Dimplexrenewables®
A world of expertise

Solar PV

Free zero carbon electricity from the sun

A name you can trust

With an unmatched reputation for quality, reliability and innovation, the Dimplex brand is well known in both public and private sectors where the brand has become synonymous with a commitment to excellence and customer satisfaction.

Recognising the need to develop and deliver solutions to meet increasingly stringent energy standards, Dimplex has made significant product research and development investment to grow a portfolio of renewable energy technology products. Now with one of the widest ranges of building integrated renewables available from a single manufacturer in the UK, we continue to expand our expertise and product ranges to meet the needs of our customers in both the domestic and commercial environments.

Our experience

Renewable technologies such as ground and air source heat pumps, solar hot water systems, solar photovoltaics, heat recovery systems and low energy radiators are not necessarily new, but expertise in the UK of how to most practically and efficiently apply them is – especially where multiple technologies need to be applied to meet increasingly demanding building energy targets. But for Dimplex there's nothing new about developing low carbon solutions – as part of the worldwide Glen Dimplex Group, we have been producing innovative heat pumps for over 30 years with thousands of installations throughout Europe.

Committed to developing our building integrated renewables product portfolio, our technical sales and in-house design teams work with housing developers, housing associations, consulting specifiers, local authorities and expert installers to ensure that we deliver the most effective renewable energy solutions, whatever the building design requirement.

Contents

Renewable energy in a changing world

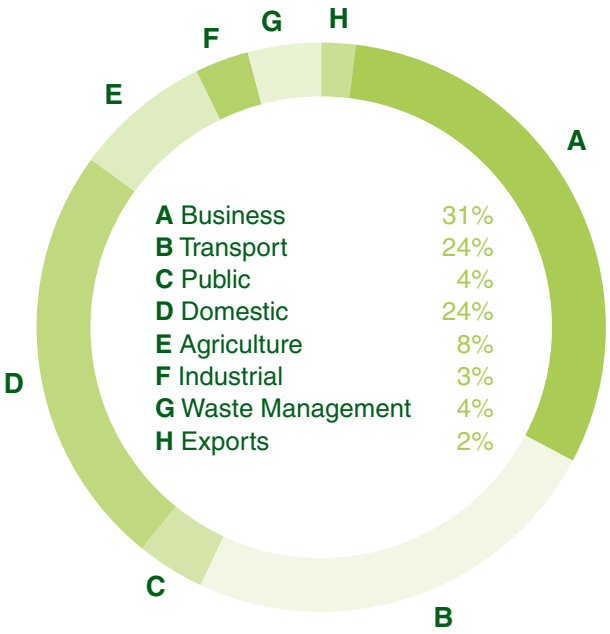
The threat to the planet from climate change, depletion of our natural energy resources and concern over the long term security of our energy supplies, means that energy efficiency and carbon dioxide emissions reduction has never been higher on social and political agendas.

With the energy used to heat, light and run buildings accounting for nearly half of the UK's carbon dioxide emissions, it's no surprise that a raft of European Directives, national legislation and government policy across the domestic and commercial building sectors now exists to reduce the long term energy and carbon impact of our buildings on the environment.

As part of EU-wide action to increase the use of renewable energy, the UK has committed to sourcing 15% of its energy from renewable sources by 2020 and building-integrated renewable technologies such as heat pumps, solar hot water solutions and solar electricity will all play an important part in achieving these targets.

Of course to deliver sustainable, low energy, low carbon buildings, designers and specifiers must take an increasingly holistic approach to reducing building energy demand and the use of renewable energy technologies. But as energy standards from policies such as the Code for Sustainable Homes increase – for example domestic new build requirements to be zero carbon by 2016 – the integration of multiple renewable technologies to provide low carbon heating, hot water and electrical power will be essential in achieving these targets.

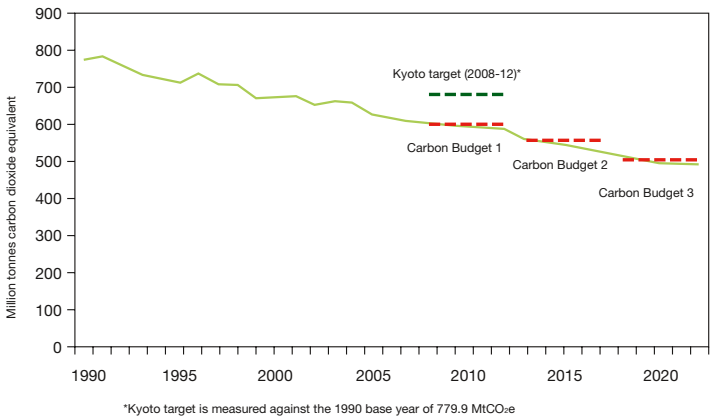
UK carbon emissions by sector



Source DECC – End user carbon emissions for 2008.

UK CO_2 reduction target trajectory

UK Net carbon account projection 1990-2022



*Kyoto target is measured against the 1990 base year of 779.9 $MtCO_2e$

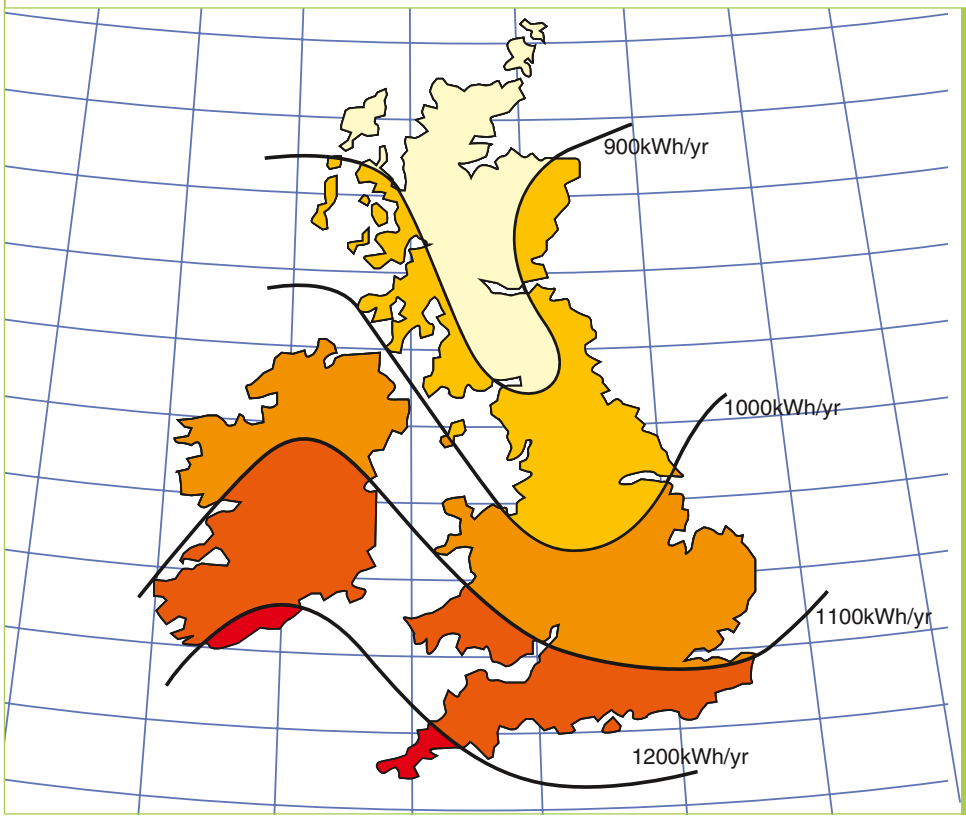
Why choose solar PV

In the light of ever rising energy costs, climate change and changing legislation, the need for a low carbon electricity producing technology that is future proof, cost effective and able to use an unlimited, sustainable source of energy is paramount – and Dimplex solar PV fits the bill perfectly.

Using free energy from the sun to produce electricity, Dimplex solar PV panels produce their energy from daylight, rather than solar radiation, meaning energy is produced even on cloudy days. Suitable for homes, businesses, schools or community buildings and with no moving parts, solar PV provides one of the easiest and most reliable ways to future proof against rising energy costs whilst reducing CO_2 emissions. And with the introduction of the Government's Clean Energy Cashback scheme, investing in solar PV to generate a building's electrical needs has never made more sense than it does now, offering a number of benefits including:

- Using natural unlimited resources to produce zero carbon energy
- Generating up to half of a building's annual electrical needs from renewable energy
- Reducing dependency on commercial electricity providers by generating your own electricity
- Making money – the Feed-in Tariff guarantees a minimum payment for every kW of energy generated for 25 years
- Reducing energy bills and minimising the impact of rising energy costs
- Saving approx. 650kg of CO_2 per year (typical 2kWp system)
- Investment in a highly reliable system with a typical lifetime of over 30 years
- Adding value to the property and adding to your green credentials
- Little or no maintenance – PV systems are silent and have no moving parts
- Easily meeting planning requirements for minimum contribution from renewable energy
- Providing a carbon reduction solution for properties under the Code for Sustainable Homes and other building standards

UK Solar Radiance



Every year the sun provides 8000 times more energy than we consume worldwide. In 1 minute, the power that the sun produces, if harnessed correctly, could power every country in the world for a whole year. Even in the relatively cold, damp and cloudy UK we receive between 900 and 1200kWh of energy per square metre of land area. So the answer to the question. "Is there enough solar power available" is yes and more than we will ever need.

The natural solution

...with so many applications

Increasingly stringent legislation and escalating fuel costs make solar PV a very attractive option.

Housing developments

Whether private sector or social housing, solar PV systems can make a significant contribution towards reducing building CO_2 emissions and running costs. This helps to achieve Building Regulations Part L and Code for Sustainable Homes compliance, as well as the increasingly frequent planning requirements for new developments to deliver a proportion of their energy from renewable sources. As more and more house purchasers become interested in low carbon energy and displaying their green credentials, housing developers have found specifying PV systems at the development stage makes developments more attractive and saleable to future purchasers.

Social housing

Solar PV systems are increasingly being specified for installation on social housing projects, both new build and refurbishments. Simple to fit and easy to integrate into the build program, Dimplex solar PV installations provide reliable energy generation, reduced energy bills for tenants and a cost effective way to meet building regulations and Code for Sustainable Homes targets. With the introduction of the Feed-in Tariffs in April 2010, housing associations that install PV systems on their housing stock can benefit from the generation tariff, thereby offsetting the costs of the installation, and generating a sizeable long term income.

Home owners

Easy to retro fit into existing homes, installing a Dimplex solar PV system can make a significant contribution towards reducing building CO_2 emissions and running costs, whilst providing an additional financial incentive through the Feed-in Tariff. Home owners benefit not only from reduced energy bills by using the energy generated, but also collect a return from the generation tariff and selling any electricity not consumed back to the grid. Homes fitted with solar PV will also potentially improve their saleability and increase their value.

Education

Installing Dimplex solar PV systems can easily help a school to address CO_2 targets and reduce energy bills, whilst providing a valuable visual statement of social responsibility. Importantly, public sector buildings are eligible for the Feed-in Tariff, so on top of reduced energy bills, schools employing solar PV systems collect a return by receiving the generation tariff and the export tariff for any unused generated electricity exported back to the grid. Installation of a PV system on school buildings represents an opportunity not only to reduce energy bills and secure energy prices, but to help educate and remind our future generations of the benefits of sustainable energy solutions

Commercial buildings

The increasing demands of Building Regulations are forcing more and more developments to look at ways of balancing the “energy model” for commercial buildings. With no moving parts, a solar PV system provides the simplest, most reliable and cost effective solution in these instances, providing CO_2 free energy that future-proofs the business against rising energy costs.

For building owners, solar PV offers a number of financial advantages through the Feed-in Tariffs regardless of whether they are the building occupier or not. The building owner can buy the PV system themselves and collect a return by receiving the generation tariff and selling, exporting or using the electricity generated. Alternatively, they could host a system owned by a third party and benefit from reduced energy bills by using the electricity generated. For developers, who have the option of installing PV systems at the development stage, solar PV will help them to achieve targets such as BREEAM Excellent and make developments more attractive to future tenants. Solar PV is a proven, reliable and virtually maintenance-free technology which provides a visual statement of a company’s green credentials, encouraging wider energy savings and improving employee retention.

Public and Community

Installing a PV system on a community building provides the ability not only to reduce energy bills and secure energy prices, but to display a community’s commitment to reducing greenhouse gases. As public sector buildings are eligible for the Feed-in Tariff, in addition to reduced energy bills public and community buildings employing solar PV systems collect a return from the generation tariff and the export tariff for any unused electricity exported back to the grid. Capital funding to offset installation costs may also be available through the Community Energy Saving Program (CESP), as well as Dimplex Renewable Energy Finance.

How solar PV works

'Photovoltaic' is a marriage of two words: 'photo' meaning light and 'voltaic' meaning electricity. At the heart of photovoltaic (PV) technology is a semi-conductor material which can be adapted to release electrons, the negatively charged particles that form the basis of electricity. The most common semi-conductor material used in photovoltaic cells is silicon, an element most commonly found in sand. There is no limitation to its availability as a raw material; silicon is the second most abundant material in the earth's mass.

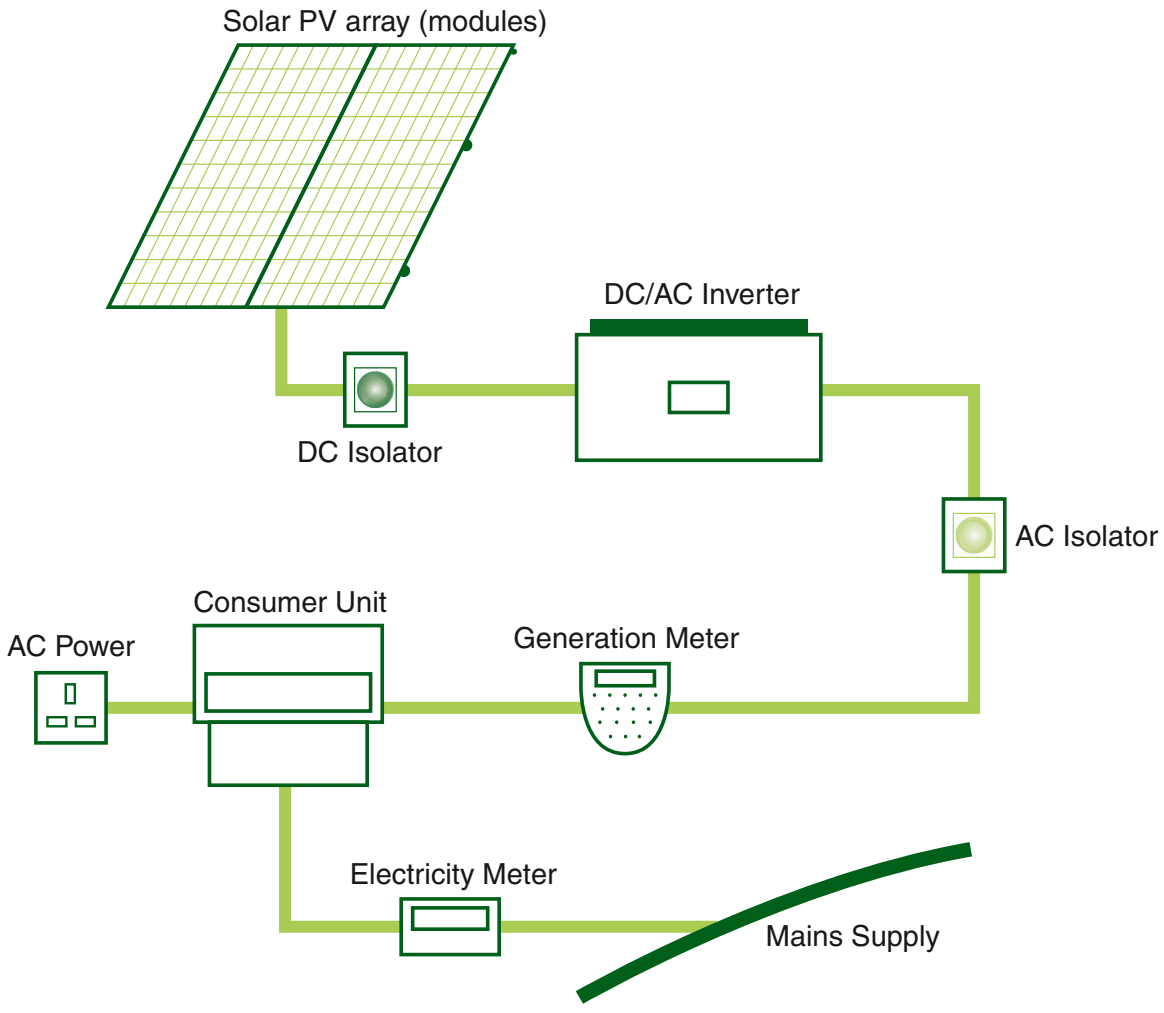
All PV cells have two layers of semi-conductor material, one positively charged and one negatively charged. When light shines on the semi-conductor, the electric field across the junction between these two layers causes electricity to flow, generating DC (direct current). The greater the intensity of the light, the greater the flow of electricity.

A photovoltaic system therefore does not need bright sunlight in order to operate, and can generate electricity even on cloudy days. Due to the reflection of sunlight, days with slight cloud can result in higher energy yields than days with a completely cloudless sky.

A typical grid connected roof mounted system (see diagram below) consists of a number of components which are scalable and highly versatile, enabling them to be used for a variety of applications, from small domestic properties to large commercial installations. The light that hits the array is converted into clean electricity, and as there are no moving parts, this is done silently.

The electricity the array creates is direct current (DC) which needs to be converted into alternating current (AC) so it can be used in the building; this is performed by the inverter. The AC electricity then passes via the generation meter, which measures how much electricity has been created by the array, and on to the consumer unit where it can be fed into the property for use or exported back to the mains grid via the electricity meter.

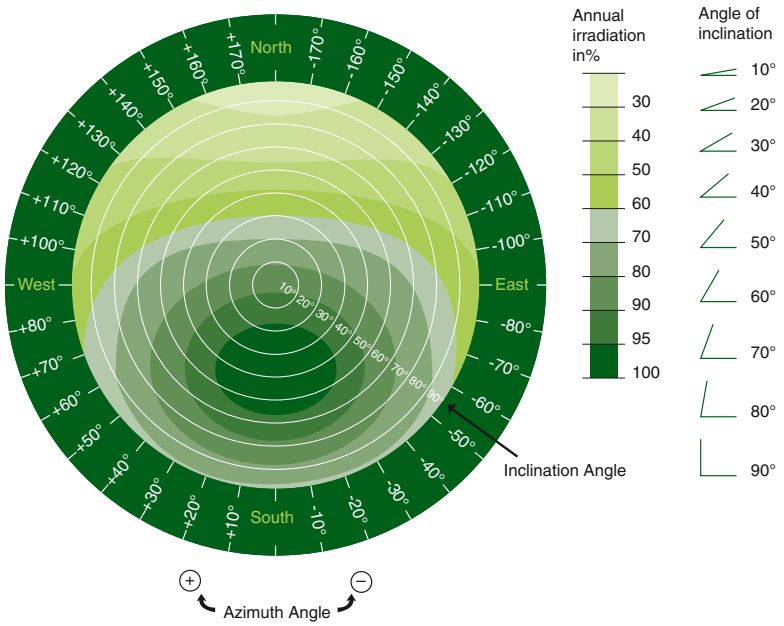
Solar PV system components



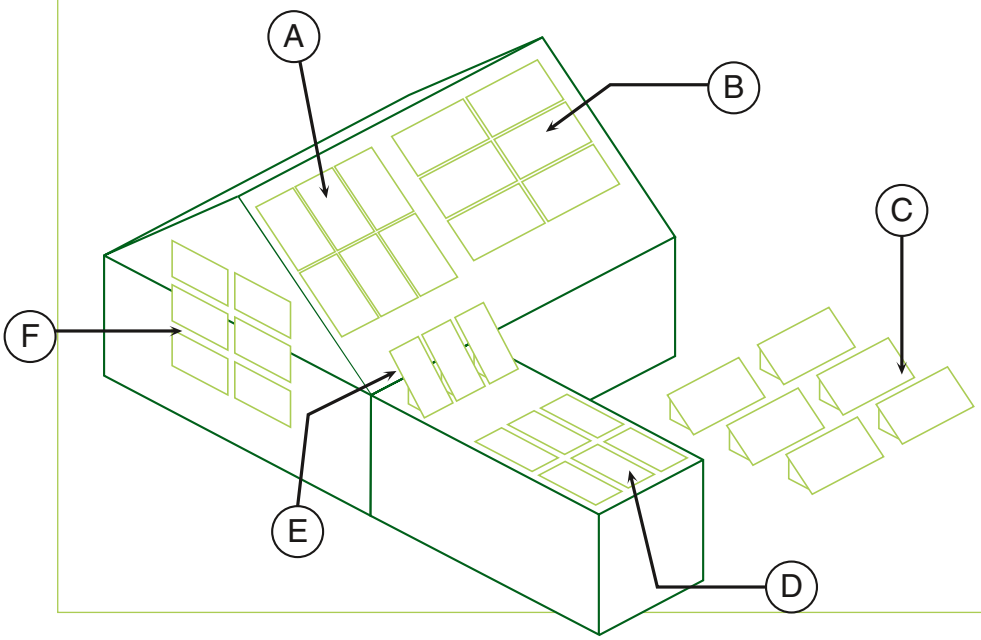
Factors to consider

System siting and orientation

The location of the PV modules is very important in order to maximize the performance and energy yield from the system. The ideal site is south facing at an angle of between 30 and 40 degrees so that the array receives the maximum amount of irradiation possible. However, other orientations such as south east or south west can be viable with a relatively low drop in expected performance, as shown in the diagram below.



Array mounting options



With our roof mounting kits various mounting options are available either as standard or as a custom specification, as shown

Ref	Comment
A	Standard Solution
B	Possible using custom mounting system
C	Possible using custom mounting system
D	Not recommended (insufficient pitch)
E	Possible using custom mounting system
F	Possible using custom mounting system

Shading

Any shade from trees, neighbouring buildings or overhead cables can have a huge impact on the performance of the PV system and so the system should be sited to avoid shading as much as possible. Even if only a small part of a module is shaded the performance of the whole array will be reduced because the modules are connected in series. A shaded cell in a module cannot produce as much current as unshaded ones which creates a bottleneck.

To protect the module, bypass diodes drop the current through the connected modules down to the level of the shaded module so reducing the power of the whole system. To achieve maximum efficiency the whole PV array needs to be shade free.

Modest shading will reduce the power of the whole array by about 20% and significant shading by about 40%. If partial shading occurs then a smaller system which is shade free may generate more electricity than a larger one. For example a 16 module system that is shaded will produce 1590kWh/year, whereas an unshaded 12 module system can produce 1987kWh/year, so it may be advisable to opt for a smaller system that completely avoids shade. A site survey carried out by one of our Accredited Installers will ensure that your system is specified and positioned for optimal performance.

Dimplex solar PV kits

Dimplex solar PV packages bring together high efficiency PV modules with an inverter, roof mounting system, generation meter, isolators and associated cables, to create a solution for residential and light commercial properties.

Available in a range of easy to purchase packs to simplify specification, all components have been specified to work together seamlessly, carefully selected for their quality and suitability for the UK climate.

Designed for both retro fit and new build projects, the systems protrude less than 200mm above the roof so they are classed as permitted development in both England and Scotland and do not require planning permission in non-conservation areas. Using MCS accredited hardware, Dimplex solar PV kits are eligible for the Feed-in Tariff when installed by an MCS Accredited Installer.

For non standard configurations or systems larger than 5.52kWp we have a design service available to specify systems to exactly meet requirements. Please contact us on **0845 601 5111** for further information.

Standard kits available

Product Code		PV Array output (kWp)	Surface Area (m^2)	Number of modules	Rows	Columns
Portrait kit	Landscape kit					
DXPV138/230/2/3xx	DXPV138/230/2/3Lxx	1.38	10.08	6	2	3
DXPV184/230/2/4xx	DXPV184/230/2/4Lxx	1.84	13.44	8	2	4
DXPV207/230/3/3xx	DXPV207/230/3/3Lxx	2.07	15.06	9	3	3
DXPV230/230/2/5xx	DXPV230/230/2/5Lxx	2.3	16.8	10	2	5
DXPV276/230/2/6xx	DXPV276/230/2/6Lxx	2.76	20.16	12	2	6
DXPV276/230/3/4xx	DXPV276/230/3/4Lxx	2.76	20.16	12	3	4
DXPV276/230/4/3xx	DXPV276/230/4/3Lxx	2.76	20.16	12	4	3
DXPV345/230/3/5xx	DXPV345/230/3/5Lxx	3.45	25.2	15	3	5
DXPV368/230/2/8xx	DXPV368/230/2/8Lxx	3.68	26.88	16	2	8
DXPV368/230/4/4xx	DXPV368/230/4/4Lxx	3.68	26.88	16	4	4
DXPV414/230/3/6xx	DXPV414/230/3/6Lxx	4.14	30.4	18	3	6
DXPV460/230/2/10xx	DXPV460/230/2/10Lxx	4.6	33.6	20	2	10
DXPV460/230/4/5xx	DXPV460/230/4/5Lxx	4.6	33.6	20	4	5
DXPV552/230/4/6xx	DXPV552/230/4/6Lxx	5.52	40.32	24	4	6

Where “xx” represents roof type options as follows: PT – Plain Tile S – Slate Tile RT – Short Tile

Module

High performance polycrystalline solar PV modules

Features

- High module conversion efficiency of 14.2%
- Positive output tolerance -0%/+3% ensuring high reliability
- Bypass diodes to minimise shading output losses
- 3.2mm anti-reflective, hydrophobic self cleaning glass covering increasing optical performance
- Tough anodized aluminium frame with drainage holes, providing lightweight protection for the module
- 1000V DC maximum system voltage
- Entire module certified to withstand high mechanical loads up to 2400N/m^2
- Suitable for vertical (standard) or horizontal (custom) mounting
- Guaranteed 25 year output performance levels
- 10 year product warranty
- MCS certificated

Full technical details for our modules, the other components and full kits can be downloaded from our website.
www.dimplexrenewables.co.uk

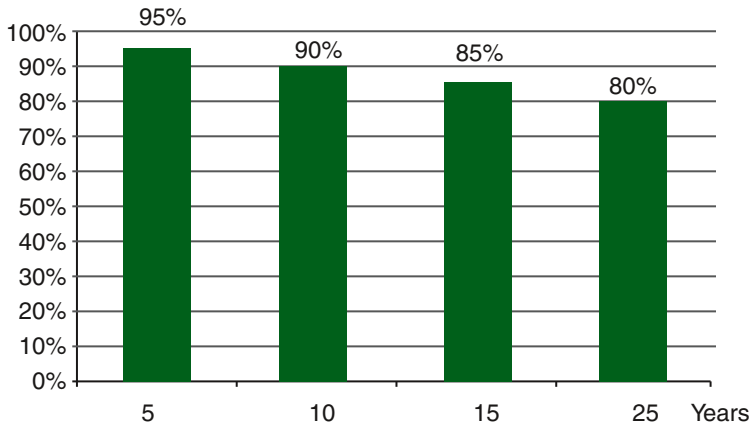
10 YEAR GUARANTEE

APPROVED PRODUCT

MCS PV0017

Performance

Guaranteed 25 year output performance levels



Technical specification

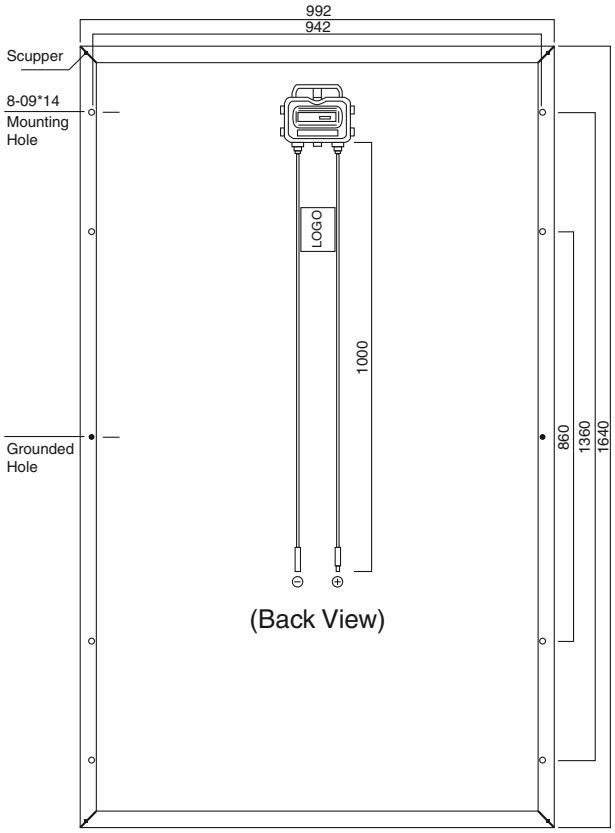
Electrical Characteristics

Standard Test Conditions (STC):	DXPVM230P6-30
Maximum power at STC (pmax)	230Wp
Output tolerance	-0% / +3%
Guaranteed minimum power	230Wp
Maximum power operating voltage (Vmp)	29.00V
Maximum power operating current (Imp)	7.99A
Open circuit voltage (Voc)	36.65V
Short circuit current (Isc)	8.59A
Module efficiency (nm)	14.2%
Cell efficiency	15.8%

Irradiance 1000w/m², module temperature 25°C, spectrum air mass = 1.5

Normal Operating Cell temperature (NOCT):	DXPVM230P6-30
NOCT	45°C +/- 2°C
Maximum power (Pmax)	163.47
Maximum power operating voltage (Vmp)	25.97
Maximum power operating current (Imp)	6.29
Open circuit voltage (Voc)	33.16
Short circuit current (Isc)	6.78
Temperature co-efficient – open circuit voltage (αVoc)	-0.34%/K
Temperature co-efficient – short circuit current (αIsc)	0.045%/K
Temperature co-efficient – peak power (αPmax)	-0.47%/K

Irradiance 800w/m², ambient temperature 20°C, wind speed = 1m/s



Mechanical Characteristics

Solar Cell	Polycrystalline 156 x 156mm
No of cells	60 (6 x 10) in series
Dimensions	1640mm x 992mm x 50mm (1.63m²)
Weight	20.5kg
Front glass	3.2mm tempered glass
Frame	Anodized aluminium alloy
Junction box	IP65 rated
Connection type	2 x 1000mm x 4mm² cable with MC3 inter-connectors

Limits

Operating temperature	-40°C to +85°C
Maximum system voltage	1000VD C
Maximum mechanical load	2400Pa
Over current protection	15A

Inverter

Although not as obvious as the panel itself – often installed out of sight in the loft – the inverter is a vital part of a PV system, converting the DC electricity created by the array to 230V AC for use in the property. Provided as part of the PV kit, our G83 compliant inverters have been selected to operate in harmony with the other components in the kit and in particular to suit the power output of the Dimplex solar PV array, ensuring energy yield is maximised. Sized to match the array output, the inverter monitors the output automatically adjusting PV array loading to provide maximum efficiency by means of a maximal power point tracker (MPPT). Dimplex solar PV kits are supplied with an appropriately sized SMA Sunnyboy or Power-One Aurora inverter.

Features

- Maximum efficiency up to 97% (dependent on model)
- G83/1-1, CE and VDE 0126-1-1 compliant
- Weatherproof plug connectors for AC and DC connection
- Maintenance free
- 5 year product warranty

Generation meter

Dimplex solar PV kits are supplied with a simple import/export meter suitable for domestic or small scale generation sites. The meter measures all of the energy generated by the system and stores all the registration and security data to memory, which can then be shown on the display. All data is retained for the life of the meter.

Features

- kWh import or kWh import/export
- 20 years certified life
- Large digit (9.8mm) multilingual display with chevron information indication
- Extensive security data
- Communications as standard
- 12kV impulse withstand
- High security, compact design (130mm W x 145mm H x 47mm D)
- DIN double insulated, glass filled polycarbonate case
- Permanently fixed main cover
- IP53 in accordance with IEC 80529
- 5 year product warranty

Isolators

Isolators

For safety reasons it is vital to be able to isolate the different parts of a solar PV system during installation or upgrade, and during any planned maintenance.

DC isolator

To isolate the solar array from the rest of the PV system, a single DC isolator is included as part of the kit. IP66/67 rated, the grey/black handle can be locked in the "off" position with a padlock, to prevent DC flow into the rest of the system. It is normally mounted between the array and the inverter, close to the inverter.

AC isolator

To isolate the inverter from the AC part of the system and the consumer unit, a three pole AC isolator is included as part of every Dimplex solar PV kit. IP66/67 rated, the red/yellow handle can be locked in the "off" position to prevent opening in the "on" position. It is normally mounted between the consumer unit and the inverter, close to the inverter.

Roof mounting

Roof mounting

To ensure that solar PV systems provide trouble free electricity for many years, it is vital that the PV modules are mounted correctly. Our standard on-roof mounting kits have been specifically matched to our panels and once installed, are robust enough to withstand the low wind/snow load experienced by 80% of the UK. Areas with higher wind/snow loads will require extra roof hooks which can be supplied on request. As standard, options are available for a range of roof coverings including plain tiles and slates.

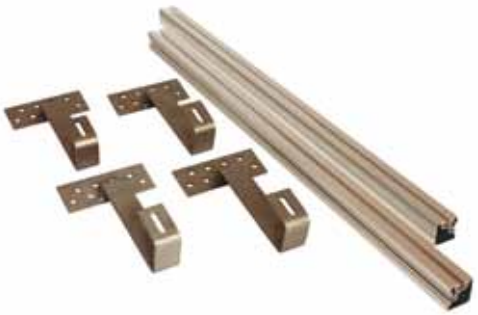
- Protrudes less than 200mm from the roof covering, meeting permitted development planning requirements in England and Wales
- Allows rapid installation with minimal adjustments to the existing roof
- Flexible mounting system adaptable to the positioning of rafters
- Module angle is the same as the roof
- Plain tile and slate options available as standard kits

A design service is available for applications that cannot be catered for by our standard kits, offering bespoke solutions including free standing systems, larger high-output systems, different roof types and areas with higher wind/snow loads.

Roof hooks

There are 3 types of roof hook available, each for a different roof type; plain, slate tile and “short tile”. They are attached to the rafters which support the weight of the modules. The hooks are designed to be used with minimal adjustments to the roof covering.

Each type of hook has a different design for use with different tile thicknesses, material and profiles. The use of the correct hook type is imperative to ensure that the module is kept close to the roof and the weight of the array is distributed evenly.



Cables & connectors

All Dimplex solar PV kits come complete with solar connecting cables pre-fitted with special multi-contact (MC3 to MC4) connectors to make installation safer and faster.

10m cables are supplied as standard to extend from the rooftop PV array to the inverter.

Accessories

A range of accessories designed to complement and enhance your chosen Dimplex solar PV kit are available upon request, including communication and monitoring devices, generation monitoring displays and an installer spares kit with additional/spare roof kit components.

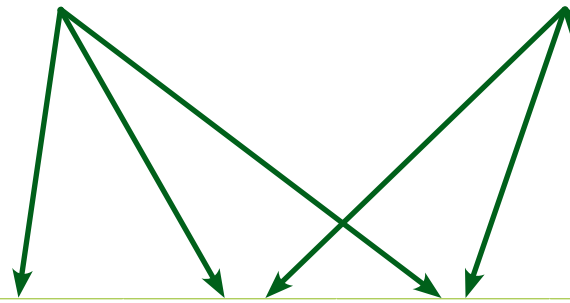
Sunny Matrix

Sunny Beam

Sunny Webbox

Sizing guide

The Dimplex solar PV offering has been grouped into easy to select kits.
Kit selection is dependent upon required array output and available roof space.

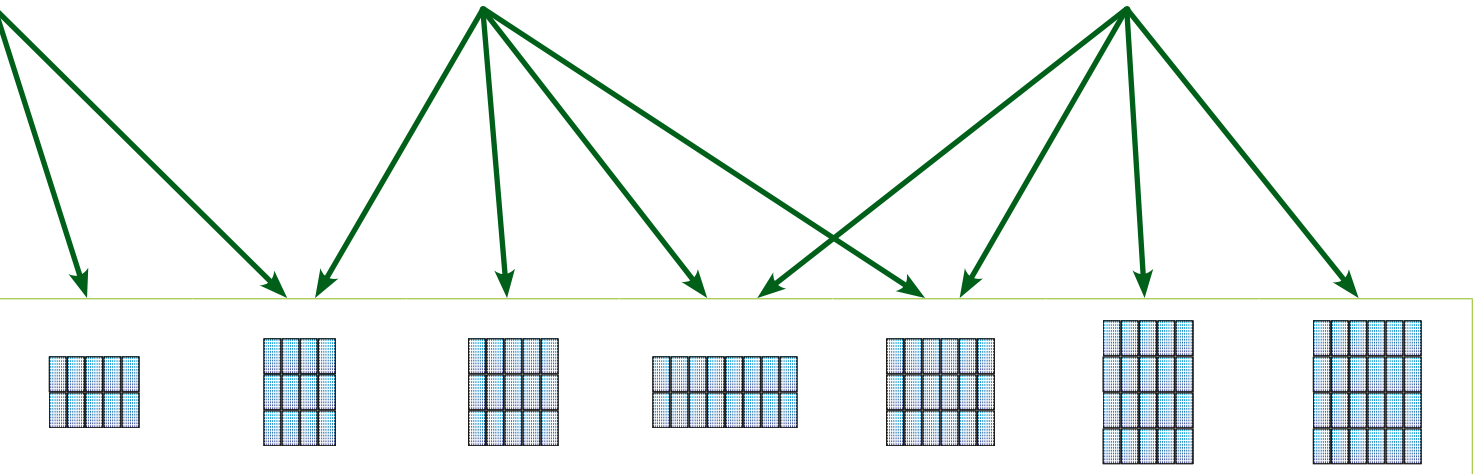


Output (kWp)	1.38	1.84	2.07
Area (m^2)	10.08	13.44	15.06
Number of modules	6	8	9
Electricity generated annually (kW)*	1265	1687	1898
Annual FiT income (£)	548	730	822
Annual export income (£) (assuming 50% of energy generated is exported)	20	26	29
Electricity cost saving (£) (based on tariff of 14p/kW)	177	236	266
TOTAL FiT Benefit/year	745	992	1117
Annual CO_2 saving (g)	419	559	629
Total system installed cost (£) (approx.)	5900	7866	8849
Payback (years)	8	8	8
TOTAL income/saving over 25 years (£)	18625	24800	27925

Note: This guide is for illustrative purposes only and the kit size will be determined by the available roof space of the property.
*Output figures supplied assume that the array is mounted on a south facing roof sloped at 35° with no shading, in a location which gives 917W/m² (Southampton, UK). Income and costs based on figures supplied as at 1st September 2011.

1: Light user, annual electrical consumption – 1650kWh
2: Medium user, annual electrical consumption – 3300kWh
3: High user, annual electrical consumption – 4950kWh
4: Light commercial user, annual electrical consumption – 12000kWh

User[2] **High User[3]** **Light commercial user[4]**



2.3	2.76	3.45	3.68	4.14	4.6	5.52
16.8	20.16	25.2	26.88	30.4	33.6	40.32
10	12	15	16	18	20	24
2109	2530	3163	3374	3796	4218	5061
913	1095	1370	1461	1644	1826	2191
33	39	49	52	59	65	78
295	354	443	472	531	591	709
1241	1488	1862	1985	2234	2482	2978
699	839	1048	1118	1258	1398	1677
9833	11799	14749	15732	17699	19665	23598
8	8	8	8	8	8	8
31025	37200	46550	49625	55850	62050	74450

For larger systems or applications that cannot be satisfied by one of our standard kits, please contact us to take advantage of our custom design service.

Funding

In order to promote the take-up of renewable and micro-generation technologies, a number of funding programmes have been set up by the Government to provide grant subsidies to householders, social housing providers, local authorities and commercial developers.

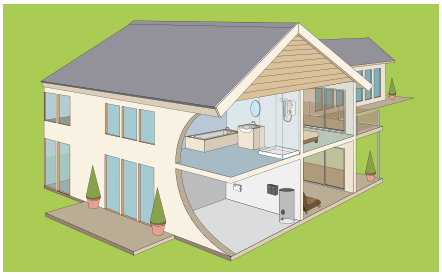
Clean Energy Cashback – Feed-in Tariffs

By choosing to install a solar PV system on your building you can not only cut your electricity bills, but generate income too – through the Feed-in Tariff (FiT). Available in Great Britain as of 1st April 2010, this scheme guarantees a minimum payment for all electricity generated by the solar PV system installed (generation tariff), as well as a separate payment for any unused electricity exported to grid (export tariff). These payments are made directly to you by your energy provider and are in addition to the bill savings made by using the electricity generated on-site. Current payment levels for solar PV are as shown in the adjoining table.

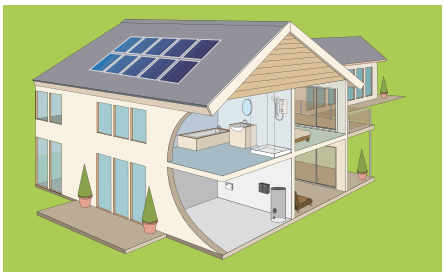
For a typical domestic household using 3300kWh per year of electricity, a 2.3kWp PV system can bring the following benefits:

PV installation size	Tariff rates for new installations (after August 2011) (p/kWh)	Tariff lifetime
	FIT Year 2 2011/12	
≤ 4kW (new build)	37.8	25
≤ 4kW (retrofit)	43.3	25
4 to 10kW	37.8	25
10 to 50kW	32.9	25
50 to 100kW	19.0	25
100 to 150kW	19.0	25
150 to 250kW	15.0	25
> 250kW	8.5	25
Standalone (off grid)	8.5	25

Figures published are correct until March 2012. The Feed-in Tariff is currently under review and future figures for FiT rates are to be confirmed.



Domestic property without Solar PV



Domestic 10 panel / 2.3kWp PV system

Annual electricity consumption (kWh)	3300	3300
Yield from solar PV (kWh)	0	2.3kWp x 917kWh/yr = 2109kWh
Income from solar PV (£)	0	2109 x 43.3p = £913.19/yr
Income from exported energy (50%)	0	2109 x 0.5 x 3.1p = £32.68/yr
Total income from PV	0	£945.87
Annual electricity bill (grid electric consumed)	3300 x 14p/kWh = £462.00/yr	
Total PV electricity bill saving	0	2109kWh/yr x 14p = £295.26*
Total annual electricity bill	£462.00	£462.00-£295.26 = £166.74
Total PV system benefit/yr	0	£945.87 + £295.26 = £1,241.13
Income benefit over 25 years	0	£31,028.25
Installation cost	0	£10,000.00
Total profit over 25 years	0	£21,028.25

Dimplex Renewable Energy Finance

Dimplex Renewable Energy Finance has been specifically designed to help not-for-profit organisations including local authorities, schools and housing associations overcome the need for initial capital investment when installing renewable technology systems.

The scheme is designed to provide a solution for organisations looking to implement renewable energy technologies, but for whom the initial capital outlay, even where grants are available, could make proceeding with the project impossible. It allows investment costs to be repaid over a period of years, funded through the savings in energy costs which the system will provide. For more information visit: **www.dimplexrenewables.co.uk** or call **0845 601 5111**

*Note: this will vary depending on proportion of PV energy consumption. The calculations shown above are based on figures obtained for a south facing roof at 35° with no shading in a location that gives 917W/m² (Southampton, UK).

Installers

Solar PV systems are one of the most efficient renewable energy generation systems available, but only as long as the systems are properly applied, designed and installed.

To deliver the kind of energy and carbon savings we know our solar energy solutions are capable of for commercial and domestic end users, it's vitally important that the highest standards are adhered to at every stage of the process. That's why at Dimplex we only supply to approved installers and why the right training is key.

Through our Accredited Installer Programme, Dimplex is committed to ensuring installations are delivered to the highest possible standards, to maximize energy saving and customer satisfaction.

Installer Training

Dimplex believes that the key to success in the solar PV market is through thorough and robust installer training, to ensure installations are provided to a high standard and to maximise the efficiency of our customers' investment. In addition to an approved installer network we also provide dedicated training courses for new installers. Our solar PV installer training is independently accredited by Logic Certification, and is designed to equip installers with the knowledge and skills to provide high quality installations with the backing of the UK's leading renewables brand. So you can select Dimplex training with complete confidence. For more information and course dates visit:
www.dimplexrenewables.co.uk

Microgeneration Certification Scheme

The Microgeneration Certification Scheme (MCS) is intended to provide a robust third party certification scheme for microgeneration products and installers, and is designed to underpin Government grant schemes such as the Feed-in Tariff. Grants are only available to applicants using both products and installers certified under the Microgeneration Certification Scheme.

The scheme evaluates products and installers against robust criteria for each of the microgeneration technologies, providing greater protection for consumers and ensuring that the Government's grant money is spent in an effective manner.

Dimplex recognises the importance of such schemes in helping to build a UK renewable technology industry based on quality and best practice, which will make a substantial contribution to cutting the UK's dependency on fossil fuels and its carbon dioxide emissions.

Dimplex actively supports the scheme and we encourage all Dimplex installer partners to become certified, giving our customers assurance as to the quality of our products and their installation, as well as providing a means of accessing Government grants.

For more information visit:
www.microgenerationcertification.org

FAQs

General solar questions

How does a solar PV system work?

Solar panels generate electricity using energy from the sun. Because the panels produce energy from daylight and not solar radiation they still produce energy on cloudy days. The direct current produced by the panels is converted by the inverter to alternating current for use in the building.
The electricity produced is either consumed directly by appliances in the building, or if more power than required is generated it is exported to the grid. At night or when the system is not producing enough energy, power is supplied by the grid in the normal way.

Do the PV panels need direct sunlight to work?

Solar PV works from daylight and not direct sunlight, but more power is produced on a sunny day as opposed to an overcast or cloudy one.

What are the effects of shade?

Shading is critical. Minor shading can result in significant loss of energy because the cell with the lowest illumination determines the operating current of the series string in which it is connected.

What happens if there is a power cut?

Our PV systems are entirely connected. If there is a power cut the system is automatically switched off as a safety measure to ensure power does not leak onto the grid in order to protect personnel working to restore the power supply. There will be no power to the building during the power cut.

What happens at night?

PV panels do not produce energy in the dark and so electricity is drawn from the grid in the normal way.

Are there different types of solar systems?

There are two distinct solar systems:

- Solar thermal – for hot water production
- Solar PV – for the production of electricity

Dimplex offers kits for both types of solar system.

Installation

Do I need planning permission?

PV roof systems fall under permitted development rights and so do not require planning permission. However if your building is listed or in an area of outstanding natural beauty, please consult you local council planning department for advice before proceeding with installation.

Will I need to inform building control?

Yes, you should speak to building control about your intentions and they will advise you if you need to take any further action. Your installer should instruct you to contact building control.

Will my roof be strong enough?

Most roofs are strong enough to support a PV installation without any reinforcement, but the installer will perform a site survey and make an assessment prior to installation.

Do I need to inform my electricity supplier?

For systems less than 4kW peak power your installer will inform them once the installation is complete.
For larger systems, permission will need to be gained in advance from the network operator.

How much roof space do I need?

Our kits start at 1.38kW peak power and this occupies roughly 10 square metres of roof space.

How long will the installation take?

Installation normally takes 2-3 days

What are the optimal conditions for PV?

PV panels work best when installed at an angle of 30 to 40 degrees on a south facing roof. Panels can be installed at different angles on west or east facing roofs but will not produce as much power as an equivalent system on a south facing roof at optimal angle. A site survey will determine the best option for your property.

Can I buy a system from Dimplex and install it myself?

Dimplex PV systems are only available from specialist distributors, electrical wholesalers and renewables merchants and must be installed by an MCS Accredited Installer, such as a Dimplex Accredited Installer. If the system is not installed by an MCS Accredited Installer it will not be covered by our warranty or eligible for the Feed-in Tariff.

Does the system need batteries?

Dimplex PV systems are designed to be connected to the grid and do not require batteries. Excess electricity generated during the day is fed back to the grid

Maintenance

Do panels need cleaning?

Usually dust and dirt washes off when it rains if the panels are installed at an angle of at least 15 degrees. In extreme cases, dirt may cause a power reduction of about 10%.

How long do PV panels last?

Dimplex PV panels have a product warranty of 10 years, expected lifetime of up to 40 years, performance of 90% for 10 years and 80% for 20 years.

Costs, benefits and the Feed-in Tariff

How much does it cost?

The total installed cost of a system will depend on the size of the system and ease of installation. It is not possible to give a precise figure without viewing the property in question. However as a general guideline, most homeowners install a system of between 2-3kWp at an installed cost of around £4000-£5000 (inc VAT) per kWp.

How much energy will it generate?

There are five main factors that will affect how much energy a PV system will generate:

- Total size of the PV array
- Latitude of the location
- Direction the panels face
- Angle the panels are mounted
- Any shading

As an example, a south facing roof mounted 1.38kWp system mounted in the Midlands should generate around 1000kWh per year saving around £400-£550 per year depending on your electricity tariff.

What is the Feed-in Tariff and how does it work?

It is a financial incentive backed by the Government and paid by your energy supplier to encourage you to create your own clean electricity. Every kWh generated earns a fixed income and additionally, any electricity not consumed in the property can be sold back to the grid. For further information see the Funding section or visit the Energy Saving Trust website www.energysavingtrust.org

Will the system be eligible for the Feed-in Tariff?

Dimplex solar PV systems are MCS certificated and when installed by an MCS Accredited Installer are eligible for the Feed-in Tariff.

What is the payback period for a solar PV installation?

We would expect that an average system would take roughly 10 to 12 years to pay for itself, after which it will make money for its owner for the remainder of the Feed-in Tariff period of 25 years.

Solar terms and definitions

AC – Alternating Current: electric current in which the direction of flow is reversed at frequent intervals.

AC cables – A cabling system suitable for conducting the AC produced by the inverter and connecting it in parallel with the main supply.

AC isolator – Electrical device capable of isolating the inverter from the 230v mains supply.

Array – A collection of electrically connected photovoltaic (PV) modules.

Array current – The electrical current produced by a PV array when it is exposed to sunlight.

Azimuth – Horizontal angle measured clockwise from true north; 180 degrees is true south.

Base load – The average amount of electric power that a utility must provide in any period.

Current – The flow of electric charge in a conductor between two points having a difference in potential (voltage).

DC – Direct current: electric current flowing in one direction only.

DC cables – A cabling system suitable for conducting the DC current produced by the PV module.

DC isolator – A means of isolating the PV module output from the inverter.

Diode – Electronic component that allows current flow in one direction only.

Duty cycle – The ratio of active time to total time. Used to describe the operating regime of appliances or loads in PV systems.

Efficiency – The ratio of output power (or energy) in input power (or energy). Expressed as a percentage.

Energy meter – A meter which indicates the amount of electricity produced by the PV array.

Export meter – A meter which indicates the amount of energy exported out into the national grid and not consumed within the property.

Grid – Term used to describe an electrical utility distribution network.

Instantaneous short circuit (Isc) – The amount of current produced by an illuminated PV cell, module or array when its positive and negative output connections are shorted.

Incident light – Light that shines onto the facade of a solar cell or module.

Inverter – In a PV system the inverter converts DC power from the PV array to AC power compatible with the AC load of the building.

Inverter parallel connection – The AC output from the inverter is connected side by side with the incoming AC supply. The inverter must automatically disconnect from the mains if there is mains power failure. The PV system cannot work stand-alone to produce electricity in the event of a mains power failure.

Irradiance – The solar power incident on a surface. Usually expressed in kilowatts per square meter.

Kilowatt hour (kWh) – One thousand watt-hours. A unit of energy. Power multiplied by time = energy.

Kilowatt peak (kWp) – The value of power generated by a PV panel under full solar radiation. Solar radiation of 1000 watts per square metre is used to define standard conditions

Load – The amount of electric power used by any electrical unit or appliance at any given time.

Load current – The current required by the electrical device.

Module – The smallest replaceable unit in a PV array. An integral, encapsulated unit containing a number of PV cells.

MPP – Maximum Power Point: the point on the current-voltage (I-V) curve of a module under illumination, where the current and voltage is maximum.

NOCT – Nominal Operating Cell Temperature: the estimated temperature of a PV module when operating under 800 W/m^2 irradiance, 20°C ambient temperature and wind speed of 1 meter per second. NOCT is used to estimate the nominal operating temperature of a module in its working environment.

Nominal voltage – A reference voltage used to describe modules or systems.

Open circuit voltage (Voc) – The maximum voltage produced by an illuminated photovoltaic cell, module or array with no load connected, measured across the positive and negative connections. This value will increase as the temperature of the PV material decreases.

Peak load – The maximum load demand on a system.

Photovoltaic system – An installation of PV modules and other components designed to produce power from sunlight and meet the power demand for a designated load.

Rated module current – The current output of a PV module measured at standard test conditions.

Solar constant – The strength of sunlight: 1353 watts per square meter in space and about 1000 watts per square meter at sea level at the equator at solar noon.

Solar elevation angle – The angle made between ground level and the sun's height above the horizon (0° when the sun is at the horizon and 90° when directly above).

Standard test conditions – Conditions under which a module is typically tested in a laboratory: irradiance intensity of 1000 watts per meter square, air mass1.5 solar reference spectrum and a cell or module temperature of 25°C, plus or minus 2°C.

String – A number of modules or panels interconnected electrically in series to produce the operating voltage required by the load.

Sun path diagram – Graphical representation of the sun's height and azimuth.

Tilt angle – The angle of inclination of a solar collector measured from the horizontal. Voltage at maximum power – The voltage at which maximum power is available from a module.

Watt hour (Wh) – A unit of energy equal to one watt of power connected for one hour.

Zenith angle – The angle between directly overhead and the line intersecting the sun (90° – zenith is the elevation angle of the sun above the horizon).

Support

As well as the most comprehensive range of renewable energy products in the UK, Dimplex also has a wealth of support information available.

Training

Whether you are an installer looking for new business opportunities or a specifier wishing to understand more about solar PV, Dimplex can help with a variety of training courses available.
If you are an electrician with demonstrable competency and experience in the design and installation of domestic single phase circuits, you could become an Accredited Dimplex Renewables Installer. Our courses are available at our headquarters in Southampton and once you have passed the course, you will enjoy the many benefits associated with this programme. For specifiers we offer a one day product familiarization course. Further details of all our courses can be found on our website, or by emailing training@dimplex.co.uk

CPD Seminars

Dimplex are part of the Construction CPD Service and take part in their annual roadshow seminars, as well as hosting events ourselves at various venues around the country. Subject to numbers and timing we are also able to undertake presentations at client offices. Copies of current presentations can be found on our website.

Newsletters

In addition to product based literature, we also produce a regular newsletter – EcoTalk which covers all the latest news and views of the industry.
Read an interactive copy at www.dimplexrenewables.co.uk

Electronic support

In addition to web based product information, we also have links to more detailed information on Dimplex solar PV kits to assist those involved in the specification or installation.

- Individual Product Data Sheets
- On-line Sizing Tool

This powerful tool helps to select the correct kit for your application and gives an indication of costs, payback period and the income that can be generated through the Feed-in Tariffs. Please visit www.dimplexrenewables.co.uk for full details.

Maintenance

When a Dimplex solar PV kit is installed in a home or a business it has to be installed by a professionally qualified installer approved under the Microgeneration Certification Scheme, such as a Dimplex Accredited Installer. The installer notifies the electricity provider to make them aware that the system has been installed and that electricity is being generated, some of which will be exported back to the grid. As part of the installation work, a clear wiring diagram will be mounted close to the system for future reference.

Roof mounted solar PV modules have no moving parts and problems very rarely arise, but the warranty information provided with the kit details what steps need to be taken should this unlikely event occur. The inverter should be inspected annually and isolators are provided to enable the system to be shut down safely.

Dimplex solar PV kits are supported by a network of Accredited Installers and a team of customer service personnel.

Warranty

Dimplex solar PV modules carry a product warranty of 10 years with a guaranteed performance of 90% after 10 years and 80% after 25 years, with an expected life of around 30 years. Inverters carry a 5 year warranty

Approvals

Dimplex solar PV kits are tested by leading international institutes and certified for reliability and safety:

- Certified to IEC61215
- Certified to IEC61730
- Certified to IEC61701
- Certified to IEC62716
- CE conformity
- MCS

Specifications

Dimplex policy is one of continuous improvement; the Company therefore reserves the right to alter specifications without notice. The information contained in this brochure is correct at the time of printing. You are advised to consult your Dealer before purchasing.

Installation Guidance

This brochure is designed to assist you with your choice of Dimplex products and it is not intended as an installation guide. For safety, products should only be installed by a competent person, in accordance with current regulations and the manufacturer's instructions.

The Dimplex Range

Dimplex offers the widest range of electric space and water heating products in the world – over 400 – to meet almost any heating need. In addition to this publication, we have a wide range of brochures for both domestic and commercial applications. Please visit our website www.dimplex.co.uk for more information.

Renewables brochure

SmartRad brochure


Heat pumps brochure


Solar brochure


Commercial brochure


Domestic heating brochure


Electric fires brochure

Solid fuel brochure

For more information on our wide range of renewables technologies, please visit **www.dimplexrenewables.co.uk**
email: **marketing@dimplex.co.uk**
or call: Trade – **0845 601 5111**
Consumer – **0845 600 5111**

With thanks to the following customer: Randwick Village Hall and Playing Fields Committee

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