



Solar PV Calculator

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How Much Will your BER Improve by Upgrading with Solar PV?

Are you considering investing in Solar PV and wondering how much it will improve your Building Energy Rating (BER)? We've got you covered. With our new Solar PV calculator, you can easily find out just how much your BER will improve. Let's walk you through the process.

Understanding Solar PV and Its Impact on

BER

Photovoltaic (PV) technology converts sunlight directly into electricity, making it a valuable addition to your home's energy system. The energy produced depends on the installed peak power (kW_p) of the PV module, along with factors like roof slope, orientation, and shading. More electricity is produced when the sunlight is more intense and hits the PV modules directly.

The BER Calculation Process for Solar PV

The calculation to determine how much your BER will improve with Solar PV is straightforward, and it follows the method outlined in Appendix M of the DEAP (Dwelling Energy Assessment Procedure) manual, specifically Section *M1: Energy from Photovoltaics (PV) Technology*.

If you would like to find out more about the DEAP methodology, you can download our *BERtech.ie App*.

[DOWNLOAD](#)

Here's a step-by-step guide to how the calculation works:

Step 01: Survey by the BER Assessor

During the BER assessment, the assessor will:

- Check the slope of the roof where the panels are installed.
- Record the number of panels.

- Determine the orientation of the panels and check for any overshading.

Step 02: Gathering information on the panels

The specific make and model of the PV panels are crucial for the calculation. If the panels were installed as part of a grant-aided project, the easiest way to get this information is from the *signed declaration of works* form, which includes the exact model number. If this document is unavailable, a signed letter from the installer on headed paper, stating the exact make and model, will also be acceptable. Once the make and model of the panel has been confirmed the Watt Peak (W_p) can be taken from the technical data sheet. This must be *CE marked* and state the correct standard, *IS EN 61215/IEC 61215*: Terrestrial Photovoltaic (PV) modules with Crystalline Solar Cells Design Qualification and Type Approval.

Packaging Configuration		Front Glass		3.2mm Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass						
(Two pallets = One stack)		Frame		Anodized Aluminium Alloy						
36pcs/pallets, 72pcs/stack, 936pcs/ 40HQ Container		Junction Box		IP68 Rated						
		Output Cables		TUV 1x4.0mm ² (+): 400mm , (-): 200mm or Customized Length						
Module Type	JKM400N-54HL4-B	JKM405N-54HL4-B	JKM410N-54HL4-B	JKM415N-54HL4-B	JKM420N-54HL4-B					
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT		
Maximum Power (Pmax)	400Wp	301Wp	405Wp	305Wp	410Wp	308Wp	415Wp	312Wp	420Wp	316Wp
Maximum Power Voltage (Vmp)	31.28V	28.89V	31.47V	29.08V	31.66V	29.59V	31.85V	29.78V	32.04V	29.97V
Maximum Power Current (Imp)	12.79A	10.30A	12.87A	10.36A	12.95A	10.42A	13.03V	10.48A	13.11A	10.54A
Open-circuit Voltage (Voc)	37.38V	35.50V	37.58V	35.69V	37.77V	35.88V	37.96V	36.06V	38.15V	36.24V
Short-circuit Current (Isc)	13.55A	10.94A	13.62A	11.00A	13.68A	11.04A	13.74A	11.09A	13.80A	11.14A
Module Efficiency STC (%)	20.48%		20.74%		21.00%		21.25%		21.51%	
Operating Temperature (°C)					-40°C~+85°C					
Maximum system voltage					1000VDC (IEC)					
Maximum series fuse rating					25A					
Power tolerance					0~+3%					

Step 03: Performing the calculation

Once the necessary information is collected, the calculation is carried out as follows:

$$\text{Electricity produced by the PV module (kWh/year)} = 0.80 \times \text{kWp} \times S \times ZPV$$

- **S:** The annual solar radiation, determined from Table H2 (based on the orientation and pitch of the panels).

- **ZPV:** The overshading factor from Table H3.

This formula gives you the amount of “delivered energy” you’ll save annually with your new Solar PV array.

15°	1036	1005	929	848	813
30°	1074	1021	886	736	676
45°	1072	1005	837	644	556
60°	1027	956	778	574	463
75°	942	879	708	515	416
Vertical	822	773	628	461	380

Table H2: Annual Solar Radiation, kWh/m²

Overshading	% of sky blocked by obstacles.	Overshading factor
Heavy	> 80%	0.5
Significant	> 60% - 80%	0.65
Modest	20% - 60%	0.8
None or very little	< 20%	1.0

Notes:

Overshading must be assessed separately for solar panels, taking account of the tilt of the collector. Usually there is less overshading of a solar collector compared to overshading of windows for solar gain (Table 6d)

The overshading factor for the installed solar collectors must be chosen from this table.

Table H3: Overshading Factor

Now using our calculator you can try it out for yourself. Simply enter the Watt Peak (Wp) of your panel, the slope of your roof, the orientation, overshading and the number of panels.

The result will be the delivered energy in kWh / year.

Solar PV Calculator

Watt Peak (Wp) of the Solar PV Panel:

^▼

Tilt of the Collector:

Horizontal ▼

Orientation of the Collector:

South ▼

Overshading Factor:

None (0% of sky blocked by obstacles) - Factor: 1.0 ▼

Number of Solar Panels in the Array:

1



CALCULATE

Delivered Energy (kWh/year) for One Panel:

--

Delivered Energy (kWh/year) for the solar PV Array:

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Step 04: Converting to Primary Energy per meter squared

electricity produced by your Solar PV system, which is shown on your energy bills. However, for the BER certificate is it shown in, “**primary energy**,” which includes an additional factor to account for the energy used in producing the electricity.

Currently, the conversion factor from delivered to primary energy is 1.75.

To calculate the impact on your BER, the last step is to express the energy savings in terms of kWh per square meter (kWh/m^2), which is the unit shown on your BER certificate. Don’t worry, you don’t need to measure your entire house, this is already done if you have a valid BER certificate. Just enter your BER or MPRN number into the SEAI National BER Register and you can find the area used to calculate your current BER rating. Now using our calculator enter the *delivered energy* and your *floor area* to see how much *primary energy* will be saved and how much your existing BER rating will improve.

Type Of Rating	Existing Dwelling
DEAP Version	4.1.0
 Download BER/DEC Certificate	
 Download Advisory Report	
Floor Area:	114.95 (m^2)

FIND FLOOR AREA

Calculator

Delivered Energy (kWh/year):

^
▼

Floor Area of the Dwelling (m²):

^
▼

CALCULATE

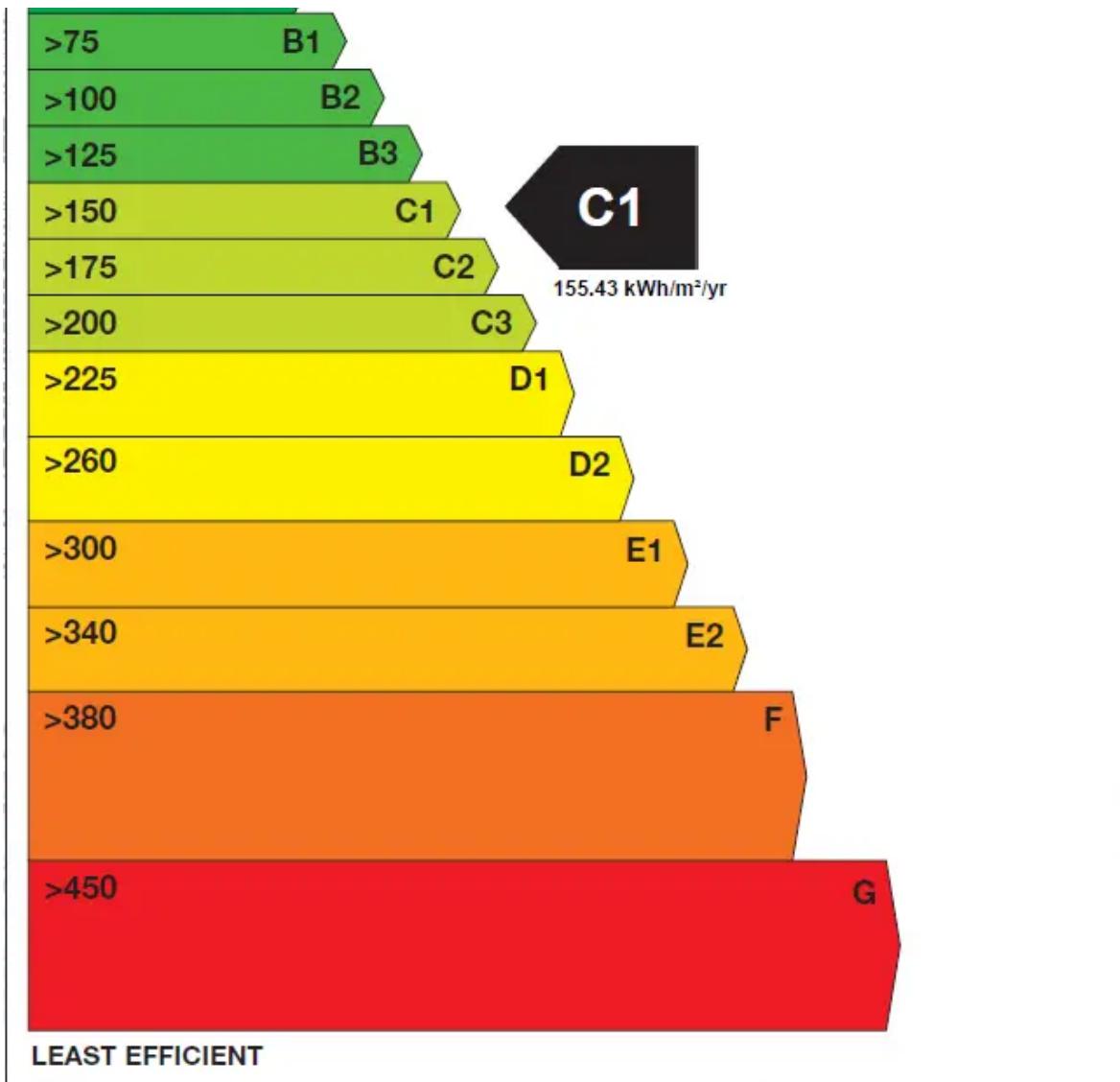
Converted to Primary Energy (kWh/year):

--

Primary Energy per Unit Area (kWh/m²/yr):

--

Subtract the result from your current energy rating to find your new rating.



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