

Remodece

How we calculate energy savings based on Energybox findings

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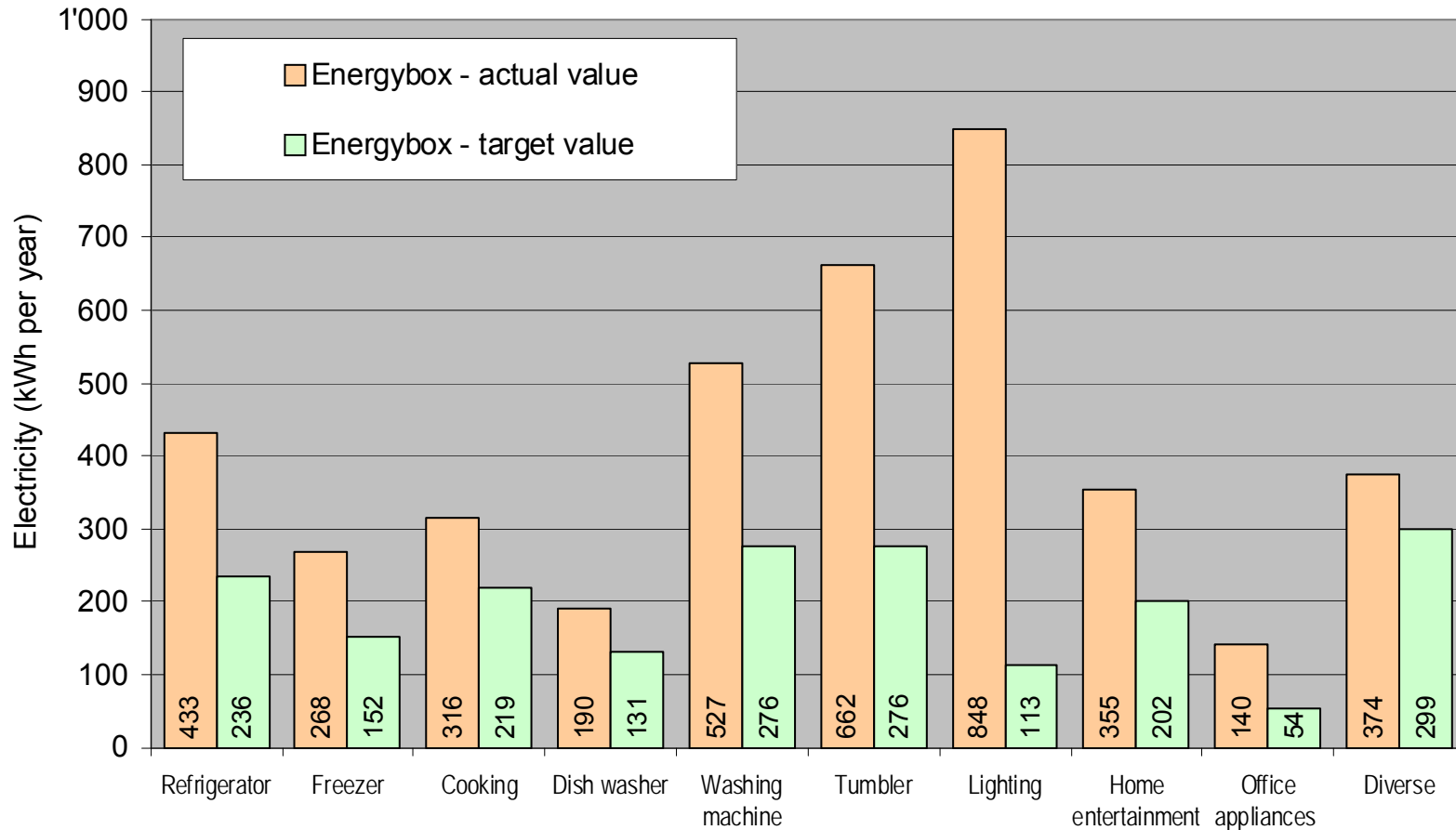
Zurich/Switzerland

www.energy-efficiency.ch

www.energybox.ch

Savings per average household (second survey 2007)

Electricity savings potential in kWh/a: target value is 48%



Average Household (second survey 2007)

Energy consumption for all applications in kWh/a	Energybox - actual value	Energybox - target value	Savings	Target/actual	VSE
Refrigerator	433	236	197	54,5%	450
Freezer	268	152	116	56,7%	350
Cooking	316	219	97	69,3%	400
Dish washer	190	131	59	68,9%	250
Washing machine	527	276	251	52,4%	250
Tumbler	662	276	386	41,7%	400
Lighting	848	113	735	13,3%	600
Home entertainment	355	202	153	56,8%	250
Office appliances	140	54	86	38,7%	250
Diverse	374	299	75	80,0%	1'000
Total	4'113	1'958	2'155	47,6%	4'200
	100,0%	47,6%	52,4%		

Our 10 topics

1	Cooling food	refrigerator
		freezer
2	Food preparation	cooking
		baking
3	Dish washing	
4	Clothes cleaning	washing
		drying
5	Lighting	
6	Entertainment	TV
		audio/video
7	Computing & Communication	PC
		printer
		tel/fax/ADSL
8	Various	
9	Warm water	
10	Space heating	

What we know about a household

- Number of persons (including age group)
- Average time in the house (presence)
- Number of rooms in apartment
- Reference area of apartment
- How often at home

Cooling Food

Calculation of best

- **Refrigerator**

≤ 2 rooms	240 kWh/a
> 3 rooms	300

- **Freezer**

„large“	252 kWh/a (60% of 420)
„small“	162 (60% of 280)

Preparing Food

Using pan cover, separate water cooker, coffeemaker

▶ 70% of standard

Calculation of best: 48 weeks per year

- **Warm food** **0.4 kWh/meal pers** **+ 0.1 add pers**
- **Cold food** **0.07 kWh/meal pers** **+ 0.03 add pers**
- **Baking** **1.15 kWh/meal pers**

Dish Washing

- By hand 0 kWh/a

- Dishwasher machine

Calculation of best

food consumption * 60%

Clothes Cleaning

- Clothes washing 60% of actual
 - 40° C wash 1.0 kWh/wash per week
 - 60° C wash 1.5
 - 90° C wash 2.0

Calculation best

$$(50 \text{ kWh/a (base)} + 100 \text{ kWh/pers a}) * (1 - \text{pres}) * 60\%$$

- Clothes drying
 - no dryer 0 kWh/a
 - machine dryer

Calculation best

$$(50 \text{ kWh/a (base)} + 100 \text{ kWh/pers a}) * (1 - \text{pres}) * 60\%$$



Now only 70 W - savings potential: 80%



New lighting from S.A.F.E.

Lighting

- Days per week people present in evening
 - mostly everybody 7 days per week
 - often everybody 5
 - often one person 3
 - rarely anybody 1

Calculation best

(100 W + 50 W/room) * 144 h/a * days per week

Entertainment

- TV

Calculation best

40 kWh/a (fix value)
(small efficient LCD TV)

- Audio & video

Calculation best

150 kWh/a (fix value)
(Topten equipment)

Computing & Communication

- PC
Calculation best **40 W * 48 weeks * h/week**
- Printer
Calculation best **10 kWh/a (fixed value)**
- Telephone/fax/broad band
Calculation best **25 kWh/a (fixed value)**

Various Equipment

- Aquarium
- Sauna
- Solarium
- Small electric heater
- Air humidifier/evaporator

Calculation best

0 kWh/a (fixed value)

Warm Water

Base 1000 kWh/a person

**Calculation best 50% = 500 kWh/a
(fixed value)**

Heating

Average base 80 kWh/m² a

**Calculation best 50% = 40 kWh/m² a
(fixed value)**

Rating Entire Household

- A class sum of calculated best values

Quick Test

6/7 March 2008

Ren

1 Age of the refrigerator:
Which class does your refrigerator have roughly?

1980
 1970
 1990
 2000

2 Cook behavior:
How do you cook and which pans use you as frequent?

100% Cook without covers
 100% Cook with cover
 25% Cook without covers, 50% cook with cover, 25% with steam pan, isolating pan or electric kettle
 50% Cook without covers, 50% with steam pan, isolating pan or electric kettle

3 Age of the dishwasher:
Which class does your dishwasher have?

1970
 1980
 1990
 2000
 No dishwasher

4 Wash temperatures:
Which portion of your laundry do you wash with which temperature?

60°- and 90°-laundry (each 50%)
 60°-laundry (50%), 40° - and 90°-laundry (each 25%)
 40°- and 60°-laundry (each 50%)
 40°-laundry

5 Kind of the laundry drying process:
Which portion of your laundry do you dry in which way?

100% Tumbler
 50% Tumbler, 50% drying room
 100% drying room
 50% drying room, 50% sun

6 Portion of energy-savings lamp:
How many saving- and fluorescent lamps are installed in relation to all lamps in your dwelling?

less than 10%
 approx.. 30%
 approx.. 60%
 more than 90%

7 Size of the television:
Which type of television you have?

Home Cinema (screen approx.. 120 cm)
 Large TV equipment (approx. 70 cm)
 Small TV equipment (approx. 45 cm)
 TV with Flat screen
 No television

8 Parasitic Power by:
How many devices are constant at electricity mains in your household?

20 devices
 15 devices
 10 devices
 5 devices

9 Various devices:
Which of the further energy-relevant devices are you using? (no or several answers possible)

Aquarium
 Small electrical furnace
 Air humidifier (hot)
 Air humidifier (cold)

10 Showering and bath behavior:
Do bathe or do you shower more frequently?

more than 90% bathing
 50% bathing, 50% showers
 25% bathing, 75% showers
 more than 90% showers

Topic	Questions	Your answer
People and Home	<ul style="list-style-type: none"> • Number of people • House or flat • Number of rooms • Postcode of place of residence 	<p>.....</p> <p>EFH / MFH</p> <p>.....</p>
Uses of electricity	<p>Major appliances invoiced directly on the electricity bill</p> <ul style="list-style-type: none"> • Electric cooker or oven • Own washing machine or badge-operated • electric hot water (boiler) • electric heating 	<p>yes / no</p> <p>yes / no</p> <p>yes / no</p> <p>yes / no</p>
Electricity bill	<p>Annual invoice with information on electricity consumption in kWh (optional)</p>	<p>..... kWh</p>
Refrigerator	<p>Type of fridge and year</p> <ul style="list-style-type: none"> • Fridge with no freezer compartment • Small fridge with freezer compartment • Large fridge with freezer compartment • Combination fridge/freezer 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Freezer	<p>Type of freezer and year of manufacture</p> <ul style="list-style-type: none"> • Small freezer (upright) • Large freezer (upright) • Small freezer (chest) • Large freezer (chest) 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Cooking habits	<p>Number of times cooking during the week</p> <ul style="list-style-type: none"> • Number of large meals • Number of small meals • Number of times you baked 	<p>.....</p> <p>.....</p> <p>.....</p>
Cooking utensils	<p>Percentage use of cooking utensils when cooking</p> <ul style="list-style-type: none"> • Normal pots/pans without lids • Normal pots/pans with lids • Pressure cooker or insulating pots/pans • Separate kettle 	<p>..... %</p> <p>+ %</p> <p>+ %</p> <p>+ %</p> <p>=100 %</p>
Dishwashing	<p>Method of washing and year of dishwasher</p> <ul style="list-style-type: none"> • Washing by machine (with eco button) • Washing by machine (without eco button) • Washing by hand 	<p>.....</p> <p>.....</p> <p>.....</p>
Washing habits	<p>Number of loads washed per week and year of washing machine</p> <ul style="list-style-type: none"> • Number of washes at 40° • Number of washes at 60° • Number of washes at 90° 	<p>.....</p> <p>.....</p> <p>.....</p>
Drying	<p>Method of drying and number of loads dried this way</p> <ul style="list-style-type: none"> • Number of loads tumble-dried • Number in airing cupboard • Number dried outside 	<p>.....</p> <p>.....</p> <p>.....</p>
Lights installed	<p>Number of lights per type (not including small rooms)</p> <ul style="list-style-type: none"> • Low-wattage halogen lamps (20 to 50 W) • Light bulbs (50 to 150 W) • High-wattage halogen lamps (150 to 500 W) • Energy-saving lamps (4 to 20 W) • Fluorescent tubes (20 to 80 W) 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

Topic	Questions	Your answer
At home	<p>How often people are home during the evening</p> <ul style="list-style-type: none"> • Usually everyone • Often everyone • Often less than one person • Rarely anyone 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Televisions	<p>Type of appliances and standby switched off when not in use</p> <ul style="list-style-type: none"> • Small television (less than 55 cm) • Normal television (55 to 70 cm) • Large television (larger than 70 cm) • Plasma television or projector • Flat-screen television (TFT) up to 55 cm 	<p>yes / no</p> <p>yes / no</p> <p>yes / no</p> <p>yes / no</p> <p>yes / no</p>
Audio/Video	<p>Number of audio video appliances</p> <ul style="list-style-type: none"> • Video or DVD recorder • DVD player • HiFi stereo system • Portable radio/CD/cassette players 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Computer	<p>Type of computer and number of hours in use per week</p> <ul style="list-style-type: none"> • PC with large tube monitor • PC with tube monitor (17 line) • PC with flat screen • Notebook 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Office electronics	<p>Number of electronic office appliances</p> <ul style="list-style-type: none"> • Printer • Scanner • Photocopier (including combination appliances) • Telephone with answering machine • Cellular phone • Fax 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Various appliances	<p>Types of appliances and number of hours in use per week</p> <ul style="list-style-type: none"> • Aquarium • Sauna • Solarium • Electric furnace • Humidifier/vaporiser (hot) • Humidifier/vaporiser (cold) 	<p>yes / no</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Electric hot water	<p>Type of electric water heating</p> <ul style="list-style-type: none"> • Normal electric boiler (in operation all year) • Normal electric boiler (summer mode) • Heat pumps/electric boiler • Solar with electric support 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Baths/showers (only if electric)	<ul style="list-style-type: none"> • Number of showers per week • Number of baths per week 	<p>.....</p> <p>.....</p>
Electric heating	<p>Type of electric heating</p> <ul style="list-style-type: none"> • Central storage • Individual storage, direct heating • Heat pumps air/water • Heat pumps salt water/water 	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
Buildings and technology (only if electric)	<ul style="list-style-type: none"> • Energy reference area • Year of construction of building • Façade and walls renovated during the last 10 years • Heating renewed during the last 10 years 	<p>..... m²</p> <p>.....</p> <p>yes / no</p> <p>yes / no</p>

Monitor

M07/08	Monitored Data 2007/08	Average annual electricity consumption kWh/a hh	Bulgaria	Czech Republic	Danmark	France	Germany	Italy	Netherland	Norway	Poland	Portugal	Rumania	Sweden	Total average
1	Cooling food	refrigerator													
		combined r/f													
		freezer													
2	Food preparation	cooking													
		baking													
3	Dish washing														
4	Clothes cleaning	washing													
		drying													
5	Lighting														
6	Entertainment	TV													
		audio/video													
7	Computing & Communication	PC/monitor													
		printer													
		tel/fax/ADSL													
8	Various														
	Total average														

BAT

BAT	Best Available Technology	Average annual electricity consumption kWh/a hh	Bulgaria	Czech Republic	Danmark	France	Germany	Italy	Netherland	Norway	Poland	Portugal	Rumania	Sweden	Total average
1	Cooling food	refrigerator													
		combined r/f													
		freezer													
2	Food preparation	cooking													
		baking													
3	Dish washing														
4	Clothes cleaning	washing													
		drying													
5	Lighting														
6	Entertainment	TV													
		audio/video													
7	Computing & Communication	PC/monitor													
		printer													
		tel/fax/ADSL													
8	Various														
	Total average														

BAT F

BAT F	Best Available Technology in Future	Average annual electricity consumption kWh/a hh	Bulgaria	Czech Republic	Danmark	France	Germany	Italy	Netherland	Norway	Poland	Portugal	Rumania	Sweden	Total average
1	Cooling food	refrigerator													
		combined r/f													
		freezer													
2	Food preparation	cooking													
		baking													
3	Dish washing														
4	Clothes cleaning	washing													
		drying													
5	Lighting														
6	Entertainment	TV													
		audio/video													
7	Computing & Communication	PC/monitor													
		printer													
		tel/fax/ADSL													
8	Various														
	Total average														