

Energy Savings Calculator for Electrical Loads

This tool was developed as part of trans-regional development project “Central Baltic cooperation in energy efficiency and feasibility in urban planning - ENEF”
Disclaimer: This tool is meant for provision of decision support at a practical level and aimed at building owners, who have preliminary understanding of energy efficiency.

Number of appartments in a blocks

Current electricity consumption per year

Input cells

Output cells

Lighting

	Existing bulb wattage	Retrofit bulb wattage	Number of light fixtures	Estimated energy saving per year in kWh
Staircase	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Other common spaces	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>

Washing and Drying

	Quantity	Energy efficiency class	Water supply	Estimated energy saving per year in kWh
Washing machine	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Dryer	Spin dryer	Dryer type	Energy efficiency rating	Estimated energy saving per year in kWh
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="#DIV/0!"/>

Circulation Pumps

Type of Motor	Energy efficiency index	Estimated energy saving per year in kWh
<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>

Assumptions

Lighting

Staircase

No of lamps per fixture

Old

1

New

1

Operating hours of use per day

4

Common areas

No of lamps per fixture

Old

1

New

1

Operating hours of use per day

2

It is possible to change
the value in orange cells

Washing

Number of apartment blocks=N

Assumptions

Source

Energy saving of 50kWh per household with three family member is observed in the case of apartment buildings in the last decade

[Kotitalouksien sähkönkäyttö 2011](#)

Each apartment is occupied by three occupants

25% of total apartment blocks uses community laundry

The use of an existing hot water supply can result in energy savings of up to 43 per cent

[Miele](#)

People tend to use hot wash (40-60 degrees) commonly

Water supply	Weight (Hf)
Existing hot water supply	1,43
Other	1

Energy class	Weight(Cf)
A+++	1,30
A++	1,20
A+	1,10
A	1,00

Energy savings related to washing machine = $0.25 * 50 * N * Hf * Cf$

Drying

	talous 1 asukas	talous 4 asukasta
Pyykinkuivausrumpu	220 kWh/v	360 kWh/v

Source: <http://energia.fi/koti-ja-lammitys/kodin-sahkolaitteet/pesu-ja-kuivauslaitteet>

	talous 3 asukasta
Pyykinkuivausrumpu	310 kWh/v

Approximate energy costs – 7kg tumble dryers

Energy efficiency rating	Approximate energy Cost per year
A	£43
B	£104
C	£106

Source:

<http://www.which.co.uk/energy/energy-saving-products/guides/energy-saving-tumble-drying-tips/energy-efficient-tumble-dryers/>

Energy efficiency rating	Coefficient(Df)
A	2,60
B	1,02
C	1,00

Assumptions

Use of Spin dryer reduces the energy required for drying the clothes by 40% (the savings also considers energy consumption of spin dryer)

Residents are aware of energy savings for drying clothes and will behave rationally

70% of the washing cases residents use dryers and remaining 30% they use no drying fans in the common laundry drying rooms

There is a 10% increase in energy efficiency of dryers

$$\text{Energy savings related to dryer} \\ = 0.25 * 0.7 * N * (31 + (310 - 310 / (Df * Sf * Tf)))$$

Spin dryer	Coefficient(Sf)
Yes	1,40
No	1,00

Different drying methods for the comparison of energy consumption (4 kg cotton load, 55% residual moisture)

Type of Dryer	Energy consumption	Coefficient (Tf)
Dryer cabinet	3.1 kWh	1,00
Conventional tumble	2.2 kWh	1,41
Heat pump technology	0.9 kWh	3,44

Source: TTS 2013

<http://www.martat.fi/kodinhoito/kodinkoneet/kuivausrumpu-ja-kuivauskaappi/>

Circulation Pump

Assumptions I

In the EU-27, the electricity consumption by circulators for heating purposes in buildings amounts to more than 50 TWh per year. This is caused by over 100 Million circulators, most of them with a power input below 250 W. **They are responsible for 5 to 10 % of private household's electricity bill.** We consider 7%

Source: [Circulation pumps:reccomendations](#)

Assumptions II

Permanent magnet circulation pumps saves 60% of the energy

There is an increase of 10% of energy efficiency due to technological progression

Energy efficiency index and Type of motor have cumulative effect on energy savings

Class	Energy Efficiency Index (EEI)
A	EEI < 0.4
B	0.4 ≤ EEI < 0.6
C	0.6 ≤ EEI < 0.8
D	0.8 ≤ EEI < 1.0
E	1.0 ≤ EEI < 1.2
F	1.2 ≤ EEI < 1.4
G	1.4 ≤ EEI

Energy efficiency index	Coefficient (Cf)
A	0,40
B	0,60
C	0,80
D	0,99

Current electricity consumption per year (Yf)

Type of motor	Coefficient (Mf)
Permanent magnet	0,40
Other	0,95

Energy savings related to circulation pump =
 $(2.1 - C_f - M_f) * 0.07 * Y_f$