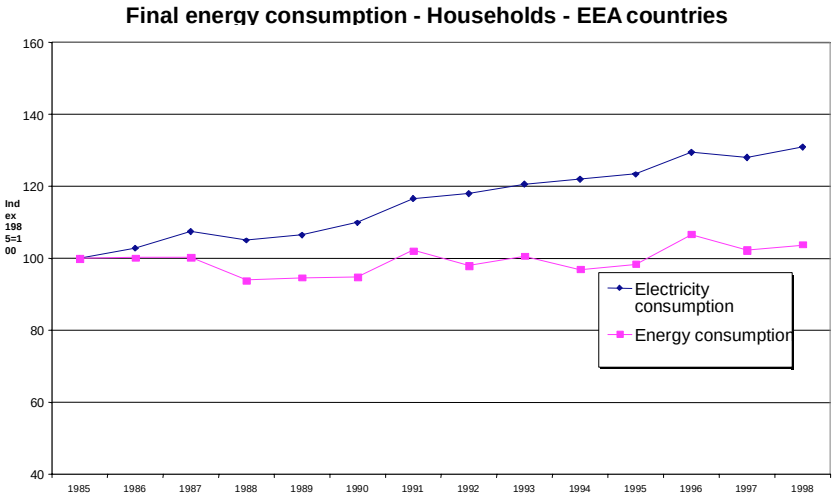
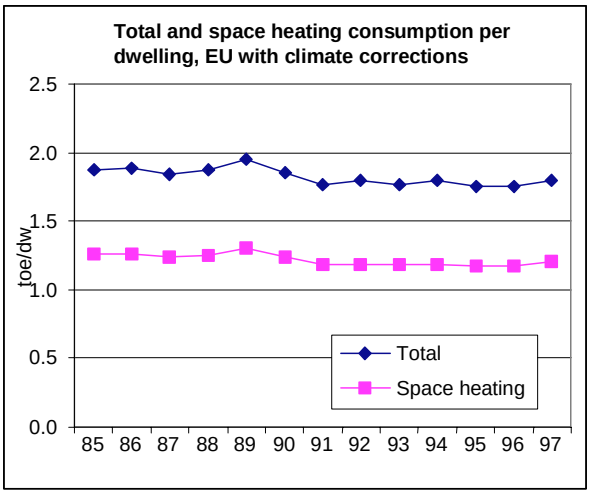
Indicator Fact Sheet Signals 2001 – Chapter Households

YIR01HH06 Household energy consumption





YIR01HH06a Changes in final energy consumption (FEC) and electricity consumption of households, EEA (index 1985=100).

YIR01HH06b Total and space heating consumption per dwelling, with climate corrections, EU. Source. Odyssee/SAVE.

Key message

☹ Energy standards for houses and the introduction of more efficient electrical appliances and heating installations have not lead to a decrease in total energy and electricity consumption by households.

☺The final energy consumption (FEC) of households has remained nearly constant since 1985 (+4 % to 1998); energy used for space heating decreased slightly and electricity consumption increased by about 31 %. Energy use per household has remained about constant and the growth in FEC is related to the increase in number of households.

Results and assessment (level of the indicator)

Relevance of the indicator for describing developments in the environment

The households sector is one of the largest users of energy in the EEA. Energy consumption has direct and indirect environmental effects, which depend on the primary energy source used (see Energy Fact Sheets).

Policy relevance and policy references

This indicator, together with total final energy consumption (YIR01EN09), helps to measure the success of key EU and Member State energy policies that aim to influence energy efficiency and pollutant and greenhouse gas emissions. Household energy consumption in the domestic sector has been addressed at the EU level through voluntary agreements, with manufacturers setting minimum energy efficiency standards for energy efficient domestic appliances; these should be introduced within a Framework Directive expected soon.

Council Directive 93/76/EEC aims to limit carbon dioxide emissions by improving energy efficiency (SAVE).

Assessment

The sector accounts for about 29 % of final energy consumption (FEC) (excluding energy used for transport) in the EEA. The FEC of the sector increased by 4 % between 1985 and 1998, with energy used for space heating falling slightly and electricity consumption rising by about 31 %. The overall increase was due to the increase in number of households, with consumption per household remaining nearly constant.

During the period, the FEC of the sector decreased in five countries (Denmark, Sweden, France, Austria, Netherlands) - by 20 to 30 % in Austria, Denmark and The Netherlands. It increased moderately (by less than15 %) in six countries (Belgium, Germany, Finland, Norway, Portugal and UK) and increased by more than 20 % in Italy, Luxembourg, Spain, and Greece. One reason for energy consumption by households continuing to increase is that energy prices generally have fallen during the period. Domestic electricity prices in real terms fell by 1 % per year between 1985 and 1996 (see *Environmental Signals 2000* – Fig. 3.5.).

Policies to slow growth in domestic demand at Member State level have focused on increasing the efficiency of space heating and appliances. Policies include standards for energy efficiency for new buildings (e.g. Denmark, Netherlands and the UK), information campaigns, improved fuel efficiency (such as the recently introduced low sulphur fuel in Germany which can only be used in high-efficiency boilers), energy-focused Eco-labels (Scandinavia) and subsidies for high efficiency appliances (refrigerators, compact fluorescent lighting, condensing boilers, etc).

The report *Energy efficiency in the European Union 1990-1998* (ENERDATA/Odysee (1999)) gives more details on the trends in household energy efficiency, some of which are highlighted here after:

Energy consumption per dwelling in the EU has been stable since 1991
Average energy consumption per dwelling (with climate correction) has been roughly stable since 1991, at between 1.75 and 1.8 toe/dwelling. Over a longer period, there has been a slight decline: by 4 % between 1985 and 1997.

In Northern countries (e.g. Denmark, Sweden, The Netherlands) energy consumption per dwelling (with climate correction) is falling slightly. In Southern countries (Spain, Greece), Austria and Ireland, it is increasing. It other countries (France, Germany, UK, Finland and Italy) it has remained stable on average. The average size of dwellings increased from 83 m^2 in 1985 to 87 m^2 in 1997. The average energy consumption per m^2 fell by 8 % between 1985 and 1997.

Space heating
Space heating accounts for most energy consumption per dwelling in the EU (69 %), followed by water heating (15 %), electrical appliances and lightning (11 %) and cooking (5 %).

The average amount of energy used per dwelling in the EU for space heating has fallen slightly since 1990, with more energy-efficient dwellings and appliances more than making up for larger and warmer houses. In all countries, the efficiency standards of new dwellings are mandatory and have regularly been tightened. Dwellings built today need 22 % less energy for space heating than those built in 1985. Compared to 1990, the resultant energy saving is 18 %.

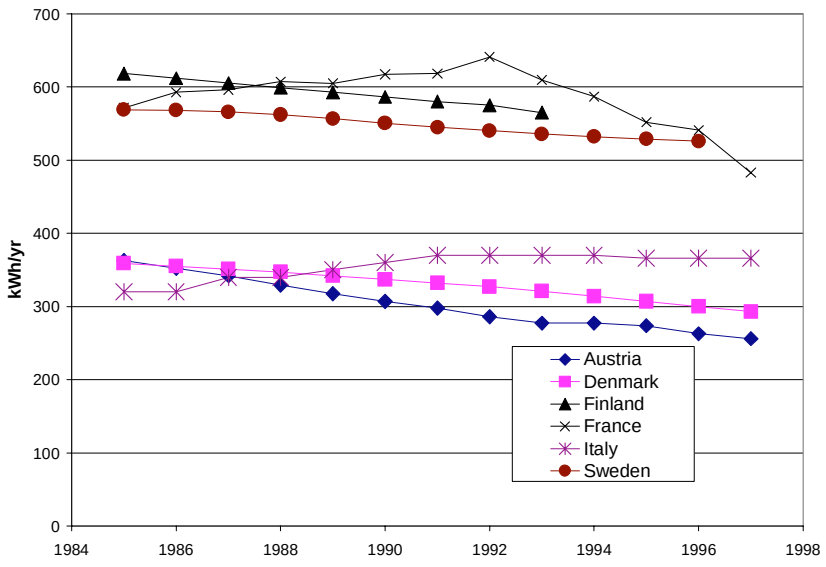
Electrical appliances and lightning
Consumption by all-electrical appliances and lighting represents about 55 % of the electricity used by households. The appliances include the six large consumers of electricity (refrigerators, freezers, washing machines, dish-washers, TV and dryers), and many small appliances.

The average energy consumption per household for electrical appliances and lighting has been increasing much more slowly since 1990 than before: 0.9 % per year between 1990 and 1997 compared with 2.1 % per year between 1985 and 1990. The main reasons are:

- more households are now equipped with all of the usual appliances (behavioural factor), i.e. little increase in the household ownership of appliances;
- changes in the size (trend to smaller households) and characteristics of appliances (more refrigerator/freezers instead of separate refrigerators and freezer) (behavioural factor);
- changes in the intensity of use, mainly for washing machines, TV and also freezers or dish-washers (behavioural factor);
- changes in the energy efficiency of these appliances (technical factors).

The average unit consumption per household for electrical appliances and lighting is progressing at a much slower pace since 1990 than before: increase of 1.2%/year from 1990 to 1999 against 2.4% between 1985 and 1990 (Figures 5.8 and 5.8a). If we leave out all the small appliances and lighting and focus on the big appliances, their average specific consumption is decreasing since 1992 at a rate of 1.5%/year. The cumulative reduction can be estimated to 100 kWh/ household since 1992, which represents electricity savings of 15 TWh. For refrigerators, the market share of the most efficient appliances is increasing (see indicator YIR01HH08)

Fig. 2.Specific consumption of electricity of refrigerators



Source: European Energy Efficiency Indicators – Odyssee Data Base (April 2000).

Table 1: Final Energy consumption by households in the EEA area (million toe).

Source: EEA Data warehouse - EUROSTAT Annual Energy Balance

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	98/85
Belgium	9.16	9.46	9.15	8.34	7.93	8.34	9.19	9.18	9.11	8.95	9.32	10.63	9.88	9.88	1.08
Denmark	5.61	5.31	4.96	4.60	4.25	4.13	4.47	4.20	4.52	4.45	4.58	4.90	4.51	4.41	0.79
Federal Republic of Germany (incl. ex-GDR from 1991)	63.1	67.1	66.8	60.9	55.6	57.9	63.3	58.4	63.3	61.3	63.0	70.1	66.6	67.6	1.07
Greece	2.81	2.58	2.92	2.91	3.25	3.23	3.28	3.18	3.18	3.22	3.35	3.97	4.07	4.23	1.50
Spain	8.84	9.06	7.85	8.44	9.06	9.26	10.2	9.85	9.80	10.3	10.0	10.6	10.7	11.1	1.25
France	39.9	40.3	39.8	36.4	35.9	36.5	41.7	40.4	39.6	37.1	36.3	40.0	37.7	38.6	0.97
Ireland	2.13	2.35	2.38	2.32	2.33	2.17	2.04	2.12	2.08	2.14	2.19	2.27	2.23	2.41	1.13
Italy	30.4	29.1	30.4	28.6	33.4	33.2	35.0	33.2	33.4	30.4	32.9	33.8	35.9	37.5	1.23
Luxembourg	0.52	0.55	0.54	0.55	0.52	0.50	0.60	0.54	0.57	0.55	0.56	0.62	0.61	0.63	1.21
Netherlands	13.0	11.5	11.3	9.9	9.7	9.8	11.0	10.1	10.7	10.5	11.1	12.3	10.7	10.3	0.80
Austria	6.99	7.23	7.22	6.53	6.30	6.77	7.28	6.99	7.19	6.69	7.04	7.67	6.30	4.80	0.69
Portugal	2.46	2.36	2.41	2.47	2.35	2.29	2.36	2.43	2.49	2.54	2.99	2.67	2.67	2.63	1.07
Finland	5.19	5.15	5.65	5.58	5.28	5.48	5.69	5.73	5.54	5.74	5.61	4.90	5.27	5.38	1.04
Sweden	9.65	7.98	7.82	7.29	6.84	6.84	7.45	7.53	8.21	8.31	7.78	8.46	8.22	8.15	0.84
United Kingdom	41.1	41.1	42.2	40.9	45.0	41.6	42.5	41.8	42.5	40.9	39.7	44.4	41.4	42.7	1.04
EU15	240.9	241.1	241.4	225.7	227.7	228.1	246.1	235.7	242.2	233.1	236.5	257.3	246.9	250.3	1.04
Iceland	0.56	0.56	0.56	0.61	0.62	0.58	0.55	0.58	0.60	0.55	0.57	:	:	:	
Norway	3.47	3.65	3.69	3.58	3.47	3.57	3.63	3.57	3.69	3.85	3.86	4.01	3.80	3.92	1.13
Liechtenstein	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
EEA	244.9	245.3	245.6	229.8	231.8	232.2	250.2	239.9	246.5	237.5	240.9	261.3	250.7	254.2	1.04

Table 2: Electricity consumption by households in the EEA area (million toe)

Source: EEA Data warehouse - EUROSTAT Annual Energy Balance

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	98/85
Belgium	1.16	1.19	1.26	1.26	1.30	1.58	1.71	1.74	1.81	1.84	1.90	2.00	1.97	2.01	1.74
Denmark	0.73	0.76	0.79	0.77	0.77	0.78	0.82	0.82	0.90	0.88	0.90	0.94	0.89	0.88	1.21
Federal Republic of Germany (incl. ex-GDR from 1991)	9.67	9.78	10.17	9.90	9.91	10.07	10.50	10.55	10.84	10.81	11.05	11.51	11.25	11.25	1.16
Greece	0.68	0.67	0.73	0.75	0.79	0.78	0.86	0.91	0.90	0.94	0.99	1.05	1.07	1.10	1.63
Spain	2.00	2.14	2.20	2.33	2.54	2.60	2.66	2.70	2.78	2.99	3.09	3.23	3.45	3.59	1.79
France	7.38	7.70	8.36	7.85	7.99	8.33	9.18	9.42	9.58	9.56	9.36	10.36	10.24	10.59	1.44
Ireland	0.34	0.35	0.36	0.36	0.37	0.39	0.41	0.44	0.44	0.46	0.47	0.49	0.46	0.47	1.40
Italy	3.83	3.93	4.14	4.24	4.38	4.53	4.70	4.79	4.85	4.90	4.92	4.98	5.03	5.10	1.33
Luxembourg	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.06	1.30
Netherlands	1.38	1.39	1.43	1.33	1.38	1.42	1.47	1.50	1.54	1.59	1.69	1.72	1.75	1.79	1.30
Austria	0.88	0.89	0.93	0.92	0.94	0.96	1.02	1.03	1.06	1.05	1.09	1.14	1.11	1.12	1.27
Portugal	0.37	0.40	0.42	0.44	0.49	0.51	0.57	0.58	0.61	0.64	0.68	0.73	0.72	0.76	2.01
Finland	1.05	1.08	1.19	1.15	1.16	1.26	1.34	1.36	1.40	1.46	1.40	1.48	1.50	1.56	1.49
Sweden	3.42	3.43	3.50	3.32	3.27	3.28	3.54	3.48	3.60	3.66	3.65	3.72	3.66	3.64	1.07
United Kingdom	7.59	7.90	8.02	7.94	7.93	8.06	8.43	8.55	8.64	8.72	8.79	9.24	8.98	9.42	1.24
EU15	40.5	41.7	43.5	42.6	43.3	44.6	47.3	48.0	49.0	49.6	50.0	52.7	52.1	53.3	1.32
Iceland	0.04	0.04	0.05	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	:	:	:	:
Norway	2.49	2.57	2.60	2.52	2.48	2.61	2.80	2.81	2.82	2.92	2.98	3.03	2.92	2.96	1.19
Liectenstein	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
EEA	43.0	44.3	46.2	45.2	45.8	47.3	50.1	50.8	51.9	52.5	53.1	55.7	55.1	56.3	1.31

Table 3: Unit consumption per dwelling with climate corrections (toe/dw).

Source: European Energy Efficiency Indicators – Odyssee Data Base (April 2000).

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
European Union	**1.87**	**1.89**	**1.84**	**1.87**	**1.95**	**1.86**	**1.77**	**1.80**	**1.76**	**1.80**	**1.76**	**1.75**	**1.80**	**n.a.**
Austria	1.30	1.31	1.34	1.35	1.47	1.53	1.46	1.51	1.52	1.51	1.45	1.36	n.a.	n.a.
Belgium	2.35	2.53	2.43	2.58	2.55	2.58	2.54	2.65	2.55	2.67	2.70	2.64	n.a.	n.a.
Denmark	1.88	2.01	1.88	1.98	1.88	1.84	1.83	1.84	1.84	1.86	1.85	1.75	1.84	1.82
Finland	2.65	2.79	2.78	2.82	3.03	2.98	2.98	3.03	3.01	2.05	2.13	2.06	2.06	n.a.
France	1.86	1.87	1.85	1.88	1.88	1.88	1.92	1.92	1.91	1.87	1.86	1.85	1.82	n.a.
Germany (West) (Ex-FRG)	2.28	2.33	2.27	2.15	1.90	1.97	2.21	2.12	2.24	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	n.a.	n.a.	n.a.	n.a.	n.a.	1.91	1.85	1.88	1.91	1.95	1.90	1.92	2.05	2.03
Greece	0.68	0.67	0.83	0.81	0.94	1.00	0.84	0.87	0.87	n.a.	1.01	1.11	1.09	n.a.
Ireland	2.15	2.11	2.36	2.32	2.42	2.41	2.26	2.03	1.98	2.10	2.10	2.08	2.27	n.a.
Italy	1.30	1.33	1.31	1.33	1.35	1.47	1.34	1.45	1.40	1.36	1.38	1.40	1.39	1.43
Luxembourg	3.53	3.90	3.69	4.24	4.03	4.04	4.17	3.98	4.12	4.07	4.15	4.42	3.77	n.a.
Netherlands	2.13	2.03	1.95	1.84	1.86	1.85	1.85	1.79	1.78	1.76	1.80	1.80	1.73	n.a.
Norway	2.00	2.16	2.12	2.16	2.16	2.20	2.05	2.08	2.13	2.16	2.21	2.23	2.17	n.a.
Portugal	0.40	0.42	0.47	0.48	0.55	0.53	0.49	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	0.76	0.75	0.78	0.74	0.78	0.79	0.77	0.80	0.77	0.87	0.89	0.86	0.91	0.92
Sweden	2.20	2.25	2.17	2.16	2.15	2.17	2.09	2.06	2.07	2.05	2.04	2.09	2.00	2.10
United Kingdom	2.02	2.07	2.08	2.15	2.10	2.15	2.15	2.12	2.07	2.08	1.99	2.08	2.10	n.a.

Table 4: Unit consumption for space heating per dwelling with climate corrections (toe/dw).

Source: European Energy Efficiency Indicators – Odyssee Data Base (April 2000).

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
European Union	**1.26**	**1.27**	**1.23**	**1.25**	**1.31**	**1.24**	**1.18**	**1.19**	**1.18**	**1.19**	**1.18**	**1.17**	**1.20**	**n.a.**
Austria	1.08	1.13	1.17	1.14	1.33	1.46	1.46	1.49	1.51	1.52	1.52	1.51	0.00	n.a.
Belgium	1.99	2.15	2.08	2.22	2.16	2.18	2.11	2.22	2.13	2.23	2.26	2.20	n.a.	n.a.
Denmark	1.27	1.38	1.25	1.38	1.32	1.30	1.26	1.28	1.25	1.29	1.27	1.15	1.27	1.25
Finland	1.72	1.82	1.81	1.83	1.97	1.94	1.94	1.97	1.95	1.33	1.39	1.34	1.34	n.a.
France	1.34	1.34	1.31	1.33	1.32	1.31	1.35	1.33	1.31	1.28	1.27	1.25	1.22	n.a.
Germany (West) (Ex-FRG)	n.a.	n.a.	1.98	n.a.	n.a.	n.a.	1.95	1.09	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.50	1.43	1.42	1.50	1.49	1.40	1.46	n.a.
Greece	n.a.	n.a.	0.18	0.17	0.19	0.20	0.15	0.16	0.15	0.27	0.16	0.16	0.15	n.a.
Ireland	1.61	1.58	1.77	1.74	1.81	1.81	1.70	1.52	1.48	1.57	1.57	1.56	1.70	n.a.
Italy	0.90	0.92	0.90	0.92	0.91	1.03	0.89	1.00	0.96	0.93	0.94	0.97	0.98	1.02
Luxembourg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.98	n.a.	n.a.	n.a.
Netherlands	1.50	1.39	1.34	1.28	1.29	1.28	1.23	1.20	1.17	1.17	1.18	1.13	1.12	n.a.
Norway	1.30	1.34	1.36	1.25	1.14	1.12	1.14	1.10	1.18	1.25	1.23	1.29	1.19	n.a.
Portugal	0.26	0.27	0.31	0.31	0.35	0.34	0.32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	0.35	0.35	0.36	0.34	0.37	0.36	0.34	0.35	0.35	0.43	0.44	0.41	0.45	0.44
Sweden	1.09	1.19	1.12	1.16	1.19	1.19	1.12	1.10	1.09	1.09	1.04	1.05	1.05	1.11
United Kingdom	1.16	1.20	1.22	1.27	1.21	1.25	1.28	1.27	1.23	1.22	1.15	n.a.	n.a.	n.a.

Table 5: Specific electricity consumption of refrigerators (kWh/yr)

Source: European Energy Efficiency Indicators – Odyssee Data Base (April 2000).

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Austria	363	352	342	329	317	307	298	286	277	277	274	263	256	n.a.
Belgium	n.a.	n.a.	n.a.	n.a.	n.a.	480	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	359	355	351	347	342	337	332	327	321	314	307	300	293	286
Finland	618	612	605	599	593	586	580	575	565	n.a.	n.a.	n.a.	n.a.	n.a.
France	572	593	596	607	605	617	618	641	609	587	552	541	483	n.a.
Germany (West) (Ex-FRG)	n.a.	n.a.	330	n.a.	305	324	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	352	342	332	322	312	303	295	287
Greece	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Italy	320	320	340	340	350	360	370	370	370	370	366	366	366	n.a.
Luxembourg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	380	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	349	n.a.	n.a.	342	342	n.a.
Norway	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Portugal	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sweden	569	568	566	562	557	550	545	540	536	532	529	526	n.a.	n.a.
United Kingdom	n.a.	n.a.	n.a.	n.a.	n.a.	356	n.a.	n.a.	n.a.	n.a.	328	n.a.	n.a.	n.a.

Meta data

Technical information

1. Data source

EUROSTAT Annual Energy Balance, Households etc. Final Energy Consumption (FEC).
European Energy Efficiency Indicators – Odyssee Data Base (April 2000).

2. Description of data

Energy and electricity consumption: 1000 tonnes of oil equivalent (TOE) and divided by the number of dwellings.

3. Geographical coverage

EU15+IS+NO

4. Temporal coverage

1985-1997

5. Methodology and frequency of data collection

Eurostat & Odyssee/SAVE update the data annually.

6. Methodology of data manipulation

Energy and electricity consumption: calculating the index 1985 = 100.

Climate corrections in Odyssee. Because of the large climatic differences among countries, and thus their space-heating requirement, the space heating consumption is adjusted for climate differences. The adjustment made in Odyssee is to calculate unit consumption for all countries scaled to average European climate.

Qualitative information

7. Strength and weakness (at data level)

Generally officially reported data following agreed procedures.

8. Reliability, accuracy, robustness, uncertainty (at data level)

9. Further work required (for data level and indicator level)

References & other reading

ENERDATA/Odyssee (1999): Energy efficiency in the European Union 1990-1998. Annual report to SAVE. http://193.54.191.189/SiteOdyssee/rapfra.pdf

OECD, 1999: Towards more Sustainable Household Consumption Patterns – Indicators to Measure Progress OECD ENV/EPOC/SE(98)2/Final