not recognize it as such. These measures particularly included wall and loft insulation, while boiler and window replacement were also included, though to a lesser extent. These tended to be seen as necessary improvements or replacements for household maintenance. In contrast, many people were aware of solar panels and considered installing them on their home. This may largely be because of the visual nature of solar panels in comparison to insulation or low-e windows, which are not as appealing as other initiatives.

Government Involvement

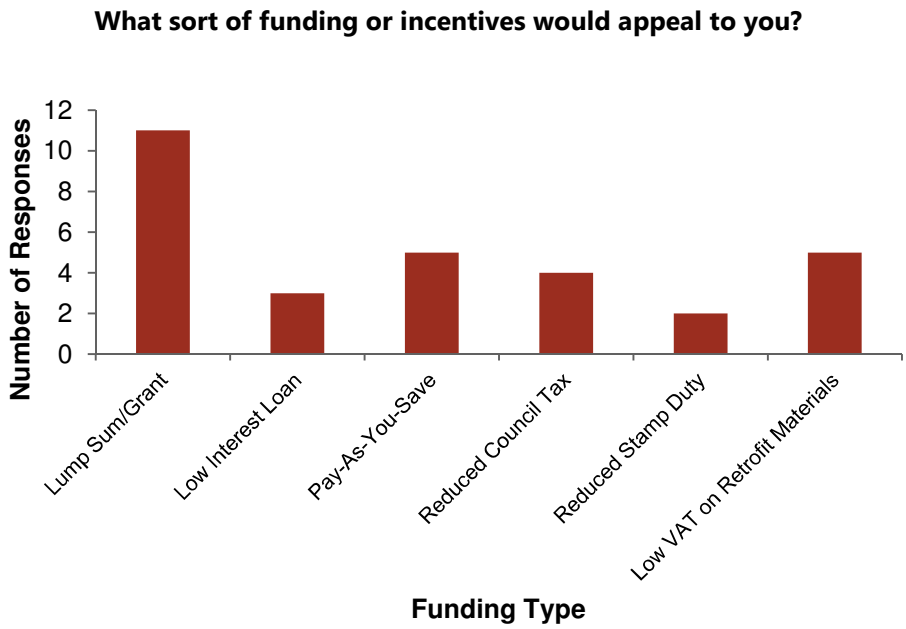
The majority of interviewees thought the government should have a role in promoting domestic retrofits and helping the public to better understand energy efficiency in the home. Most of the individuals thought the government should help in educating the public about energy use and environmental issues. While many had a minimal understanding of thermal efficiency, they tended to be quite keen in learning more and felt the government should assist in improving awareness. A significant percentage felt that the government should go beyond just educating the public and should organise and manage a retrofit scheme, as well as provide funding and quality assurance. Most thought that this would make the process simpler and help to guide individuals through the process. It would also necessarily involve

both the national level government and local councils in order to address regional needs.

Only two interviewees thought that a retrofit scheme should be organised privately and not through the government. While they thought that competition would help improve the quality of work, they admitted that market uptake would likely be slow without government contribution and that private interest alone may lead to bias toward poor quality materials or workmanship.

Funding

There was a wide range of views regarding what sort of funding that would appeal to each interviewee. Each individual was allowed to choose more than one funding option:



Eleven individuals said a lump sum grant was the most appealing, although it would have to be sizeable to cover a large portion of the total cost. Only five people thought a scheme with no upfront costs or Pay-As-You-Save (similarly to what is proposed under the Green Deal) was an attractive proposal. One

interviewee thought paying through energy bills would be too complicated to be successful, while another thought such a scheme would be easier than organising the installation process individually. Five people also thought low-VAT on retrofit materials would be appealing. Overall, the majority of interviewees thought the process would only be appealing if the government funded a significant amount of the cost.

Package Proposals

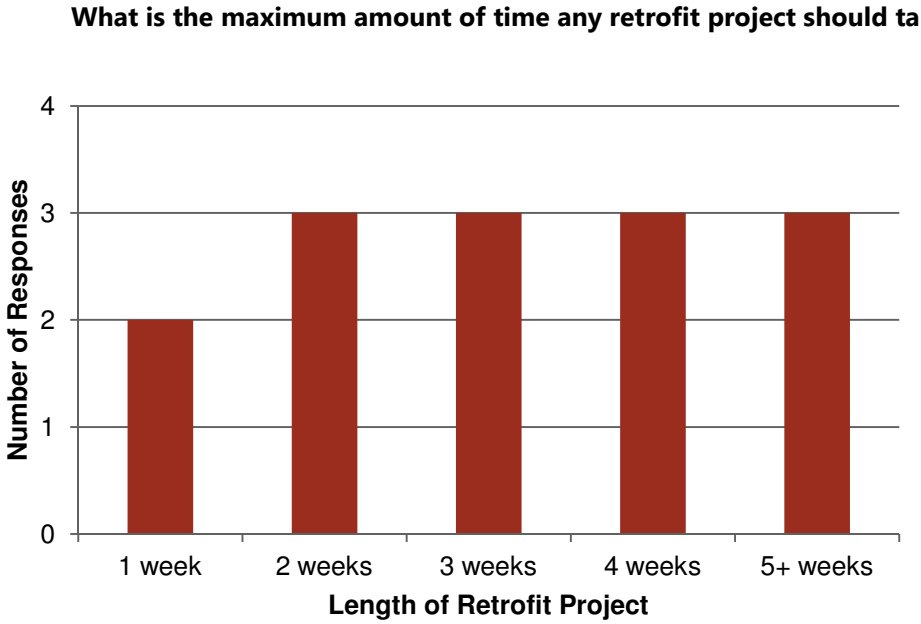
As suggested earlier, interviewees were presented with real data from the BRE models for their house type, including current costs, energy savings and overall reductions in CO_2. When each individual was presented with these figures, the overwhelming sentiment was that the prices were far too high for most people to afford. Five interviewees said they would not choose any of the packages because of the high costs and their inability to afford them without significant funding. Two of the five thought that packages would not really work in reality because of the need for flexibility in order to mix and match the parts you would want and those you did not. In many cases, a number of the houses had already installed a number of these improvements and set packages may not be appropriate. As one interviewee pointed out, if a whole house package costs £60,000, people will be more likely to do the smaller parts of the house, including windows, doors and boilers. A few interviewees also thought the packages would be more appealing to younger people or families who are just moving in to a house.

Apart from those who would not choose any of the packages, there was a relatively even spread among the remaining three packages. Package Three was appealing to some because of the associated benefits of improved comfort. However, one interviewee said she would only be interested in that level of work if it were brought under £10,000. There were similar sentiments for those who chose Package Two, as they said though the CO_2 and fuel

saving were worthwhile but it would need to be less than £8, 000 in order to be viable. Lastly, those who chose Package A said they did so because it was simply the cheapest. One interviewee thought that the benefit of Package A would be having the opportunity to add measures on this basic package in subsequent years.

Trust and Accountability

Despite numerous accounts of previous negative experiences with home renovation, the majority of interviewees would choose a higher level of disruption in order to minimise costs. Problems with 'rogue traders' or 'cowboy builders' were frequently reported, including the creation of further problems with the house as a result of poor workmanship. However, for many of the individuals, the number of people on site was not a major issue. For most of them, they were happy to have as many people in and around their home in order to have the work completed relatively quickly.



Others suggested that approximately five or six was a reasonable number of people to have on site at one time.

While most of the individuals favoured higher disruption in exchange for lower cost, few said they would be willing to live elsewhere during the work. There are major concerns regarding privacy and the protection of their belongings, as well as worries about leaving the home empty in the evening or if builders would secure the home correctly. The bulk of interviewees felt they would want to stay in the house or somewhere nearby in order to monitor the work, illustrating a widespread distrust of contractors and builders. Other concerns included high storage costs, insurance for belongings and the loss of architectural or decorative character. A number of these issues could be solved by ensuring transparency and accountability throughout the process, as well as after installation work is completed.

6.0 - Synthesis findings

6.1 - Key findings

The wealth of data gathered throughout the course of 5.4 is of great use to the project. This section will aim to summarise some of the key findings in terms of the value metrics defined in deliverable 5.1:

- **Economic values** – e.g. upfront cost, savings on energy bills;
- **Physical values** – e.g. increased comfort, aesthetics;
- **Process values** – e.g. disruption, information, time taken;
- **Product values** – e.g. trust in brand, quality of product;
- **Through-life values** – e.g. maintenance, warranties, usability;
- **Social values** – e.g. perception of social status, community value;
- **Other values** – e.g. environmental concerns, competing priorities.

Economic values

All three strands of the 5.4 research confirmed that economic concerns remain the most important to customers, consistently across all segments. Affordability of retrofit measures is the primary barrier facing customers and the consideration of the scale of energy savings (and the expected payback) remain of the highest interest. Information about cost was also deemed essential at all stages of a potential retrofit.

The Focus Groups did, however, indicate that certain customer segments (Early Entrepreneurs, Stretched Pensioners, Unconvinced Dependants and Transitional Retirees) may prefer that energy performance is prioritised over upfront cost (i.e. they would rather not see costs cut at the expense of final performance of the system) as part of a retrofit project, indicating that these segments do see the value in paying more for a more efficient output. Furthermore, the Virtual Retrofits also confirmed that most people interviewed

were positive about retrofit and recognised the benefits provided that the price was right.

In terms of financial incentives, reducing VAT on retrofit (to 5%) was popular with all but the wealthiest segment (Successful Ruralites) who felt that the reduction would be too trivial to sway them towards undertaking retrofit measures. Flexible Finance and Pay as you Save options were also popular, but the general view expressed across the segments was that retrofit measures should be highly subsidised or made free by government. Discussions with customers in the Virtual Retrofits indicated that any retrofit package costing more than £10,000 was likely to be too expensive and, ideally, the cost should be much lower.

Physical Values

Validating previous assumptions, comfort (primarily thermal comfort but also considering other elements such as air quality and noise) is the second most important factor to customers considering retrofit. Elderly segments, in particular, recognised the benefits of a warmer home and were often keen to link this to maintaining good health.

The survey indicated that all segments generally agreed that an energy efficient home is warmer, more comfortable, healthier and has lower energy bills than a "normal" home. However, there was less agreement on whether a retrofitted home would be of beneficial or detrimental effect to the aesthetic or the value of the property. The Successful Ruralites, in particular, seemed to express concern over loss of architectural features of their (often) older homes. The Virtual Retrofits highlighted this with one interviewee insisting that they bought their home "warts and all" being fully aware that it would be expensive to heat but that this was part and parcel of the heritage of the

home that appealed to them. As such, they would be reluctant to change the appearance of the home through measures like external solid wall insulation.

Existing problems with the home were discussed at the Focus Groups and Virtual Retrofits, indicating that Early Entrepreneurs were most likely to perceive energy-efficiency problems/opportunities with their current home and that lower income groups were most likely to suffer from damp or condensation.

Process Values - Awareness and Information

In terms of awareness, whilst all segments indicated good awareness of energy saving behaviours and high profile measures such as loft insulation, double glazing and solar panels, awareness in other retrofit products (such as solid wall insulation) was typically lower. Greener Graduates and Early Entrepreneurs were typically more aware of a broader range of technological solutions involving microgeneration and controls, whereas Stretched Pensioners and Older Established were more likely than the rest to have basic awareness of the existence of wall and floor insulation.

The focus groups highlighted that across all segments, there is a wide perception that customers have already retrofitted their homes (typically having insulated their loft to an unspecified level, installed a new boiler within the last few years and having double glazing). This is an important awareness issue to overcome as customers who perceive that they already have completed works are unlikely to be interested in retrofit unless they are aware that they need it. This will also need consideration by Work Package 3 to see whether further upgrades can be carried out cost effectively according to proposals developed by this work area. The Virtual Retrofits also indicated that lack of awareness was a major barrier to retrofit rollout and that many interviewees felt they lacked a strong understanding of home energy use and

improving energy efficiency. Many interviewees indicated that they expected the government to take a bigger role in improving public awareness and leading on retrofit.

Customers seeking information on retrofit would typically go to friends or family as the most trusted provider of information, followed by government agencies, energy/consumer advice bodies and energy companies. Advertisements were typically poorly trusted, particularly by older segments. Older Established customers also indicated that information on retrofit was difficult to find. The Internet and local and national media appeared to be the most popular channels for receiving information on retrofit.

Information required by customers includes, most importantly, cost followed by programme specific details (what is being installed and when) and details of energy savings. Successful Ruralites indicated that they would be most demanding in the breadth of information they would expect, particularly from the survey. There was a general consensus, though, that information provided to customers should be concise and jargon-free.

The survey indicated that the most important pieces of information for customers to aid a decision on retrofit would be better information from the energy supplier followed by seeing an example of a retrofitted home.

Process Values – Disruption and time

Customers perceived minimising disruption and time taken on the works as very important. However, the Virtual Retrofits indicated that most customers would be willing to tolerate a higher level of disruption if it would reduce costs.

However, the suggestion that customers should move out for the duration of a whole-house retrofit was unpopular with all segments, especially Successful

Ruralites. Most customers felt uncomfortable with the idea of vacating their property and would like to remain in the home for various reasons including distrust in leaving the home with the retrofit team, concern over children and pets, disruption to daily life and concern for possessions. Stretched Pensioners in the Focus Group appeared to indicate the greatest level of resistance to the idea of moving out.

If customers were to vacate the property for the works, staying with friends or family or going on holiday were the most popular options.

The acceptable time for a whole-house retrofit project, as typically indicated by customers, was 1-2 weeks. Stretched Pensioners were most likely to ask for a shorter work period whereas Urban Constrained were more likely to let the works run "as long as it takes". Most interviewees in the Virtual Retrofits indicated that number of operatives on site was not important if this reduced the time taken and/or cost for works to be carried out.

Other process concerns highlighted by interviewees included storage costs, insurance for belongings and a preference that retrofit be organised and backed by government.

Product values

Trust remains a significantly important factor in customers' minds when considering retrofit. As mentioned above, leaving the home in the hands of a retrofit operative made many customers feel uncomfortable. Indeed, all segments mentioned concerns about "rogue traders" or "cowboy builders". Personal experience and recommendations from friends and family appear to be the primary way to overcome this lack of trust, however seeking innovative ways to boost consumer trust in retrofit providers appears to be key in convincing customers from all segments to retrofit their homes.

The survey indicated that the desirability of specific measures typically was consistent with customers' perceptions of greater energy saving potential – particularly double glazing, loft insulation and draught proofing. Solar panels were frequently identified as a measure that people of all segments would be interested in installing. This may indicate the success of raising the profile of this technology through the Feed-In Tariff. A similar model could be considered for other measures such as solid wall insulation. Greener Graduates and Early Entrepreneurs showed the most interest in micro renewable technologies whereas Stretched Pensioners showed a greater interest in installing/upgrading a more efficient traditional heating system over the next three years.

The Virtual Retrofits and focus groups highlighted a widespread concern with the concept of fixed packages, with many customers being put off by the lack of flexibility and the opportunity to opt-in or opt-out of specific measures. Early Entrepreneurs particularly insisted on having plenty of choice. This finding is of particular importance to Work Package 3 and 4's ongoing development of packages of measures.

The most popular delivery agents, across the segments, were local trades (with the survey indicating a particular preference from older segments). Larger contractors were typically only popular for those in rented accommodation. For social tenants, this is likely to be because works conducted by a large contractor is the norm, with social landlords typically employing the services of a large contractor to deliver both their reactive and planned works programmes (e.g. Decent Homes) Energy companies were also considered as a trusted body to deliver works.

Through-Life values

Typically, customers were less concerned with through-life values when compared with the above considerations. It wasn't anticipated that a retrofitted home would present new challenges in terms of maintenance and upkeep, and customers felt that if they were provided enough quality advice that they would be able to manage living in a retrofitted home.

One key through-life element that was raised by customers through the Focus Groups was the need for warranties on the retrofit measures and works to ensure that customers were protected in the event of post-works problems. Typically customers expected lifetime warranties on these products.

Social Values

As previously noted, local trades were a preferred vehicle for most segments. Furthermore, many indicated that they felt that retrofit was a local issue by suggesting that local authorities should be involved in the process and that retrofit should be advertised or promoted through local media.

Beyond this, though, social values seemed to be of low importance for most segments. Early Entrepreneurs and Greener Graduates indicated an above average desire for visible measures that might improve their social standing ("green bling") but this was not discussed in detail.

Related Values

Competing priorities were important for many segments, particularly Young Starters who showed no interest in retrofit or carrying out works to their home due to other life factors that were more important to them.

Opportunities to carry out a retrofit, according to the survey, would be when moving into a new home or when replacing a heating system. When selling your home or during a change in family circumstances were less popular instances to conduct a retrofit.

Other works that customers indicated that they have recently completed or have planned for the near future are typically dominated by decoration or minor building projects, providing limited opportunity to combine with larger-scale retrofit projects. However, the focus groups indicated that people are more likely to consider energy efficiency works over the next three years than to have completed such works over the last three, indicating a potential shift in attitude towards making energy efficiency improvements. Young Starters and Unconvinced Dependants have limited plans or desire to improve their homes in the near future.

Finally, environmental concerns were mentioned by all segments across the research streams but never seemed to be of great enough weight to motivate customers towards retrofit, even for Greener Graduates.

6.2 - Indications of early adopters

Following the work on 5.4, a synergies workshop with other Work Package leaders was held to determine whether we could see any early adopters arising from the work.

A simple matrix was created to assist this process. Splitting the table into the three key tenures, each segment was categorised according to its population within that tenure, its openness to retrofit measures being undertaken in their home and its awareness and interest in the subject. Each category had three options, to which a score was assigned as follows:

Category / Score	1	2	3
Population	(S)mall	(M)edium	(L)arge
Openness	(R)esistant	(A)mbivalent	(H)igh
Awareness/Interest	(U)ninterested	(V)aguely	(I)nterested

Tenure / Attitudes	Owner Occ			Social Renters			Private Renters			Product	Sum
Group Segment	Pop	Open	Aw	Pop	Open	Aw	Pop	Open	Aw	Score	Score

Unconvinced Dependants	S	A	V	L	A	V	S	A	V	192	17
Urban Constrained	M	A	V	M	A	V	S	A	V	256	17
Young Starters	M	R	V	M	R	V	M	R	V	64	15
Stretched Pensioners	M	H	I	M	H	I	S	H	I	2916	23
Greener Graduates	S	A	I	S	R	U	L	A	I	108	17
Early Entrepreneurs	L	H	I	S	R	U	M	H	I	486	20
Middle Grounders	L	A	U	S	A	U	S	A	U	24	14
Successful Ruralites	L	H	V	S	R	U	S	H	V	108	17
Transitional Retirees	L	H	V	M	H	V	S	H	V	1296	21
Older Established	L	H	I	S	H	I	S	H	I	2187	23

By adding or multiplying these scores, it becomes clear that four segments appear to be potential target groups for early rollout of retrofit:

- The three older groups – Stretched Pensioners, Older Established and Transitional Retirees;
- One younger/middle-aged group – Early Entrepreneurs.

More detail and insight into these customer types will be considered in deliverable 5.5 where we will consider more detailed value propositions for these segments.

6.3 – Impact on other Work Packages

This section briefly summarises some of the key learning that may impact the work of other work packages in the project

Work Package 3 – Technical Measures

Customer concerns regarding the loss of architectural features will need to be considered in designing technical solutions suited for older homes (typically Pre-1919 with heritage features). Solutions will also need to be tailored to the economic means of customers, and how much they will be willing and able to pay for retrofit work. Cost-effective solutions will therefore play a pivotal role in a mass retrofit programme. Options will also be necessary, since some individuals may have already undertaken extensive work on their home while

others elements that need to be replaced or upgraded. Flexibility in the packages should also be necessary so as not to be off-putting to customers.

A higher proportion of bungalows (based on survey data) for some of our identified early adopters (elderly groups) should also be considered when designing packages of measures for archetypes.

Work Package 4 – Supply Chain

Customers highlighted the need for a more efficient process both in terms of cost and time. Most of the negative experiences interviewees mentioned had an element of long delays or failure to meet expectations. There are also significant issues with regard to trust, as individuals were concerned about ensuring quality work and builders being responsible in their homes. Problems with having residents present during installations have been well documented but with current levels of mistrust it is unlikely people will be willing to leave their homes during building work. A major preference for local delivery is also a key factor that impacts this work package.

Work Package 6 – Policy and Regulation

This work package will be interested in analysing the necessary government policy and guidance for improving local procurement policy. The results of the interviews will also be important, given the high percentage of interviewees who would want a government organised and funded retrofit scheme.

The perception that government should be heavily involved in funding works and raising awareness was also a key finding as well as customers' preference for flexible finance and VAT reduction proposals but rejection of regulations that might restrict them ("sticks") and disapproval of a council tax banding idea.

7.0 - Next Steps

The final deliverable in Work Package 5 is **5.5 – Synthesis Report.**

This deliverable will draw together and report on the work package as a whole. It will return to the initial findings from stakeholders, discuss the future of the customer segmentation and compare learning from our UK-wide customer research strands (5.4) with the experience of those who have gone through it. 5.5 also will aim to:

- Return to the survey data to re-interrogate based on specific questions from the consortium;
- Summarise each customer segment – what we know about them now;
- Develop recommendations for engagement plans for early adopters;
- Make recommendations for marketing retrofit;
- Consider the role of social marketing techniques in rolling out retrofit;

Peabody are also keen to include any additional items that the consortium or the client feel would be beneficial to the project or the wider programme of research being developed by the client.