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EU energy efficiency measures contribute to stabilise electricity consumption – drop in domestic use

Energy efficiency measures introduced across the European Union are already contributing to stabilise electricity consumption. A combination of labelling, minimum efficiency standards and voluntary agreements, together with national policies and incentives, have flattened the energy and electricity consumption in recent years. For the first time since 1990, final electricity consumption decreased in 2007 in EU households from 806.52 TWh in 2006 to 800.72 TWh. This report, issued today by the European Commission's Joint Research Centre (JRC), calculates the market share of energy-efficiency appliances and equipment and the energy consumption by sector in 2007. It also identifies the appliances in which energy efficiency has the largest potential: domestic, street and office lighting; televisions and stand-by appliances in households, as well as electric motors in industry.

The *Electricity Consumption and Efficiency Trends in the European Union* report, by the JRC's Institute for Energy (IE), presents the results of an in-depth survey conducted on electricity consumption across the EU-27 for 2007, focusing on commonly used electrical appliances and equipment. It also includes the main findings of the first preparatory studies for implementing the Eco-design Directive, which provide EU-wide rules for the design of energy-using products.

The results show that over the period 2004-2007, EU's energy and electricity consumption trends in the residential sector remained stable. For the first time since 1990, the final electricity consumption in 2007 was lower than in the previous year in this sector and almost constant in the tertiary sector (table 1).

However, global electricity end-use consumption rose in the same period (+4.46%, table 1); although only at about half the rate of economic growth (+8.23%), as opposed to 2006 when it grew at a similar percentage to overall GDP (10.8%).

In 2007, final energy consumption was down (-1.31%) compared to 2004, with the biggest fall in the residential sector (-7.12%).

Final electricity consumption in households

The largest electricity consumers in EU households (table 2) were electric heating (18.8%), cold appliances (refrigerators and freezers with 15.3%), lighting (10.8%) and water-heating systems (8.6%). Overall electricity consumption amounted to 800.72 TWh in the EU residential sector.

The information and communication technologies (ICTs) are becoming more and more important in terms of electricity consumption, accounting in 2007 for up to 13% in the residential sector (+2% compared to 2004). This is due to a wider penetration of some technologies (i.e. computers, set-top-boxes, modems, external power supplies) as well as a strong penetration of new technologies due to the market transformation (i.e. digital television, larger screens LCD and plasma display television and broadband communication).

The 'stand-by' consumption accounts for 5.9% of electricity consumption in EU homes – almost the same as computers and dishwashers combined. The reduction of this kind of consumption is the subject of an EU eco-design Regulation and it will be an important driver for achieving energy savings by 2020.

Other important sources of savings can be achieved in domestic lighting, which could go down by 46% by 2020 of current consumption due to the recent European Eco-design Regulation that will phase-out the inefficient incandescent lamps (table 4).

White appliances (refrigerators, freezers, washing machines and dishwashers) are a success story of improved energy efficiency through implementation of EU energy labelling directives; national policies (i.e. tax incentives and price rebates) and voluntary agreements of manufacturers. By implementing the corresponding EU Eco-design regulations, an additional 5% annual energy savings can be achieved by 2020.

Commercial and industrial sectors

The largest electricity consumers in the EU tertiary sector (table 3) are indoor lighting in commercial buildings (21,6% or 26,3% if considered together with street lighting), electric space and water heating systems (19,7%), ventilation (12,7%) and commercial refrigeration (8,7%). Total consumption was 760 TWh, close to the EU households' consumption.

Electric motor systems are by far the most important type of electric load in industry in the EU, using 59% of the electricity consumed accounting for some 680 TWh/year. As an effect of the eco-design regulations and energy labelling, electric motors could save up to 135 TWh per year (a nearly 20% consumption decrease). Overall consumption in the industry sector totalled 1149.9 TWh.

Creating the right climate for energy efficiency

The climate for improved energy efficiency in the EU has been significantly enhanced over the last decade, as new industry standards and agreements have been introduced and significant legislation has come into force or is under assessment. For example, the Eco-design Directive (2005/32/EC) set conditions and criteria to help manufacturers develop electrical products that are more environmentally friendly.

Other influential energy directives include the End-use Energy Efficiency and Energy Services Directive (2006/32/EC [ESD]), the Energy Performance of Buildings Directive (2002/91/EC [EPBD, under recast]) and the Labelling Directive (1992/75/EC [under recast]). In addition, individual Member States have complemented these European initiatives by adopting their own policies including information, financial incentives, supplier obligations and voluntary agreements.

Download

The *Electricity Consumption and Efficiency Trends in the European Union* report:
<http://re.jrc.ec.europa.eu/energyefficiency/>

Eco-design preparatory studies: http://ec.europa.eu/energy/efficiency/studies/ecodesign_en.htm

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Table 1: EU-27 final electricity consumption trends (source: Eurostat)

	1990 [TWh]	1999 [TWh]	2000 [TWh]	2001 [TWh]	2002 [TWh]	2003 [TWh]	2004 [TWh]	2005 [TWh]	2006 [TWh]	2007 [TWh]
Final cons.	2140,69	2441,13	2516,83	2592,09	2599,74	2667,96	2721,79	2762,68	2826,07	2843,24
Residential	583,41	707,52	710,91	735,16	738,51	770,83	784,17	795,04	806,52	800,72
Tertiary	433,11	589,42	614,72	642,35	644,09	672,79	688,81	706,21	757,24	760,43
Industry	978,5	1020,0	1068,6	1088,6	1092,1	1102,4	1126,7	1135,6	1132,7	1149,9
Transport	62,68	68,88	71,05	71,25	71,61	72,29	72,83	73,89	70,80	71,66
Agriculture	55,42	45,67	46,91	47,16	46,16	44,56	44,76	47,63	50,64	51,23
Others	27,56	9,66	4,67	7,58	7,30	5,11	4,48	4,27	8,16	9,26

Table 2: Breakdown of residential electricity consumption in EU-27 in 2007 (JRC)

EU-27 residential electricity consumption	[TWh]
Cold appliances (refrigerators & freezers)	122,0
Washing machines	51,0
Dishwashers	21,5
Electric ovens & hobs	60,0
Air-conditioning	17,0
Ventilation	22,0
Water heaters	68,8
Heating systems/electric boilers	150,0
Lighting	84,0
Television	54,0
Set-top boxes	9,3
Computers	22,0
External power supplies	15,5
Home appliances stand-by	43,0
Others	60,6
Residential electricity consumption	800,72

Table 3: Estimate breakdown of electricity end-use in the EU-27 tertiary sector in 2007 (JRC)

EU-27 tertiary electricity in 2007	[TWh]
Office appliances stand-by	9,43
Computers	26
Imaging equipments	7
Office lighting	164
Street lighting	36
Air-conditioning	21,6
Space and water heating	150
Commercial refrigeration	65,83
Cooking appliances	40
Ventilation	96
Circulators (and other similar)	52
Pumps	45
Miscellaneous	47,57
Total final consumption	760,43

Table 4: Total estimated annual savings by 2020, as an effect of the Eco-design Regulations and Energy Labelling (Source: JRC extrapolation on the Eco Design preparatory studies and "EU Legislative Instruments for Lighting Conference on Energy Efficiency in the Lighting Market" by Andras Toth)

Measure	Estimated savings (annual by 2020) [TWh]
Domestic lighting (ecodesign)	39
Street & office lighting (ecodesign)	38
Freezers & refrigerators (ecodesign & labelling)	6
Washing machines (ecodesign & labelling)	2
Dishwashers (ecodesign & labelling)	2
Televisions (ecodesign & labelling)	43
Stand-by (ecodesign)	35
Simple set-top boxes (ecodesign)	6
External power supplies (ecodesign)	9
Electric motors (ecodesign)	135
Circulators (ecodesign)	25
Total savings (annual by 2020) [TWh]	340