SunStation

How solar saves and makes you money

solarcentury

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Making a return on investment from solar on your roof

Solar is a long-term investment. The cash-flow it produces will vary quite a lot over the years, so this guide explains the important factors to consider when you're modelling your return on investment, how they change year on year, and how the Solarcentury Sunstation calculator treats them.

Six key points to consider:

1. How much is your solar system going to cost?
2. What yield is it going to produce?
3. What income and savings will you receive?
4. How will the inputs and outputs change over time?
5. How long will the system last?
6. How do you maximise and measure the return on investment?

Measuring the return on investment

Payback

One way of measuring return on investment is the number of years it takes for the system to payback against the costs that you've outlaid. This is typically 7-8 years for solar.

However, although this is a valid way to look at your investment, it should not be the only measure. That's because the system continues to generate income and savings many years after it's paid back.

Return on investment (IRR)

This is the measure used by most investors. It's effectively the average percentage annual return earned across the life of the system, a bit like the percentage return on a financial investment.

Most domestic solar systems generate a 10 % return. This means that the income less any running costs added up over 20 years averages out at 10 % per annum on the original capital outlay.

Absolute return

This is a £ number. If you add up all the income and savings and then net off all the costs, you are left with the absolute return. **Typically, a 4kWp system in the South-East will generate an absolute return of about £20k over the 20-year Feed-in Tariff period. This does not include the initial outlay.**

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① How much will the system cost?

If you've had a survey and a confirmed quotation from a reputable installer, then the price of the system is confirmed.

VAT will be charged, but only at 5%.

The prices shown by the Solarcentury Sunstation calculator are approximate, because they don't have a survey to work with and can't take full account of the size, condition and accessibility of your roof. For a really accurate quotation, nothing beats getting a survey.

Solarcentury's Sunstation calculator assumes the following prices:

- 2.0kWp (14.0 square metres) = £4,200
- 2.5kWp (17.5 square metres) = £4,700
- 3.0kWp (21.0 square metres) = £5,200
- 3.5kWp (24.5 square metres) = £5,700
- 4.0kWp (28.0 square metres) = £6,300

These prices will increase a little if the system is likely to be difficult to install.

② What's the expected electricity yield?

The yield depends on a number of factors. The same size of system can produce different yields, depending on where in the country it's located, its orientation (the direction it's facing) and the amount of potential shading.

The Microgeneration Certification Scheme (MCS) helps MCS-accredited installers to calculate the yield through a series of look-up tables for postcode, orientation, pitch and shading. It's a giant spreadsheet. You first need to find the zone that best fits your location using the tabs along the bottom. You can plot the yield from your system looking at the slope and the orientation. The resulting number tells you the yield from 1kWp. So if your system is going to be 4kWp, you times the number by four. View the MCS

Installers may also predict your yield using a European database called PV GIS Climate-SAF. It's widely used by professional solar investors. You can use it yourself: simply put in your postcode, the size of your system, the slope of your roof and its orientation. Then click *Calculate* to see your annual predicted yield.

Solarcentury's Sunstation calculator uses the MCS look-up tables to predict the yield for your house.

Predicting daylight

Despite what you might think about British weather, daylight is an amazingly predictable resource. Year on year, daylight levels might fluctuate by as much as 10%, but over 20 years the average shows very little fluctuation.

In fact, it varies so little that professional investors take no account of it. The irradiance level (the amount of power produced by the sun) is regarded as consistent year-on-year for all solar projects.

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3 What income and savings will you receive?

The feed-in-tariff (FiT)

The FiT gives you two streams of revenue:
1. **The generation tariff** is paid for every unit of electricity that your system produces, regardless of whether it's used or not.
2. **The export tariff** is paid for electricity that is exported – but as this isn't monitored for residential systems, export is assumed to be 50 % of whatever is generated.

Both the tariffs are paid to you quarterly. The tariff decreases from time to time, but there is no decrease once you have an installed system.

The Solarcentury Sunstation calculator uses the current tariffs:

- Generation tariff: 13.39p per unit
- Export tariff: 4.85p per unit

Tax

Good news! You aren't taxed on the income from the generation or the export tariffs, making your return on investment tax-free.

4 How will the inputs and outputs change over time?

Inflation

Both parts of the FiT – the generation tariff and the export tariff – go up or down once a year in line with inflation. The index used is the Retail Prices Index (RPI).

The measurement is taken as of the end of December and applies from the beginning of the following April. For modelling purposes, most professional investors assume between 2.5 % -3.0 % inflation per annum.

Solarcentury's calculator assumes 2.5% RPI increase per annum.

Electricity price

A further part of your return comes from buying less grid electricity, so this saving will increase or decrease depending on whether or not electricity prices go up or down.

Most people assume prices will continue to rise above inflation. That's certainly the assumption of professional investors. It's also the view of the Department of Energy and Climate Change; their prediction over the next 10 years shows an increase 40 % . But that's before inflation; if you factor in inflation, this takes the annual percentage increase up to 7 % (depending on your view of how inflation will increase or decrease).

Solarcentury's calculator assumes an annual 6% increase in electricity price rises including inflation.

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5 How long will the system last?

Maintenance (and warranties)

Your system will come with product warranties and an installation warranty.

- Solar modules: typically a 25-year power warranty and a 10-year product warranty.
- Inverter: typically a 10-year warranty.
- Installation: typically a 2-5 year warranty.

The manufacturers provide the product warranties and pass them to you when your project's completed. The installer provides the installation warranty.

The part of the system that will almost certainly need replacing during the lifetime of the investment is the inverter. As it has a 10-year warranty, you'll probably need to pay for one new inverter during the 20 year Feed-in Tariff period.

In theory therefore, there is little to budget for (just one inverter). However, the hidden cost of maintenance lies in the way warranty claims work. Manufacturers' warranties cover the cost of a replacement product only. This means that the fitting costs aren't covered. So even if you have a legitimate warranty claim, you may have to pay for costs such as scaffolding and time.

Professional investors always allow for inverter swap-outs and allow a small contingency to cover unknown costs. This makes sense for homeowners too.

The Solarcentury Sunstation system allows £80 for maintenance per annum.

This includes an accrual (i.e. money put aside each year) for an inverter swap and a small amount of contingency. In practice, many homeowners with solar systems are happy to cover small, infrequent costs outside the warranty periods as they arise.

Like any other roof cover, solar panels degrade over time and therefore the yield drops very slightly every year; however, this drop is less than 1 %.

Solarcentury's Sunstation calculator assumes 0.7% degradation per annum.

6 How to maximise your investment

It's easy to maximise your solar investment: just use as much as possible of the solar electricity that you generate. This means you don't have to buy so much electricity from the grid.

To put it simply, you just run the dishwasher or the washing-machine when the system is producing electricity, rather than at night.

Solarcentury's Sunstation calculator assumes 50% of the electricity is consumed.

How long is this investment for?

The Feed-in Tariff and Export Tariff are contracted for 20 years, so most people consider the return on investment over this timescale.

However, it's worth considering that your system will still be working beyond this. The lifetime of solar is regarded as being 40 years or more, so you'll still be saving on grid electricity. And given that grid electricity could be in the region of 48p per unit in 20 years' time, that's a saving worth having!

The Solarcentury Sunstation calculator assumes no savings beyond year 20 – so anything you're still saving then is upside.

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