

Bittern Countryside

Community Interest Company



Energy Fact Sheet 1.

New for 2021

“Electricity from Sunshine”

Save energy,

Cut your carbon footprint,

Save the environment!



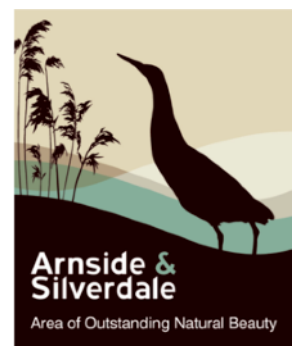
Supporting the

Arnside Silverdale AONB Low Carbon Landscape Initiative

Bittern Countryside Community Interest Company
Registered Office: The Old Station Building, Arnside, LA5 0HG
Registered number 6363720

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Website: <http://www.bitterncountrysidecic.org.uk>



Introduction

This is one of a series of leaflets* prepared by the Bittern Countryside CIC to help you understand renewable energy and see how it can save you money on your energy bills and reduce your carbon emissions too. We now have many years of experience in solar Photo Voltaic (PV) and prices of installations have dropped. However the financial incentives for having solar power are also less. We have reprinted this booklet to take account of this.

Are domestic solar panels worth having?

As far as the planet is concerned the answer is a resounding **YES** if your roof is suitable. There are two main reasons to install them. One is that we need all the green electricity we can get if we are to avoid the real problems that climate change will bring to us and our descendants. A 4 kWh installation will reduce your carbon footprint by around 30 tonnes of CO² over its lifetime after allowing for the CO² produced during its manufacture and installation. Secondly if we want to guard against rising electricity prices one way is to generate ones own. As more and more people get electric cars and the cost of electricity rises, being able to charge them from your own solar energy, at least some of the time, becomes more appealing.

How does Solar PV work?

Solar PV systems turn sunlight into electricity through the solar cells they contain. Electricity leaves the panel as direct current and passes through an inverter that turns it into 240 V alternating current just like the electricity you get from the grid. This electricity can then power any appliances or lights etc that you are using at the time with any surplus going back into the grid. The only way to save the electricity for later use is by battery storage. You can of course use it to heat your hot water tank and use the hot water later.

Is Solar Photovoltaic suitable for me?

Firstly consider the site:

Shading

First thing in the morning and last thing in the evening it is possible that surrounding buildings or trees may partially shade a PV array, when the sun is low in the sky. This effect will be more marked in winter than in summer! Providing shading occurs only for a short time early or late in the day, this will only have a very small impact on the annual energy generation, as very little power will be generated then. It is important however to ensure that no part of your PV array will be shaded during the main part of the day.

Orientation

The sun travels from East to West. (In the summer the sun can rise in the Northeast and set in the Northwest). Clearly therefore the more that a solar PV array is facing South the more energy is produced. As far as the slope of the roof is concerned, in the UK latitudes, the best angle is between 30° and 45° from horizontal. You can use a flat roof. The panels sit on mounts resting on the roof that hold them at the correct angle. The impact is dependent upon the orientation of the array as shown in the table below. If you have roofs facing east and west then you can still get a useful amount of electricity by having an array on each side (you will need an inverter for each array).

Approximate solar radiation per sq m (in watts) in summer

Orientation,	W	SW	S	SE	E
Slope of roof 30°-45°	860	980	1030	980	860

In winter the figures are much reduced with a 45° roof being much more efficient than a roof with a slope of 30°.

Winter Mid Nov - Mid Feb	Spring Mid Feb - Mid May	Summer Mid May - Mid Aug	Autumn Mid Aug - Mid Nov	Yearly total
7%	28%	37%	28%	100%

To sum up there are five main factors that will impact how much energy a solar PV system will generate:

1. The total size and efficiency of the PV array.
2. The latitude of the location.
3. Which direction the PV panels face.
4. What slope the panels are mounted on.
5. Anything which shades the panels.

How do I get paid for my generated energy?

Now the Feed-in Tarriff has ended there is no compulsion for your energy supplier to pay you for the energy you provide. However many of them do and the government is looking at standardising this payment, the Smart Export Guarantee. In order to qualify you must have an up-to-date smart meter. The amount you export will be measured by your smart meter and you will be paid for each kWh you export. For example at the moment most export rates are between 3 and 4 pence per kWh. In addition of course you can use any energy you produce. As the average cost per kWh is around 18p then it makes sense to try to use or store any you can.

How much energy will I produce on my roof?

This is difficult to quantify precisely but most 3.3 kWp installations in our area produce around 3,000kWh each year (Some panels are more efficient than others).

How does it connect to the grid?

Your installer will link the inverter into the grid. Sometimes you will be exporting your excess energy and at other times you will be using energy from the grid to top up your solar power. In winter most of your power will come from the grid. For Solar PV systems up to 4kWp you do not need permission from your electricity company to do this, but you must inform them.

Do you pay to connect to the grid?

Generally systems above 4 kWp cannot be connected to the grid without permission from the distribution company. In Cumbria and Lancashire you may also have to pay a one-off connection fee to Electricity North West Ltd. The fee varies depending on the rating of the installation - systems under 16A (4 kWp) are free. The fee covers the survey and any upgrading of cables on the electricity distribution network that may be needed for larger systems. This may occur if you are not on a three phase electricity system.

Is the installation unsightly and does it damage the roof?

Most panels sit on a frame just above your existing roof. This is fixed by ties to the roof timber. It should not do any damage to your roof. The panels are neat and tidy. However a more visually satisfying solution is solar tiles. These replace the tiles on your roof but are more expensive. However if you are thinking of replacing your roof or having an extension they may well be worth considering as you can offset the cost of the solar tiles against replacement slates.

Do I need planning permission?

Most properties will not need planning permission, but you should contact your Local Authority at an early stage to establish the situation for your specific project. For all properties you will need to inform your local building control department of the local authority. There is not normally a charge for this. A reputable installer will make sure your system satisfies any criteria set. More information may be found in the Government's guidance for planning. see <http://www.planningportal.gov.uk/permission/commonprojects/solarpanels/>

Are there any systems up and running in the area?

The Educational Institute in Arnside have had solar PV panels (Sundog) for nearly 14 years and are very pleased with them. They are happy to talk to

anyone about them. Check their website for contact details

[-www.arnsideeducationalinstitute.org/](http://www.arnsideeducationalinstitute.org/)

Ken and Ann Kitchen at KinCraig, Stonycroft Drive, Arnside, 01524 762 512, have had them installed too (by Love Solar) as have the AONB office at The Old Station Building, Arnside and they are happy to talk to people about the installation. You can also see solar PV panels at RSPB Leighton Moss.

What should I expect to pay for a system of PV panels on a roof?

This will depend on many things. The following table shows the approximate costs (as at September 2021) with estimated energy generated for two different sized installations assuming a south-facing unshaded roof. It assumes the new SEG of 3.76p per kWh and a cost of 18p per kWh to buy electricity from your supplier and that you use half of what you make and export the other half. However remember that you will be expecting this system to last well over 20 years and buy the best quality you can afford. Get several quotes and do not be tempted by high powered salesmen. The panels should not need any maintenance over the life of the system. They are self-cleaning. You may need a new inverter though after between 10 and 20 years.

Rating	estimated annual energy kWh	Price (£) of system inc VAT	Estimated Annual SEG payment	Estimated saving on electric bill	Time taken to pay for installation*
1.7kWp	1500	3,500-4,000	£28	£135	21-24 years
4 kWp	3500	5,000 - 6,000	£65	£315	13 - 16 years

* These pay back times do not take account of any increase in tariff due to inflation or any increase in the price of energy. You will probably get your money back several years sooner than stated.

Can I use my own power in a power cut?

No. If the mains power is cut your solar energy will also be disconnected. This is to avoid the power you provide going back down the power wires and electrocuting anyone working on the fault. You could however use your solar energy to keep a backup battery fully charged that could be used for LED lights etc in an emergency. Off-grid systems use large energy stores (aka batteries) to provide 24 hour power that is totally independent of an incoming mains voltage supply.

Are all the panels and inverters the same?

Some panels are more efficient than others so use these if space is at a premium. Some makes of panels are also much lighter than others. This might be a consideration if you are worried about the strength of your roof timbers. Also some inverters do seem to be

noisy. Check that the inverter your supplier is providing will be more or less silent. Most equipment either comes from the UK, Germany or the Far East. In addition you should be offered a remote display meter showing how much energy you are producing. This is worth investing in. The cost of the installation will reflect these factors (reliability, efficiency, quietness, component sourcing and add-ons).

Where can I get more information?

Most installers have information on their web sites. You might want to go to the Energy Saving Trust web site. see - www.energysavingtrust.org.uk/

How can you make the most use of your free electricity?

The panels will generate some power even on dull days, but are obviously only capable of reaching maximum output when the sun shines - try to use appliances that use lots of power, like your washing machine on those days. If you have an immersion heater in your hot water tank, set it to come on in the middle of the day for a few hours. Try to have only one high energy use appliance on at a time. That way you will not draw on the mains supply from the wider distribution network, saving you money.

Should I invest in battery storage to store any excess electricity?

From the planet's point of view the answer is an emphatic **NO** at this time. The electricity you do not use is not wasted but goes to reduce gas powered generation. Battery technology is such that the battery will produce large amounts of CO² and other wastes during its manufacture, transport and its recycling afterwards. This may change over the coming years. It might be worth while if you often have power cuts. Some systems can safely be used to power your home during power outages.

Facts and figures on solar PV installations in our AONB.

Do we really get enough sunshine here?

Yes we do! Here is some data from typical installations in the AONB.

Place	years	Total kWh	Size of installation	Orientation
E. I. , Arnside	13	56,116	5.0 kWp	SSW
Arnside Kincaig †	11	32,168	3.3 kWp	SSW
AONB Office, Arnside	6	18,394	4 kWp	SW

† The panels are shaded by trees until around 11 am.

Are there any local suppliers?***

Your installer should be MCS accredited to enable you to get any SEG.

Most electricity providers have installers;
eg E.on (<https://www.eonenergy.com>).

Love Solar <http://www.love-solar.co.uk/> has done a lot of installations in our area including that on the Old Station Building, Arnside and Storth Village School.

**** Neither the AONB nor The Bittern Countryside CIC are endorsing either of these particularly.*

Where did the CIC get its information from?

All the information is drawn from recognised official websites, publications and from practical experience - contact us at: info@bitterncountrysidecic.org.uk or by telephone on 01524 761034 for more information.

If we all work together we can help reduce our carbon footprint and help preserve our AONB from the ravages caused by climate change.

If you have found this helpful please pass it on to a friend to read. All the fact sheets are available free of charge on our web site.

*The BCCIC has produced 5 Energy *Fact Sheets* and a *directory*. They are all available free on our website at http://bitterncountrysidecic.org.uk/?BCCI-C_PUBLICATIONS

Fact Sheet 1 “**Electricity From Sunshine**” deals with PhotoVoltaic panels.

Fact Sheet 2 “**Heat from Trees**” deals with woodburning and multifuel stoves.

Fact Sheet 3 “**Woodfuel Wisdom**” deals with buying, storing and using wood.

Fact Sheet 4 “**Avoiding energy waste**” looks at small ways you can lower your carbon footprint.

Fact Sheet 5 “**Heat from Ground and Air**” deals with Heat Pumps.

*“**Feel Good about Wood**” is a directory that gives more information about local wood management, wood products and wood suppliers in the AONB.*

We also produce a series of Nature Atlases about the flora and fauna of our AONB which are also available on our website, or hard copies can be purchased from the Landscape Trust Online Bookshop or from the shop at RSPB Leighton Moss.

3.3kWp Solar Installation at Arnside: Generation started Sept 2010. 32,000kWh generated in 11 years



AONB Office
4kWp Solar PV
Installation:
Generation started
Sept 2015.
18,000kWh generated
in 6 years



RSPB Leighton Moss
New Installation



Educational Institute Arnside:
5kWp Installation: started
2008, generated 56,116 kWh
by 2021

