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Domestic energy fact file

Private rented homes

G A Walters, I Kempson and L D Shorrock

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Domestic energy fact file: private rented homes

G A Walters, I Kempson and L D Shorrock

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Introduction

This report provides information on trends relating to energy use and energy efficiency in private rented homes. It presents tables, graphs and charts equivalent to those in the Domestic Energy Fact File which covers all tenures (1). Three companion reports covering owner occupied (2), local authority (3) and registered social landlord (RSL) homes (4) have also been prepared. The four reports are intended as replacements for the three tenure-based Domestic Energy Fact Files produced in 1994 (5,6,7). Only three reports were produced in 1994 because, at that time, the available data on RSL homes were not sufficient to be able to prepare any meaningful statistics on trends in this tenure, and so these homes were included with private rented homes.

As far as possible, the information in the four new reports is consistent with that in the main Domestic Energy Fact File (1). However, readers may notice some instances where the sum of the numbers in the individual tenures does not quite add to the previously quoted all-tenures figure. Such instances are generally due to the fact that the all-tenures information was often taken directly from printed reports rather than from the electronic files that have been used as far as possible for the individual tenure reports. Although the printed reports and the electronic files are from the same source they sometimes indicate slightly different figures. The electronic files are known to have been updated as necessary and so it is clear that the figures that they contain should generally be preferred to those in the printed reports wherever there appears to be a discrepancy.

Although this report focuses on private rented homes it also draws comparisons with other tenures (primarily with owner occupied homes) to illustrate important points. The aim of the report is to present as complete a picture as possible of the trends in energy use and energy efficiency in private rented homes between 1970 and 1998. However, some data are missing, and consequently several tables only present figures from around the mid-1970s (although the relevant information for the earlier years does usually exist for homes in general (1)). Note also that the figures in this report up to around the mid-1980s (1991, in the case of the average dwelling heat loss) include RSL homes. The precise date from which RSL homes can be separated out from private rented homes depends on the particular topic under consideration and is noted against the individual tables.

The tables, graphs and charts in this and its three companion reports are intended to illustrate long-term trends. Fluctuations from year to year should be viewed with caution since they may sometimes only reflect statistical variations between respective survey samples. Such caution is particularly important in the case of the RSL and private rented tenures where the sample sizes are quite small.

The text in this and the companion reports is kept to a minimum because the main Domestic Energy Fact File (1) already provides most of the necessary discussion and explanation. Text is restricted to:

- Additional explanations where needed, and
- Discussion of notable differences between the characteristics of private rented homes and those of homes in other tenures or of homes in general.

Most – but not all – of the tables in the main Domestic Energy Fact File have their equivalent in this report. If a table in that report does not have an equivalent in the following sections it is either because the information is common to all tenures or because, in a given instance, it is not very meaningful to attempt to distinguish between the different tenures. Data limitations also mean that the preparation of certain tables is not feasible at the individual tenure level.

Household expenditure on fuel, light and power

Notes:

Table 1 gives average weekly expenditure by private rented households on fuel, light and power and on all goods. Actual expenditures at contemporary prices are shown as well as expenditures adjusted to 1996 equivalents. These adjusted expenditures are also shown on Figure 1.

Private rented householders spend slightly less than owner occupiers on fuel, light and power, but substantially less on all goods. This expenditure on all goods by private rented households has increased fairly steadily over the years and, accordingly, the expenditure on fuel, light and power, expressed as a percentage of expenditure on all goods, is now only slightly lower than in owner occupied households.

Expenditures on fuel have generally fallen in real terms over the past decade, and there are several reasons for this. Fuel prices have fallen in real terms and mean household sizes have been steadily reducing. Insulation standards and heating efficiencies in private rented homes have improved slightly in recent years, but these effects have been partly offset by improving standards of comfort in the home. These issues are discussed in subsequent sections of this report.

Table 1 Average weekly expenditure on all goods, fuel, light and power (£/week) *

Year	Contemporary prices **		1996 prices: private rented **			1996 prices: owner occupiers		
	All goods	Fuel, light and power	All goods	Fuel, light and power	%	All goods	Fuel, light and power	%
1981	106.55	6.63	168.85	10.51	6.2	231.27	12.59	5.4
1982	103.54	6.30	158.24	9.63	6.1	242.85	14.03	5.8
1983	108.60	6.95	160.28	10.25	6.4	249.48	14.92	6.0
1984	116.34	7.66	166.00	10.93	6.6	261.86	14.40	5.5
1985	121.72	7.93	168.10	10.95	6.5	269.83	14.75	5.5
1986	147.32	8.56	197.11	11.45	5.8	291.15	15.07	5.2
1987	155.82	8.91	201.57	11.53	5.7	295.41	14.49	4.9
1988	172.40	8.83	215.87	11.05	5.1	304.98	13.94	4.6
1989	204.31	8.85	247.87	10.73	4.3	321.39	13.70	4.3
1990	218.18	9.29	256.71	10.93	4.3	340.85	13.77	4.0
1991	215.90	9.79	246.59	11.18	4.5	351.56	14.86	4.2
1992	222.20	10.78	246.96	11.98	4.9	359.67	15.25	4.2
1993	259.16	10.83	280.52	11.72	4.2	351.15	15.09	4.3
1994	293.63	10.31	309.73	10.87	3.5	351.60	14.66	4.2
1995	268.83	10.85	276.52	11.16	4.0	351.07	14.33	4.1
1996	291.05	10.79	291.05	10.79	3.7	364.88	14.43	4.0
1997	298.19	9.38	290.12	9.13	3.1	379.93	13.39	3.5
1998	293.51	9.47	276.97	8.93	3.2	385.92	12.05	3.1

Source: Family Expenditure Survey

* This table refers to the UK. All other tables in this report apply to Great Britain

** The figures shown for the years 1981 to 1985 are for private rented and RSL sectors combined.

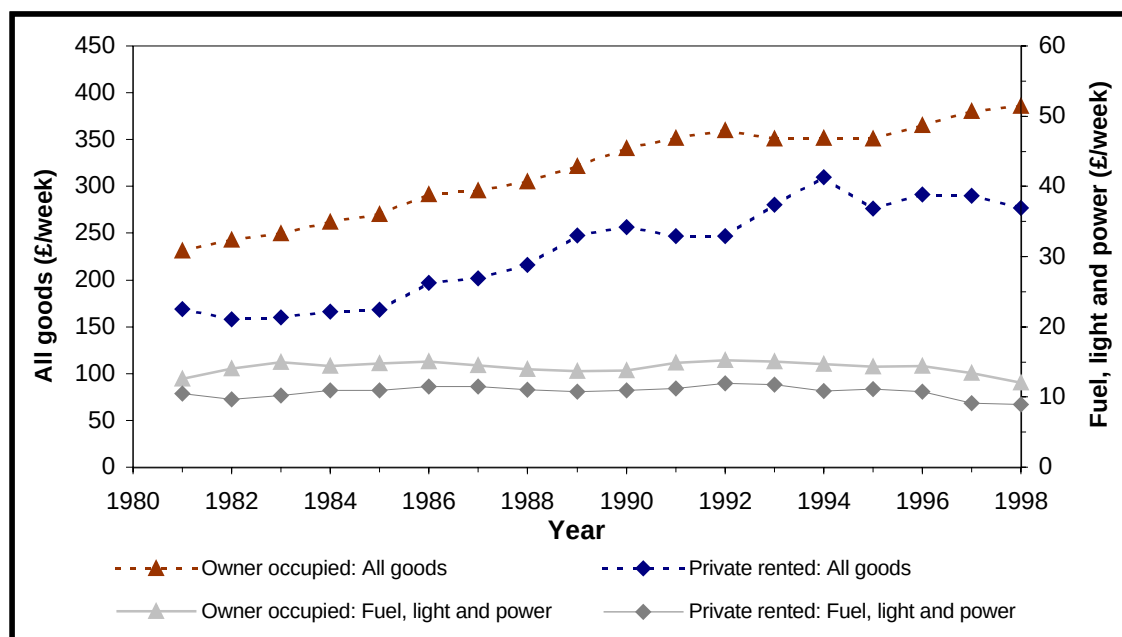


Figure 1 Average weekly expenditure on all goods, fuel, light and power (1996 prices)

Households and household size

Notes:

Table 2 shows figures for the number of private rented households and the mean household size for this tenure. The mean household size for owner occupied tenure is also shown. Figure 2 shows that private rented household sizes tend to be considerably smaller than owner occupied households. By multiplying the number of households by the mean household size, it is possible to estimate what percentage of the population was living in private rented accommodation in any one year. For example, this calculation indicates that in 1996 almost 3.7 million people, or nearly 6% of the population, were living in private rented homes.

There are currently no data readily available for the mean household sizes for the years after 1996.

Table 2 Households and household size

Year	Households ('000s)	Mean household size	
		Private rented **	Owner occupied
1972	3261		
1973*	3227	2.20	2.93
1974	3466		
1975*	2872	2.24	2.89
1976	2525		
1977	2236	2.23	2.81
1978	2397	2.23	2.82
1979*	2437	2.21	2.77
1980	2585	2.11	2.80
1981	2153	2.13	2.81
1982	2159		
1983	1816	2.15	2.79
1984	1823	2.16	2.77
1985	1682	2.17	2.71
1986	1687	2.12	2.69
1987	1290	2.23	2.70
1988	1238	2.19	2.62
1989	1250	2.10	2.66
1990	1284	2.14	2.59
1991	1433	2.17	2.59
1992	1560	2.22	2.57
1993	1599	2.18	2.53
1994	1593	2.12	2.52
1995	1654	2.18	2.50
1996	1715	2.14	2.54
1997	1727		
1998	1751		

Source: Housing and Construction Statistics
General Household Survey

* denotes that the mean household size for these years have been extrapolated or interpolated

** The figures shown for the years 1972 to 1980 are for private rented and RSL sectors combined.

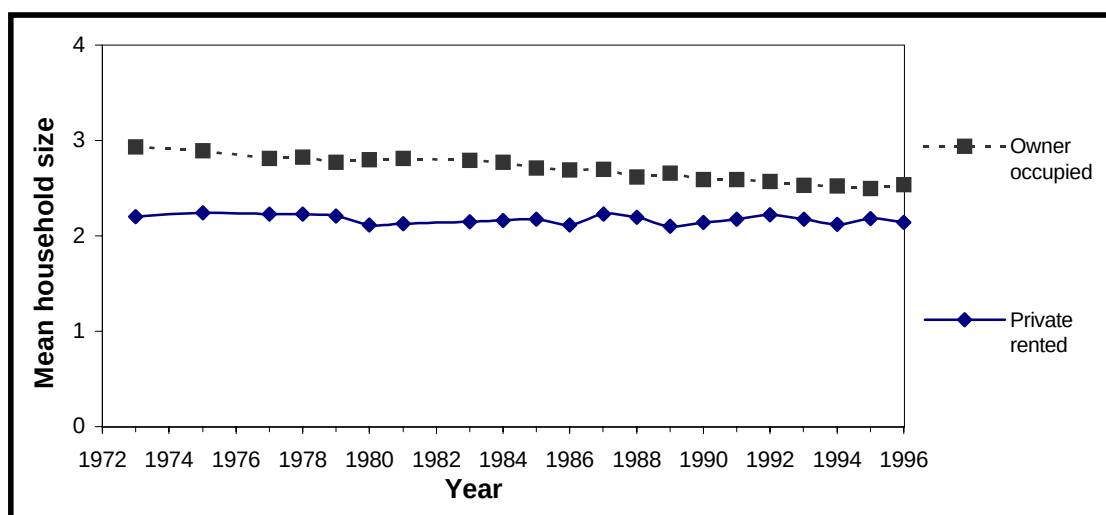


Figure 2 Mean household size

Age of the housing stock

Notes:

It is apparent, from Figure 3, that a large proportion of the stock in the private rented sector was built before 1918. This bias towards older homes is part of the reason why the heat loss of the average private rented home is higher than the overall average (see Table 13). Another reason for the relatively high heat loss from private rented homes is that they generally have poorer insulation standards. This is discussed in subsequent sections of the report.

Table 3 Housing stock distribution by age ('000s of homes) *

Year	Pre-1918	1918-1938	1939-1959	1960-1971	1972-	Total homes
1978	1310	455	294	257	82	2397
1979	1396	511	254	172	104	2437
1980	1454	480	268	192	191	2585
1981	1474	493	219	222	215	2622
1982	1404	439	278	227	294	2642
1983	1248	392	212	177	291	2320
1984	1150	469	213	193	323	2348
1985	1058	431	185	216	339	2230
1986	1129	376	128	207	413	2252
1987	704	251	99	111	125	1290
1988	661	241	121	73	142	1238
1989	702	229	90	75	154	1250
1990	625	181	173	84	220	1284
1991	739	262	120	132	180	1433
1992	730	315	126	109	280	1560
1993	712	297	126	142	322	1599
1994	615	370	217	161	230	1593
1995	832	344	127	102	249	1654
1996	727	347	150	172	319	1715
1997	778	372	165	122	290	1727
1998	705	379	221	146	300	1751

Source: GfK Home Audit

* The figures shown for the years 1972 to 1986 are for private rented and RSL sectors combined.

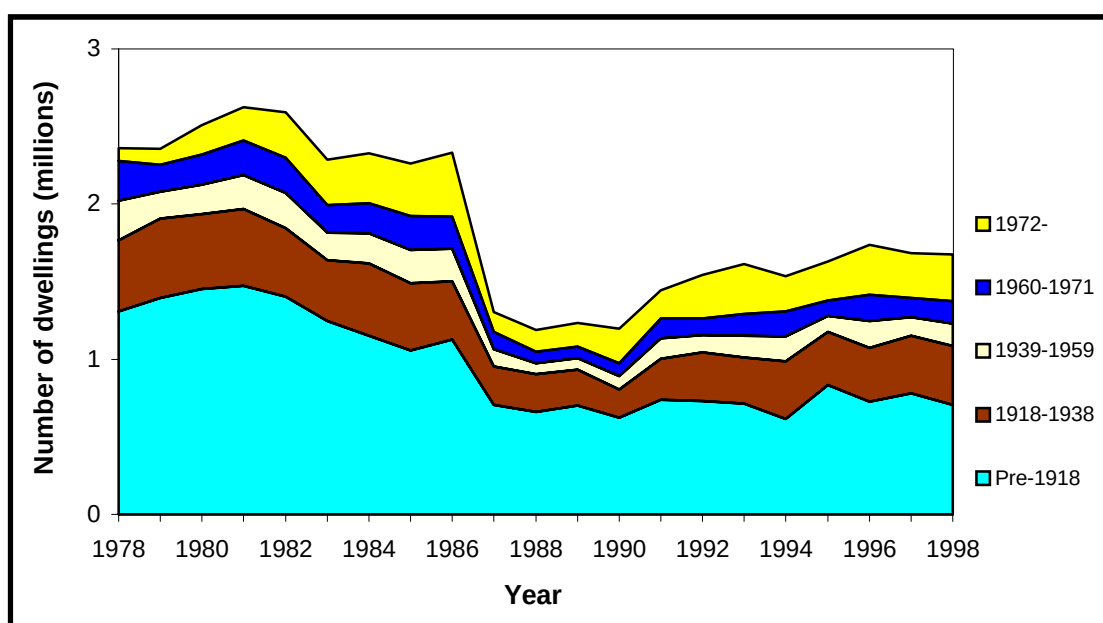


Figure 3 Housing stock distribution by age

House types

Notes:

The distribution of private rented homes between the different dwelling types is quite different from that of owner occupied homes. Flats, in particular, make up a very high proportion of the private rented stock, and terraced houses are very common. For a given standard of insulation, a flat will have the lowest heat loss, and a terraced house will have the second lowest, of all dwelling types. Furthermore, this tenure also consists of a relatively high proportion of older dwellings which may also be poorly insulated, and there is a tendency towards high heat loss in such dwellings. However, these losses may be partly offset by the tendency of flats and terraced houses to have relatively low heat losses. It follows that the average private rented dwelling has a heat loss which is only slightly higher than the overall average.

Table 4 Housing stock distribution by type of dwelling ('000s of homes) *

Year	Semi-detached	Terraced	Flat	Detached	Bungalow	Other	Total
1976	543	1037	656	129	51	110	2525
1977	414	970	638	119	30	65	2236
1978	450	868	740	136	95	108	2397
1979	488	1005	605	200	88	53	2437
1980	514	1033	719	190	56	73	2585
1981	466	1062	654	282	83	76	2622
1982	517	1043	730	216	74	62	2642
1983	471	945	602	184	61	58	2320
1984	428	896	679	231	68	45	2348
1985	411	809	733	180	67	30	2230
1986	412	733	794	227	57	29	2252
1987	199	481	389	152	49	21	1290
1988	232	438	401	119	31	17	1238
1989	210	428	454	111	27	20	1250
1990	250	381	521	73	40	19	1284
1991	249	565	460	117	32	10	1433
1992	247	621	525	95	42	31	1560
1993	236	567	609	123	55	9	1599
1994	222	585	568	142	61	14	1593
1995	219	621	688	76	46	4	1654
1996	314	633	598	105	50	15	1715
1997	297	624	682	71	47	6	1727
1998	315	603	720	71	32	10	1751

Source: GfK Home Audit

* The figures shown for the years 1976 to 1986 are for private rented and RSL combined.

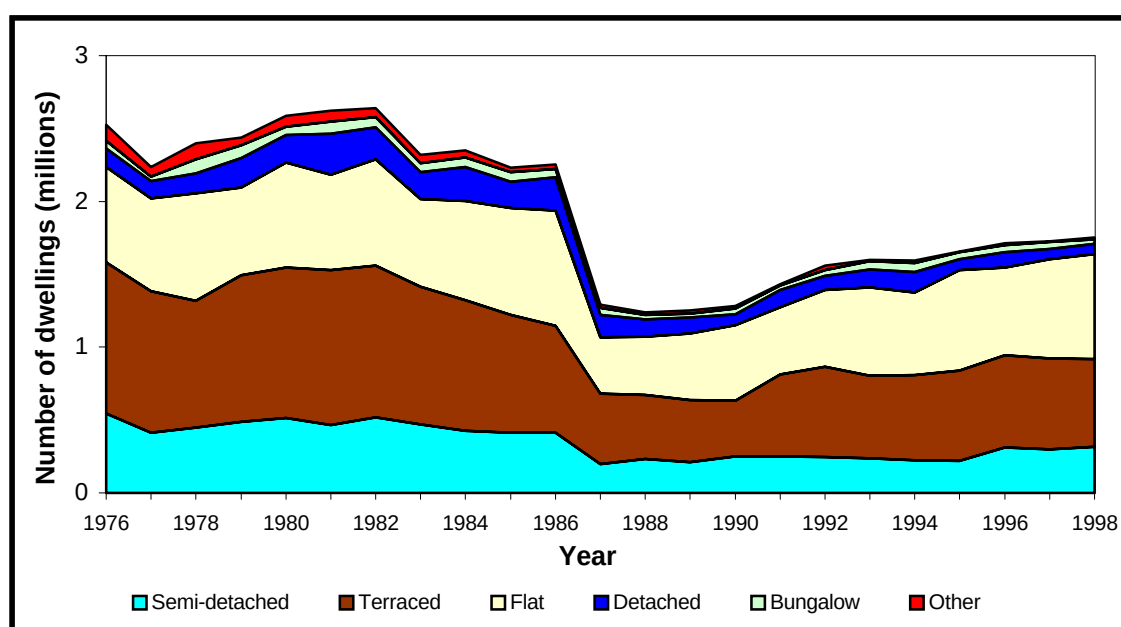


Figure 4 Housing stock distribution by type of dwelling

Regional distribution of the housing stock

Notes:

Regional distribution of the housing stock does not vary markedly with tenure. From Table 5 it can be seen that while there has been a distinct increase in the overall stock within this tenure since 1988, there has been little change in the regional distribution of the private rented stock with time.

* Readers should, in particular, be aware that the figures presented prior to 1987are for RSL and private rented sectors combined.

Table 5 Housing stock distribution by region ('000s of homes) *

Year	South West	Wales	South East	East Anglia	Yorks/ Humber	East Mids.	West Mids.	North West	North	Scot-land	Total G.B.
1977	181	53	821	77	282	178	145	229	92	174	2236
1978	164	80	850	108	258	219	156	227	128	208	2397
1979	248	134	805	67	216	193	177	258	171	168	2437
1980	204	97	920	80	269	184	159	270	175	228	2585
1981	168	156	951	88	202	237	175	272	169	207	2622
1982	157	122	1073	91	221	163	161	261	192	197	2642
1983	170	112	824	83	203	122	168	280	165	194	2320
1984	228	69	805	77	218	98	135	353	211	152	2348
1985	179	65	761	136	147	120	193	283	147	198	2230
1986	161	64	815	158	178	91	156	308	130	192	2252
1987	85	54	472	72	115	92	93	152	48	105	1290
1988	105	29	479	74	76	91	119	93	74	99	1238
1989	141	53	502	66	80	62	76	120	67	82	1250
1990	137	36	479	51	93	79	82	165	56	106	1284
1991	113	46	485	82	124	110	100	203	55	116	1433
1992	110	80	636	79	98	95	112	182	36	132	1560
1993	139	56	606	74	104	80	154	213	64	108	1599
1994	155	86	572	91	106	81	155	138	36	173	1593
1995	173	66	595	73	133	114	115	166	81	137	1654
1996	177	95	657	46	110	83	124	199	73	152	1715
1997	177	73	774	47	123	108	108	117	59	140	1727
1998	167	86	664	69	131	82	160	236	67	88	1751

Source: GfK Home Audit

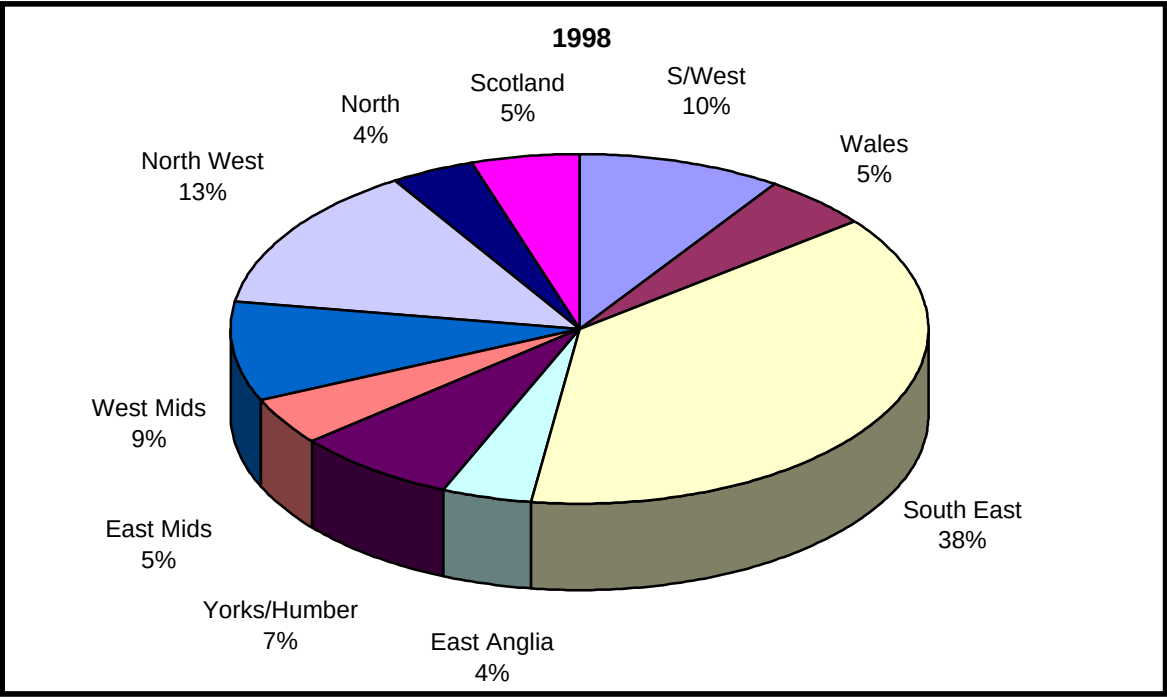


Figure 5 Housing stock distribution by region

Loft insulation

Notes:

Uptake of loft insulation in private rented households has always been far lower than in owner occupied dwellings. In 1974, the proportion of private rented dwellings with accessible lofts which had loft insulation was just over 24%, where the corresponding proportion for owner occupied homes was over 53%. However, it would appear that the private rented sector has been catching up slightly, since just under 83% of dwellings in private rented tenure currently have loft insulation, where just over 94% of owner occupied dwellings have such insulation.

Readers should be aware of fluctuations in the general trend for this tenure, which are undoubtedly due to the relatively small sample size within this group.

* The figures shown for the years 1974 to 1986 are for private rented and RSL sectors combined.

Table 6a Ownership and depth of loft insulation ('000s of homes) *

Year	< 1"	1"	2"	3"	4" or more	Not stated	Total with	Potential	Total houses
1974	-	-	-	-	-	439	439	1795	3466
1975	-	-	-	-	-	357	357	1488	2872
1976	30	33	82	79	15	78	317	1308	2525
1977	24	49	93	64	20	39	289	1099	2236
1978	9	52	130	96	36	65	387	1129	2397
1979	16	54	100	163	31	137	501	1307	2437
1980	22	43	194	164	67	66	555	1429	2585
1981	24	73	219	230	92	70	707	1569	2622
1982	11	37	203	186	167	103	708	1422	2642
1983	20	50	196	175	246	138	825	1373	2320
1984	12	28	173	242	323	99	877	1317	2348
1985	10	56	112	167	289	257	891	1295	2230
1986	7	45	132	203	337	184	908	1410	2252
1987	19	40	83	99	193	82	515	797	1290
1988	3	42	81	113	173	77	490	780	1238
1989	12	18	57	137	186	74	484	734	1250
1990	5	16	63	112	167	57	419	650	1284
1991	6	38	93	152	174	95	558	828	1433
1992	10	15	52	164	189	189	619	871	1560
1993	14	17	107	136	173	165	612	931	1599
1994	5	19	118	99	294	105	640	868	1593
1995	2	11	78	112	314	136	653	862	1654
1996	7	23	102	150	269	177	728	1005	1715
1997	1	25	65	185	396	127	799	989	1727
1998	3	3	75	147	394	180	803	970	1751

Source: GfK Home Audit

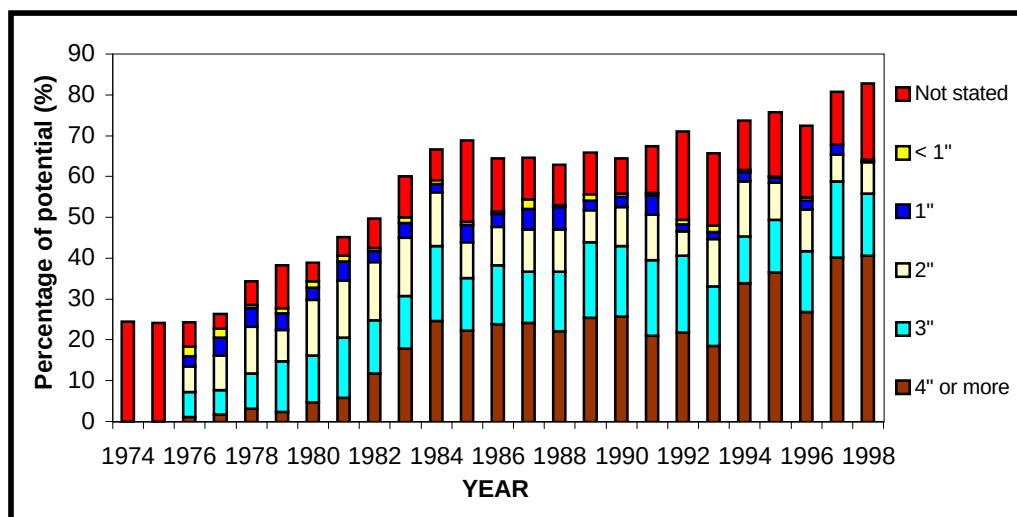


Figure 6 Ownership and depth of loft insulation

Table 6b Homes with 4" or more of loft insulation ('000s of homes)

Year	4"	5"	5" or more	6" or more	Total with 4" or more
1991	125	-	49	-	174
1992	140	-	49	-	189
1993	132	-	41	-	173
1994	194	35	-	64	294
1995	171	54	-	89	314
1996	133	62	-	75	269
1997	213	63	-	120	396
1998	156	102	-	136	394

Cavity wall insulation

Notes:

Although it is difficult to highlight any discernible trend, it is clear that uptake of cavity wall insulation in private rented homes has been very slow. Currently, only about 8% of dwellings with cavity walls have had them insulated. The corresponding figure for owner occupied homes is 29%.

Readers should be aware that sample sizes are likely to be particularly small in this tenure and there will undoubtedly be inconsistencies in the data. Another problem which presents itself is that a large number of occupants in private rented dwellings do not know whether or not the cavity wall has been insulated and, therefore, it would be unwise to draw any further conclusions from the figures presented (see Table 7).

Table 7 Ownership of cavity wall insulation ('000s of homes)

Year	With cavity insulation	Not known if cavity insulated	Potential	Total households
1974	15	-	2290	3466
1975	11	-	1902	2872
1976	11	-	1674	2525
1977	9	-	1487	2236
1978	25	-	1613	2397
1979	45	-	1651	2437
1980	34	-	1759	2585
1981	39	287	1791	2622
1982	64	337	1813	2642
1983	44	379	1598	2320
1984	109	349	1620	2348
1985	87	325	1540	2230
1986	82	395	1557	2252
1987	44	236	513	1290
1988	39	217	514	1238
1989	61	210	546	1250
1990	32	283	601	1284
1991	39	281	628	1433
1992	59	362	697	1560
1993	42	348	688	1599
1994	75	439	758	1593
1995	89	373	672	1654
1996	79	568	855	1717
1997	69	447	822	1727
1998	71	500	902	1751

Source: GfK Home Audit

* The figures shown for the years 1974 to 1986 are for private rented and RSL sectors combined.

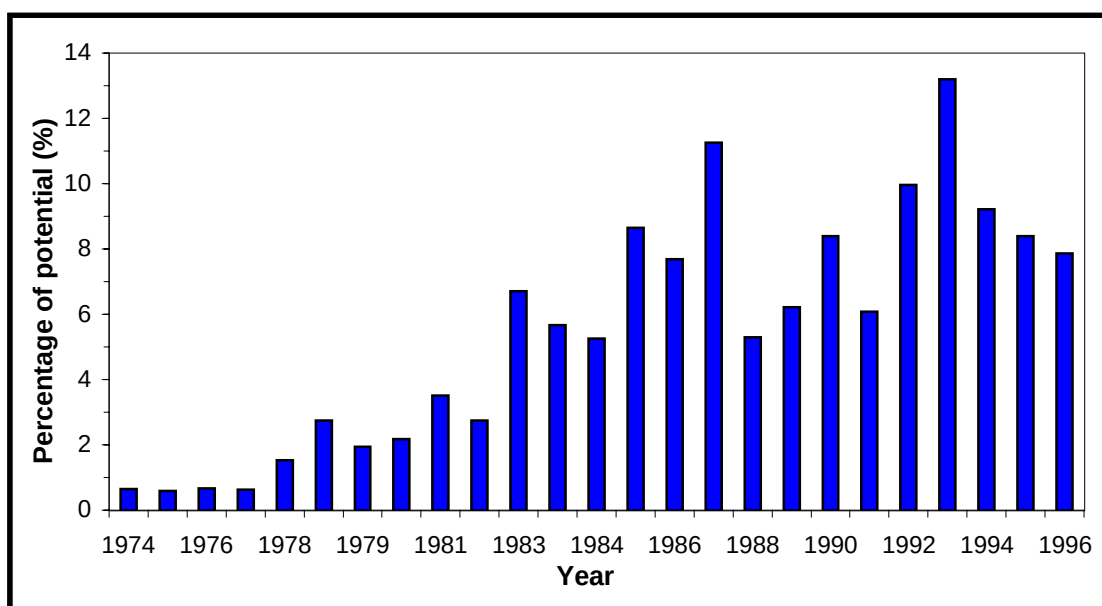


Figure 7 Ownership of cavity wall insulation

Double glazing

Notes:

Double glazing has shown a very poor uptake in private rented homes. Currently, in contrast to owner occupied homes, very few private rented homes have some double glazing. Only 37% of dwellings in this tenure have some double glazing whereas almost 78% of owner occupied homes have some.

Table 8 Ownership of double glazing ('000s of homes)

Year	Percentage of rooms treated *						Total with double glazing	Potential
	Less than 20%	20% - 39%	40% - 59%	60% - 79%	80% or more	Not stated		
1974	-	-	-	-	-	63	63	3466
1975	-	-	-	-	-	62	62	2872
1976	-	-	-	-	-	51	51	2525
1977	-	-	-	-	-	50	50	2236
1978	-	-	-	-	-	75	75	2397
1979	-	-	-	-	-	76	76	2437
1980	-	-	-	-	-	116	116	2585
1981	-	-	-	-	-	134	134	2622
1982	-	-	-	-	-	227	227	2642
1983	44	49	41	20	69	13	235	2320
1984	49	43	64	45	34	12	248	2348
1985	31	56	30	22	29	48	217	2230
1986	52	36	69	6	118	13	294	2252
1987	45	27	40	19	70	0	201	1290
1988	44	56	21	18	40	9	188	1238
1989	31	42	29	31	40	44	216	1250
1990	33	40	24	32	74	20	222	1284
1991	39	42	68	55	86	24	314	1433
1992	36	53	63	43	126	26	347	1560
1993	32	64	78	46	212	23	455	1599
1994	47	52	64	93	190	31	476	1593
1995	28	78	46	100	219	17	489	1654
1996	45	53	108	107	258	27	598	1715
1997	34	58	87	98	240	75	592	1727
1998	32	83	58	160	274	51	658	1751

Source: GfK Home Audit

* The figures shown for the years 1974 to 1986 are for private rented and RSL sectors combined.

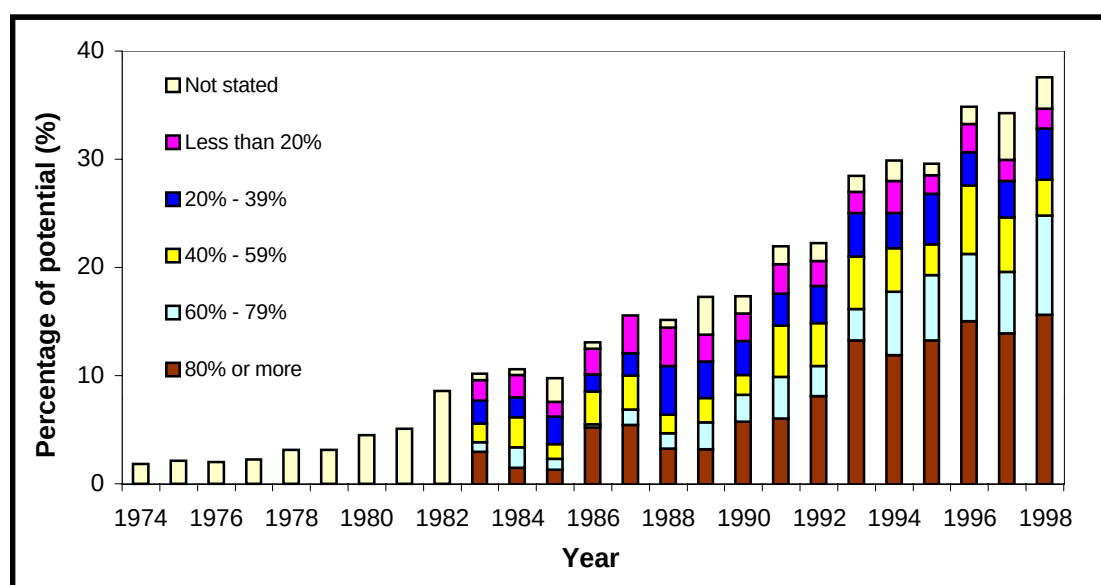


Figure 8 Ownership of double glazing

Draught proofing

Notes:

Draught proofing in private rented homes shows no obvious trends and there has been only a minimal increase in uptake over the years, except at the 80% or more level. This is in contrast to other tenures which, generally, tend to show quite obvious trends of increasing ownership in the form of draught stripping or double glazing, which intrinsically incorporates a draught seal.

Table 9 Ownership of draught proofing ('000s of homes)

Year	Percentage of rooms treated *						Total with draught proofing	Potential
	Less than 20%	20% to 39%	40% to 59%	60% to 79%	80% or more	Not stated		
1983	202	225	107	35	111	39	717	1816
1984	245	198	114	62	113	12	744	1823
1985	182	284	102	62	130	48	807	1682
1986	210	281	136	52	182	13	874	1687
1987	130	134	78	47	132	-	522	1290
1988	135	177	62	34	85	9	503	1238
1989	95	130	95	57	84	44	506	1250
1990	95	166	53	51	111	21	497	1284
1991	109	151	130	73	126	24	613	1433
1992	116	206	100	56	169	26	674	1560
1993	122	194	132	69	237	23	778	1599
1994	112	162	122	126	226	31	780	1593
1995	63	164	88	141	295	22	773	1654
1996	77	144	165	138	312	29	865	1715
1997	93	159	134	129	294	75	884	1727
1998	88	137	8	190	344	51	818	1751

Source: GfK Home Audit

* The figures shown for the years 1983 to 1986 are for private rented and RSL sectors combined.

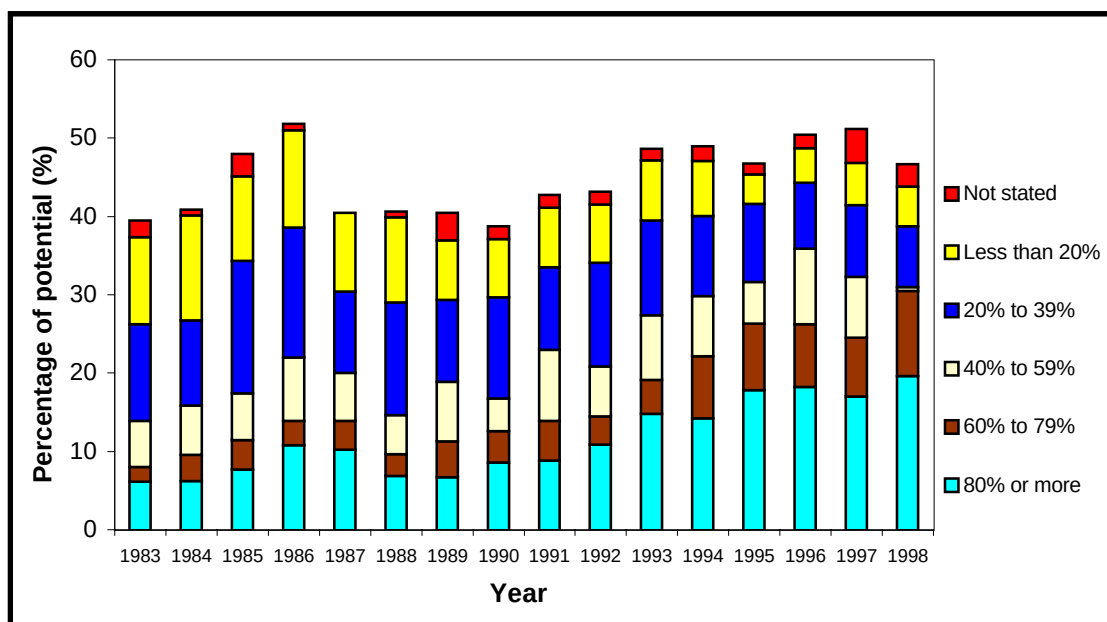


Figure 9 Ownership of draught proofing

Hot water tank insulation

Notes:

Across all the years, hot water tank insulation has been taken up less strongly in private rented homes than it has in owner occupied homes. However, the private rented sector is beginning to catch up. In 1976 about 64% of private rented homes with hot water tanks had insulation, whereas 83% of owner occupied homes had this measure. By 1998 just over 88% of private rented dwellings had insulated tanks, compared with almost 96% in owner occupied dwellings.

Table 10 Ownership of hot water tank insulation ('000s of homes) *

Year	1" or less	2"	3"	3" or more	>3"	Not stated	Total with	Potential	Total households
1976	247	436	-	260	-	134	1077	1671	2525
1977	264	306	-	167	-	207	945	1445	2236
1978	274	420	149	-	47	182	1073	1557	2397
1979	418	484	228	-	13	96	1239	1671	2437
1980	321	602	340	-	78	74	1415	1808	2585
1981	334	603	372	-	82	76	1467	1911	2622
1982	440	551	301	-	104	83	1478	1788	2642
1983	339	636	307	-	85	83	1450	1782	2320
1984	415	590	288	-	127	126	1545	1833	2348
1985	280	653	312	-	106	173	1523	1830	2230
1986	308	598	365	-	131	232	1635	1859	2252
1987	110	322	319	-	46	88	885	1032	1290
1988	100	279	319	-	75	50	822	966	1238
1989	101	271	399	-	45	55	871	1007	1250
1990	106	279	460	-	53	48	946	1083	1284
1991	106	304	506	-	61	61	1038	1165	1433
1992	97	256	513	-	88	79	1035	1188	1560
1993	100	306	564	-	52	102	1125	1264	1599
1994	74	291	626	-	62	70	1124	1292	1593
1995	82	173	689	-	63	71	1079	1245	1654
1996	79	266	592	-	111	62	1110	1247	1715
1997	74	255	706	-	76	59	1170	1298	1727
1998	64	210	813	-	71	41	1199	1360	1751

Source: GfK Home Audit

* The figures for the years 1976 to 1986 are for private rented and RSL sectors combined

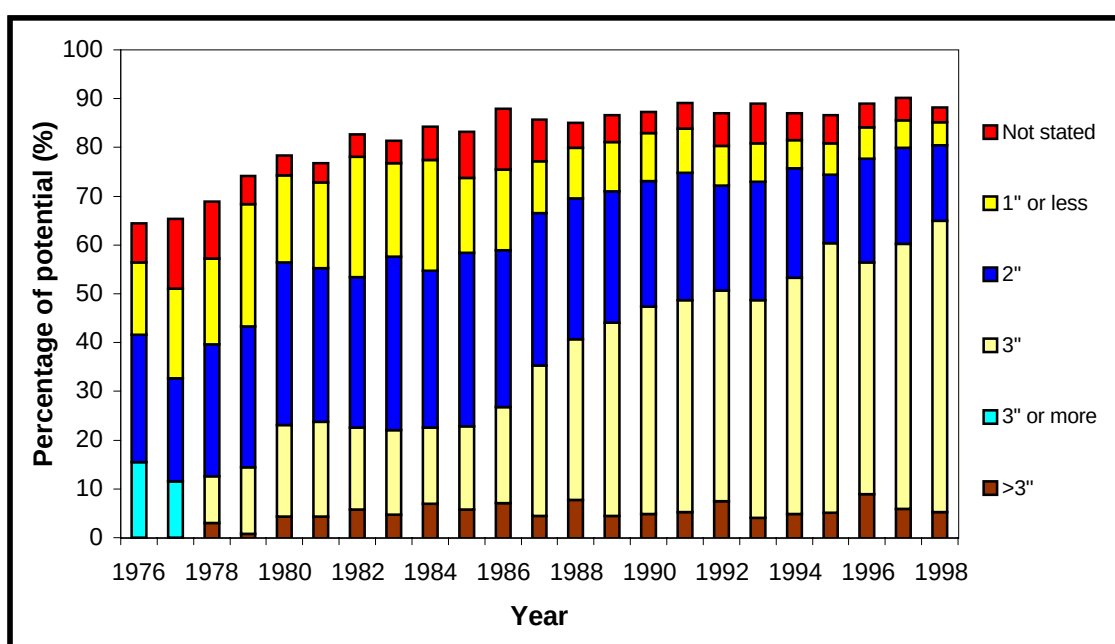


Figure 10 Ownership of hot water tank insulation

Insulation ownership

Notes:

Table 11 looks at the number of private rented homes which have combinations of insulation measures, and also those which lack any fabric insulation whatsoever. There are no useful tenure based data available prior to 1987, but, nonetheless, some trend is discernible from Figure 11. The number of private rented dwellings which have full insulation has increased only slightly, wherever ownership of such insulation measures is possible, while the number of homes lacking any fabric insulation has, to a slightly greater extent, declined throughout this period. In 1987, 48% of private rented dwellings had no fabric insulation at all. By 1998, this figure had fallen to just over 34%. However, in 1987, 1% of dwellings in this sector had full insulation, but by 1998 this figure had grown to less than 3%.

The main Domestic Energy Fact File gives a more detailed explanation of the terms "no insulation" and "full insulation".

Table 11 Households with full and with no insulation measures ('000s of homes)

Year	Total households with no insulation	Total households with full insulation	Total households
1987	620	13	1290
1988	613	11	1238
1989	601	16	1250
1990	703	12	1284
1991	677	8	1433
1992	723	32	1560
1993	690	18	1599
1994	669	56	1593
1995	708	79	1654
1996	669	52	1715
1997	648	39	1727
1998	600	51	1751

Source: GfK Home Audit

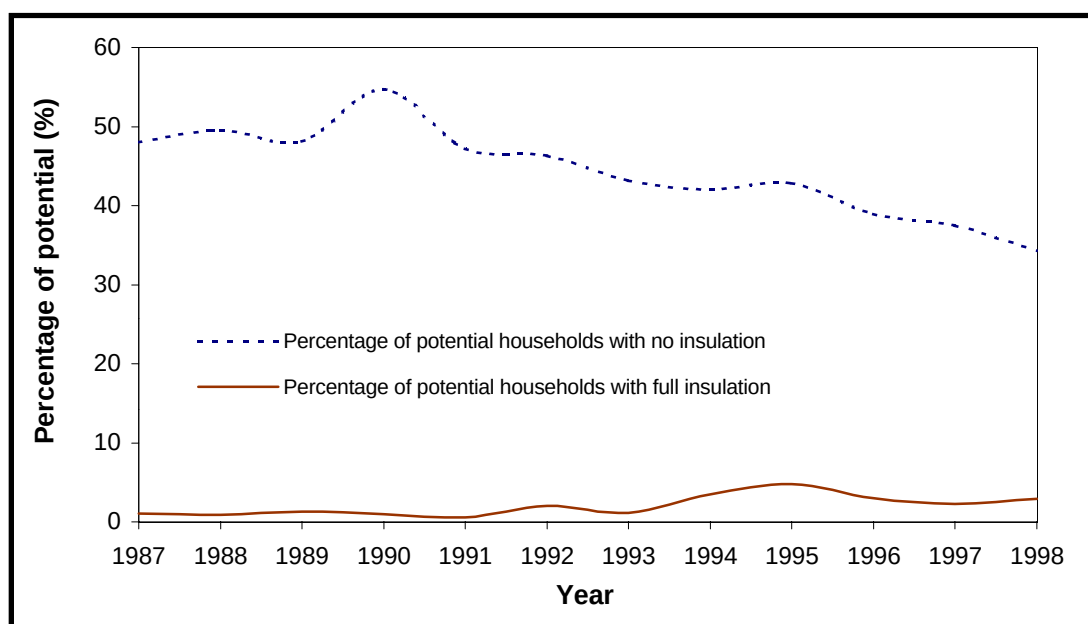


Figure 11 Households with full and with no insulation

Energy consumption and external temperatures

Notes:

Energy consumption of private rented homes fell markedly between 1970 and 1990, but has since increased. This trend follows a decline in the number of private rented dwellings up to 1990, followed by an increase in the number of homes in more recent years. The average consumption per dwelling has remained fairly stable, at a level consistently lower than for owner occupied homes.

Peaks in energy use generally correspond with troughs in the external temperature (see Figure 12). Some of the earlier figures shown in the table, prior to 1981, are slightly speculative due to the lack of expenditure data by tenure for these earlier years. However, the trends in household consumption for each tenure, which are easily discernible, indicate that the estimates represent the actual consumptions quite well.

* The figures shown for the years 1970 to 1985 are for private rented and RSL sectors combined.

Table 12 Domestic energy consumption and external temperatures

Year	Total houses ('000s)		Total delivered energy (PJ)		Av. ext. temp (°C)	Av. consumption per private rented dwelling (GJ)*
	Private rented *	All tenures	Private rented *	All tenures		
1970	3328	17987	214.4	1502	5.8	64.4
1971	3315	18221	199.3	1453	6.7	60.1
1972	3261	18426	195.0	1482	6.4	59.8
1973	3227	18603	198.9	1533	6.1	61.7
1974	3466	18783	194.9	1546	6.7	56.2
1975	2872	18988	181.9	1505	6.4	63.3
1976	2525	19215	176.3	1490	5.8	69.8
1977	2236	19450	180.7	1540	6.6	80.8
1978	2397	19650	178.8	1574	6.3	74.6
1979	2437	19827	187.7	1688	5.1	77.0
1980	2585	20010	174.4	1621	5.8	67.5
1981	2622	20177	170.4	1616	5.4	65.0
1982	2642	20327	147.2	1593	5.8	55.7
1983	2320	20525	125.5	1585	6.2	54.1
1984	2348	20769	130.5	1542	5.8	55.6
1985	2230	21017	125.8	1703	4.8	56.4
1986	1687	21254	104.8	1768	5.2	62.1
1987	1290	21485	79.8	1760	4.9	61.8
1988	1238	21710	78.8	1714	6.3	63.6
1989	1250	21927	71.9	1628	6.9	57.5
1990	1284	22140	70.9	1652	7.6	55.2
1991	1433	22390	87.0	1815	6.1	60.8
1992	1560	22623	96.4	1786	6.1	61.8
1993	1599	22850	97.6	1846	6.2	61.0
1994	1593	23074	92.8	1772	7.2	58.2
1995	1654	23300	97.5	1724	6.9	59.0
1996	1715	23512	109.0	1953	5.7	63.6
1997	1727	23660	88.6	1820	7.3	51.3
1998	1751	24000	101.4	1864	7.5	57.9

Source: Family Expenditure Survey,
Digest of UK Energy Statistics

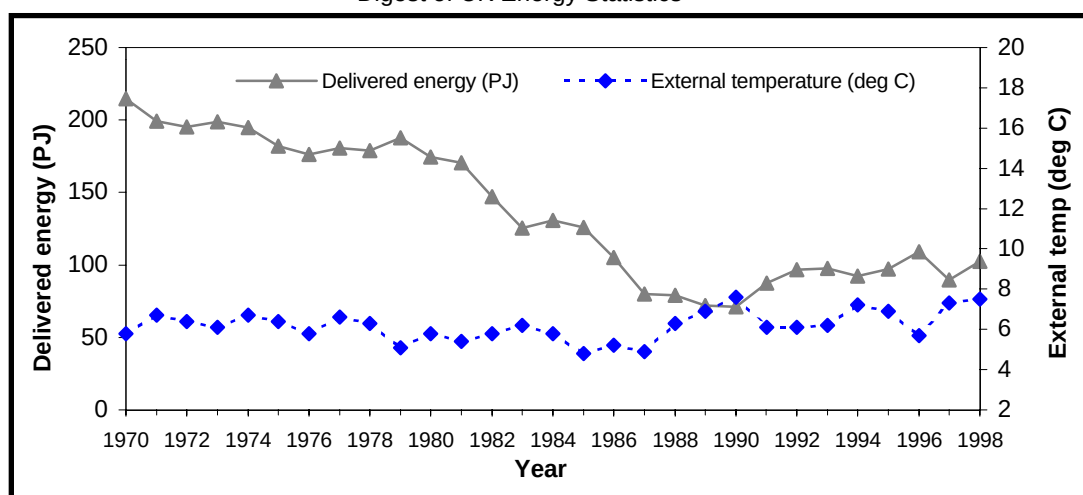


Figure 12 Domestic energy consumption and external temperatures

Heat loss of the average private rented dwelling

Notes:

The heat loss of the average private rented dwelling is only slightly higher than the average across all tenures, despite the fact that such homes often tend to be older properties, with poor insulation standards. There is, however, a strong bias towards flats and terraced houses which tend to have better heat loss characteristics (as discussed elsewhere in this report).

Table 13 and Figure 13 also give average heat losses for the other tenures.

Table 13 Heat loss of the average dwelling (W/°C)

Year	All tenures	Private rented **	Owner occupied	Local authority	RSL
1976	351.2	363.3	378.9	305.7	
1977*	345.0	359.6	373.1	297.3	
1978*	339.0	356.1	367.5	289.3	
1979*	334.0	353.2	362.8	282.5	
1980*	327.0	349.0	356.2	273.1	
1981*	321.0	345.5	350.6	265.0	
1982	314.7	341.8	344.7	256.5	
1983*	309.0	332.4	336.7	248.3	
1984	306.1	327.6	332.7	244.1	
1985	304.3	318.5	328.1	246.0	
1986	300.4	322.8	323.1	242.4	
1987	296.9	313.4	319.1	238.2	
1988	294.7	314.5	315.5	235.8	
1989	292.6	302.0	314.1	231.9	
1990	290.2	298.1	310.3	231.4	
1991	287.8	294.1	306.5	230.8	
1992	281.8	295.9	300.6	224.9	263.1
1993	280.6	294.9	300.7	220.8	239.2
1994	279.5	288.5	301.8	213.7	236.3
1995	276.0	271.3	299.5	212.2	228.4
1996	274.0	277.7	295.8	212.2	223.7
1997	271.4	270.7	293.4	210.9	218.7
1998	270.8	268.0	293.0	209.5	217.3

Source: BREHOMES

* Figures for these years are interpolated

** The figures for the years 1976 to 1991 are for private rented and RSL sectors combined

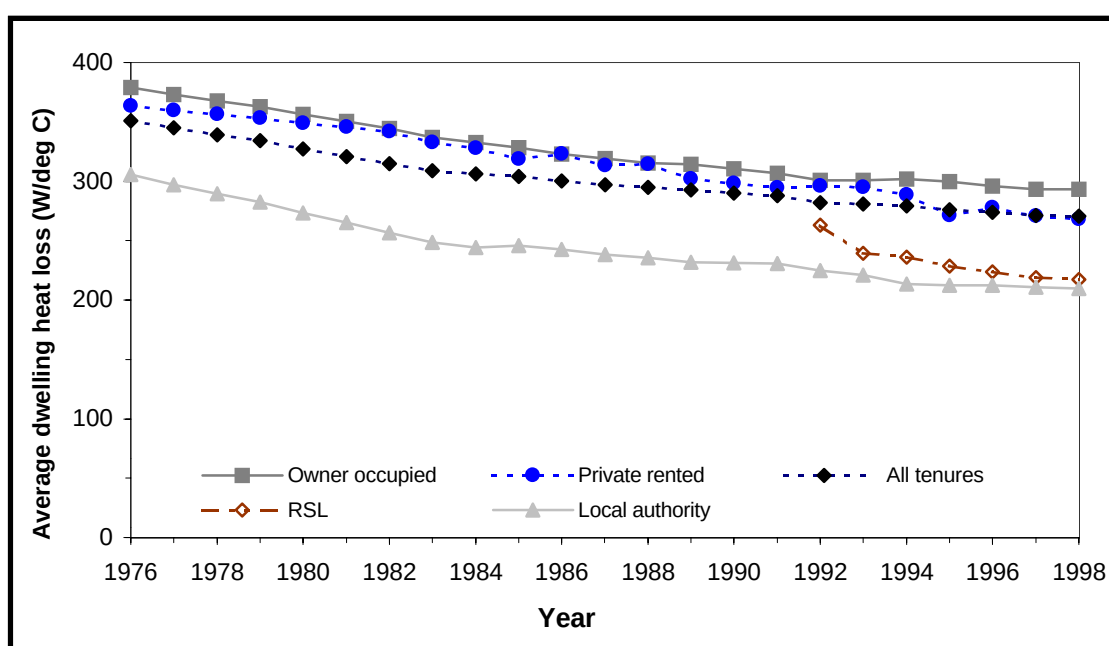


Figure 13 Heat loss of the average dwelling

Central heating ownership

Notes:

Central heating ownership is less common in private rented homes than in owner occupied homes. However, the rate of uptake in rented accommodation has been greater in recent years. Currently, 72% of private rented dwellings have central heating where the corresponding figure for owner occupied dwellings is 91%.

Table 14 Central heating ownership ('000s of homes)

Year	Private rented homes *			Percentage of households with central heating (%)	
	No central heating	Central heating	Total homes	Private rented *	Owner occupied
1977	1706	530	2236	24	65
1978	1727	670	2397	28	65
1979	1777	660	2437	27	67
1980	1855	731	2585	28	68
1981	1799	822	2622	31	71
1982	1705	937	2642	35	73
1983	1415	905	2320	39	76
1984	1422	926	2348	39	78
1985	1153	1077	2230	48	76
1986	911	777	1687	46	80
1987	665	625	1290	49	80
1988	664	574	1238	46	82
1989	624	625	1250	50	83
1990	578	706	1284	55	84
1991	619	813	1433	57	86
1992	524	1036	1560	66	86
1993	524	1076	1599	67	88
1994	542	1052	1593	66	88
1995	436	1218	1654	74	89
1996	552	1163	1715	68	90
1997	486	1241	1727	72	90
1998	491	1260	1751	72	91

Source: GfK Home Audit

* The figures for the years 1977 to 1985 are for private rented and RSL sectors combined

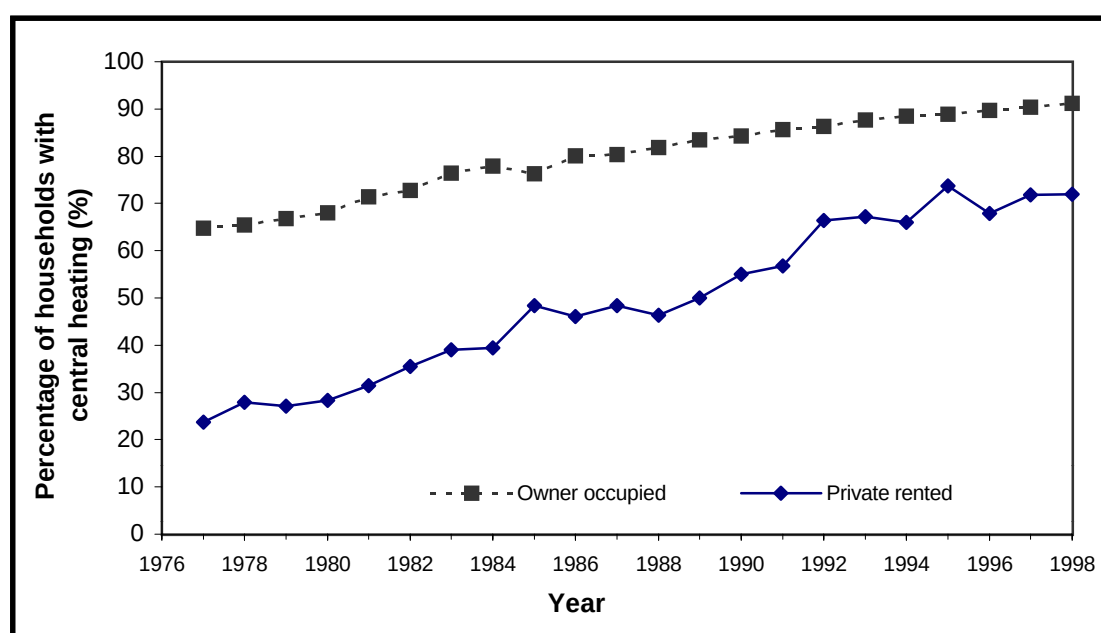


Figure 14 Central heating ownership

Heating appliances

Notes:

There has been a strong increase in the proportion of private rented homes with gas central heating. Ownership has increased from 45% of the total of centrally heated dwellings in 1977, to nearly 68% in 1998. The corresponding figures for gas central heating ownership for owner occupied homes are almost 61% in 1977, increasing to just under 83% in 1998.

The use of solid fuel central heating systems shows a marked decline in private rented homes. In 1977, just under 14% of dwellings with central heating used solid fuel. By 1998, less than 4% of dwellings in this tenure with central heating used solid fuel.

Table 15a Main form of heating in centrally heated dwellings ('000s of homes) *

Year	Solid fuel	Electric storage	Other electric	All electric	Gas	Oil	Other	Oil and other	Total homes
1977	74			178	239			39	530
1978	74			236	281			79	670
1979	106			238	266			50	660
1980	73			252	357			49	731
1981	98	196	54	250	398	26	50	77	822
1982	110	135	74	209	523	36	59	95	937
1983	112	127	56	183	534	36	40	76	905
1984	96	176	67	243	535	31	21	52	926
1985	132	169	64	233	612	33	67	100	1077
1986	89	143	34	177	451	31	28	59	777
1987	77	104	22	126	368	27	28	54	625
1988	69	109	20	129	335	19	22	41	574
1989	45	111	42	153	392	16	18	35	625
1990	57	116	44	159	455	16	19	35	706
1991	67	131	24	155	546	32	13	46	813
1992	58	165	36	201	693	48	37	84	1036
1993	64	189	25	214	755	26	18	43	1076
1994	60	188	41	229	700	38	25	63	1052
1995	49	256	34	290	798	41	41	81	1218
1996	50	227	17	244	788	33	48	81	1163
1997	53	219	42	261	837	27	63	90	1241
1998	50	243	27	269	854	35	52	87	1260

Source: GfK Home Audit

* The figures for the years 1977 to 1985 are for private rented and RSL sectors combined

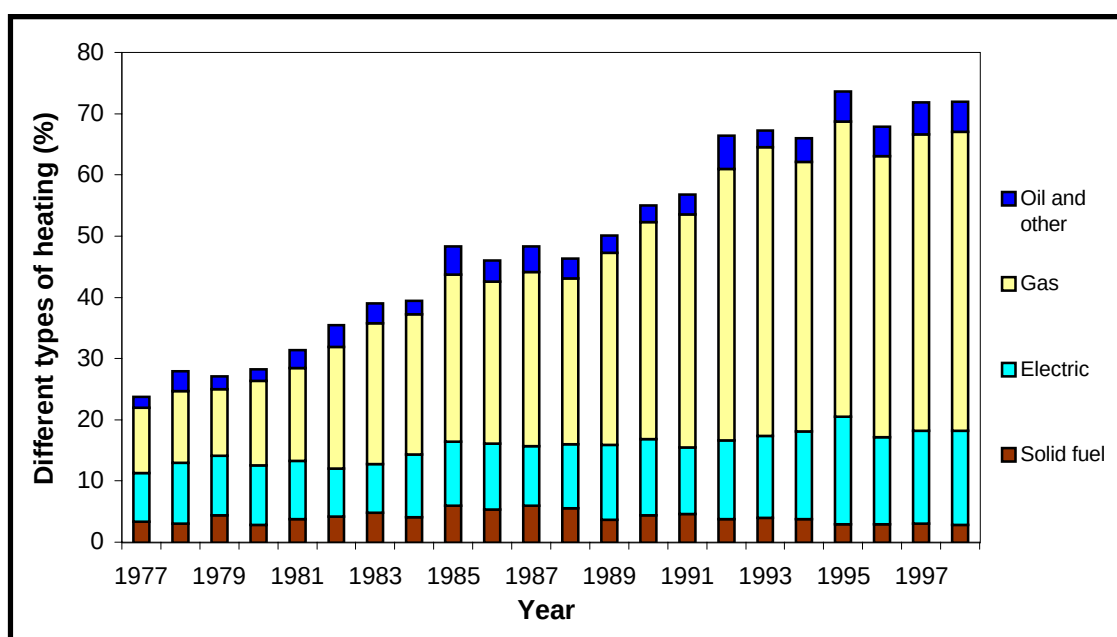


Figure 15a Main form of heating as a proportion of all homes

Heating appliances

Notes:

While there has been a strong increase in the number of private rented homes with central heating, there has been a very significant decline in the number of homes without any form of central heating. In particular, the ownership of solid fuel and oil heating systems have fallen. The total number of dwellings without any central heating and heated by solid fuel fell by over 86%. By comparison, in owner occupied homes, the number of dwellings without central heating and owning solid fuel systems fell by just under 75%. There are currently no private rented households with oil heating systems recorded in the sample.

Table 15b Main form of heating in non-centrally heated dwellings ('000s of homes) *

Year	Solid fuel	Electric	Gas	Oil	Other	Oil and other	Total homes
1977	512	374	791			28	1706
1978	462	380	854			31	1727
1979	425	373	949			30	1777
1980	465	382	901			106	1855
1981	425	407	928			40	1799
1982	431	338	896			39	1705
1983	335	281	706	28	64	92	1415
1984	306	249	793	15	61	76	1422
1985	280	173	653	12	35	47	1153
1986	184	160	510	5	51	56	911
1987	156	110	366	7	26	33	664
1988	129	139	355	6	33	39	662
1989	130	131	326	3	32	35	623
1990	94	135	315	-	35	35	579
1991	100	120	366	4	34	37	624
1992	94	120	281	2	28	30	524
1993	94	94	298	2	35	36	523
1994	85	108	320	2	26	28	542
1995	72	108	229	4	25	29	438
1996	106	130	293	2	19	21	550
1997	110	145	211	-	21	21	486
1998	71	126	276	-	18	18	491

Source: GfK Home Audit

* The figures for the years 1977 to 1985 are for private rented and RSL sectors combined

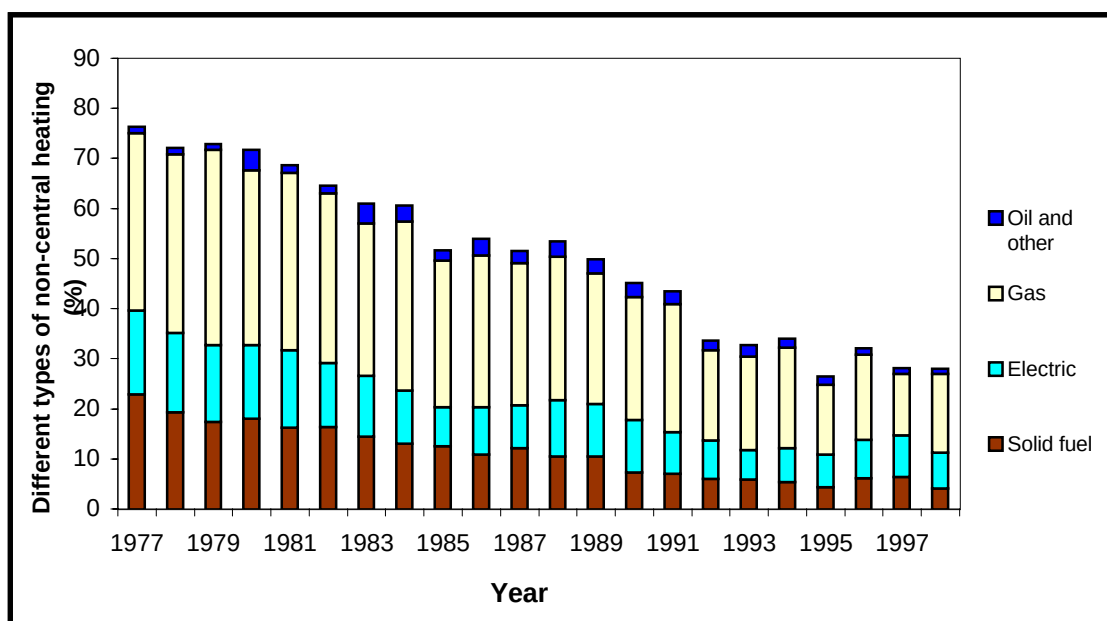


Figure 15b Main form of heating as a proportion of all homes

Weighted average space heating efficiencies

Notes:

Table 16 shows heating efficiencies calculated on the same basis as for the Domestic Energy Fact File, 1998 update. Data are given for private rented homes and owner occupied homes. The heating efficiency is slightly lower in private rented homes (see Figure 16) because a much lower proportion of homes in this tenure have central heating. However, the difference is not quite as large as might be expected, particularly in more recent years. This is because a higher proportion of private rented homes have electric central heating, for which the efficiency is taken to be 100%.

Table 16 Weighted average space heating efficiencies (%)

Year	Central heating efficiency	Non-central heating efficiency	Average efficiency	
			Private rented *	Owner occupied
1977	69	46	52	61
1978	69	47	53	62
1979	68	48	54	62
1980	69	48	54	62
1981	68	49	55	62
1982	68	50	57	63
1983	68	51	58	64
1984	69	51	58	65
1985	69	51	60	65
1986	68	51	59	65
1987	68	51	59	65
1988	68	52	60	65
1989	69	51	60	66
1990	69	52	61	66
1991	69	51	61	66
1992	69	52	63	66
1993	70	52	64	67
1994	70	52	64	67
1995	70	53	65	68
1996	70	52	64	68
1997	71	53	66	69
1998	71	53	66	69

Source: BREHOMES

* The figures for the years 1977 to 1985 are for private rented and RSL sectors combined

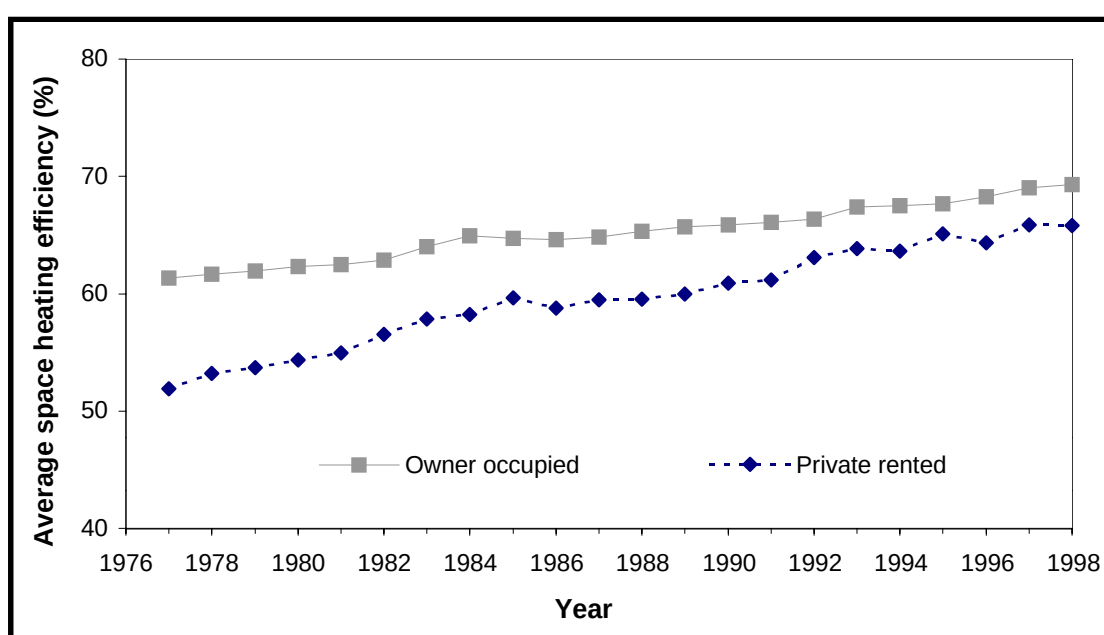


Figure 16 Weighted average space heating efficiencies

Standards of comfort

Notes:

Table 17 presents some estimates of mean internal temperatures in private rented homes, and compares them with estimates for owner occupied homes. While these absolute values may be somewhat tentative, the general trend which is evident may certainly be viewed with some confidence.

The temperatures assumed for all centrally heated and non-centrally heated homes are the same as those which appear in the 1998 update to the main Domestic Energy Fact File. The overall average has been calculated from these temperatures, knowing the numbers of private rented dwellings with and without central heating. As might be expected, this indicates that private rented homes tend to be slightly cooler than owner occupied homes.

Table 17 Standards of comfort: mean internal and average winter external temperatures

Year	Percentage of dwellings with central heating (%)	Calculated average internal temperature (°C)		External temperature (°C)	Total houses ('000s)
		Private rented *	Owner occupied		
1977	23.7	13.55	14.58	6.6	2236
1978	28.0	13.65	14.59	6.3	2397
1979	27.5	13.13	14.14	5.1	2437
1980	28.6	13.68	14.65	5.8	2585
1981	31.8	13.39	14.34	5.4	2153
1982	36.3	13.91	14.79	5.8	2159
1983	40.3	14.49	15.37	6.2	1816
1984	39.8	13.83	14.77	5.8	1823
1985	49.5	13.92	14.62	4.8	1682
1986	46.3	14.56	15.40	5.2	1687
1987	48.5	14.26	15.06	4.9	1290
1988	46.4	15.29	16.18	6.3	1238
1989	50.0	15.38	16.22	6.9	1250
1990	55.0	16.29	17.03	7.6	1284
1991	56.8	15.75	16.47	6.1	1433
1992	66.4	15.92	16.42	6.1	1560
1993	67.3	16.37	16.88	6.2	1599
1994	66.0	16.82	17.38	7.2	1593
1995	73.7	16.46	16.84	6.9	1654
1996	67.8	16.63	17.17	5.7	1715
1997	71.9	17.75	18.21	7.3	1727
1998	72.0	18.07	18.55	7.5	1751

Source: BREHOMES

* The figures shown for the years 1977 to 1985 are for private rented and RSL sectors combined

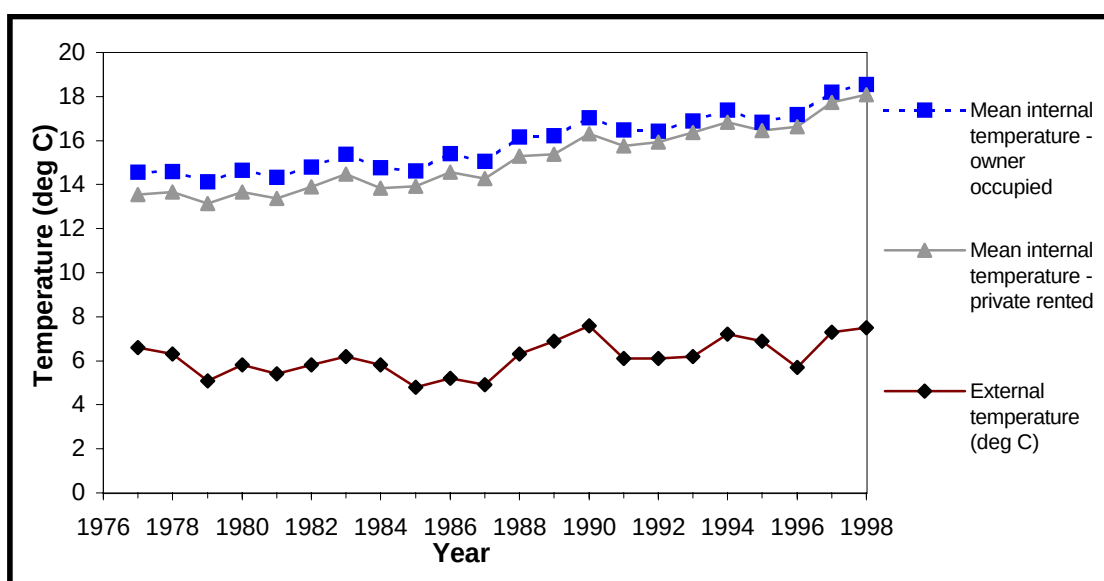


Figure 17 Standards of comfort: mean internal and average winter external temperatures

Energy consumption by end use

Notes:

The distribution of total domestic energy consumption between the main end uses is necessarily a little tentative, particularly for individual tenures.

The figures quoted in Table 18 for private rented homes are based on the assumption that the proportions for the individual end uses are the same as those already estimated for all tenures. This same assumption has been used for other tenures. This assumption is not entirely correct but it is unlikely to be in serious error.

From Figure 18 it is apparent that there has been an overall decline in energy consumption in private rented homes.

Table 18 Domestic energy consumption by end use (PJ) *

Year	Space heating	Water heating	Lights and app's	Cooking	All energy	All energy per h/hold (GJ)	Space heating per h/hold (GJ)
1970	128.3	56.3	13.7	16.1	214.5	64.5	38.6
1971	115.5	54.3	14.0	15.6	199.3	60.1	34.8
1972	113.8	52.0	14.2	15.0	195.1	59.8	34.9
1973	118.0	51.2	14.9	14.8	198.9	61.7	36.6
1974	115.8	49.4	15.3	14.4	194.9	56.2	33.4
1975	105.3	47.2	15.5	13.9	181.9	63.3	36.7
1976	99.8	47.0	15.9	13.5	176.3	69.8	39.5
1977	104.0	46.9	16.5	13.3	180.7	80.8	46.5
1978	105.1	44.3	16.6	12.8	178.8	74.6	43.9
1979	115.3	43.1	16.8	12.5	187.7	77.0	47.3
1980	104.8	40.8	16.9	11.9	174.4	67.5	40.5
1981	101.3	40.4	17.1	11.5	170.4	79.2	47.1
1982	86.3	35.5	15.5	9.9	147.2	68.2	40.0
1983	73.4	30.0	13.8	8.3	125.5	69.1	40.4
1984	74.6	32.0	15.3	8.7	130.5	71.6	40.9
1985	76.8	28.0	13.7	7.3	125.8	74.8	45.7
1986	64.8	23.3	11.5	5.6	105.2	62.3	38.4
1987	48.9	18.0	9.0	4.2	80.1	62.1	37.9
1988	47.0	18.5	9.4	4.1	79.0	63.8	37.9
1989	40.8	18.2	9.2	3.8	72.0	57.6	32.6
1990	40.3	18.1	9.1	3.7	71.1	55.4	31.4
1991	52.3	20.7	10.2	4.0	87.3	61.0	36.5
1992	57.4	23.0	11.8	4.6	96.7	62.0	36.8
1993	58.7	22.4	11.6	4.7	97.5	61.0	36.7
1994	54.0	22.3	11.6	4.7	92.5	58.1	33.9
1995	55.2	24.3	12.6	5.0	97.1	58.7	33.4
1996	67.0	24.3	12.5	5.1	108.9	63.5	39.1
1997	52.3	21.6	11.2	4.5	89.6	51.9	30.3
1998	58.5	25.5	13.1	5.4	102.5	58.5	33.4

Source: BREHOMES

* The figures shown for the years 1970 to 1985 are for private rented and RSL sectors combined.

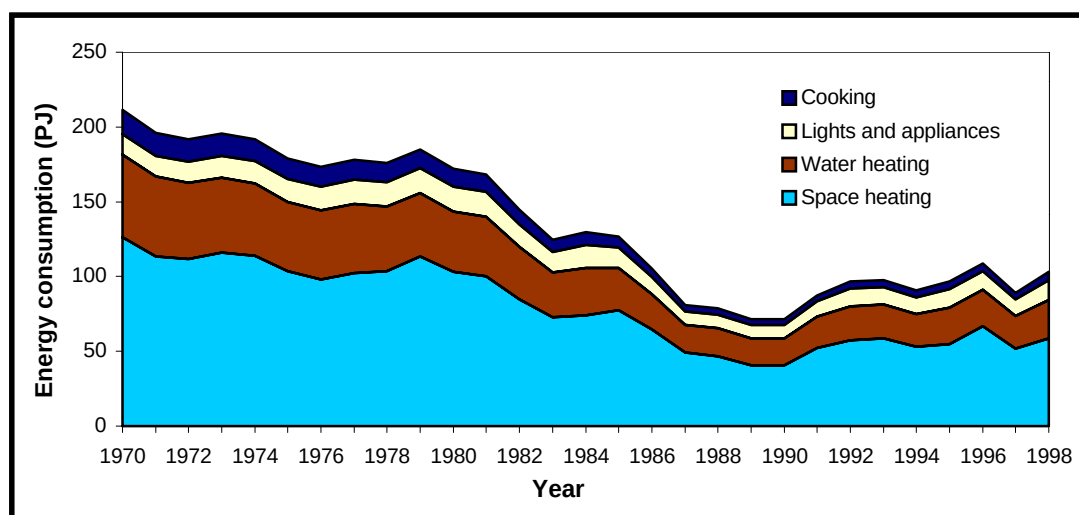


Figure 18 Domestic energy consumption by end use

Domestic energy consumption by fuel

Notes:

The total energy use figures for private rented homes quoted in Table 12 and Table 18 were calculated using information relating to individual fuels. Table 19 presents the estimated domestic consumption by the different fuel types. As noted elsewhere, the figures quoted for the years prior to 1981 are a little tentative. Nonetheless, the trends which can be established from the quoted figures are consistent with the general trends within the tenures, which would indicate that the estimates are close to the true consumptions.

Although overall consumption across all fuels in private rented dwellings shows a decline, the general pattern which emerges is similar to the pattern for all tenures. It is characterised by the rapid penetration of natural gas, the decline of solid fuel and oil, and the disappearance of town gas in the mid '80s.

Table 19 Energy use of the housing stock by fuel (PJ) *

Year	Solid fuels	Natural gas	Town gas	All gas	Electric	Oil/other	All fuels	Average consumption per h/hold (GJ)
1970	136.8	4.7	21.7	26.5	31.4	19.8	214.5	64.5
1971	117.4	10.7	18.8	29.5	32.9	19.5	199.3	60.1
1972	103.4	17.2	16.6	33.8	35.5	22.4	195.1	59.8
1973	100.9	24.3	11.9	36.2	37.3	24.6	198.9	61.7
1974	94.8	32.7	7.8	40.5	37.8	21.8	194.9	56.2
1975	80.2	40.6	3.7	44.3	36.4	21.0	181.9	63.3
1976	74.1	45.5	1.1	46.6	34.6	21.0	176.3	69.8
1977	75.1	49.2	0.3	49.6	34.9	21.1	180.7	80.8
1978	68.5	54.5	0.1	54.6	34.9	20.8	178.8	74.6
1979	69.1	61.7	0.1	61.9	36.5	20.3	187.7	77.0
1980	59.7	63.3	0.1	63.5	35.0	16.2	174.4	67.5
1981	55.6	65.8	0.1	65.9	34.4	14.5	170.4	79.2
1982	43.8	63.5	0.1	63.6	31.0	8.9	147.2	68.2
1983	31.2	57.5	0.1	57.6	27.9	8.9	125.5	69.1
1984	34.0	55.5	0.1	55.5	28.4	12.6	130.5	71.6
1985	26.0	57.0	0.1	57.1	30.9	11.8	125.8	74.8
1986	22.4	50.3	-	50.4	24.2	8.3	105.2	62.3
1987	15.5	37.1	-	37.1	19.4	8.1	80.1	62.1
1988	15.3	41.4	-	41.4	16.4	5.9	79.0	63.8
1989	12.6	38.0	-	38.0	16.3	5.2	72.0	57.6
1990	8.0	38.9	-	38.9	18.2	5.9	71.1	55.4
1991	13.0	47.1	-	47.1	18.7	8.4	87.3	61.0
1992	15.8	49.2	-	49.2	20.7	10.9	96.7	62.0
1993	12.3	54.5	-	54.5	22.0	8.7	97.5	61.0
1994	15.4	49.6	-	49.6	21.4	6.2	92.5	58.1
1995	10.6	53.1	-	53.1	22.6	10.8	97.1	58.7
1996	8.7	67.6	-	67.6	23.6	9.0	108.9	63.5
1997	6.4	54.4	-	54.4	22.5	6.3	89.6	51.9
1998	6.1	58.8	-	58.8	24.5	13.1	102.5	58.5

Source: Digest of UK Energy Statistics

Family Expenditure Survey

* The figures shown for the years 1970 to 1985 are for private rented and RSL sectors combined

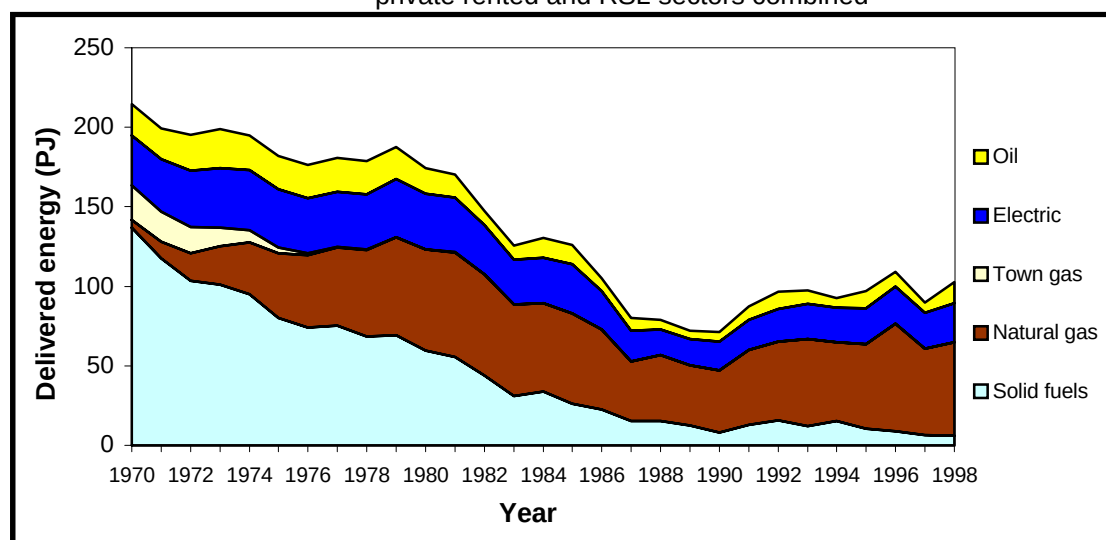


Figure 19 Energy use of the housing stock by fuel type

Carbon dioxide emission

Notes:

Table 20 and Figure 20 show that the carbon dioxide emission associated with housing stock within the private rented tenure has been falling significantly over a number of years. This is due, in part, to a reduction in the number of homes within this tenure. As can be seen from Table 20, the average emission of carbon dioxide per household has fallen significantly over this period, from just under 8 tonnes in 1970 to just over 4 tonnes of carbon dioxide per household in 1998. There are a number of reasons for this.

- The energy efficiency improvements to private rented homes described elsewhere in this report have held energy use down. These energy efficiency measures may be less substantial than the measures achieved in other tenures, but, nonetheless, it is highly likely that they will have had a significant effect.

- The move towards natural gas and away from solid fuel and oil has had a beneficial effect because of the lower emission factor associated with natural gas.

- The electricity emission factor has been steadily declining because of the improving efficiency of electricity generation, transmission and distribution. The trend towards electricity generation by gas sources is continuing and should help to sustain the decline in the electricity emission factor.

Table 20 Carbon dioxide emission due to domestic energy consumption (million tonnes CO₂) *

Year	Fuel type				All fuels	
	Solid	Gas	Electric	Oil	Total	Per household (tonnes CO ₂)
1970	12.7	2.3	9.3	1.5	25.8	7.8
1971	11.0	2.0	9.5	1.4	23.9	7.2
1972	9.7	2.2	10.1	1.7	23.6	7.2
1973	9.4	2.2	10.5	1.8	23.9	7.4
1974	8.9	2.3	10.2	1.6	23.0	6.6
1975	7.5	2.4	9.8	1.6	21.4	7.4
1976	7.0	2.5	9.1	1.6	20.1	8.0
1977	7.0	2.7	9.2	1.6	20.4	9.1
1978	6.4	2.9	8.9	1.5	19.7	8.2
1979	6.4	3.3	9.6	1.5	20.8	8.6
1980	5.6	3.4	9.2	1.2	19.4	7.5
1981	5.2	3.5	8.9	1.1	18.7	7.1
1982	4.1	3.4	7.6	0.7	15.8	6.0
1983	2.9	3.1	6.7	0.7	13.4	5.8
1984	3.1	3.0	6.5	0.9	13.6	5.8
1985	2.4	3.1	7.2	0.9	13.5	6.1
1986	2.1	2.7	5.5	0.6	10.9	6.5
1987	1.4	2.0	4.4	0.6	8.4	6.5
1988	1.4	2.2	3.5	0.4	7.6	6.1
1989	1.2	2.0	3.3	0.4	6.9	5.5
1990	0.8	2.1	3.8	0.4	7.1	5.5
1991	1.2	2.5	3.7	0.6	8.1	5.7
1992	1.5	2.7	4.0	0.8	9.0	5.8
1993	1.0	2.9	4.0	0.6	8.6	5.4
1994	1.3	2.7	3.4	0.5	7.9	4.9
1995	0.9	2.9	3.5	0.8	8.1	4.9
1996	0.7	3.6	3.3	0.7	8.3	4.9
1997	0.6	2.9	3.0	0.5	7.0	4.0
1998	0.5	3.2	3.2	1.0	7.9	4.5

Source: BRE estimates of emission factors applied to Table 19

* The figures shown for the years 1970 to 1985 are for private rented and RSL sectors combined.

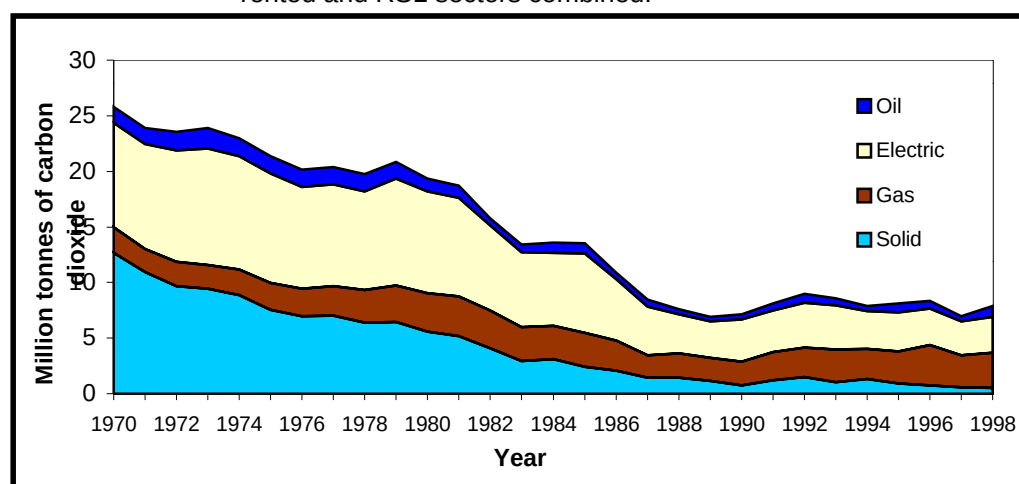


Figure 20 Carbon dioxide emissions due to domestic energy consumption

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G A Walters, I Kempson and L D Shorrocks. BRE Report BR 408. December 2000.
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In addition, a number of sources have been referred to in compiling this report. The relevant sources are quoted below the individual tables. Some tables simply quote their source as BREHOMES. For these tables, a fuller explanation of the derivation of the figures can be obtained from the text accompanying the equivalent tables in the main Domestic Energy Fact File (1). For the other tables, the relevant sources are listed below. In most cases, several editions of these sources have been consulted.

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