Lighting Energy with Daylight Dimming and Occupancy Control

Annual lighting energy with and without daylight-linked dimming and occupancy control, standby power of controls, savings and energy per square metre.

Method: Lighting energy with control factors

Input parameters

Unit system: SI

Parameter	Value	Unit
Installed lighting power	12.000	kW
Annual operating hours	3,000.0	h
Share of hours with useful daylight	50.000	%
Average dimming saving in those hours	60.000	%
Occupancy factor (fraction of time lights needed)	85.000	%
Standby power of controls	60.000	W
Floor area	1,000.0	m²

Calculated results

Parameter	Value	Unit
Annual energy without controls	36,000	kWh
Annual energy with controls	21,946	kWh
Saving	39.040	%
Annual energy per square metre (kWh/m²)	21.946	

Notes for this case

• E_c = P_it_yF_o(1 − F_ds_d) + P_s·8760 h. Daylight savings depend on window size, depth of the zone and sensor placement; occupancy savings on how often spaces are empty. Control standby power runs all year. The last output is in kWh/m² per year.

Formula and method

$$E_c = P_i t_y F_o (1 - F_d s_d) + P_s \cdot 8760\,\mathrm{h}$$

Variables

P_i	Installed lighting power	W
t_y	Annual operating hours	s
F_d	Share of hours with useful daylight	-
s_d	Average dimming saving in those hours	-
F_o	Occupancy factor (fraction of time lights needed)	-
P_s	Standby power of controls	W
A	Floor area	m²
E_0	Annual energy without controls	J
E_c	Annual energy with controls	J
$\Delta E / E_0$	Saving	-
E_c / A	Annual energy per square metre (kWh/m²)	-

Method and standards

Lighting energy.

Assumptions and limits

- Average factors over the year.

References

Lighting energy with control factors

Report details

Report reference	FCC-8F3Q-DHPT (the same inputs always give the same reference)
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Calculator	Lighting Energy with Daylight Dimming and Occupancy Control
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Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/lighting/lighting-daylight-dimming-energy

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.