



Programme Area: Buildings

Project: Building Supply Chain for Mass Refurbishment of Houses

Title: ETI thermal efficiency project initial stock types

Abstract:

Please note this report was produced in 2011/2012 and its contents may be out of date. This deliverable is number 1 of 7 in Work Package 2 and presents the results of a segmentation of the English housing stock. For the purposes of analysis within the project the English housing stock has been split into 36 different archetypes based on the dates of construction and the dwelling configuration. This is to support the analysis of retrofit interventions identified on an individual dwelling basis, and their subsequent extrapolation to the entire English housing stock. Data on key characteristics relevant to thermal efficiency or the costs of improvement are presented for each of the housing archetypes.

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.

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ETI THERMAL EFFICIENCY PROJECT

INITIAL STOCK TYPES

BRE

WP2.1a REPORT

The English housing stock has been split into 36 different archetypes based on the date of construction of the property and the dwelling configuration. Approximately 12 of these types represent over 60% of the stock. The characteristics of these 12 types are described below in detail. This information has been produced by analysis of data from three years of the English House Condition Survey / English Housing Survey from 2006 to 2008.

Characteristics have been chosen to be of particular relevance to thermal efficiency or the costs of improvement. The characteristics described are:

- Frequency
- Current notional CO₂ emissions
- Predominant wall type & presence of wall insulation
- Roof type
- Percentage of glazing
- Type of glazing
- Presence of bay windows
- Floor area
- Wall area
- Roof area
- Existing loft insulation thickness
- Notional CO₂ reductions following EPC recommended measures
- Presence of 'additional part' (an extension or extension-like area)
- Wall finish

A basic assessment of the potential for Thermal Efficiency improvements is also provided for each type.

Although the most prevalent dwelling types have been described, it will be noted that some of the less prevalent types (e.g. pre-1919 detached houses) are currently responsible for a greater proportion of the (SAP based notional) CO₂ emissions than some of the more common types. The 12 most prevalent types, however, do encompass a good cross section of the stock (in terms of age and type) and should allow costs to be calculated. All 36 types will be used for the energy modelling stage of the project.

The 36 archetypes are shown in Table A below, with the 12 most prevalent types described in detail below this.

	Frequency	Percent	Cumulative Percent	Proportion of whole stock CO ₂ emissions	Frequency Rank
Pre-1919,mid terrace	1,860,000	8.5	8.5	8.5	1
1919-1944,semi detached	1,740,000	8.0	16.6	9.0	2
1945-1964,semi detached	1,740,000	8.0	24.5	7.8	3
Post-1980,detached	1,500,000	6.9	31.4	7.2	4
1965-1980,semi detached	1,000,000	4.6	36.0	4.1	5
1965-1980,purpose built flat, low rise	940,000	4.3	40.4	2.3	6
Post-1980,purpose built flat, low rise	910,000	4.2	44.5	1.7	7
1965-1980,detached	850,000	3.9	48.5	5.3	8
Pre-1919,semi detached	710,000	3.3	51.7	5.6	9
1965-1980,bungalow	690,000	3.2	54.9	3.0	10
Pre-1919,converted flat	660,000	3.0	58.0	2.9	11
1919-1944,mid terrace	620,000	2.9	60.8	2.3	12
1965-1980,mid terrace	620,000	2.9	63.7	1.9	13
Post-1980,semi detached	620,000	2.9	66.5	1.8	14
1945-1964,bungalow	610,000	2.8	69.3	2.8	15
Pre-1919, end terrace	590,000	2.7	72.1	3.8	16
Pre-1919,detached	570,000	2.6	74.7	7.4	17
1945-1964,purpose built flat,low rise	550,000	2.5	77.2	1.5	18
1945-1964,mid terrace	500,000	2.3	79.5	1.7	19
Post-1980,mid terrace	480,000	2.2	81.7	1.1	20
Post-1980,bungalow	470,000	2.1	83.9	1.6	21
1945-1964,detached	430,000	2.0	85.9	3.1	22
1919-1944,detached	430,000	2.0	87.8	3.7	23
1965-1980,end terrace	390,000	1.8	89.7	1.5	24
1945-1964, end terrace	390,000	1.8	91.4	1.6	25
Post-1980,end terrace	370,000	1.7	93.1	1.0	26
1919-1944, end terrace	370,000	1.7	94.8	1.7	27
1919-1944, purpose built flat,low rise	230,000	1.1	95.9	0.7	28
1919-1944,bungalow	210,000	1.0	96.9	1.1	29
Pre-1919, purpose built flat,low rise	180,000	0.8	97.7	0.6	30
1965-1980,purpose built flat,high rise	170,000	0.8	98.5	0.4	31
Pre-1964,purpose built flat,high rise	140,000	0.6	99.1	0.4	32
1919-1944,converted flat	70,000	0.3	99.4	0.2	33
Pre-1919,bungalow	70,000	0.3	99.7	0.4	34
Post-1980,purpose built flat,high rise	30,000	0.1	99.9	0.1	35
Post 1945,converted flat	30,000	0.1	100.0	0.1	36

Table A: The 36 archetypes in England

PRE - 1919 MID TERRACE

Rank: 1ST



1. Background information

Approx 1,860,000 properties of this type, which is around 8.5% of the whole stock.

50% of the properties of this type have a floor area between 66 and 97 sqm.

Total CO₂ emissions at present (under SAP assumption): 11.8 million tonnes/yr CO₂, which represents 8.5% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 1 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock CO ₂ emissions
Pre-1919,mid terrace	1,860,000	8.5	11,810,000	8.5

2.2 The predominant wall type of this type of dwelling is shown in Table 2 below.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	Solid uninsulated	1,550,000	83.8	83.8
	Cavity uninsulated	240,000	12.9	96.7
	Others	60,000	3.3	100.0
	Total	1,860,000	100.0	

2.3 Table 3 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	Pitched roof	1,830,000	98.9	98.9
	Others	20,000	1.1	100.0
	Total	1,860,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 4

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	0%-15%	100,000	5.4	5.4
	15%-20%	310,000	16.8	22.2
	20%-25%	580,000	31.0	53.2
	25%-30%	420,000	22.7	75.9
	30%-35%	290,000	15.8	91.7
	Over 35%	150,000	8.3	100.0
	Total	1,860,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 5 below.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	Single glazing	520,000	27.8	27.8
	Double glazing	1,260,000	67.8	95.7
	Mix of glazing (no predominant type)	80,000	4.3	100.0
	Total	1,860,000	100.0	

2.6 Table 6 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	No bays	1,030,000	55.2	55.2
	Bays	830,000	44.8	100.0
	Total	1,860,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 7 below.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	Owner Occupied	1,320,000	71.2	71.2
	Local Authority	40,000	1.9	73.1
	Housing Association (RSL)	60,000	3.1	76.2
	Private Rented	440,000	23.8	100.0
	Total	1,860,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 8. 50% of this type of dwelling have a floor area between 66 sqm and 97 sqm.

Table 8 Pre- 1919 mid terrace mean, median usable floor area and IQR				
			Useable floor area (sqm)	
Pre-1919,mid terrace	Mean		86.7	
	Median		79.0	
	Percentiles	25		66.2
		50		79.0
		75		97.2

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 9. 50% of this type of dwelling have a wall area between 47 sqm and 75 sqm.

Table 9 Pre- 1919 mid terrace mean, median external exposed wall area and IQR				
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)	
Pre-1919,mid terrace	Mean		63.6	
	Median		59.3	
	Percentiles	25		46.5
		50		59.3
		75		75.0

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 10. 50% of this type of dwelling have a roof area between 33 sqm and 48 sqm.

Table 10 Pre- 1919 mid terrace mean, median roof area and IQR				
			Total dwelling roof area	
Pre-1919,mid terrace	Mean		40.9	
	Median		39.8	
	Percentiles	25		32.6
		50		39.8
		75		48.0

2.11 Table 11 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 11 Pre- 1919 mid terrace thickness of loft insulation				
		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	None	170,000	9.3	9.3
	less than 50mm	50,000	2.7	11.9
	50 up to 99mm	500,000	26.9	38.8
	100 up to 149mm	650,000	35.1	73.9
	150 up to 199mm	170,000	9.1	83.0
	200mm or more	320,000	17.0	100.0
	Total	1,860,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 12. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieve an emissions reduction of between 0.5 tonnes/yr and 1.9 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
Pre-1919,mid terrace	Mean		1.3
	Median		1.2
	Percentiles	25	0.5
		50	1.2
		75	1.9

2.13 Table 13 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is a part of the dwelling which 'sticks out' and results in a non-rectangular dwelling shape. This part is often at the rear of the property and can be an extension or 'as built'. Almost 75% of the dwellings of this type have additional parts.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	No additional parts	470,000	25.3	25.3
	Additional parts	1,390,000	74.7	100.0
	Total	1,860,000	100.0	

2.14 Table 14 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
Pre-1919,mid terrace	masonry pointing	1,280,000	68.8	68.8
	non masonry pointing	580,000	31.2	100.0
	Total	1,860,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, almost 97% can be improved by adding wall insulation; nearly 39% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 28% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	96.7
2	Add roof insulation (existing insulation less or equal to 99mm thick)	38.8
3	Add double glazing (predominant glazing type not double glazed)	27.8

1919-1944, SEMI-DETACHED

Rank: 2nd



1. Background information

Approx 1,700,000 properties of this type, which is around 8% of the whole stock.

50% of the properties of 1919-1944 semi-detached dwellings have a floor area between 73 and 102 sqm.

Total CO₂ emissions at present (under SAP assumption): 12.5million tonnes/yr CO₂, which represents 9% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 15 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1919-1944,semi-detached	1,740,000	8.0	12,490,000	9.0

2.2 The predominant wall types of this type of dwelling are shown in Table 16 below.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	Cavity with insulation	440,000	25.4	25.4
	Cavity uninsulated	650,000	37.1	62.5
	Solid uninsulated	640,000	36.5	99.0
	Others	20,000	1.0	100.0
	Total	1,740,000	100.0	

2.3 Table 17 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	Pitched	1,710,000	98.2	98.2
	Others	30,000	1.8	100.0
	Total	1,740,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 18.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	0%-15%	110,000	6.2	6.2
	15%-20%	470,000	27.2	33.4
	20%-25%	620,000	35.4	68.9
	25%-30%	380,000	21.6	90.5
	Over 30%	170,000	9.4	100.0
	Total	1,740,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown Table 19.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	Single glazing	210,000	12.0	12.0
	Double glazing	1,520,000	86.9	99.0
	Mix of glazing (no predominant type)	20,000	1.0	100.0
	Total	1,740,000	100.0	

2.6 Table 20 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	No bay	580,000	33.4	33.4
	Bays	1160,000	66.6	100.0
	Total	1,740,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 21.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	Owner Occupied	1,420,000	81.6	81.6
	Local Authority	130,000	7.6	89.2
	Housing Association (RSL)	60,000	3.4	92.6
	Private Rented	130,000	7.4	100.0
	Total	1,740,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 22. 50% of this type of dwelling have a floor area between 73 sqm and 102 sqm.

Table 22 1919-1944 semi-detached mean, median usable floor area and IQR			
			Useable floor area (sqm)
1919-1944,semi-detached	Mean		92.5
	Median		85.2
	Percentiles	25	72.9
		50	85.2
		75	102.1

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 23. 50% of this type of dwelling have a wall area between 84 sqm and 107 sqm.

Table 23 1919-1944 semi-detached mean, median external exposed wall area and IQR			
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)
1919-1944,semi-detached	Mean		97.2
	Median		93.7
	Percentiles	25	83.7
		50	93.7
		75	106.8

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 24. 50% of this type of dwelling have a roof area between 39 sqm and 56 sqm.

Table 24 1919-1944 semi-detached mean, median roof area and IQR			
			Total dwelling roof area
1919-1944,semi-detached	Mean		49.6
	Median		46.4
	Percentiles	25	38.9
		50	46.4
		75	56.1

2.11 Table 25 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 25 1919-1944 semi-detached dwellings thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
Pre-1919,mid terrace	none	70,000	3.8	3.8
	less than 50mm	70,000	3.8	7.6
	50 up to 99mm	430,000	24.5	32.1
	100 up to 149mm	590,000	34.0	66.1
	150 up to 199mm	230,000	13.2	79.3
	200mm or more	360,000	20.7	100.0
	Total	1,740,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 26. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieve a reduction between 1.1 tonnes/yr and 2.8 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
1919-1944,semi-detached	Mean		2.0
	Median		1.9
	Percentiles	25	1.1
		50	1.9
		75	2.8

2.13 Table 27 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 46% of the dwellings of this type have additional parts added.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	No additional parts	950,000	54.3	54.3
	Additional parts	800,000	45.7	100.0
	Total	1,740,000	100.0	

2.14 Table 28 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
1919-1944,semi-detached	masonry pointing	990,000	56.8	56.8
	Other types	750,000	43.2	100.0
	Total	1,740,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, almost, almost 74% can be improved by adding wall insulation; nearly 32% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 12% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	73.6
2	Add roof insulation (existing insulation less or equal to 99mm thick)	32.1
3	Add double glazing (predominant glazing type not double glazed)	12.0

1945-1964, SEMI-DETACHED

Rank: 3rd



1. Background information

Approx 1,740,000 properties of this type, which is around 8% of the whole stock.

50% of the properties of this type have a floor area between 74 and 95 sqm.

Total CO₂ emissions at present (under SAP assumption): 10.8 million tonnes/yr CO₂, which is almost 8% of total stock CO₂ emission.

2. Detailed description

2.1 Table 29 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1945-1964,semi-detached	1,740,000	8.0	10,830,000	7.8

2.2 The predominant wall types of this type of dwelling are shown in Table 30 below.

	Frequency	Percent	Cumulative Percent	
1945-1964,semi-detached	Cavity with insulation	840,000	48.2	
	Cavity uninsulated	700,000	40.5	88.7
	Solid uninsulated	170,000	9.9	98.5
	Others	30,000	1.5	100.0
	Total	1,740,000	100.0	

2.3 Table 31 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

Table 31 1945-1964 semi-detached predominant roof type				
		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	Pitched	1,670,000	96.0	96.0
	Others	70,000	4.0	100.0
	Total	1,740,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 32

Table 32 1945-1964 semi-detached dwellings glazing extent				
		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	Less than 25%	1,320,000	76.1	76.1
	25%-75%	410,000	23.9	100.0
	Total	1,740,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 33 below.

Table 33 1945-1964 semi-detached dwellings glazing type				
		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	Single glazing	130,000	7.7	7.7
	Double glazing	1,570,000	90.5	98.3
	Mix of glazing (no predominant type)	30,000	1.7	100.0
	Total	1,740,000	100.0	

2.6 Table 34 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

Table 34 1945-1964 semi-detached dwellings bays				
		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	No bays	1,240,000	71.6	71.6
	Bays	500,000	28.4	100.0
	Total	1,740,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 35.

Table 35 1945-1964 semi-detached dwellings tenure				
		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	Owner Occupied	1,250,000	71.8	71.8
	Local Authority	270,000	15.3	87.1
	Housing Association (RSL)	110,000	6.5	93.7
	Private Rented	110,000	6.3	100.0
	Total	1,740,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 36. 50% of this type of dwelling have a floor area between 74 sqm and 95 sqm.

Table 36 1945-1964 semi-detached dwellings mean, median usable floor area and IQR			
			Useable floor area (sqm)
1945-1964,semi-detached	Mean		87.6
	Median		82.4
	Percentiles	25	73.8
		50	82.4
		75	95.1

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 37. 50% of this type of dwelling have a wall area between 84 sqm and 105 sqm.

Table 37 1945-1964 semi-detached dwellings mid terrace mean, median external exposed wall area and IQR			
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)
1945-1964,semi-detached	Mean		94.1
	Median		93.1
	Percentiles	25	83.8
		50	93.1
		75	104.7

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 38. 50% of this type of dwelling have a roof area ranged from 40 sqm and 53 sqm.

Table 38 1945-1964 semi-detached dwellings mid terrace mean, median roof area and IQR			
			Total dwelling roof area
1945-1964,semi-detached	Mean		47.4
	Median		44.0
	Percentiles	25	39.3
		50	44.0
		75	52.6

2.11 Table 25 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 39 1945-1964 semi-detached dwellings thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
1945-1964,semi-detached	none	40,000	2.5	2.5
	less than 50mm	60,000	3.3	5.8
	50 up to 99mm	320,000	18.5	24.3
	100 up to 149mm	630,000	36.1	60.4
	150 up to 199mm	260,000	15.2	75.6
	200mm or more	420,000	24.4	100.0
	Total	1,740,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 40. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 1.0 tonnes/yr and 2.6 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
1945-1964,semi-detached	Mean		1.8
	Median		1.7
		25	1.0
	Percentiles	50	1.7
		75	2.6

2.13 13 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Over 33% of the dwellings of this type have additional parts.

		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	No additional parts	1,160,000	66.8	66.8
	Additional parts	580,000	33.2	100.0
	Total	1,740,000	100.0	

2.14 Table 42 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
1945-1964,semi-detached	masonry pointing	1,300,000	75	75
	non masonry pointing	430,000	25	100
	Total	1,740,000	100	

3. Potential for basic thermal efficiency improvements

For this dwelling type, about 50% can be improved by adding wall insulation; over 24% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 8% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	50.4
2	Add roof insulation (existing insulation less or equal to 99mm thick)	24.3
3	Add double glazing (predominant glazing type not double glazed)	7.7

POST-1980, DETACHED

Rank: 4th



1. Background information

Approx 1,500,000 properties of this type, which is around 7 % of the whole stock.

50% of the properties of this type have a floor area between 99 and 155 sqm.

Total CO₂ emissions at present (under SAP assumption): 10 million tonnes/yr CO₂, which is about 7% of the total stock CO₂ emission.

1. Detailed description

2.1 Table 43 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
Post-1980, detached	1,500,000	6.9	9,980,000	7.2

2.2 The predominant wall types of this type of dwelling are shown in Table 44 below.

		Frequency	Percent	Cumulative Percent
Post-1980, detached	Cavity with insulation	860,000	57.2	57.2
	Cavity uninsulated	620,000	41.5	98.7
	Other	20000.0	1.3	100.0
	Total	1,500,000	100.0	

2.3 Table 45 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
Post-1980, detached	Pitched	1,460,000	97.4	97.4
	Others	40,000	2.6	100.0
	Total	1,500,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 46

Table 46 Post-1980 detached dwellings glazing extent				
		Frequency	Percent	Cumulative Percent
Post-1980, detached	0%-15%	590,000	39.1	39.1
	15%-20%	600,000	39.8	78.9
	20%-25%	250,000	16.6	95.5
	25%-30%	50,000	3.0	98.5
	Over 30%	20,000	1.5	100.0
	Total	1,500,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 47 below.

Table 47 Pre- 1919 mid terrace glazing type				
		Frequency	Percent	Cumulative Percent
Post-1980, detached	Single glazing	60,000	4.1	4.1
	Double glazing	1,430,000	95.5	99.6
	Mix of glazing (no predominant type)	10,000	0.4	100.0
	Total	1,500,000	100.0	

2.6 Table 48 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

Table 48 post-1980 detached dwellings bays				
		Frequency	Percent	Cumulative Percent
Post-1980, detached	No bays	950,000	63.4	63.4
	Bays	550,000	36.6	100.0
	Total	1,500,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 49. "Others" includes 'Local Authority', 'Housing Association (RSL)' and 'Private Rented'.

Table 49 Post-1980 detached dwellings tenure				
		Frequency	Percent	Cumulative Percent
Post-1980, detached	Owner Occupied	1,420,000	94.7	94.7
	Others	80,000	5.3	100.0
	Total	1,500,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 50 above. 50% of this type of dwelling have a floor area between 99 sqm and 155 sqm

Table 50 Post-1980 detached dwellings mean, median usable floor area and IQR				
		Useable floor area (sqm)		
Post-1980, detached	Mean			135.1
	Median			121.8
		25		98.7
	Percentiles	50		121.8
		75		155.1

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 51. 50% of this type of dwelling have a external wall area between 147 sqm and 190 sqm.

		Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m ²)	
Post-1980, detached	Mean		171.8
	Median		165.8
	Percentiles	25	146.8
		50	165.8
		75	190.1

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 52. 50% of this type of dwelling have a roof area between 53 sqm and 81 sqm.

		Total dwelling roof area	
Post-1980, detached	Mean		70.4
	Median		64.6
	Percentiles	25	52.6
		50	64.6
		75	81.1

2.11 Table 53 shows the range of existing loft insulation thicknesses in this dwelling type.

		Frequency	Percent (%)	Cumulative Percent
Post-1980, detached	none & less than 99mm	170,000	11.3	11.3
	100 up to 149mm	540,000	36.0	47.4
	150 up to 199mm	350,000	23.3	70.7
	200mm or more	440,000	29.3	100.0
	Total	1,500,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 54. 50% of this type of dwelling achieves CO₂ Emissions reductions of between 0.8 tonnes/yr and 2.1 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
Post-1980, detached	Mean		1.5
	Median		1.4
	Percentiles	25	0.8
		50	1.4
		75	2.1

2.13 Table 55 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Over 52% of the dwellings of this type have additional parts.

Table 55 Presence of additional parts in post-1980 detached dwellings				
		Frequency	Percent	Cumulative Percent
Post-1980, detached	No additional parts	720,000	47.9	47.9
	Additional parts	780,000	52.1	100.0
	Total	1,500,000	100.0	

2.14 Table 56 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish. Over 92% of post-1980 detached dwellings have 'masonry pointing' predominant wall finish.

Table 56 Predominant wall finish in post-1980 detached dwellings				
		Frequency	Percent	Cumulative Percent
Post-1980, detached	masonry pointing	1,380,000	92.2	92.2
	non masonry pointing	120,000	7.8	100.0
	Total	1,500,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, over 42% can be improved by adding wall insulation; about 11% of the dwelling of this type can have roof insulation added to achieve better thermal performance; only 4% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	42.2
2	Add roof insulation (existing insulation less or equal to 99mm thick)	11.3
3	Add double glazing (predominant glazing type not double glazed)	4.1

1965-1980, SEMI-DETACHED

Rank: 5th



1. Background information

Approx 1,000,000 properties of this type, which is around 4.6 % of the whole stock.

50% of the properties of this type have a floor area between 72 and 97 sqm.

Total CO₂ emissions at present (under SAP assumption): 5.8 million tonnes/yr CO₂, which represents 4% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 57 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1965-1980, semi-detached	1,000,000	4.6	5,770,000	4.1

2.2 The predominant wall types of this type of dwelling are shown in Table 58 below..

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	Cavity with insulation	460,000	46.5	46.5
	Cavity uninsulated	520,000	51.7	98.1
	Solid with & without insulation	10,000	1.2	99.3
	Others	10,000	0.7	100.0
	Total	1,000,000	100.0	

2.3 Table 59 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	Pitched	900,000	90.3	90.3
	Others	100,000	9.7	100.0
	Total	1,000,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 60

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	0%-15%	110,000	10.7	10.7
	15%-20%	310,000	31.5	42.2
	20%-25%	340,000	33.6	75.8
	25%-30%	170,000	16.7	92.5
	Over 30%	70,000	7.5	100.0
	Total	1,000,000	100.0	

2.5 Table 61 shows the number of bays in the dwelling type of 1965-1980 semi-detached. Bays can be either single or multi- storey.

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	No bays	920,000	91.6	91.6
	Bays	90,000	8.4	100.0
	Total	1,010,000	100.0	

2.6 Table 62 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	Single glazing	50,000	4.9	4.9
	Double glazing	930,000	93.3	98.2
	Mix of glazing (no predominant type)	20,000	1.8	100.0
	Total	1,000,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 63

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	Owner Occupied	880,000	88.5	88.5
	Local Authority	30,000	3.1	91.5
	Housing Association (RSL)	20,000	2.2	93.7
	Private Rented	60,000	6.3	100.0
	Total	1,000,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 64. 50% of this type of dwelling have a floor area between 72sqm and 97sqm.

		Useable floor area (sqm)	
1965-1980, semi-detached	Mean		87.0
	Median		82.8
	Percentiles	25	72.1
		50	82.8
		75	97.1

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 65. 50% of this type of dwelling have a wall area between 81sqm and 103sqm.

Table 65 1965-1980 semi-detached dwellings mean, median external exposed wall area and IQR				
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)	
1965-1980, semi-detached	Mean		91.1	
	Median		91.6	
	Percentiles	25		80.9
		50		91.6
		75		102.5

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 66. 50% of this type of dwelling have a roof area ranged from 33 sqm and 48 sqm.

Table 66 1965-1980 semi-detached mean, median roof area and IQR				
			Total dwelling roof area	
1965-1980, semi-detached	Mean		47.8	
	Median		44.9	
	Percentiles	25		38.9
		50		44.9
		75		54.6

2.11 Table 67 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 67 1965-1980 semi-detached dwellings thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
1965-1980, semi-detached	None & less than 50mm	70,000	7.2	7.2
	50 up to 99mm	230,000	23.2	30.4
	100 up to 149mm	370,000	37.4	67.7
	150 up to 199mm	130,000	13.5	81.2
	200mm or more	190,000	18.8	100.0
	Total	1,000,000	100.0	

2.10 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 68. 50% of this dwelling type achieves a CO₂ emissions reduction of between 1.0 tonnes/yr and 2.5 tonnes/yr by applying the improvement measures.

Table 68 1965-1980 semi-detached dwellings mean, median environmental impact rating improvements and IQR				
			Improvement on CO ₂ Emissions (tonnes/yr)	
1965-1980, semi- detached	Mean		1.8	
	Median		1.7	
	Percentiles	25		1.0
		50		1.7
		75		2.5

2.13 Table 69 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 37% of the dwellings of this type have additional parts added.

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	No additional parts	630,000	63.5	63.5
	Additional parts	370,000	36.5	100.0
	Total	1,000,000	100.0	

2.14 Table 70 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
1965-1980, semi-detached	Masonry pointing	920,000	91.6	91.6
	non masonry pointing	80,000	8.4	100.0
	Total	1,000,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, almost 53% can be improved by adding wall insulation; over 30% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 5% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	52.7
2	Add roof insulation (existing insulation less or equal to 99mm thick)	30.4
3	Add double glazing (predominant glazing type not double glazed)	4.9

1965-1980, PURPOSE BUILT FLAT, LOW RISE

Rank: 6th



1. Background information

Approx 940,000 properties of this type, which is around 4 % of the whole stock.

50% of the properties of this type have a floor area between 42 and 65 sqm.

Total CO₂ emissions at present (under SAP assumption): nearly 3.2 million tonnes/yr CO₂, which represents about 2% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 71 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1965-1980 purpose built flat, low rise	940,000	4.3	3,150,000	2.3

2.2 The predominant wall types of this type of dwelling are shown in Table 72 below.

	Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	Cavity with insulation	310,000	32.9
	Cavity uninsulated	540,000	57.7
	Solid uninsulated	70,000	7.0
	Others	20,000	2.4
	Total	940,000	100.0

2.3 Table 73 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs. Note that this refers to the roof of the block, not necessarily the dwelling itself.

	Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	Pitched	700,000	74.3
	Others	240,000	25.7
	Total	940,000	100.0

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 74

Table 74 1965-1980 purpose built low rise flat glazing extent				
		Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	0%-20%	40,000	4.0	4.0
	20%-25%	220,000	23.6	27.6
	25%-30%	230,000	24.5	52.1
	30%-35%	300,000	32.3	84.4
	Over 35%	150,000	15.6	100.0
	Total	940,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 75.

Table 75 1965-1980 purpose built low rise flat glazing type				
		Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	Single glazing	180,000	18.9	18.9
	Double glazing	690,000	73.2	92.1
	Mix of glazing (no predominant type)	70,000	7.9	100.0
	Total	940,000	100.0	

2.6 Table 76 shows the number of the bay types in the dwelling type of 1965-1980 purpose built low rise flat. Bays can be either single or multi- storey.

Table 76 1965-1980 purpose built low rise flat bay types				
		Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	No bays	880,000	92.7	92.7
	Bays	60,000	7.3	100.0
	Total	940,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 77

Table 76 1965-1980 purpose built low rise flat tenure				
		Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	Owner Occupied	240,000	25.0	25.0
	Local Authority	350,000	37.4	62.4
	Housing Association (RSL)	190,000	19.7	82.1
	Private Rented	170,000	17.9	100.0
	Total	940,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 78. 50% of this type of dwelling have a floor area between 42 sqm and 65 sqm.

Table 78 1965-1980 purpose built low rise flat mean, median usable floor area and IQR			
		Useable floor area (sqm)	
1965-1980 purpose built flat, low rise	Mean		55.0
	Median		51.1
	Percentiles	25	42.4
	Percentiles	50	51.1
		75	64.9

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 79. 50% of this type of dwelling have a wall area between 21sqm and 38 sqm.

		Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)
1965-1980 purpose built flat, low rise	Mean	30.0
	Median	28.5
	25	21.3
	Percentiles 50	28.5
	75	37.5

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 80. 50% of this type of dwelling have a roof area ranged from 42 sqm and 63 sqm. Note that this refers to the roof of the block, not necessarily the dwelling itself.

		Total dwelling roof area
1965-1980 purpose built flat, low rise	Mean	53.4
	Median	49.5
	25	41.3
	Percentiles 50	49.5
	75	62.6

2.11 Table 81 shows the range of existing loft insulation thicknesses in this dwelling type.

		Frequency	Percent (%)	Cumulative Percent
1965-1980 purpose built flat, low rise	None or less than 50mm	10,000	1.5	1.5
	50 up to 99mm	100,000	10.5	11.9
	100 up to 149mm	160,000	16.6	28.6
	150 up to 199mm	40,000	4.5	33.0
	200mm or more	80,000	8.6	41.7
	no loft	550,000	58.3	100.0
	Total	940,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 82. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 0.3 tonnes/yr and 1.1 tonnes/yr by applying the improvement measures recommended.

		Improvement on CO ₂ Emissions (tonnes/yr)
1965-1980 purpose built flat, low rise	Mean	0.7
	Median	0.7
	25	0.3
	Percentiles 50	0.7
	75	1.1

2.13 Table 83 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 37% of the dwellings of this type have additional parts added.

Table 83 Presence of additional parts in 1965-1980 purpose built low rise flats				
		Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	No additional parts	640,000	67.7	67.7
	Additional parts	310,000	32.3	100.0
	Total	940,000	100.0	

2.14 Table 84 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

Table 84 Predominant wall finish in 1965-1980 purpose built low rise flat				
		Frequency	Percent	Cumulative Percent
1965-1980 purpose built flat, low rise	masonry pointing	820,000	87.1	87.1
	others	120,000	12.9	100.0
	Total	940,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, almost, almost 65% can be improved by adding wall insulation; nearly 12% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 20% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	64.7
2	Add roof insulation (existing insulation less or equal to 99mm thick)	11.9
3	Add double glazing (predominant glazing type not double glazed)	19.8

POST-1980, PURPOSE BUILT FLAT, LOW RISE

Rank: 7th



1. Background information

Approx 910,000 properties of this type, which is around 4 % of the whole stock.

50% of the properties of this type have a floor area between 39 and 57 sqm.

Total CO₂ emissions at present (under SAP assumption): 2.4 million tonnes/yr CO₂, which represents almost 2% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 85 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
Post-1980 purpose built flats, low rise	910,000	4.2	2,420,000	1.7

2.2 The predominant wall types of this type of dwelling are shown in Table 86 below.

	Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	Cavity with insulation	440,000	48.7
	Cavity uninsulated	440,000	49.0
	Solid uninsulated	10,000	1.5
	Others	10,000	0.8
	Total	910,000	100

2.3 Table 87 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs. Note that this refers to the roof of the block, not necessarily the dwelling itself.

Table 87 Post-1980 purpose built low rise flats predominant roof type				
		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	Pitched	830,000	91.4	91.4
	Others	80,000	8.6	100.0
	Total	910,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 88.

Table 88 Post-1980 purpose built low rise flats glazing extent				
		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	0%-20%	40,000	4.8	4.8
	20%-25%	110,000	11.8	16.6
	25%-30%	110,000	12.6	29.2
	30%-35%	220,000	24.4	53.7
	Over 35%	420,000	46.3	100.0
	Total	910,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 89.

Table 89 Post-1980 purpose built low rise flats glazing type				
		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	Single glazing	130,000	14.5	14.5
	Double glazing	630,000	69.8	84.3
	Mix of glazing (no predominant type)	140,000	15.7	100.0
	Total	910,000	100.0	

2.6 Table 90 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

Table 90 Post-1980 purpose built low rise flats bays				
		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	No bays	700,000	77.0	77.0
	Bays	210,000	23.0	100.0
	Total	910,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 91 below.

Table 91 Post-1980 purpose built low rise flats tenure				
		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	Owner Occupied	370,000	41.2	41.2
	Local Authority	80,000	8.8	50.1
	Housing Association (RSL)	240,000	26.6	76.6
	Private Rented	210,000	23.4	100.0
	Total	910,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 92. 50% of this type of dwelling have a floor area between 39sqm and 57sqm.

		Useable floor area (sqm)	
Post-1980 purpose built flats, low rise	Mean		52.5
	Median		47.6
	Percentiles	25	39.2
		50	47.6
		75	57.3

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 93. 50% of this type of dwelling have a wall area between 15sqm and 29sqm.

		Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)	
Post-1980 purpose built flats, low rise	Mean		23.0
	Median		21.0
	Percentiles	25	14.8
		50	21.0
		75	28.6

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 94. 50% of this type of dwelling have a roof area ranged from 42 sqm and 61 sqm. Note that this refers to the roof of the block, not necessarily the dwelling itself.

		Total dwelling roof area	
Post-1980 purpose built flats, low rise	Mean		53.9
	Median		49.6
	Percentiles	25	41.8
		50	49.6
		75	60.7

2.11 Table 95 shows the range of existing loft insulation thicknesses in this dwelling type.

		Frequency	Percent (%)	Cumulative Percent
Post-1980 purpose built flats, low rise	None or less than 99mm	40,000	4.4	4.4
	100 up to 149mm	140,000	15.5	19.9
	150 up to 199mm	60,000	7.1	27.0
	200mm or more	100,000	11.1	38.1
	no loft	560,000	61.9	100.0
	Total	910,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 96. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type dwelling achieves CO₂ Emissions reductions between 0.3 tonnes/yr and 1.1 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
Post-1980 purpose built flats, low rise	Mean		0.7
	Median		0.7
	Percentiles	25	0.3
		50	0.7
		75	1.1

2.13 Table 97 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 44% of the dwellings of this type have additional parts added.

		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	No additional parts	510,000	56.0	56.0
	Additional parts	400,000	44.0	100.0
	Total	910,000	100.0	

2.14 Table 98 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
Post-1980 purpose built flats, low rise	Masonry pointing	830,000	91.2	91.2
	non masonry pointing	80,000	8.8	100.0
	Total	910,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, almost 51% can be improved by adding wall insulation; over 4% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 15% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	50.5
2	Add roof insulation (existing insulation less or equal to 99mm thick)	4.4
3	Add double glazing (predominant glazing type not double glazed)	14.5

1965-1980, DETACHED HOUSE

Rank: 8th



1. Background information

Approx 850,000 properties of this type, which is around 4 % of the whole stock.

50% of the properties of this type have a floor area between 97 and 153 sqm.

Total CO₂ emissions at present (under SAP assumption): 2.4 million tonnes/yr CO₂, which represents 5% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 99 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1965-1980, detached	850,000	3.9	7,410,000	5.3

2.2 The predominant wall types of this type of dwelling are shown in Table 100.

		Frequency	Percent	Cumulative Percent
1965-1980 detached	Cavity with insulation	430,000	50.8	50.8
	Cavity uninsulated	410,000	48.5	99.3
	Other	10,000	0.7	100.0
	Total	850,000	100	

2.3 Table 101 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
1965-1980, detached	Pitched	780,000	91.3	91.3
	Others	70,000	8.7	100.0
	Total	850,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 102

Table 102 1965-1980 detached dwellings glazing extent				
		Frequency	Percent	Cumulative Percent
1965-1980, detached	0%-15%	200,000	23.0	23.0
	15%-20%	320,000	37.9	60.9
	20%-25%	230,000	26.7	87.7
	25%-30%	80,000	9.1	96.7
	Over 30%	28,017	3	100.0
	Total	850,000	100	

2.5 The predominant type of glazing of this dwelling type is shown in Table 103.

Table 103 1965-1980 detached dwellings glazing type				
		Frequency	Percent	Cumulative Percent
1965-1980, detached	Single glazing	60,000	7.5	7.5
	Double glazing	770,000	90.9	98.5
	Mix of glazing (no predominant type)	10,000	1.5	100.0
	Total	850,000	100.0	

2.6 Table 104 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

Table 104 1965-1980 detached dwellings bays				
		Frequency	Percent	Cumulative Percent
1965-1980, detached	No bays	760,000	89.4	89.4
	Bays	90,000	10.6	100.0
	Total	850,000	100	

2.7 The tenure breakdown of dwellings of this type is shown in Table 105

Table 105 1965-1980 detached dwellings tenure				
		Frequency	Percent	Cumulative Percent
1965-1980, detached	Owner Occupied	810,000	94.6	94.6
	Others	50,000	5.4	100.0
	Total	850,000	100	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 106. 50% of this type of dwelling have a floor area between 97sqm and 153sqm.

Table 106 1965-1980 detached dwellings mean, median usable floor area and IQR				
		Useable floor area (sqm)		
1965-1980, detached	Mean			131.3
	Median			120.0
		25		96.5
	Percentiles	50		120.0
		75		152.8

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 107. 50% of this type of dwelling have a wall area between 133sqm and 181sqm.

		Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)		
1965-1980, detached	Mean		157.6	
	Median		157.1	
	Percentiles	25		133.1
		50		157.1
		75		181.1

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 108. 50% of this type of dwelling have a roof area ranged from 53 sqm and 85 sqm.

		Total dwelling roof area		
1965-1980, detached	Mean		71.8	
	Median		66.0	
	Percentiles	25		52.5
		50		66.0
		75		85.2

2.11 Table 109 shows the range of existing loft insulation thicknesses in this dwelling type.

		Frequency	Percent (%)	Cumulative Percent
1965-1980, detached	None & less than 50mm	40,000	5.0	5.0
	50 up to 99mm	230,000	27.1	32.1
	100 up to 149mm	310,000	36.7	68.9
	150 up to 199mm	110,000	12.9	81.8
	200mm or more	160,000	18.2	100.0
	Total	850,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 110. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 1.4 tonnes/yr and 3.8 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)		
1965-1980, detached	Mean		2.7	
	Median		2.3	
	Percentiles	25		1.4
		50		2.3
		75		3.8

2.13 Table 111 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 62% of the dwellings of this type have additional parts.

Table 111 Presence of additional parts in 1965-1980 detached dwellings				
		Frequency	Percent	Cumulative Percent
1965-1980, detached	No additional parts	330,000	38.5	38.5
	Additional parts	520,000	61.5	100.0
	Total	850,000	100.0	

2.14 Table 112 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

Table 112 Predominant wall finish in 1965-1980 detached dwellings				
		Frequency	Percent	Cumulative Percent
1965-1980, detached	Masonry pointing	760,000	88.8	88.8
	non masonry pointing	100,000	11.2	100.0
	Total	850,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type,, almost 49% can be improved by adding wall insulation; over 32% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 8% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	48.8
2	Add roof insulation (existing insulation less or equal to 99mm thick)	32.1
3	Add double glazing (predominant glazing type not double glazed)	7.5

PRE-1919, SEMI-DETACHED

Rank: 9th



1. Background information

Approx 710,000 properties of this type, which is around 3% of the whole stock.

50% of the properties of this type have a floor area between 85 and 144 sqm.

Total CO₂ emissions at present (under SAP assumption): 7.9 million tonnes/yr CO₂, which represents nearly 6 % of total stock CO₂ emissions.

2. Detailed description

2.1 Table 113 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
Pre-1919, semi-detached	710,000	3.3	7,850,000	5.6

2.2 The predominant wall types of this type of dwelling are shown in Table 114 below.

		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	Cavity with insulation	40,000	5.8	5.8
	Cavity uninsulated	100,000	14.6	20.4
	Solid uninsulated	560,000	78.7	99.1
	Others	10,000	0.9	100.0
	Total	710,000	100	

2.3 Table 115 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	Pitched	700,000	98.1	98.1
	Others	10,000	1.9	100.0
	Total	710,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 116.

		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	0%-15%	150,000	21.5	21.5
	15%-20%	250,000	34.7	56.2
	20%-25%	210,000	29.3	85.5
	25%-30%	70,000	9.8	95.3
	Over 30%	30,000	4.7	100.0
	Total	710,000	100	

2.5 The predominant type of glazing of this dwelling type is shown Table 117.

		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	Single glazing	280,000	39.0	39.0
	Double glazing	410,000	57.5	96.5
	Mix of glazing (no predominant type)	30,000	3.5	100.0
	Total	710,000	100.0	

2.6 Table 118 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	No bays	360,000	50.6	50.6
	bays	350,000	28.7	100.0
	Total	710,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 119

		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	Owner Occupied	590,000	82.2	82.2
	Others	130,000	17.8	100.0
	Total	710,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 120. 50% of this type of dwelling have a floor area between 85 sqm and 144 sqm.

		Useable floor area (sqm)		
Pre-1919, semi-detached	Mean		122.9	
	Median		107.2	
	Percentiles	25		84.6
		50		107.2
		75		143.8

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 121. 50% of this type of dwelling have a wall area between 103sqm and 150sqm.

Table 121 Pre-1919 semi-detached dwellings mean, median external exposed wall area and IQR				
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)	
Pre-1919, semi-detached	Mean		130.7	
	Median		122.5	
	Percentiles	25		102.7
		50		122.5
		75		150.0

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 122. 50% of this type of dwelling have a roof area ranged from 41 sqm and 68 sqm.

Table 122 Pre-1919 semi-detached dwellings mean, median roof area and IQR				
			Total dwelling roof area	
Pre-1919 semi-detached	Mean		57.5	
	Median		52.0	
	Percentiles	25		41.3
		50		52.0
		75		67.7

2.11 Table 123 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 123 Pre-1919 semi-detached dwellings thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
Pre-1919 semi-detached	None & less than 50mm	250,000	11.0	11.0
	50 up to 99mm	180,000	24.6	35.6
	100 up to 149mm	250,000	35.2	70.8
	150 up to 199mm	90,000	13.3	84.1
	200mm or more	110,000	15.9	100.0
	Total	710,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 124. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 1.0 tonnes/yr and 3.4 tonnes/yr by applying the improvement measures.

Table 124 pre-1919 semi-detached dwellings mean, med Improvement on CO₂ Emissions and IQ				
			Improvement on CO ₂ Emissions (tonnes/yr)	
Pre-1919 semi-detached	Mean		2.3	
	Median		2.1	
	Percentiles	25		1.0
		50		2.1
		75		3.4

2.13 Table 125 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 74% of the dwellings of this type have additional parts.

Table 125 Presence of additional parts in pre-1919 semi-detached dwellings				
		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	No additional parts	190,000	26.2	26.2
	Additional parts	530,000	73.8	100.0
	Total	710,000	100.0	

2.14 Table 126 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

Table 126 Predominant wall finish in 1965-1980 detached dwellings				
		Frequency	Percent	Cumulative Percent
Pre-1919, semi-detached	Masonry pointing	480,000	67.3	67.3
	non masonry pointing	230,000	32.7	100.0
	Total	710,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, 93% can be improved by adding wall insulation; nearly 36% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 39% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	93.3
2	Add roof insulation (existing insulation less or equal to 99mm thick)	35.6
3	Add double glazing (predominant glazing type not double glazed)	39.0

1965-1980, BUNGALOW

Rank: 10th



1. Background information

Approx 690,000 properties of this type, which is around 3 % of the whole stock.

50% of the properties of this type have a floor area between 55 and 88 sqm.

Total CO₂ emissions at present (under SAP assumption): 4.2 million tonnes/yr CO₂, which represents 3% of total stock CO₂ emissions.

2. Detailed description

2.1 Table 127 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1965-1980, bungalows	690,000	3.2	4,240,000	3.0

2.2 The predominant wall types of this type of dwelling are shown in Table 128 below.

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	Cavity with insulation	420,000	60.5	60.5
	Cavity uninsulated	250,000	35.3	95.9
	Solid uninsulated	10,000	1.8	97.6
	Others	20,000	2.4	100.0
	Total	690,000	100.0	

2.3 Table 129 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	Pitched	680,000	97.8	97.8
	Others	20,000	2.2	100.0
	Total	690,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 130

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	0%-15%	80,000	10.9	10.9
	15%-20%	220,000	32.2	43.1
	20%-25%	200,000	29.3	72.4
	25%-30%	120,000	16.8	89.1
	30%-35%	50,000	6.9	96.0
	Over 35%	30,000	4.0	100.0
	Total	690,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 131.

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	Single glazing	60,000	8.2	8.2
	Double glazing	620,000	89.9	98.1
	Mix of glazing (no predominant type)	10,000	1.9	100.0
	Total	690,000	100.0	

2.6 Table 132 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	No bays	660,000	94.8	94.8
	Bays	30,000	5.2	100.0
	Total	690,000	100	

2.7 The tenure breakdown of dwellings of this type is shown in Table 133

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	Owner Occupied	520,000	74.8	74.8
	Local Authority	80,000	11.8	86.6
	Housing Association (RSL)	60,000	8.4	95.0
	Private Rented	30,000	5.0	100.0
	Total	690,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 134. 50% of this type of dwelling have a floor area between 55 sqm and 88sqm.

Table 134 1965-1980 bungalows mean, median usable floor area and IQR				
			Useable floor area (sqm)	
1965-1980, bungalows	Mean		75.8	
	Median		68.5	
	Percentiles	25		54.8
		50		68.5
		75		88.0

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 135. 50% of this type of dwelling have a wall area between 57 sqm and 105 sqm.

Table 135 1965-1980 bungalows mean, median external exposed wall area and IQR				
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)	
1965-1980, bungalows	Mean		83.3	
	Median		81.7	
	Percentiles	25		56.7
		50		81.7
		75		105.1

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type is shown in Table 136. 50% of this type of dwelling have a roof area ranged from 57 sqm and 91 sqm.

Table 136 1965-1980 bungalows mean, median roof area and IQR				
			Total dwelling roof area	
1965-1980, bungalows	Mean		77.5	
	Median		71.0	
	Percentiles	25		56.6
		50		71.0
		75		90.6

2.11 Table 137 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 137 1965-1980 bungalows thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
1965-1980, bungalows	none	10,000	1.0	1.0
	less than 50mm	20,000	3.6	4.6
	50 up to 99mm	120,000	17.9	22.5
	100 up to 149mm	220,000	31.1	53.7
	150 up to 199mm	100,000	14.8	68.4
	200mm or more	220,000	31.6	100.0
	Total	690,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 138. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 0.7 tonnes/yr and 2.3 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
1965-1980, bungalows	Mean		1.6
	Median		1.4
	Percentiles	25	0.7
		50	1.4
		75	2.3

2.13 Table 139 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Only 39% of the dwellings of this type have additional parts added.

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	No additional parts	420,000	61.1	61.1
	Additional parts	270,000	38.9	100.0
	Total	690,000	100.0	

2.14 Table 140 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
1965-1980, bungalows	Masonry pointing	570,000	81.3	81.3
	non masonry pointing	130,000	18.7	100.0
	Total	690,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, over 37% can be improved by adding wall insulation; nearly 23% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 8% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	37.1
2	Add roof insulation (existing insulation less or equal to 99mm thick)	22.5
3	Add double glazing (predominant glazing type not double glazed)	8.2

PRE-1919, CONVERTED FLAT

Rank: 11th



1. Background information

Approx 660,000 properties of this type, which is around 3 % of the whole stock.

50% of the properties of this type have a floor area between 46 and 80 sqm.

Total CO₂ emissions at present (under SAP assumption): 4.0 million tonnes/yr CO₂, which represents 2.9 % of total stock CO₂ emissions.

2. Detailed description

2.1 Table 141 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
Pre-1919, converted flats	660,000	3	3,970,000	2.9

2.2 The predominant wall types of this type of dwelling are shown in Table 142.

	Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	Cavity with insulation	10,000	1.6
	Cavity uninsulated	50,000	7.6
	Solid uninsulated & insulated	600,000	90.8
	Total	660,000	100.0

2.3 Table 143 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs. Note that this refers to the roof of the block, not necessarily the dwelling itself.

Table 143 pre-1919 converted flats predominant roof type				
		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	Pitched	610,000	92.8	92.8
	Others	50,000	7.2	100.0
	Total	660,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 144.

Table 144 pre-1919 converted flats glazing extent				
		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	15%-20%	30,000	4.5	4.5
	20%-25%	460,000	70.1	74.6
	25%-30%	130,000	20.3	94.8
	Over 30%	30,000	5.2	100.0
	Total	660,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 146.

Table 146 Pre-1919 converted flats glazing types				
		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	Single glazing	320,000	49.0	49.0
	Double glazing	270,000	40.9	89.9
	Mix of glazing (no predominant type)	70,000	10.1	100.0
	Total	660,000	100.0	

2.6 Table 145 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

Table 145 Pre-1919, converted flats bays				
		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	No bays	250,000	38.2	38.2
	Bays	410,000	17.3	55.6
	Total	660,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 147.

Table 147 Pre-1919 converted flats tenure				
		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	Owner Occupied	250,000	37.8	37.8
	Local Authority	20,000	3.5	41.3
	Housing Association (RSL)	60,000	9.5	50.8
	Private Rented	320,000	49.2	100.0
	Total	660,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 148. 50% of this type of dwelling have floor areas between 46 sqm and 80sqm.

Table 148 Pre-1919 converted flats mean, median usable floor area and IQR			
			Useable floor area (sqm)
Pre-1919, converted flats	Mean		68.7
	Median		61.6
		25	46.4
	Percentiles	50	61.6
		75	79.9

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 149. 50% of this type of dwelling have wall areas between 35 sqm and 63 sqm.

Table 149 Pre-1919 converted flats mean, median external exposed wall area and IQR			
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)
Pre-1919, converted flats	Mean		54.8
	Median		47.8
		25	34.8
	Percentiles	50	47.8
		75	63.0

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type are shown in Table 150. 50% of this type of dwelling have roof areas ranged from 42 sqm and 71 sqm. Note that this refers to the roof of the block, not necessarily the dwelling itself.

Table 150 pre-1919 converted flats mean, median roof area and IQR			
			Total dwelling roof area
Pre-1919, converted flats	Mean		60.1
	Median		54.6
		25	41.5
	Percentiles	50	54.6
		75	71.2

2.11 Table 151 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 151 Pre-1919 converted flats thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
Pre-1919, converted flats	None& less than 50mm	40,000	6.2	6.2
	50 up to 99mm	140,000	21.4	27.6
	100 up to 149mm	70,000	10.8	38.4
	150 up to 199mm	10,000	1.6	40.0
	200mm or more	40,000	6.4	46.4
	no loft	350,000	53.6	100.0
	Total	660,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 152. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 1.4 tonnes/yr and 3.8 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
Pre-1919, converted flats	Mean		1.0
	Median		0.8
		25	0.1
	Percentiles	50	0.8
		75	1.5

2.13 Table 153 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Over 74% of the dwellings of this type have additional parts added.

		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	No additional parts	170,000	25.7	25.7
	Additional parts	490,000	74.3	100.0
	Total	660,000	100.0	

2.14 Table 154 shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
Pre-1919, converted flats	Masonry pointing	450,000	67.8	67.8
	non masonry pointing	210,000	32.2	100.0
	Total	660,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, almost 98.2% can be improved by adding wall insulation; nearly 28% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 49% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	98.2
2	Add roof insulation (existing insulation less or equal to 99mm thick)	27.6
3	Add double glazing (predominant glazing type not double glazed)	49.0

1919-1944, MID TERRACE

Rank: 12th



1. Background information

Approx 620,000 properties of this type, which is around 2.9 % of the whole stock.

50% of the properties of this type have a floor area between 64 and 85 sqm.

Total CO₂ emissions at present (under SAP assumption): 3.2 million tonnes/yr CO₂, which represents 2.3 % of total stock CO₂ emissions.

2. Detailed description

2.1 Table 155 shows total number properties of this type, and the proportion that this represents of the total dwelling stock. It also shows total CO₂ emissions of this type and the percentage of total stock CO₂ emissions.

	Frequency	Percent (%)	Total CO ₂ current emissions (tonnes/yr) (EHCS SAP 2005)	% of total stock emissions
1919-1944, mid terraces	620,000	2.9	3,230,000	2.3

2.2 The predominant wall types of this type of dwelling are shown in Table 156 below.

		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	Cavity with insulation	120,000	19.1	19.1
	Cavity uninsulated	170,000	27.4	46.5
	Solid uninsulated & insulated	330,000	53.5	100.0
	Total	620,000	100.0	

2.3 Table 157 lists the number dwellings of this type with pitched roofs; the 'Others' roof type includes mansard roofs, flat roofs and chalet roofs.

Table 157 1919-1944 mid terrace dwellings predominant roof type				
		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	Pitched	610,000	98.1	98.1
	Others	10,000	1.9	100.0
	Total	620,000	100.0	

2.4 The percentage of glazing as a proportion of total exposed wall area (including the glazing area) for this dwelling type is shown in Table 158

Table 158 1919-1944 mid terrace dwellings glazing extent				
		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	0%-20%	90,000	13.7	13.7
	20%-25%	150,000	23.3	37.1
	25%-30%	140,000	23.0	60.0
	30%-35%	150,000	24.6	84.6
	Over 35%	100,000	15.4	100.0
	Total	620,000	100.0	

2.5 The predominant type of glazing of this dwelling type is shown in Table 160.

Table 159 1919-1944 mid terrace dwellings glazing type				
		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	Single glazing	80,000	13.2	13.2
	Double glazing	530,000	84.4	97.6
	Mix of glazing (no predominant type)	20,000	2.4	100.0
	Total	620,000	100.0	

2.6 Table 159 shows the presence of bay windows in this dwelling type. Bays can be either single or multi- storey.

Table 160 1919-1944, mid terraces bays				
		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	No bays	320,000	51.2	51.2
	Bays	300,000	48.8	100.0
	Total	620,000	100.0	

2.7 The tenure breakdown of dwellings of this type is shown in Table 161

Table 161 1919-1944 mid terrace dwellings tenure				
		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	Owner Occupied	420,000	67.6	67.6
	Local Authority	90,000	15.2	82.8
	Housing Association (RSL)	30,000	5.5	88.3
	Private Rented	70,000	11.7	100.0
	Total	620,000	100.0	

2.8 Mean and median floor area and the interquartile range (IQR) of this dwelling type are shown below in Table 162. 50% of this type of dwelling have a floor area between 64 sqm and 85 sqm.

Table 162 1919-1944 mid terrace dwellings mean, median usable floor area and IQR				
			Useable floor area (sqm)	
1919-1944, mid terraces	Mean		76.8	
	Median		73.8	
	Percentiles	25		63.5
		50		73.8
		75		85.4

2.9 Mean and median external wall area and interquartile range (IQR) of this dwelling type are listed in Table 163. 50% of this type of dwelling have a wall area between 42sqm and 63sqm.

Table 163 1919-1944 mid terrace dwellings mean, median external exposed wall area and IQR				
			Total unattached dwelling wall area {exc. windows/doors and parts adjacent to heated spaces} (m2)	
1919-1944, mid terraces	Mean		54.2	
	Median		51.2	
	Percentiles	25		42.3
		50		51.2
		75		63.2

2.10 Mean and median roof area and interquartile range (IQR) of this dwelling type are shown in Table 164. 50% of this type of dwelling have a roof area ranged from 33 sqm and 45 sqm.

Table 164 1919-1944 mid terrace dwellings mean, median roof area and IQR				
			Total dwelling roof area	
1919-1944, mid terraces	Mean		39.6	
	Median		38.7	
	Percentiles	25		32.9
		50		38.7
		75		44.8

2.11 Table 165 shows the range of existing loft insulation thicknesses in this dwelling type.

Table 165 1919-1944 mid terrace dwellings thickness of loft insulation				
		Frequency	Percent (%)	Cumulative Percent
1919-1944, mid terraces	none	40,000	6.0	6.0
	less than 50mm	20,000	3.5	9.5
	50 up to 99mm	160,000	25.2	34.6
	100 up to 149mm	220,000	35.0	69.6
	150 up to 199mm	70,000	10.8	80.4
	200mm or more	120,000	19.6	100.0
	Total	620,000	100.0	

2.12 The notional (SAP based) CO₂ emissions improvement which can be achieved in this dwelling type, following the installation of all lower cost and higher cost measures, as recommended on an Energy Performance Certificate (see Appendix A) are shown in Table 166. Mean, median and interquartile ranges (IQR) of the improvement are also included. 50% of this type of dwelling achieves a CO₂ emissions reduction of between 0.6 tonnes/yr and 1.7 tonnes/yr by applying the improvement measures.

		Improvement on CO ₂ Emissions (tonnes/yr)	
1919-1944, mid terraces	Mean		1.3
	Median		1.2
		25	0.6
	Percentiles	50	1.2
		75	1.7

2.13 shows the proportion of this dwelling type with an 'additional part'. An 'additional part' is any part of the dwelling which 'sticks out' from the usual rectangular dwelling shape. This part is often at the rear of the property and can be an extension or an 'as built' part. Almost 36% of the dwellings of this type have additional parts added.

		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	No additional parts	400,000	63.7	63.7
	Additional parts	230,000	36.3	100.0
	Total	620,000	100.0	

2.14 Table 168 shows 55% shows the proportion of this dwelling type with a predominantly 'masonry pointing' wall finish.

		Frequency	Percent	Cumulative Percent
1919-1944, mid terraces	Masonry pointing	340,000	55.2	55.2
	non masonry pointing	280,000	44.8	100.0
	Total	620,000	100.0	

3. Potential for basic thermal efficiency improvements

For this dwelling type, over 80% can be improved by adding wall insulation; nearly 35% of the dwelling of this type can have roof insulation added to achieve better thermal performance; and at least 28% can have the existing single glazing replaced by double glazing.

	Improvement measures	Percent
1	Add wall insulation (cavity and solid wall)	80.1
2	Add roof insulation (existing insulation less or equal to 99mm thick)	34.6
3	Add double glazing (predominant glazing type not double glazed)	13.2

Appendix A – EPC improvements:

A standardised methodology for recommending improvements is used when an Energy Performance Certificate is produced. This methodology recommends a set of improvements which could be made to any particular dwelling. This methodology is laid out in full in Appendix T of the SAP 2005 documentation available at: <http://projects.bre.co.uk/sap2005/>. Using EHS data we are able to examine the effect of installing these measures¹.

The improvements are described as either ‘low cost’ or ‘higher cost’ and consist of the following:

EPC low cost measures (under £500)	EPC higher cost measures
install cavity wall insulation where the wall is of cavity construction	upgrade central heating controls - typically to a stage where a room thermostat, a central programmer and thermostatic radiator valves (TRV's) have been installed
install or upgrade loft insulation where there is a loft that is not a full conversion to a habitable room and has 150mm or less of loft insulation	upgrade to a class A condensing boiler using the same fuel (mains gas, LPG or fuel oil). This is not applied to communal heating systems.
install or upgrade hot water cylinder insulation to a level matching a 160mm jacket. This is only recommended where the current level is less than 25mm of spray foam or a jacket that is less than 100mm thick.	upgrade existing storage radiators (or other electric heating) to more modern, fan-assisted storage heaters
	Install a hot water cylinder thermostat where there is a cylinder without a thermostat
	Replace warm-air units that are over 20 years old with a fan-assisted flue

Measures are only recommended for implementation if that measure alone would result in the SAP rating increasing by at least 0.95 SAP points. The suggested measures do not necessarily imply that current measures in place in the home are defective nor that the home is deficient in terms of any particular standard.

¹ It should be noted that there are a few minor differences between the full EPC improvement methodology and that which can be applied using EHS data. See EHS 2008 Technical Report for details.