

logicor



Energy wastage due to leaving electrical appliances switched on when not in use

Report for Logicor Ltd prepared by
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Narrative

CommunicateResearch Ltd (ComRes) conducted a survey into energy wastage in November 2009.

There were 2051 respondents who were asked how long and how often they tended to leave certain household electrical appliances (18 in number, listed below) switched on and unattended, both deliberately and accidentally.

From the responses, tables of head-counts were drawn up.

In the 115 tables supplied by ComRes to Logicor Ltd the numbers were standardised to match general population sizes.

The tables give breakdowns of the numbers admitting to wastage by gender, age group, social class, and geographical region: a list of these tables is given below in Appendix 1.

Figures were obtained from the internet for energy consumption levels of the 18 appliances, see Appendix 2.

These figures were then combined with the numbers extracted from the ComRes tables to produce estimates of average energy wastage. The details of this calculation are given in Appendix 3.

Summary of data

In the following summary table the figures give average kilowatt-hours (kWh) wasted per day for each appliance.

The first column is averaged over the respondents admitting to wastage, and the second is averaged over all 2051 respondents. Multiplication by 365 yields total wastage 2434.5 and 1317.6 kWh/year which, at 15p per kWh, translates to average annual costs of £365.18 and £197.65. Note that these figures do not include 'standby' modes of appliances, which gives rise to comparatively small wastage.

Appliance		Average wastage per day (kWh)	
		Over those admitting wastage	Over all 2051 respondents
1	Electric kettle	0.34	0.32
2	Electric blanket	0.07	0.01
3	Electric light/lamp	0.44	0.40
4	Tumble dryer	1.92	1.03
5	Microwave	0.11	0.10
6	Immersion/water heater	3.26	1.22
7	Modem	0.06	0.05
8	Computer	0.30	0.29
9	Computer screen	0.38	0.31
10	CD player/hi fi	0.02	0.02
11	Set-top box	0.11	0.07
12	TV	0.18	0.17
13	Clothes iron	0.02	0.01
14	Electric portable heater	0.33	0.10
15	Hair-care appliance	0.06	0.04
16	Electric hob	0.32	0.12
17	Mobile-phone charger	0.01	0.01
18	Printer	0.06	0.05

Appendices

Appendix 1: ComRes tables

The survey conducted by ComRes in November 2009 concerns energy wastage due to leaving electrical appliances switched on and unattended (here referred to as wastage).

The 115 ComRes tables in the files supplied are as listed below. The 'Breakdowns' here are by gender (male/female), age group (18-24, 25-34, 35-44, 45-54, 55-64, 65+), social class (AB, C1, C2, DE), and geographical region (15 regions); each breakdown gives rise to 18 tables, one for each of the appliances in question.

	Table 1	Summary: how many respondents use the listed 18 appliances
Deliberate wastage	Table 2	Summary: how many (of those who use) admit to deliberate wastage at any time
	Tables 3-20	Breakdowns of Table 2
	Table 21	Summary: of those appearing in Table 2, how often the wastage occurs
	Tables 22-39	Breakdowns of Table 21
	Table 40	Summary: of those appearing in Table 2, how long are appliances left on
	Table 41-58	Breakdowns of Table 40
Accidental wastage	Table 59	Summary: how many (of those who use) admit to accidental wastage at any time
	Tables 60-77	Breakdowns of Table 59
	Table 78	Summary: of those appearing in Table 59, how often the wastage occurs
	Tables 79-96	Breakdowns of Table 78
	Table 97	Summary: of those appearing in Table 59, how long are appliances left on
	Tables 98-115	Breakdowns of Table 97

Appendix 2: Average wattage of appliances (when in full operation) from various websites

There is considerable variation in the figures published on the internet. Those here are selected from ostensibly-authoritative sources. Even so, the ranges for some appliances are very wide, partly reflecting the different models and makes. To obtain a single figure for wattage, where a range of values is quoted the mid-point has been taken. Further, in order to extract 'typical' energy consumption some assumptions have been made. For example, a household computer is taken to be a desk-top, a printer to be an ink-jet, a hair-care appliance to be a dryer, and electric light to be four single bulbs. The resulting representative power consumption (watts) figures used for calculations for the 18 appliances are given in the following table.

Appliance	Average power in full operation (W)	Representative figure (W)
Electric kettle	1200-3000	2100
Electric blanket	100-200	150
Electric light/lamp	60(single bulb) 100(two-tube 4ft fluorescent)	240
Tumble dryer	1800-5750	3750
Microwave	600-1500	1050
Immersion/water heater	4500-5500	5000
Modem	10	10
Computer	20-50(laptop) 80-200(desktop)	100
Computer screen	150	150
CD player/hi fi	30	30
Set-top box	20-25	22
TV	70-150	110
Clothes iron	1000-1800	1400
Electric portable heater	750-1500	1125
Hair-care appliance	1000-1875	1440
Electric hob	1200-8000	4600
Mobile-phone charger	4	4
Printer	35(inkjet) 1200(laser)	35

Appendix 3: Calculations

The table below gives estimated average times per day (minutes) for which appliances are left on and unattended. The calculations involved are outlined below.

The following abbreviations are used in the table:

ndelibs= no. users admitting to deliberate wastage, av1= average time;

naccids= no. users admitting to accidental wastage, av2= average time;

nusers= no. users overall, av3= average time (deliberate, accidental, and neither).

For the last two columns, av4 and kWh, the number of responders overall is 2051, both users and non-users.

Table of average times (minutes) per day for which appliances are left on and unattended together with kWh wastage/day

	Appliance	Users admitting to deliberate wastage			Users admitting to accidental wastage			Users overall			Users and non-users overall (2051 responders)	
		ndelibs	av1	kWh	naccids	av2	kWh	nusers	av3	kWh	av4	kWh
1	Electric kettle	417	30.3	1.06	145	40.6	1.42	1922	9.6	0.34	9.0	0.32
2	Electric blanket	82	84.0	0.21	23	19.2	0.05	265	27.7	0.07	3.6	0.01
3	Electric light/lamp	868	173.6	0.69	694	76.3	0.31	1857	109.7	0.44	99.3	0.40
4	Tumble dryer	399	63.7	3.98	61	135.4	8.46	1096	30.7	1.92	16.4	1.03
5	Microwave	410	20.7	0.36	114	25.5	0.45	1888	6.0	0.11	5.6	0.10
6	Immersion/water heater	307	424.2	7.07	98	198.0	3.30	764	195.8	3.26	73.0	1.22
7	Modem	842	604.4	0.10	222	382.5	0.06	1557	381.4	0.06	289.5	0.05
8	Computer	1052	275.9	0.46	407	156.5	0.26	1983	178.5	0.30	172.6	0.29
9	Computer screen	799	262.8	0.66	331	125.6	0.31	1654	152.1	0.38	122.7	0.31
10	CD player/hi fi	360	129.9	0.06	202	103.4	0.05	1645	41.1	0.02	33.0	0.02
11	Set-top box	639	513.3	0.19	241	248.7	0.09	1326	292.5	0.11	189.1	0.07
12	TV	727	202.4	0.37	449	94.0	0.17	1954	96.9	0.18	92.3	0.17
13	Clothes iron	44	13.4	0.31	98	7.0	0.16	1804	0.7	0.02	0.6	0.01
14	Electric portable heater	101	87.9	1.65	32	61.2	1.15	622	17.4	0.33	5.3	0.10
15	Hair-care appliance	53	15.7	0.38	114	24.3	0.58	1409	2.6	0.06	1.8	0.04
16	Electric hob	76	30.2	2.31	62	13.3	1.02	744	4.2	0.32	1.5	0.12
17	Mobile-phone charger	895	162.0	0.01	401	138.8	0.01	1922	104.4	0.01	97.8	0.01
18	Printer	479	278.6	0.16	233	161.2	0.09	1737	98.4	0.06	83.4	0.05

Average times (minutes) for which appliances are left switched on and unattended have been estimated by taking the mid-points of the time periods quoted in the ComRes tables, e.g 15.5= mid-point of 1-30 mins; the last one, 48 hours or more, is taken as 2880 mins. The ComRes tables also give wastage frequency in five bands, 'daily', 'about once a week', etc. These have been converted into day-equivalents by assigning a factor 1/7 to 'once-a-week', etc.

Unfortunately, the ComRes tables do not give enough detail for precise calculations. For that one would need the original, individual responses from which their tables have been compiled. One source of uncertainty is a possible association between 'how often' and 'how long'. For instance, if, when wastage occurs frequently, it tends to be only for short periods, then the average 'wastage' will be smaller than if it tended to be for long periods. Without individual records, this possible correlation cannot be known. A default option has been taken here - that there is no association between frequency and period of wastage.

There are some further questions to be resolved. One concerns the response 'permanently' (left switched on and unattended). For some appliances this would imply that it is never used for the function intended. For others, such as an immersion heater, permanent operation would not be unusual but that does not imply continuous wastage. Certain judgements have been made as follows. The wastage for an immersion heater has been taken as 20% of its power consumption. The 'permanent' category for electric kettles, tumble dryers, microwaves, hair dryers, clothes irons and electric hobs has been reclassified from 'permanent' to 'once per day' since it is deemed unlikely that any of these could actually be left switched on permanently. These modifications will reduce the overall estimate of wastage thus giving a more conservative figure.