Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: Synthesis Report - Appendix

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. This document is an appendix of Deliverable D5.5 – Synthesis Report.

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.

5.5 Synthesis Report Appendix Customer Survey Analysis

Optimising Thermal Efficiency of Existing Homes

Rokia Raslan

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Validation of House Type and Customer Type Combinations

The Single Dwelling Implementation Plan (deliverable 3.4) report outlines the development of individualised improvement scenarios that are tailored to a number of customer segments and house types combinations.

Data Sources

The identification of these combinations was undertaken through the analysis of information from the following two main sources:

- **The demographic information from WP5:** Deliverable 5.4, Customer Engagement Exercise 02: Large-Scale Survey, Workshops and Virtual Refurbishments sought to focus on the customer experience and requirements of domestic retrofit for those customers who have not yet undertaken deep retrofit works. For both on-line and postal surveys over 932 forms (total responses) were submitted for both online and postal surveys. All valid responses that were usefully complete and contained relevant feedback (although not necessarily fully filled) were considered (Table 3).

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

Table 1: Customer Segment Distribution for Survey Respondents

- **BRE population data:** the BRE stock data was used to determine in which house type each customer segment is likely to live. For most of the customer types, the top two house types for each were chosen. For some segments, only one house type was analysed as a result of either small population size or because the customer type is unlikely to undertake a retrofit.

Based on the previous two sources, the 3.4 report highlighted the following 20 house type/age and customer type combinations:

No	Name	Age	House Type	Occupant
1	19DET-SR	Pre 1919	Detached	SR
2	19MID-YS	Pre 1919	Mid-Terrace	YS
3	19MID-GG	Pre 1919	Mid-Terrace	GG
4	19MID-EE	Pre 1919	Mid-Terrace	EE
5	19CNV-GG	Pre 1919	Converted Flat	GG
6	30SEM-MG	1919-1944	Semi-Detached	MG
7	30SEM-TR	1919-1944	Semi-Detached	TR
8	30SEM-UC	1919-1944	Semi-Detached	UC
9	30SEM-OE	1919-1944	Semi-Detached	OE
10	50SEM-UD	1945-1964	Semi-Detached	UD
11	50SEM-UC	1945-1964	Semi-Detached	UC
12	50SEM-SP	1945-1964	Semi-Detached	SP
13	50SEM-TR	1945-1964	Semi-Detached	TR
14	50SEM-OE	1945-1964	Semi-Detached	OE
15	70DET-OE	1965-1980	Detached	OE
16	70DET-SP	1965-1980	Bungalow	SP
17	70LRF-YS	1965-1980	Purpose Built Low Rise Flat	YS
18	90DET-SR	Post 1980	Detached	SR
19	90DET-MG	Post 1980	Detached	MG
20	90DET-EE	Post 1980	Detached	EE

Table 2: 3.4 House type/House age and Customer Segment typologies

Survey Analysis Results

As part of the work undertaken for the Synthesis Report, the survey data was re-interrogated in an aim to validate the assumptions and methodology used in the selection of house type and customer type combinations.

A cross-tabulation of customer segment type, house type and age of survey respondents was undertaken (Appendix A) to determine the distribution of occupation across the various housing typologies. Following this, the main house type/age combinations highlighted in Appendix D of The Single Dwelling Implementation Plan (deliverable 3.4) report were

analysed to determine if the distribution of respondents correlated to those used in the report.

The results of the analysis are illustrated in Table 3, which describes the percentage of respondents (differentiated by segment) occupying each of the main house type/age combinations.

	OE	SP	TR	EE	UC	GG	UD	MG	YS	SR
Pre-1919 Detached	3%	0%	0%	1%	0%	0%	0%	3%	0%	**13%**
Pre-1919 Mid-Terrace	0%	5%	2%	**1%**	6%	**6%**	0%	0%	**16%**	4%
Pre-1919 Converted Flat	1%	0%	0%	0%	0%	**14%**	0%	0%	0%	1%
1919-1944 Semi-Detached	**5%**	**3%**	**4%**	3%	**8%**	1%	**8%**	**8%**	4%	4%
1945-1964 Semi-Detached	**15%**	**10%**	**1%**	4%	**15%**	1%	**11%**	11%	8%	5%
1965-1980 Detached	**6%**	**3%**	15%	8%	1%	0%	0%	14%	0%	8%
1965-1980 Bungalow	9%	**12%**	17%	1%	0%	0%	0%	0%	0%	5%
1965-1980 Purpose Built Low Rise Flat	0%	3%	1%	0%	1%	10%	2%	1%	**0%**	0%
Post-1980 Detached	3%	0%	12%	**48%**	1%	1%	0%	**12%**	0%	**19%**

Key

	Combination in Top 3 Survey Respondents %/Analysed
	Combination Not in Top 3 Survey Respondents %/Analysed
	Combination in Top 3 Survey Respondents %/ Not Analysed

Table 3: Cross Tabulation of 3.4 House type/House age and Customer Segment

The overall analysis of the cross-tabulated survey response rates for the 20 combinations validates the majority (~75%) of house type/age and customer segment combinations. Specific findings from the analysis include the following:

- For a total of 15 out of 20 combinations analysed in the 3.4 report, survey response rates for these combinations were in the top 3 percentage for that segment. This is especially true for Post-1980 Detached/Early Entrepreneur combination, where approximately 48% of respondents from that segment occupied that particular house type.

- For 6 out of 20 combinations analysed in the 3.4 report, survey response rates for these combinations were not in the top 3 percentage for that segment. For example the Pre-1919 Mid-Terrace/Early Entrepreneurs, 1945-1964 Semi-Detached/Transitional Retirees and 1965-1980 Purpose Built Low Rise Flat/ Young

Starter combinations all had 1% or under of total survey respondents from those particular segments.

- 4 house type/age and customer segment combinations had a high level of survey respondents but were not included in the analysis.

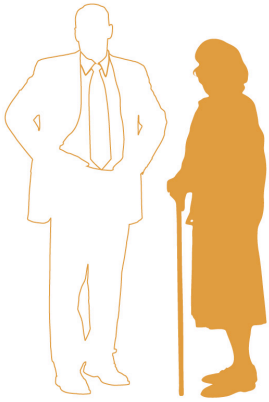
Profiles of early adopters

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, Transitional Retirees – as well as the younger segment, Early Entrepreneurs.

John and Tracey, 70
Older Established

Geoff and Sally, 60
Transitional Retirees



Alice, 75
Stretched Pensioners

Justin and Stephanie, 30
Early Entrepreneurs

Older Established

The key findings of this section can be summarised as:

Demographic profile:

- Gender: Equally male & female
- Age distribution: Higher age bands compared to general population. Over 90% above the age of 65: 15% from the "65-69" age bracket and over 70% in the "70 and over" category.
- Income level: Concentrated around £10,000-£19,999 band
- Main source: Retirement pensions
- Education: Degree/HNC equivalent level/ no qualifications
- Nearly 45% sole property occupant

John and Tracey, 70
Older Established

Top house types :

Semi-detached house	1945-1964	15%
Semi-detached house	1965-1980	9%
Bungalow	1945-1964	9%

Attitudes to retrofit:

- Perception of value of retrofit closely follows general survey population
- Main drivers for retrofit: "To make my home comfortable", "To reduce the energy bill for my home" "To make my property more energy efficient"
- All retrofit measures rated as highly desirable. Desirability of measures was closely linked to the perceived energy saving potential.
- Most popular planned works: General decoration/building works, Installation of new boiler/heating supply and Other (unspecified) works

Energy perception and behaviours:

- Main heating system/fuel type: Central heating system fuelled by gas.
- Heating behaviour: Generally managed through the use of a timer, kept on for 10.80 hours during weekdays and 11.16 hours on weekends (mean values). Thermostat temperature=19.51^{O}C (mean value), mainly controlled using a single thermostat/controller.
- Top energy conservation actions: Switch off unused lights, turn appliances off instead of using stand-by and only boil as much water as I need.
- Houses mainly in good order, common problems include condensation and draughts.

Demographic profile

The "Older Established" segment group accounted for 19% of all survey respondents, contributing a total of 176 out of an overall 932 valid responses. Based on an analysis of the data from this segment, the demographic profile of this segment group can be summarised as follows:

Age band distribution: Compared to the general population, the age distribution of this segment group was concentrated in the higher age bands (Figure 1). Over 90% of respondents were above the age of 65, with 15% from the "65-69" age bracket and over 70% in the "70 and over" category.

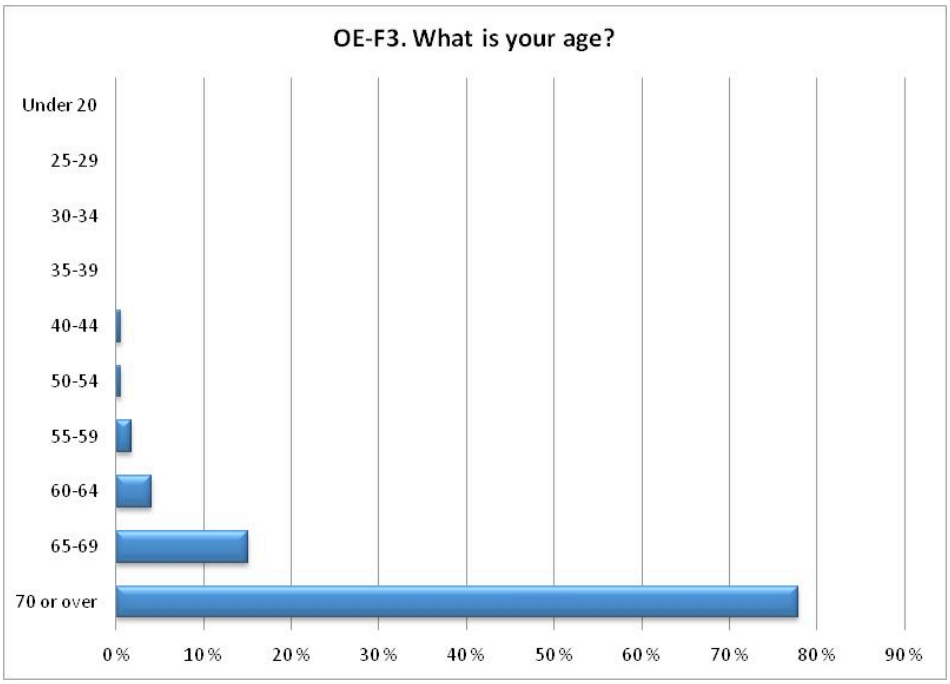


Figure 1: Age band profile for "Older Established" segment group

Income band distribution and sources: The distribution of the majority of respondents (~40%) was concentrated around the £10,000-£19,999 income band group (Figure 2). This conforms to the pattern found in the general population as a whole. Based on the employment data from this group, it can be assumed that this income is mainly from retirement pensions. Compared to the general population, a lower percentage of respondents (~13%) from this group received additional income in the form of means tested benefits.

Education and employment: Respondents were in the main either educated to a Degree/HNC equivalent level (~37%) or had no qualifications (~24%). The majority (90%) of those surveyed considered themselves to be retired and a large percentage (8%) were also "long term sick or disabled". Smaller, but still significant percentages (between 1%-3%) had additional responsibilities of looking after the family or as carers for elderly or disabled persons.

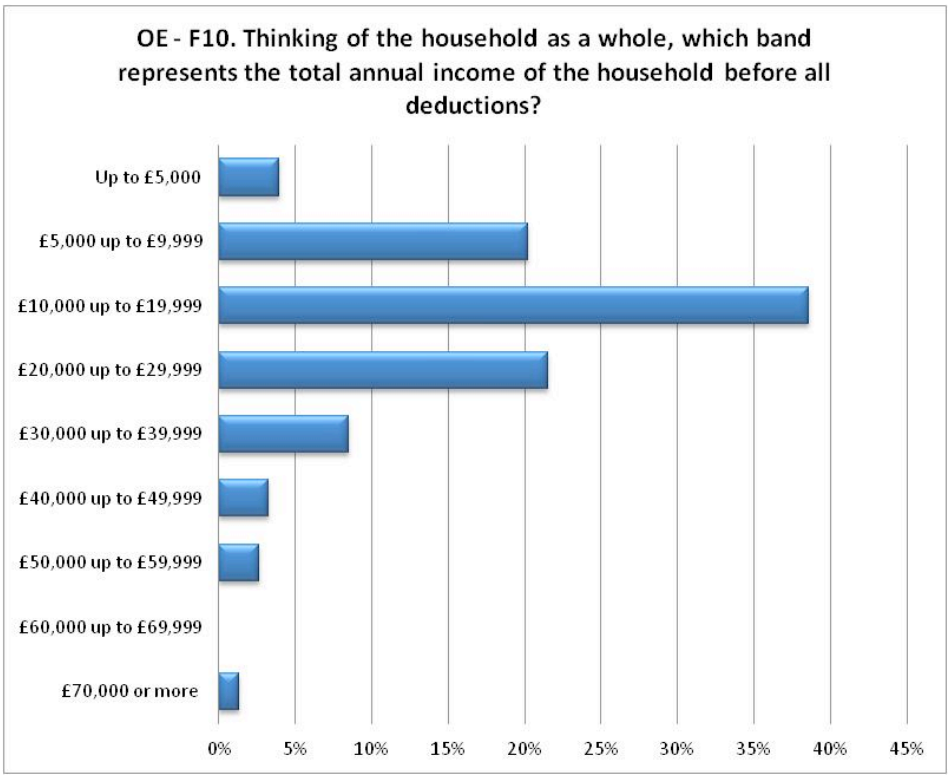


Figure 2: Income band distribution for "Older Established" segment group

Household make-up and roles: In terms of occupancy, nearly 45% were the sole occupant of the property and 50% shared the house with another adult. Even though the number of respondents was equally divided between the two gender groups, it should be noted that in both cases they were overwhelmingly the main bill payer in the property (approximately 95% of all valid responses).

Top house types

Based on the analysis of the data the top house type/age combinations for this segments group is listed in order of popularity in Table 4.

	House type	Age band	Segment group occupancy
1	Semi-detached house	1945-1964	15%
2	Semi-detached house	1965-1980	9%
3	Bungalow	1945-1964	9%
4	Bungalow	1965-1980	9%
5	Bungalow	1981-1990	7%
6	End-terraced house	Before 1919	7%
7	Detached house	1965-1980	6%

Table 4: Top house type/ age band combinations for "Older Established" segment group

Over 80% of the segment group own their properties outright, which is well above the figure found of the general survey population (~40%). It should be noted that despite low occupancy rates (1 or 3 people) the majority lived in 3 bedroom properties (~50%) and a considerable percentage (~13%) lived in larger houses with 4 or more bedrooms.

Attitudes to retrofit

Perceived value of retrofit: In a pattern closely following that found in the general survey population***,*** there was a general agreement in the "Older Established" segment group that that an energy efficient home was considered to be more comfortable, warmer, healthier and with lower energy use and bills than a regular home. Similarly, approximately 40% of those surveyed believed that the appearance of an energy efficient house was no different to a regular house and around 20% believed that an energy efficient house was not higher in value.

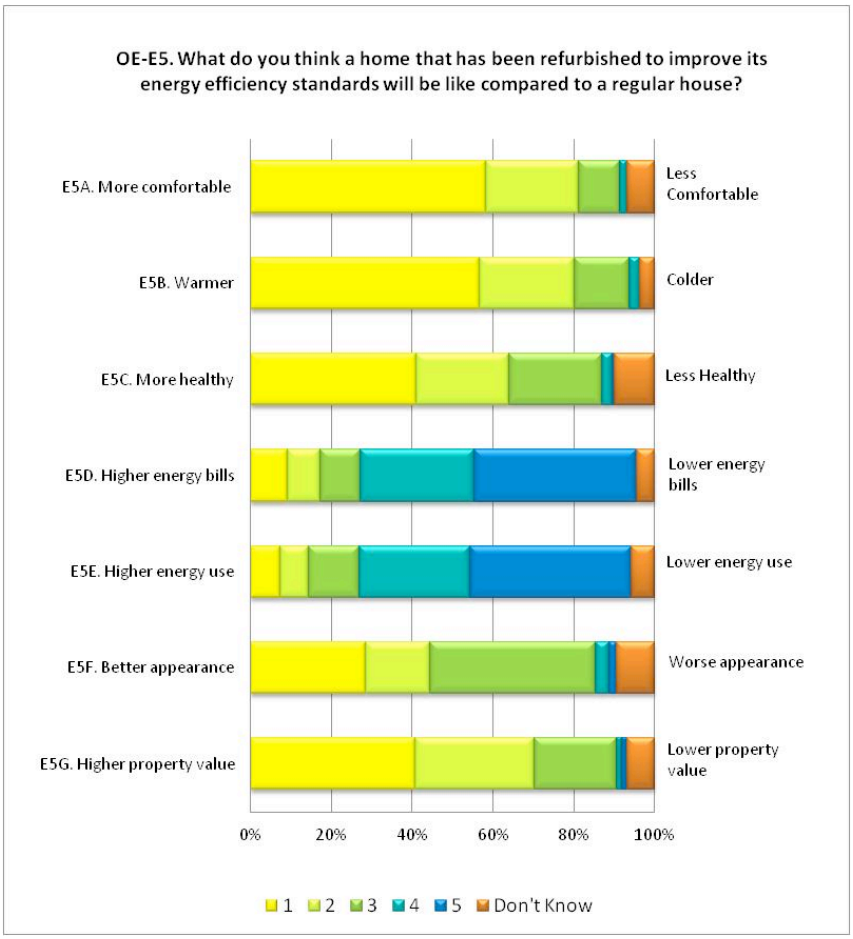


Figure 3: Perceptions of energy efficiency - "Older Established" segment group

Drivers and barriers for retrofit: The main drivers (Figure 3) for retrofit highlighted as the most important by the group are:

- "To make my home comfortable"
- "To reduce the energy bill for my home"
- "To make my property more energy efficient"

These three factors were also singled out by the general survey population as the main reasons for undertaking retrofit in their homes.

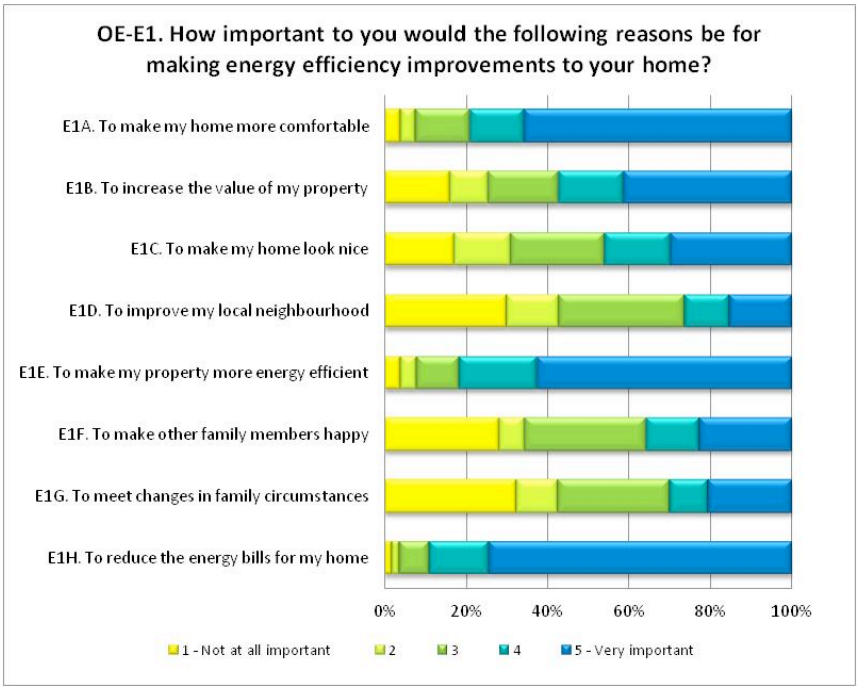


Figure 4: Drivers for Retrofit - "Older Established" segment group

The perception of the best and worst trigger points for implementing retrofit for this segment group was closely aligned to the other older groups (Stretched Pensioners, and Transitional Retirees). The most preferred trigger points were in general when other refurbishment works were taking place.

Trigger Point	Perception
Moving into a new house	5
Planning to sell current home	1
Fitting of new kitchen/bathroom	5
Adding an extension	5
Replacing heating system	5
Electrical rewiring	5
Roof replacement	5
Redecoration	5
Retirement	3
Changes in family circumstances (e.g. new baby, children moving out etc)	3

Key: 1=Worst Time, 5=Best Time

Table 5: Timing of Retrofit Works: Potential Barriers and Trigger Points for "Older Established" segment group

Retrofit information: The majority of those surveyed (~47%) reported that they had found that information about retrofit was easy or very easy to obtain, however it should be noted that approximately 14% also stated that they found it hard to find credible and relevant information. The Older Established segment group in particular showed a preference for

better information on television and radio and talking to an energy professional to help them decide on whether to carry out retrofit on their homes, with over 80% of those surveyed highlighted these two options. In terms of trustworthiness, the segment followed the trend found in the general population with family and friends, consumer advice and energy advice organisations all ranking highly.

Retrofit measures: Almost all retrofit measures were rated as being highly desirable by this segment group. The desirability of these measures was closely linked to the perceived energy saving potential. Solid wall insulation and floor insulation were much less popular with this particular group than for the survey group as a whole.

Works	Desirability	Energy Saving Potential
Install floor insulation	1	3
Install loft insulation	5	5
Install cavity wall insulation	5	5
Install solid wall insulation	1 / 3	4
Insulate the water/heating pipes	5	3 / 5
Insulate the hot water tank	5	5
Fit double or energy efficient glazing	5	5
Draught-proof windows and/or doors	5	5

Key: ***Desirability-Would like to have*** *(1= Would not like, 5= Would very much like)*

Energy Saving Potential- Would save energy *(1= Saves no energy, 5= Saves a lot of energy)*

Table 6: Perception of Desirability and Energy Saving Potential of Retrofit Works- "Older Established" segment group

The majority (~47%) of those surveyed were not planning to undertake any work in the homes in the next 3 years and for those who were planning to undertake works the most popular measures selected were:

- General decoration/building works
- Installation of new boiler/heating supply
- Other (unspecified) works

In terms of the implementation of works, the previous analysis of the general population group had found that local trades people were recognised as the most likely option for the implementation of retrofit and were by far the most likely to be engaged by older age-band segments (e.g. 1 and 2). Segment group analysis shows that local trades-people were by far the most preferred group, followed by energy suppliers who were in general more popular with the younger segments.

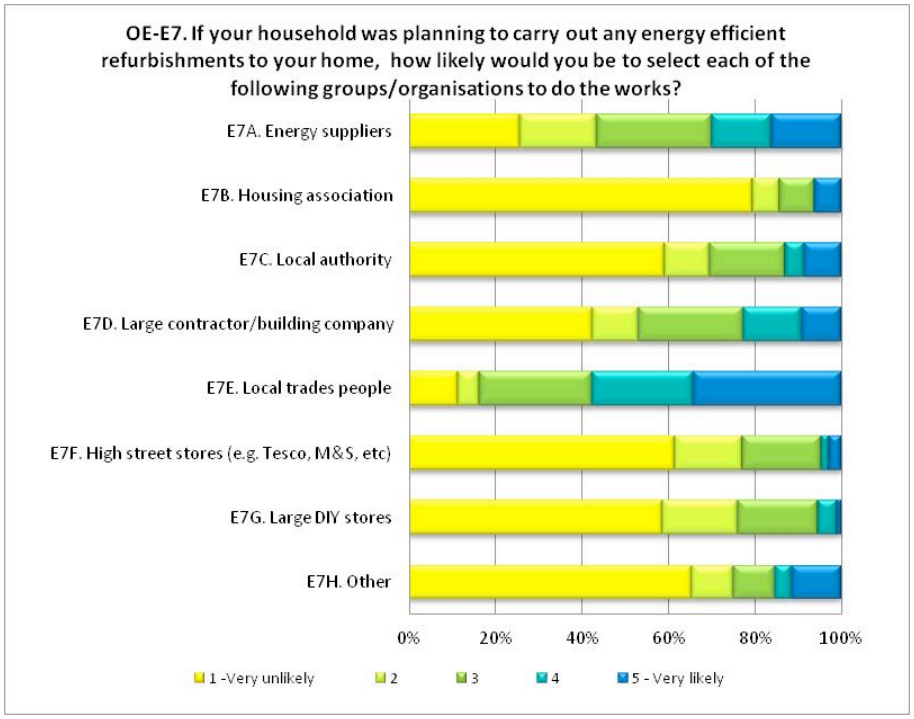


Figure 5: Implementation of Retrofit - "Older Established" segment group

Energy perception and behaviours

Heating systems: The most widespread heating option for this group is a central heating system, with gas being the pre-dominant fuel type used. Other features of this segment groups' heating behaviour can be highlighted as follows:

- Heating is generally managed through the use of a timer.
- Heating is kept on for 10.80 hours during weekdays and 11.16 hours on weekends (mean values).
- The thermostat temperature is kept at 19.51^{O}C (mean value)and is mainly controlled using a single thermostat/controller.
- Respondents "sometimes" / "rarely" feel cold in their homes and will both increase the thermostat temperature and clothing to increase their comfort levels.
- Respondents ""rarely" feel hot in their homes and will both decrease the thermostat temperature and open windows to increase their comfort levels.

Energy conservation: The majority of those surveyed from the Older Established group (>50%) believed that they were average consumers of energy) and paid a similar amount for their energy compared to a house of similar size. To conserve energy, the top three actions adopted by this segment group can be listed as:

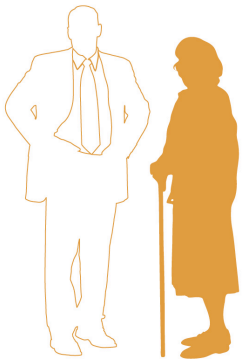
- Switch off unused lights
- Turn appliances off instead of using stand-by
- Only boil as much water as I need when using

House health: Although most respondents considered their houses to be in good order, the most common problems reported were condensation and draughts.

Stretched Pensioners

The key findings of this section can be summarised as:

Demographic profile:



Alice, 75
Stretched Pensioners

- Gender: Mainly female
- Age distribution: Higher age bands compared to general population. Over 70% above the age of 65: 15% from the "65-69" age bracket and over 55% in the "70 and over" category.
- Income level: Concentrated around £5,000-£9,999 band
- Main source: Retirement pensions and means tested benefits
- Education: Mainly no qualifications
- Nearly 50% sole property occupant

Top house types :

Bungalow	1965-1980	12%
Semi-detached house	1945-1964	10%
Bungalow	1945-1964	8%

Attitudes to retrofit:

- Perception of value of retrofit closely follows general survey population.
- Main drivers for retrofit: "To make my home comfortable", "To reduce the energy bill for my home" and "To make my property more energy efficient".
- Segment had the most favourable view on all retrofit measures.
- Most popular planned works: General decoration/building works, Installation of loft insulation and other (unspecified) works.

Energy perception and behaviours:

- Main heating system/fuel type: Central heating system fuelled by gas.
- Heating behaviour: Generally managed generally managed both through the use of a timer and manually (occupant switches on when cold). Heating is kept on for 10.87 hours during weekdays and 11.35hours on weekends (mean values). Thermostat temperature= 21.02^{O}C (mean value), mainly controlled using a single thermostat/controller.
- Top energy conservation actions: Switch off unused lights, Shower instead of taking a bath, only boil as much water as I need.
- Houses mainly in good order, common problems include condensation and draughts.

Demographic profile

The “Stretched Pensioner” segment group accounted for 16.5% of all survey respondents, contributing a total of 153 out of an overall 932 valid responses. Based on an analysis of the data from this segment, the demographic profile of this segment group can be summarised as follows:

Age band distribution: Compared to the general population, the age distribution of this segment group was concentrated in the higher age bands (Figure 6) but to a lesser extent than the Older Established segment. Over 70% of respondents were above the age of 65, with 15% from the “65-69” age bracket and approximately 55% in the “70 and over” category.

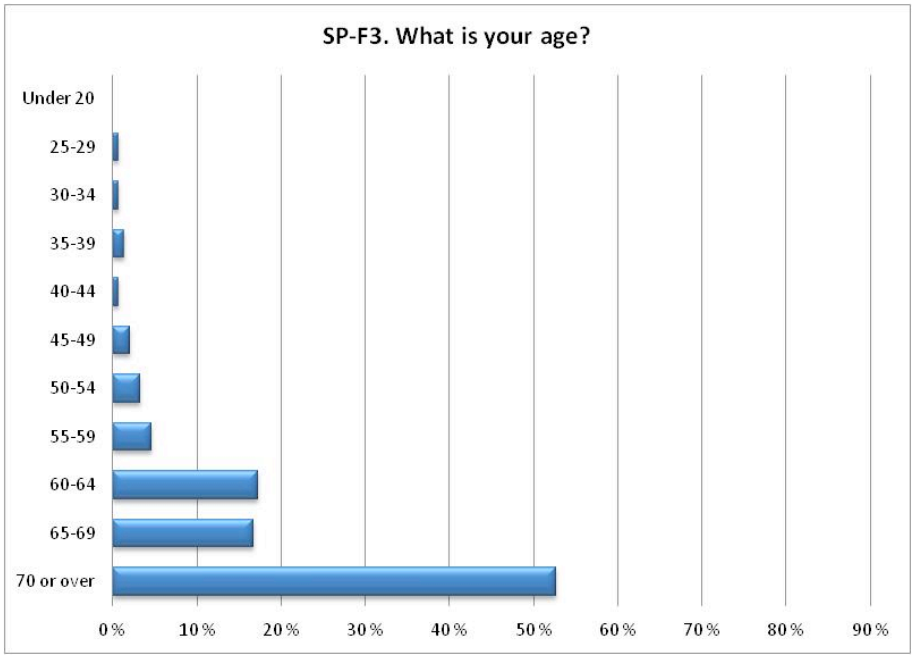


Figure 6: Age band profile for “Stretched Pensioner” segment group

Income band distribution and sources: On the whole, the Stretched Pensioner group had a lower income distribution profile than the Older Established segment. The majority of respondents (~40%) were concentrated around the £5,000-£9,999 income band group (Figure 7), which is comparatively lower than the pattern found in the general population. Employment data shows that compared to the Older Established group, a lower percentage (~77%) were fully retired and a significant percentage were still working on a part-time basis. The data also suggests that the main sources of income were pensions and means

tested benefits. Compared to the general population, a high percentage of respondents (~45%) from this group received additional income in the form of means tested benefits.

Education and employment: Respondents from this segment group in the main had no qualifications (~55%). The majority of those surveyed considered themselves to be retired and a very significant percentage (17%) were also "long term sick or disabled". Smaller, but still significant percentages (between 1%-3%) had additional responsibilities of looking after the family or as carers for elderly or disabled persons.

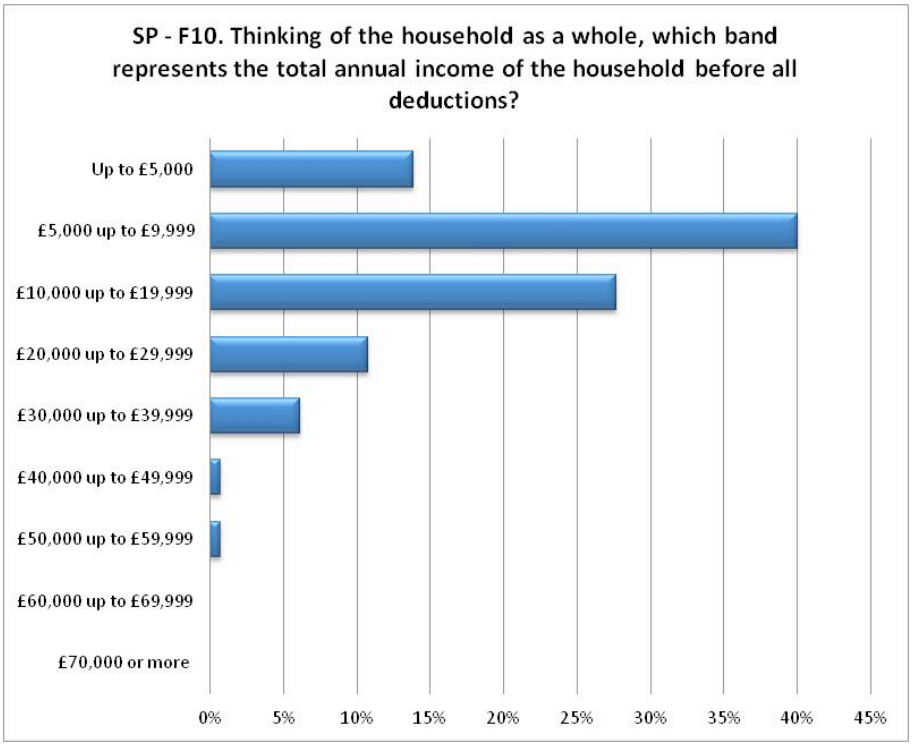


Figure 7: Income band distribution for "Stretched Pensioner" segment group

Household make-up and roles: In terms of occupancy, over 50% were the sole occupant of the property and 45% shared the house with another adult. For this group respondents were mainly female and were in the majority of cases the main bill payer in the property (approximately 95% of all valid responses). In general, this group reported a higher level of health problems than the "Older Established" segment.

Top house types

Based on the analysis of the data the top house type/age combinations for this segments group is listed in order of popularity in Table 7.

	House type	Age band	Segment group occupancy
1	Bungalow	1965-1980	12%
2	Semi-detached house	1945-1964	10%
3	Bungalow	1945-1964	8%
4	End-terraced house	Before 1919	5%
5	End-terraced house	1919-1944	5%
6	Mid-terraced house	Before 1919	5%
7	Mid-terraced house	1965-1980	5%

Table 7: Top house type/ age band combinations for the "Stretched Pensioner" segment group

Over 40% of the segment group own their properties outright, which is similar to the figure found of the general survey population (~40%). Despite having similar occupancy rates to the Older Established group, houses occupied by the Stretched Pensioner segment respondents were considerably smaller with approximately 20% of those surveyed living in one bedroom properties.

Attitudes to retrofit

Perceived value of retrofit: In a pattern closely following that found in the general survey population**,** there was a general agreement in the "Stretched Pensioner" segment group that that an energy efficient home was considered to be more comfortable, warmer, healthier and with lower energy use and bills than a regular home. A significant proportion (over 10%) of those surveyed did not know if the appearance and value of an energy efficient house was any different to a regular house.

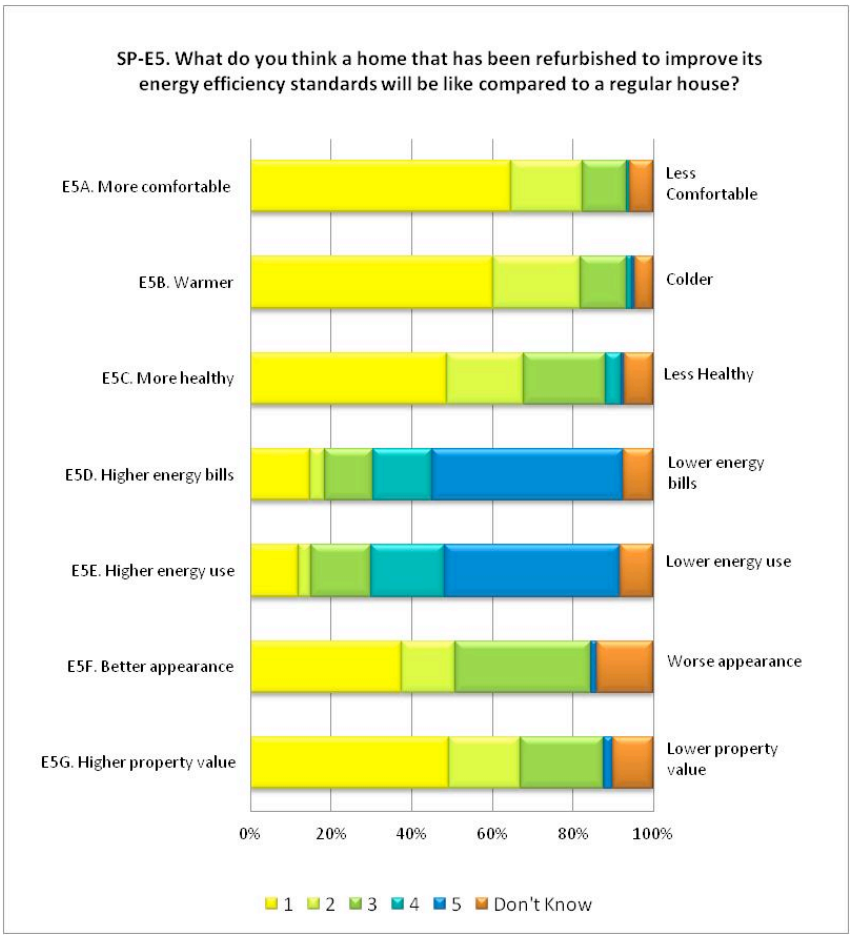


Figure 8: Perceptions of energy efficiency - "Stretched Pensioner" segment group

Drivers and barriers for retrofit: The main drivers (Figure 9) for retrofit highlighted as the most important by the group are:

- "To make my home comfortable"
- "To reduce the energy bill for my home"
- "To make my property more energy efficient"

These three factors were also singled out by the general survey population as the main reasons for undertaking retrofit in their homes.

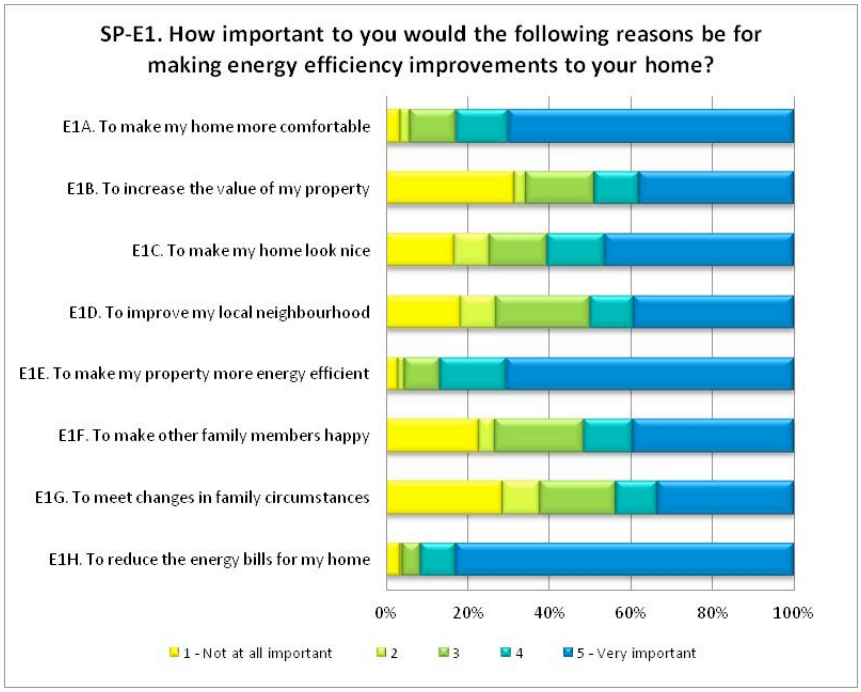


Figure 9: Drivers for Retrofit - "Stretched Pensioner" segment group

The perception of the best and worst trigger points for implementing retrofit for this segment group was closely aligned to the other older groups (Older Established and Transitional Retirees). The most preferred trigger points were in general when other refurbishment works were taking place.

Retrofit information: The majority of those surveyed (~46%) reported that they had found that information about retrofit was easy or very easy to obtain, however it should be noted that approximately 18% also stated that they found it hard to find credible and relevant information. The Stretched Pensioner segment group in particular showed a preference for better information on television and radio and talking to an energy professional to help them decide on whether to carry out retrofit on their homes, with over 80% of those surveyed highlighted these two options. In terms of trustworthiness, the segment followed the trend found in the general population with family and friends, energy performance certificates, consumer advice and energy advice organisations all ranking highly.

Trigger Point	Perception
Moving into a new house	5
Planning to sell current home	1
Fitting of new kitchen/bathroom	5
Adding an extension	5
Replacing heating system	5
Electrical rewiring	5
Roof replacement	5
Redecoration	3
Retirement	3
Changes in family circumstances (e.g. new baby, children moving out etc)	1

Key: 1=Worst Time, 5=Best Time

Table 8: Timing of Retrofit Works: Potential Barriers and Trigger Points for "Stretched Pensioner" segment group

Retrofit measures: All retrofit measures were rated as being both highly desirable and highly energy saving by this segment group. It should be noted that this segment group had the most favourable perception of retrofit measure in the survey group as a whole.

Works	Desirability	Energy Saving Potential
Install floor insulation	5	5
Install loft insulation	5	5
Install cavity wall insulation	5	5
Install solid wall insulation	5	5
Insulate the water/heating pipes	5	5
Insulate the hot water tank	5	5
Fit double or energy efficient glazing	5	5
Draught-proof windows and/or doors	5	5

Key: ***Desirability-Would like to have*** *(1= Would not like, 5= Would very much like)*

Energy Saving Potential- Would save energy *(1= Saves no energy, 5= Saves a lot of energy)*

Table 9: Perception of Desirability and Energy Saving Potential of Retrofit Works- "Stretched Pensioner" segment group

The majority (~38%) of those surveyed were planning to undertake work in their homes in the next 3 years and for those who were planning to undertake works the most popular measures selected were:

- General decoration/building works
- Installation of loft insulation
- Other (unspecified) works

In terms of the implementation of retrofit works, an analysis of segment group responses shows that local trades-people were by far the most preferred group, followed by local authorities and housing associations.

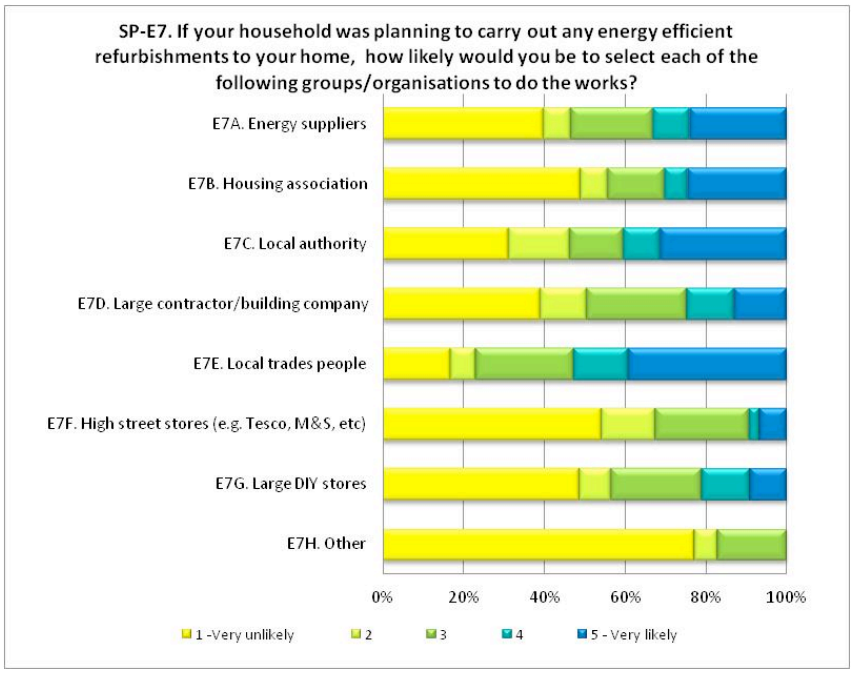


Figure 10: Implementation of Retrofit - "Stretched Pensioners" segment group

Energy perception and behaviours

Heating systems: The most widespread heating option for this group is a central heating system, with gas being the pre-dominant fuel type used. Other features of this segment groups' heating behaviour can be highlighted as follows:

- Heating is generally managed both through the use of a timer and manually (occupant switches on when cold).
- Heating is kept on for 10.87 hours during weekdays and 11.35 hours on weekends (mean values).
- The thermostat temperature is kept at 21.02^{O}C (mean value)and is mainly controlled using a single thermostat/controller.
- Respondents "sometimes" / "rarely" feel cold in their homes and will both increase the thermostat temperature and clothing to increase their comfort levels.
- Respondents "sometimes"/"rarely" feel hot in their homes and will both decrease the thermostat temperature and open windows to increase their comfort levels.

Energy conservation: The majority of those surveyed from the Stretched Pensioner group (>40%) believed that they were average consumers of energy) and paid a similar amount for their energy compared to a house of similar size. To conserve energy, the top three actions adopted by this segment group can be listed as:

- Switch off unused lights
- Shower instead of taking a bath
- Only boil as much water as I need when using

House health: Although most respondents considered their houses to be in good order, the most common problems reported were condensation and draughts.

Transitional Retirees

The key findings of this section can be summarised as:

Demographic profile:

- Gender: Mainly male
- Age distribution: Higher age bands compared to general population. Over 93 % above the age of 65: 15% from the "65-69" age bracket and over 75% in the "70 and over" category.
- Income level: Concentrated around £10,000-£19,999 and £20,000-£29,999 band
- Main source: Retirement pensions and salaries
- Education: Mainly Degree/HNC equivalent level

Geoff and Sally, 60
Transitional Retirees

Top house types :

Bungalow	1965-1980	17%
Detached house	1965-1980	15%
Semi-detached house	1965-1980	10%

Attitudes to retrofit:

- Perception of value of retrofit generally follows general survey population.
- Main drivers for retrofit: "To make my home comfortable", "To reduce the energy bill for my home" and "To make my property more energy efficient".
- Retrofit measures rated as being highly desirable include loft installation, insulating pipes, installing double glazing and draught proof doors and windows.
- Most popular planned works: General decoration/building works, Installation of new boiler/heating supply, Installation of cavity wall insulation.

Energy perception and behaviours:

- Main heating system/fuel type: Central heating system fuelled by gas.
- Heating behaviour: Generally managed generally managed both through the use of a timer. Heating is kept on for 9.16 hours during weekdays and 10.42hours on weekends (mean values). Thermostat temperature = 21.48^{O}C (mean value), mainly controlled using a single thermostat/controller.
- Top energy conservation actions: Switch off unused lights, Turn appliances off instead of using stand-by and only boil as much water as I need when using kettle.
- Common house problems include condensation, draughts and mould.

Demographic profile

The "Transitional Retirees" segment group accounted for approximately 9% of all survey respondents, contributing a total of 81 out of an overall 932 valid responses. Based on an analysis of the data from this segment, the demographic profile of this segment group can be summarised as follows:

Age band distribution: Compared to the general population, the age distribution of this segment group was concentrated in the higher age bands (Figure 11). Over 93% of respondents were above the age of 65, with approximately 15% from the "65-69" age bracket and over 75% in the "70 and over" category.

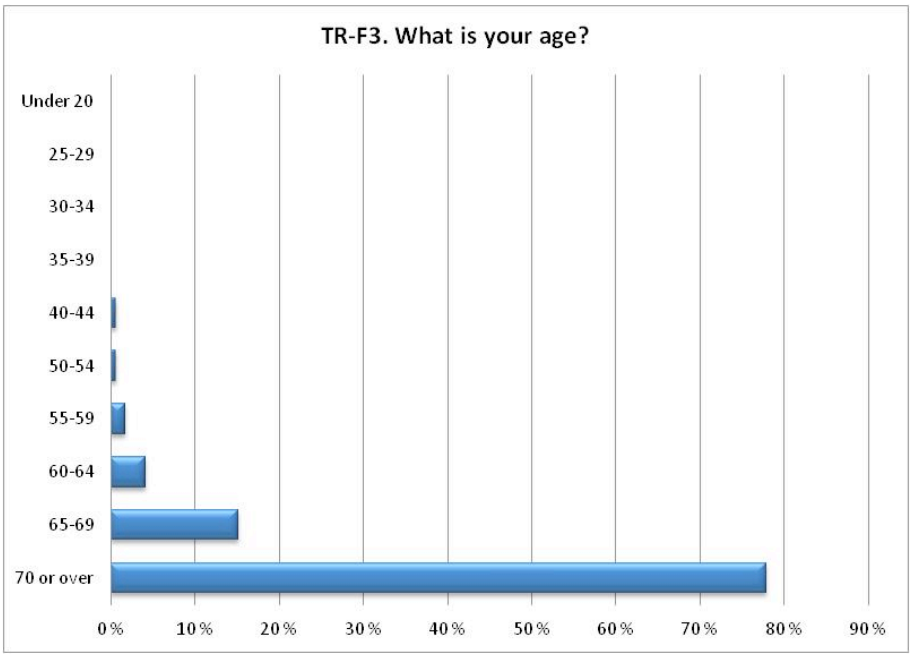


Figure 11: Age band profile for "Transitional Retirees" segment group

Income band distribution and sources: The majority of respondents were concentrated around the £10,000-£19,999 (~25%) and £20,000-£29,999 income bands (Figure 12). This conforms to the pattern found in the general population as a whole and slightly higher than other older segment groups. Based on the employment data from this group, it can be assumed that this income is mainly from both salaries (for those who remained in employment) and retirement pensions. Compared to the general population, a very low percentage of respondents (~3%) from this group received additional income in the form of means tested benefits.

Education and employment: Respondents were in the main educated to a Degree/HNC equivalent level (~43%). Approximately 40% of those surveyed considered themselves to be employed on a full time basis and an equivalent number reported that they were retired. A smaller, but still significant percentage had additional responsibilities of looking after the family.

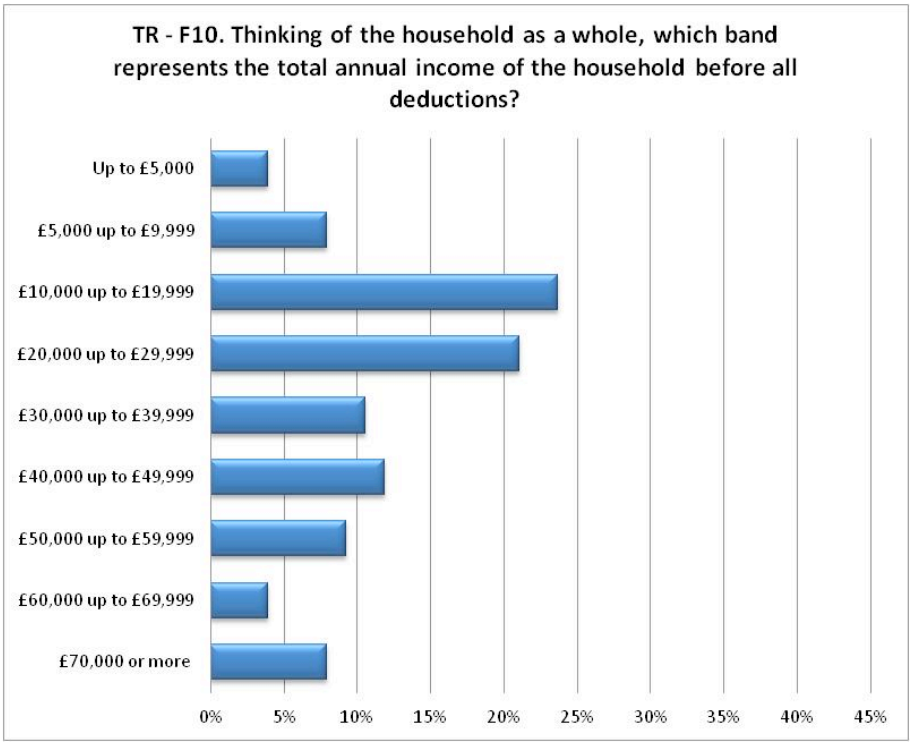


Figure 12: Income band distribution for "Transitional Retirees" segment group

Household make-up and roles: In terms of occupancy, respondents from this group reported a much higher occupancy level than other older segments with about 75% sharing the house with 2 adults. The majority of respondents from this group (~68%) were male, it should be noted that in both cases they were overwhelmingly the main bill payer in the property (approximately 95% of all valid responses).

Top house types

Based on the analysis of the data the top house type/age combination for this segments group is listed in order of popularity in Table 10.

	House type	Age band	Segment group occupancy
1	Bungalow	1965-1980	17%
2	Detached house	1965-1980	15%
3	Semi-detached house	1965-1980	10%
4	Detached house	1981-1990	9%
5	Semi-detached house	Before 1919	7%
6	Bungalow	1945-1964	6%
7	End-terraced house	1945-1964	5%

Table 10: Top house type/ age band combinations for "Older Established" segment group

Over 77% of the segment group own their properties outright, which is well above the figure found of the general survey population (~40%). The majority (~60%) lived in larger houses with 3 or more bedrooms.

Attitudes to retrofit

Perceived value of retrofit: There was a general agreement in the "Transitional Retirees" segment group that that an energy efficient home was considered to be more comfortable, warmer and with lower energy use and bills than a regular home. However, there was some variation in their relative perception of other qualities namely healthiness, value and appearance.

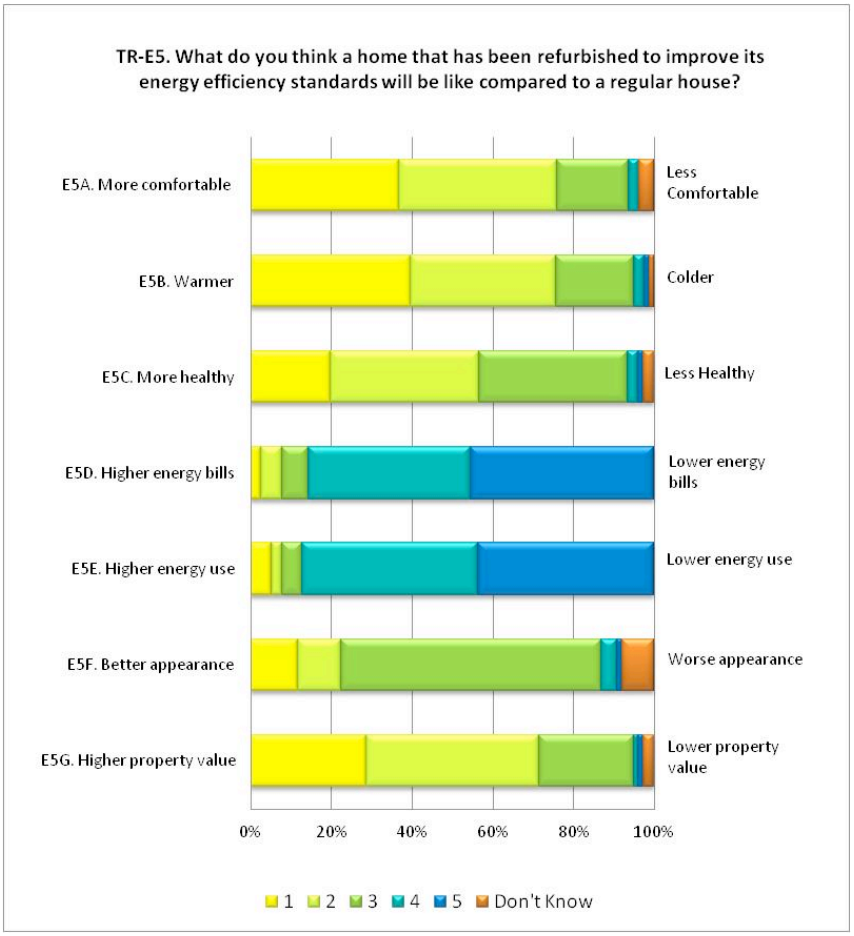


Figure 13: Perceptions of energy efficiency - "Transitional Retirees" segment group

Drivers and barriers for retrofit: The main drivers (Figure 14) for retrofit highlighted as the most important by the group are:

- "To make my home comfortable"
- "To reduce the energy bill for my home"
- "To make my property more energy efficient"

These three factors were also singled out by the general survey population as the main reasons for undertaking retrofit in their homes.

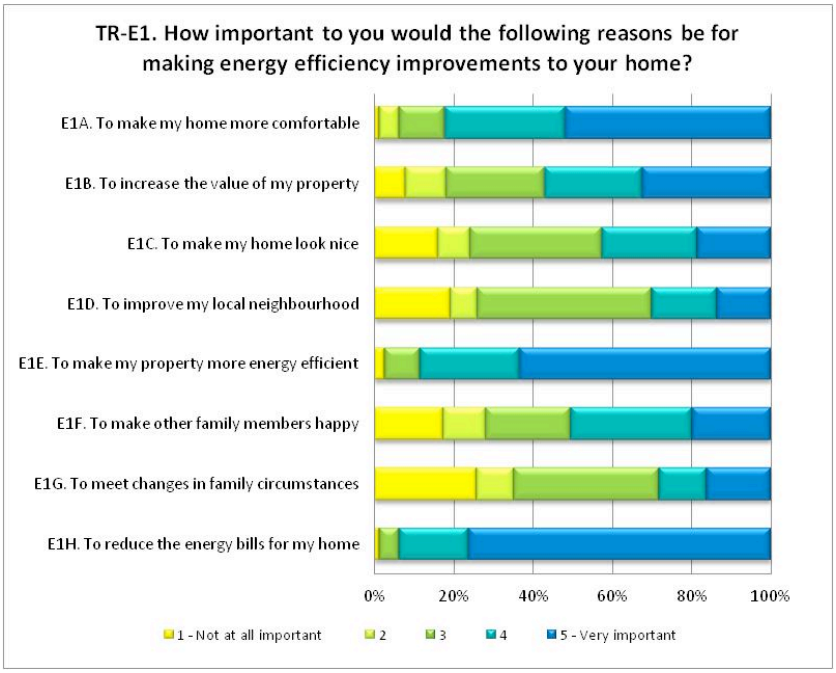


Figure 14: Drivers for Retrofit - "Transitional Retirees" segment group

The perception of the best and worst trigger points for implementing retrofit for this segment group was closely aligned to the other older groups (Stretched Pensioners and Older Established). The most preferred trigger points were in general when other (major) refurbishment works were taking place.

Trigger Point	Perception
Moving into a new house	5
Planning to sell current home	1
Fitting of new kitchen/bathroom	4
Adding an extension	5
Replacing heating system	5
Electrical rewiring	5
Roof replacement	5
Redecoration	3
Retirement	3
Changes in family circumstances (e.g. new baby, children moving out etc)	3

Key: 1=Worst Time, 5=Best Time

Table 11: Perception of Desirability and Energy Saving Potential of Retrofit Works- "Transitional Retirees" segment group

Retrofit information: The majority of those surveyed (~34%) reported that they had found that information about retrofit was moderately easy to obtain. The Transitional Retirees segment group in particular showed a preference for better information on television and radio and talking to an energy professional to help them decide on whether to carry out retrofit on their homes, with around 80% of those surveyed highlighted these two options.

In terms of trustworthiness, the segment showed a preference for advice from consumer advice and energy advice organisations in particular.

Retrofit measures: The retrofit measures rated as being highly desirable by this segment group was loft installation, followed by insulating pipes, installing double glazing and draught proof doors and windows. The desirability of these measures was not as closely linked to the perceived energy saving potential as with other older segments. Solid wall insulation and floor insulation were much less popular with this particular group than for the survey group as a whole.

Works	Desirability	Energy Saving Potential
Install floor insulation	1	3
Install loft insulation	5	5
Install cavity wall insulation	1	5
Install solid wall insulation	1	4
Insulate the water/heating pipes	4	5
Insulate the hot water tank	1	5
Fit double or energy efficient glazing	4	5
Draught-proof windows and/or doors	4	5

Key: ***Desirability-Would like to have*** *(1= Would not like, 5= Would very much like)*

Energy Saving Potential- Would save energy *(1= Saves no energy, 5= Saves a lot of energy)*

Table 12: Timing of Retrofit Works: Potential Barriers and Trigger Points for "Older Established" segment group

The majority (~35%) of those surveyed did not know if they were going to undertake any work in the homes in the next 3 years and for those who were planning to undertake works the most popular measures selected were:

- General decoration/building works
- Installation of new boiler/heating supply
- Installation of cavity wall insulation

In terms of the implementation of works, the analysis of respondent data shows that local trades-people were by far the most preferred group, followed by energy suppliers who were in general more popular with the younger segments and larger contractors.

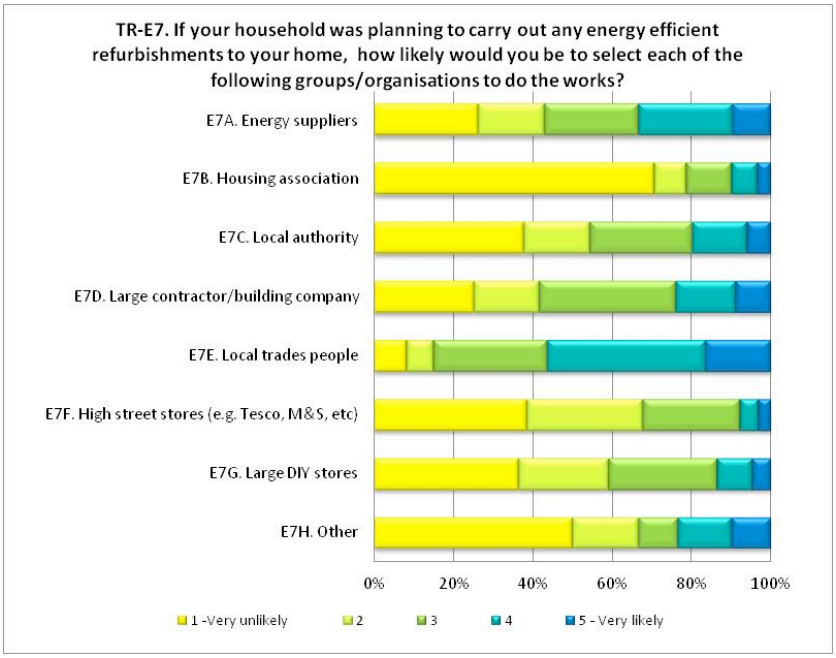


Figure 15: Implementation of Retrofit - "Older Transitional Retiree" segment group

Energy perception and behaviours

Heating systems: The most widespread heating option for this group is a central heating system, with gas being the pre-dominant fuel type used. Other features of this segment groups' heating behaviour can be highlighted as follows:

- Heating is generally managed through the use of a timer.
- Heating is kept on for 9.16 hours during weekdays and 10.42 hours on weekends (mean values).
- The thermostat temperature is kept at 20.48^{O}C (mean value)and is mainly controlled using a single thermostat/controller.
- Respondents "sometimes" / "rarely" feel cold in their homes and will both increase the thermostat temperature and clothing to increase their comfort levels.
- Respondents ""rarely" feel hot in their homes and will both decrease the thermostat temperature and open windows to increase their comfort levels.

Energy conservation: The majority of those surveyed from the Transitional Retiree group (>50%) believed that they were average consumers of energy) and paid a similar amount for their energy compared to a house of similar size. To conserve energy, the top three actions adopted by this segment group can be listed as:

- Switch off unused lights
- Turn appliances off instead of using stand-by
- Only boil as much water as I need when using

House health: Although most respondents considered their houses to be in good order, the most common problems reported were draughts, condensation and mould.

Early Entrepreneurs

The key findings of this section can be summarised as:

Demographic profile:

- Gender: Equally male and female
- Age distribution: Mid-range age bands compared to general population. Over 45% in "40-44" age bracket and over 20% in the "45-49" category.
- Income level: Concentrated around £40,000-£49,999 band
- Main source: Salaries
- Education: Mainly Degree/HNC equivalent level

Justin and Stephanie, 30
Early Entrepreneurs

Top house types :

Detached house	After 1990	45%
Detached house	1965-1980	8%
Detached house	1981-1990	7%

Attitudes to retrofit:

- Perception that retrofit did not improve appearance or value of homes.
- Main drivers for retrofit: "To make my home comfortable", "To reduce the energy bill for my home" and "To make my property more energy efficient".
- Segment was the most indifferent regarding desirability of most retrofit measures.
- Most popular planned works: General decoration/building works, with other measures trailing far behind.

Energy perception and behaviours:

- Main heating system/fuel type: Central heating system fuelled by gas.
- Heating behaviour: Generally managed generally managed both through the use of a timer. Heating is kept on for 9.16 hours during weekdays and 10.42 hours on weekends (mean values). Thermostat temperature= 19.90^{O}C (mean value), mainly controlled using a single thermostat/controller.
- Top energy conservation actions: Switch off unused lights, Shower instead of taking a bath, only boil as much water as I need.
- Common house problems include condensation, damp and draughts.

Demographic profile

The "Early Entrepreneur" segment group accounted for 8.5% of all survey respondents, contributing a total of 79 out of an overall 932 valid responses. Based on an analysis of the data from this segment, the demographic profile of this segment group can be summarised as follows:

Age band distribution: Compared to the general population, the age distribution of this segment group was concentrated in the mid-range age bands (Figure 16). Over 45% of respondents were in the "40-44" age band and around 20% were from the "45-49" age band category.

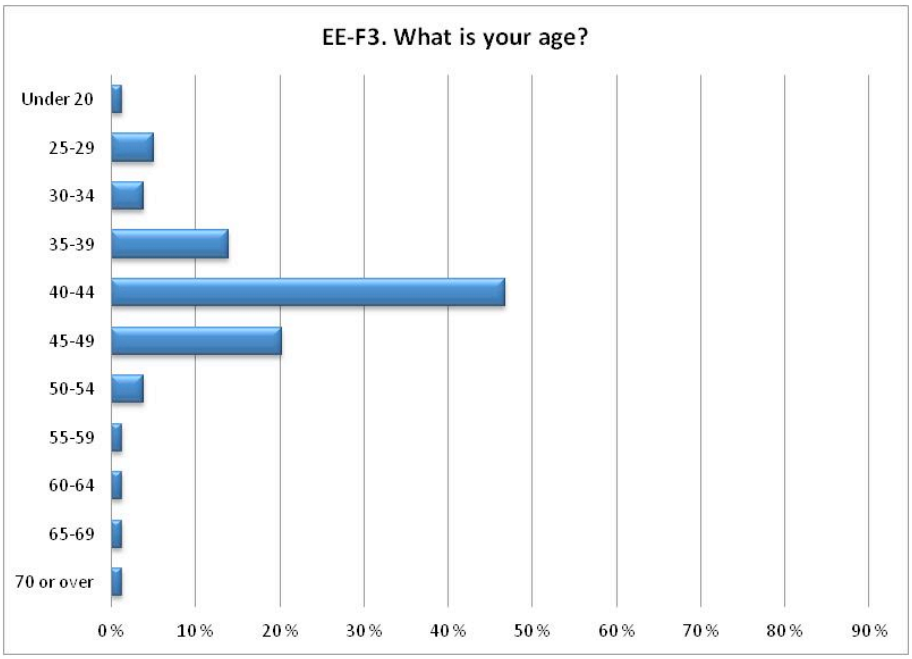


Figure 16: Age band profile for "Early Entrepreneur" segment group

Income band distribution and sources: The distribution of the majority of respondents (~23%) was concentrated around the £40,000-£49,999 income band group (Figure 17). This is a higher distribution than that found in the general population as a whole. Based on the employment data from this group, it can be assumed that this income is mainly from salaries. Compared to the general population, a very low percentage of respondents (less than 4%) from this group received additional income in the form of means tested benefits.

Education and employment: Respondents were in the main educated to a Degree/HNC equivalent level (~50%). The majority (90%) of those surveyed considered themselves to be in full time employment and a significant percentage (~8%) had additional responsibilities of looking after the family.

Household make-up and roles: In terms of occupancy, nearly 80% of those surveyed reported that they shared the house with 2 other adults and children. Even though the number of respondents was equally divided between the two gender groups, it should be noted that in both cases they were overwhelmingly the main bill payer in the property (approximately 93% of all valid responses).

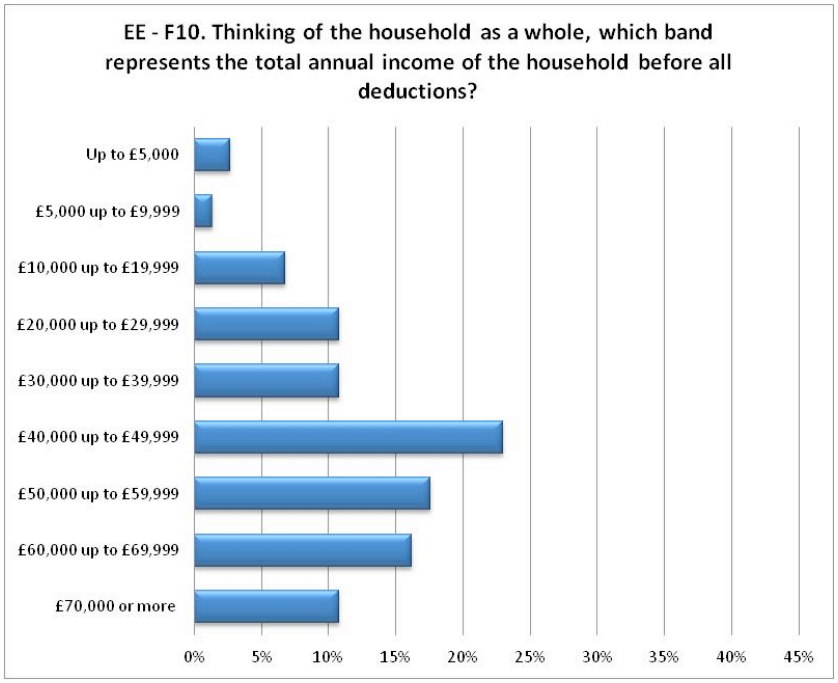


Figure 17: Income band distribution for "Early Entrepreneur" segment group

Top House types

Top house types

Based on the analysis of the data the top house type/age combination for this segments group is listed in order of popularity in Table 13.

	House type	Age band	Segment group occupancy
1	**Detached house**	After 1990	45%
2	**Detached house**	1965-1980	8%
3	**Detached house**	1981-1990	7%
4	**Semi-detached house**	After 1990	7%
5	**End-terraced house**	1945-1964	5%
6	**Semi-detached house**	1965-1980	5%
7	**Semi-detached house**	Before 1919	4%
8	**Semi-detached house**	1945-1964	4%
9	**Detached house**	1919-1944	4%

Table 13: Top house type/ age band combinations for "Early Entrepreneur" segment group

Around 85% of the segment group owned their properties through a loan or mortgage arrangement, which is well above the figure found of the general survey population (~35%). The majority (over 80%) lived in larger properties with 3 or more bedrooms.

Attitudes to retrofit

Perceived value of retrofit: There was a general agreement in the "Early Entrepreneur" segment group that that an energy efficient home was considered to have lower energy use and bills than a regular home. The group also perceived energy efficient homes to be more comfortable, warmer and healthier, but to a lesser extent than the survey population as a whole. Approximately 70% of those surveyed believed that the appearance of an energy efficient house was no different to a regular house and around 20% believed that an energy efficient house was not higher in value.

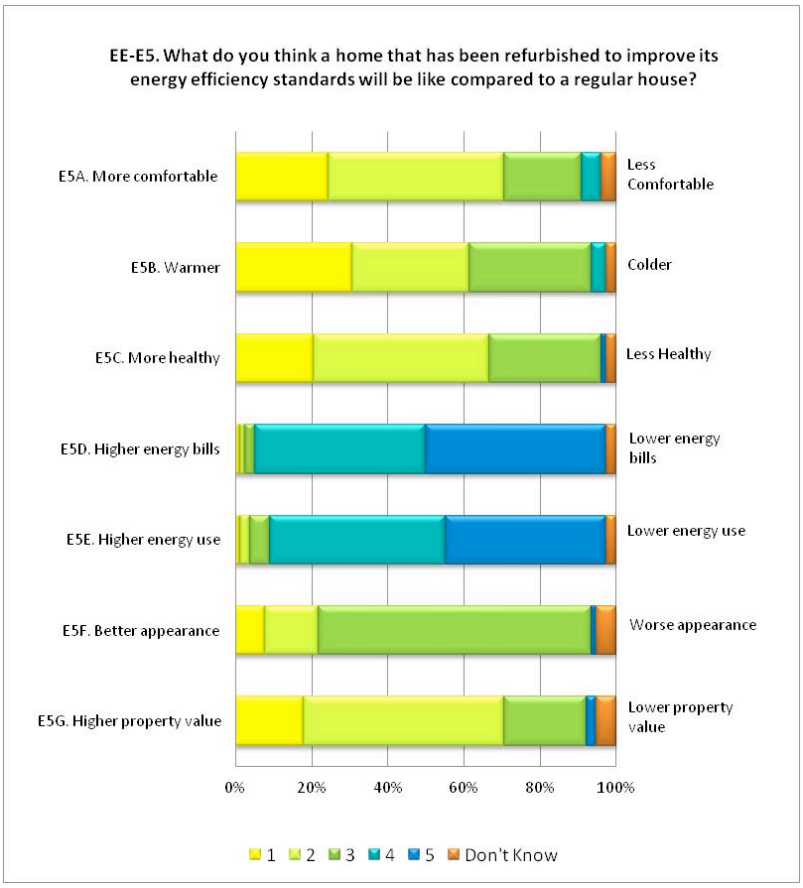


Figure 18: Perceptions of energy efficiency - "Early Entrepreneur" segment group

Drivers and barriers for retrofit: The main drivers (Figure 19) for retrofit highlighted as the most important by the group are:

- "To make my home comfortable"
- "To reduce the energy bill for my home"
- "To make my property more energy efficient"

These three factors were also singled out by the general survey population as the main reasons for undertaking retrofit in their homes.

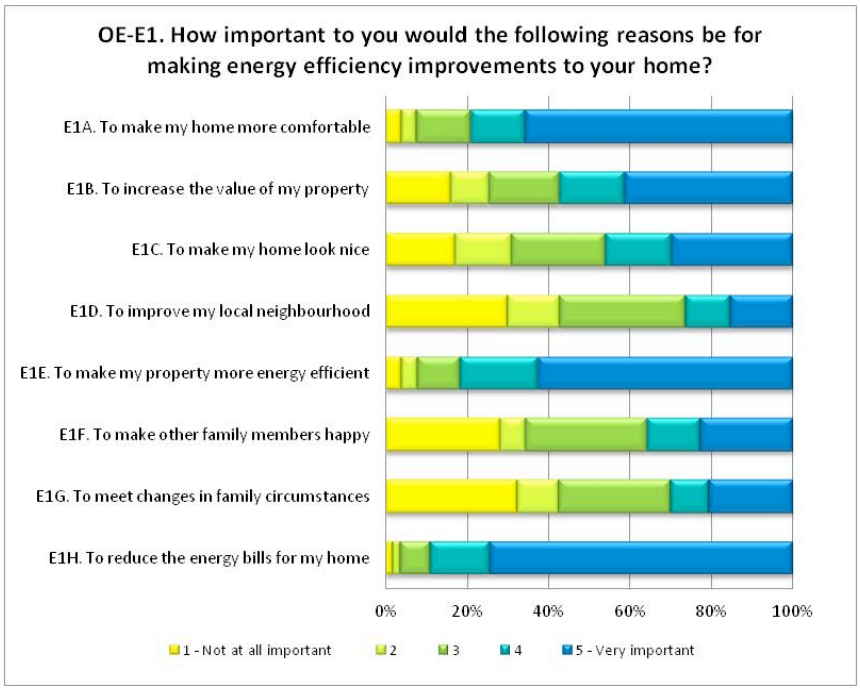


Figure 19: Drivers for Retrofit - "Early Entrepreneur" segment group

The perception of the best and worst trigger points for implementing retrofit for this segment group was closely aligned to the older early adopter groups, where the most preferred trigger points were in general when other refurbishment works were taking place. However, for this group moving to a new house was also viewed as a potentially desirable time to undertake retrofit.

Trigger Point	Perception
Moving into a new house	5
Planning to sell current home	3
Fitting of new kitchen/bathroom	5
Adding an extension	5
Replacing heating system	5
Electrical rewiring	5
Roof replacement	5
Redecoration	4
Retirement	3
Changes in family circumstances (e.g. new baby, children moving out etc)	3

Key: 1=Worst Time, 5=Best Time

Table 14: Timing of Retrofit Works: Potential Barriers and Trigger Points for "Older Established" segment group

Retrofit information: The majority of those surveyed (~47%) reported that they had found that information about retrofit was moderately easy to obtain. The Early Entrepreneur segment group in particular showed a preference for better information from the national press, on television and radio and talking to an energy professional to help them decide on whether to carry out retrofit on their homes, with around 80% of those surveyed highlighted these three options. In terms of trustworthiness, the segment ranked consumer advice and energy advice organisations highly.

Retrofit measures: This segment group were largely indifferent regarding almost all retrofit measures, with the notable exception being draught-proofing windows and doors. All measures were rated highly in terms of the perceived energy saving potential.

Works	Desirability	Energy Saving Potential
Install floor insulation	3	4
Install loft insulation	3	5
Install cavity wall insulation	3	4
Install solid wall insulation	3	4
Insulate the water/heating pipes	3	4
Insulate the hot water tank	3	4
Fit double or energy efficient glazing	3	4
Draught-proof windows and/or doors	5	4

Key: *Desirability-Would like to have (1= Would not like, 5= Would very much like)*
Energy Saving Potential- Would save energy (1= Saves no energy, 5= Saves a lot of energy)

Table 15: Timing of Retrofit Works: Potential Barriers and Trigger Points for "Early Entrepreneur" segment group

The majority (~41%) of those surveyed were planning to undertake any work in the homes in the next 3 years and for those who were planning to undertake works the most popular measure selected was general decoration/building works, with other measures trailing far behind.

In terms of the implementation of works, the previous analysis of the general population group had found that local trades people were recognised as the most likely option for the implementation of retrofit. Segment group analysis shows that local trades-people were by far the most preferred group, followed by energy suppliers and DIY stores.

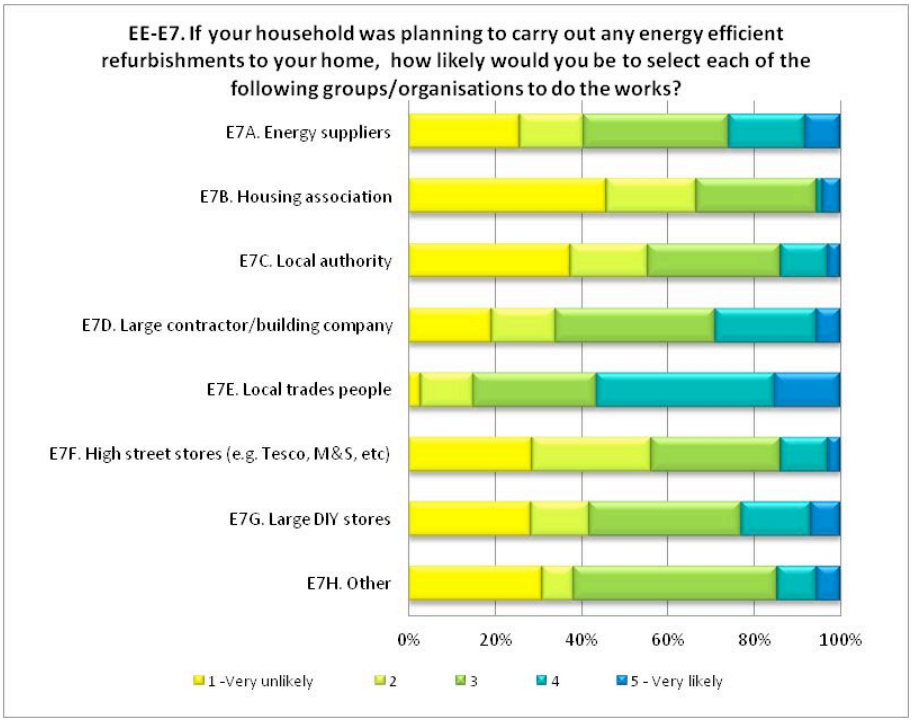


Figure 20: Implementation of Retrofit - "Older Established" segment group

Energy perception and behaviours

Heating systems: The most widespread heating option for this group is a central heating system, with gas being the pre-dominant fuel type used. Other features of this segment groups' heating behaviour can be highlighted as follows:

- Heating is generally managed through the use of a timer.
- Heating is kept on for 9.16 hours during weekdays and 10.42 hours on weekends (mean values).
- The thermostat temperature is kept at 19.90^{O}C (mean value)and is mainly controlled using a single thermostat/controller.
- Respondents "sometimes" / "rarely" feel cold in their homes and will both increase the thermostat temperature and clothing to increase their comfort levels (but to a lesser extent than the other 3 early adopter groups).
- Respondents "sometimes"/"rarely" feel hot in their homes and will mainly open windows then decrease the thermostat temperature to increase their comfort levels.

Energy conservation: The majority of those surveyed from the Early Entrepreneur group (>50%) believed that they were average consumers of energy) and paid a similar amount for their energy compared to a house of similar size. To conserve energy, the top three actions adopted by this segment group can be listed as:

- Switch off unused lights
- Shower instead of taking a bath
- Only boil as much water as I need when using kettle

House health: Although most respondents considered their houses to be in good order, the most common problems reported were condensation, damp and draughts.