Free-E

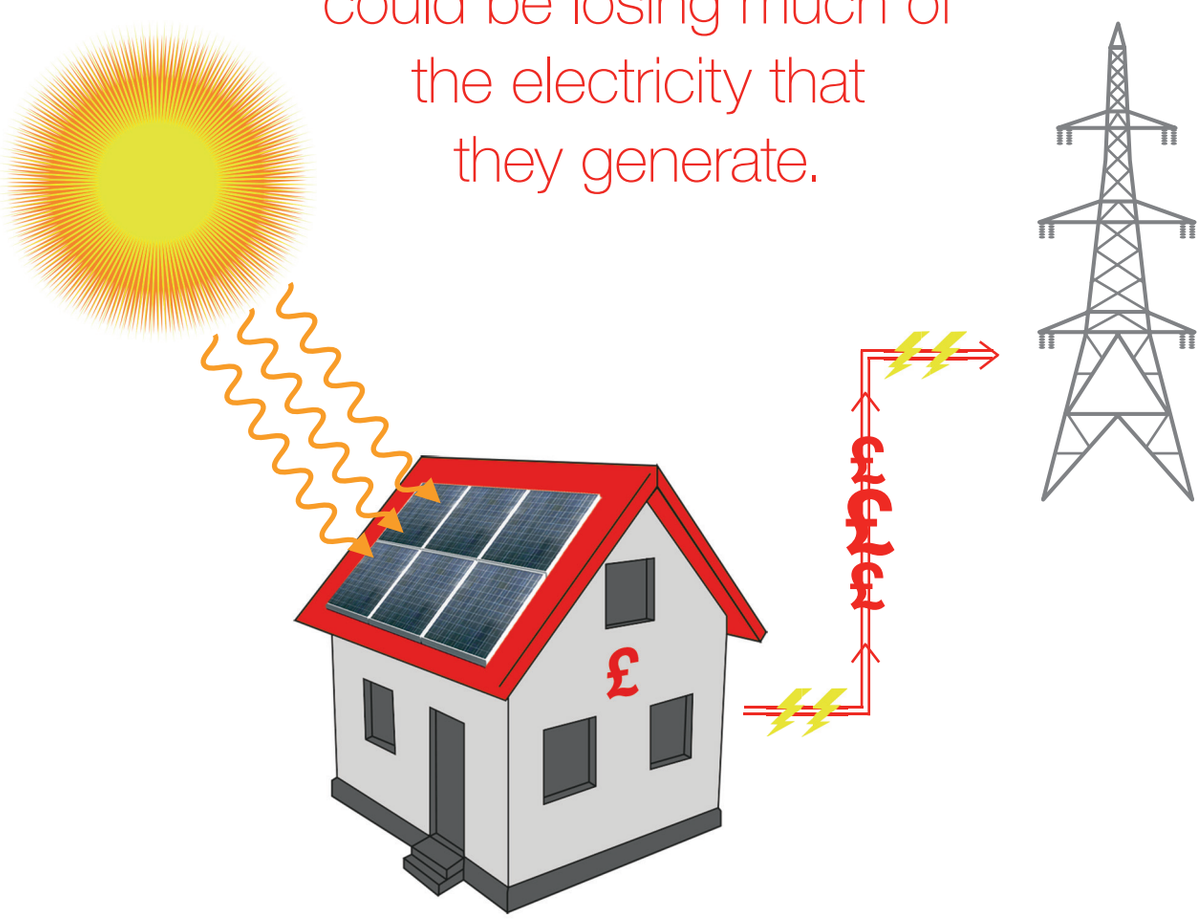
Dimplex®

Solar PV Energy Management System.

Turns surplus power into **free** hot water.

dimplex.co.uk/Free-E

Many solar PV installations could be losing much of the electricity that they generate.



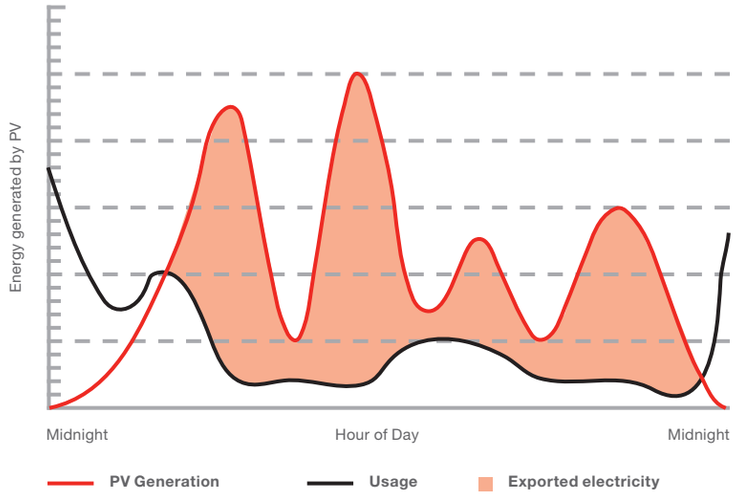
The problem

When a solar PV installation generates electricity, a household's electrical appliances use the electricity that they need first. The surplus energy is then sent back to the national grid.

But did you know that this surplus energy is not measured? Instead, it is assumed that a property will use half of the electricity; the other half is then sold back (exported) to the grid.

In reality, homeowners could be giving away far more than they are getting paid for. This is demonstrated in **Figure 1** below.

Figure 1: 70% of PV generation is typically wasted (exported).



The red line shows the typical PV generation throughout a day, while the black line is the amount used by the homeowner. The area shaded in orange is the amount of electricity that is potentially being exported back to the grid – in other words, how much electricity the homeowner is losing out on.

Some people try to maximise their usage by remembering to use appliances when it is sunny.

But there is a better way.

Introducing Dimplex Free-E.

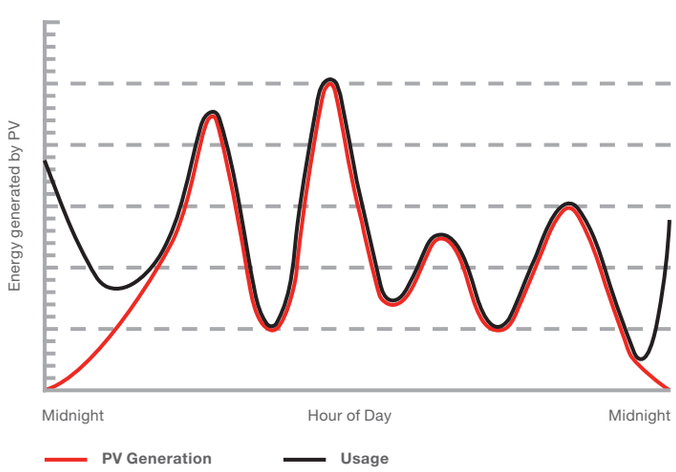
Dimplex Free-E is a clever wireless energy management system that works with a solar PV installation to heat the domestic hot water tank for free. Free-E does this by monitoring a household's energy usage accurately and diverting surplus energy to the hot water tank's immersion heater, instead of back to the grid.

By making use of this surplus energy, a household could use an additional 70% of the energy generated – and that can mean a significant reduction in energy bills. As a result, Free-E could pay for itself in just three years.[1]

Even better, Free-E does all of this without affecting the revenue from the Feed-in Tariff (FiT) or the 50% export tariff.[2] So, homeowners still get paid for energy generated, while maximising their usage too.

Free-E is up to 97% efficient at automatically converting PV energy to hot water. So there is no need for homeowners to remember to switch appliances on and off to use up solar-generated energy. Even on cloudy days, Free-E can utilise up to 97% of the electricity generated within a home (see **Figure 2**).

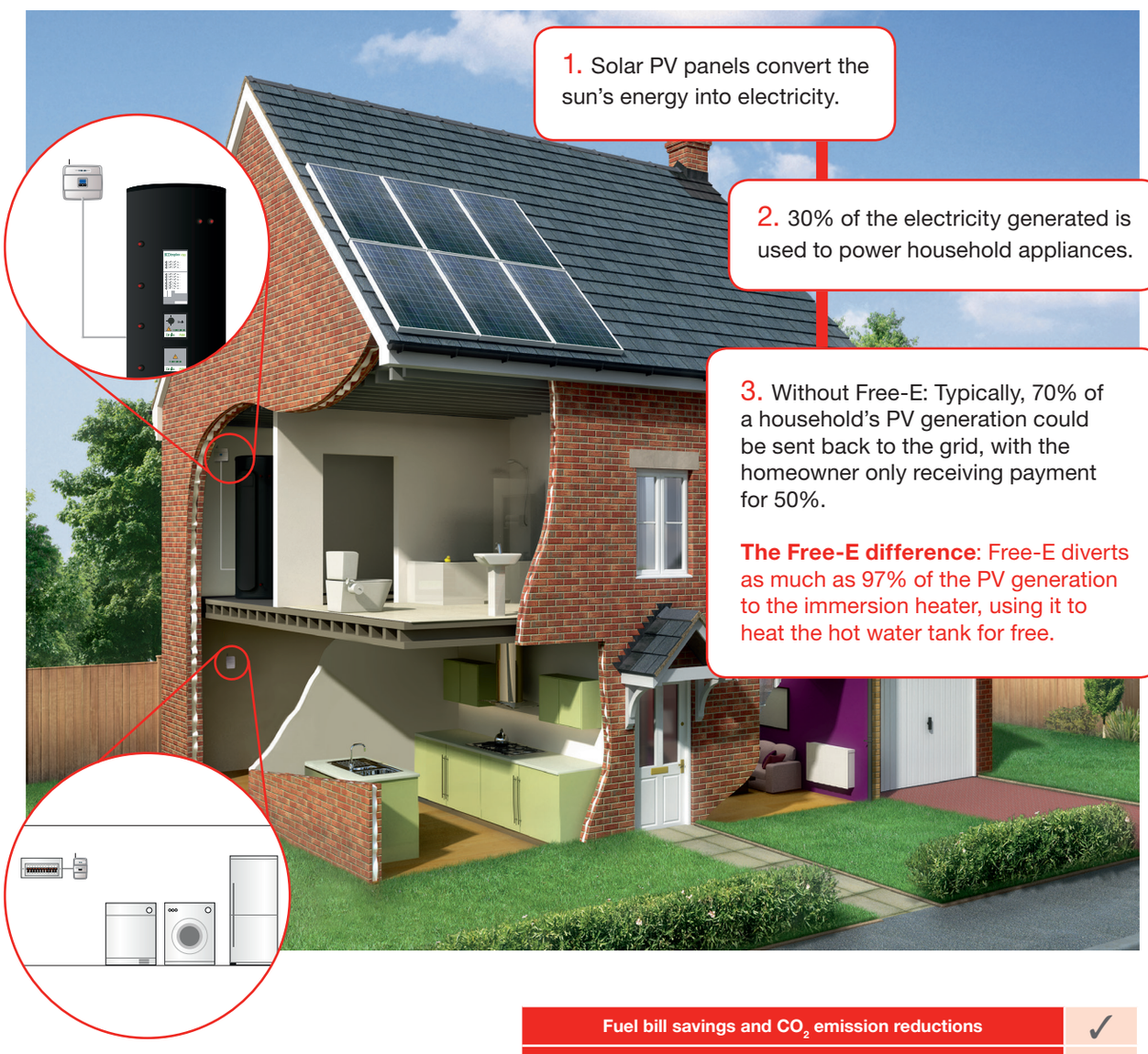
Figure 2: With Free-E, up to 97% of PV generation is used within the home.



With Free-E installed, PV generation and PV-generated electricity usage within the home can match each other by up to 97%.

[1] Indicated by field trials. Exact savings will vary for every property dependent on central heating fuel, size of PV installation, amount of hot water consumed and current method of heating water.
[2] Prior to the roll-out of smart metering.

The Free-E difference.



1. Solar PV panels convert the sun's energy into electricity.

2. 30% of the electricity generated is used to power household appliances.

3. Without Free-E: Typically, 70% of a household's PV generation could be sent back to the grid, with the homeowner only receiving payment for 50%.

The Free-E difference: Free-E diverts as much as 97% of the PV generation to the immersion heater, using it to heat the hot water tank for free.

Fuel bill savings and CO_2 emission reductions	✓
Fast and smooth automatic power modulation in compliance with all EU directives	✓
Indicates present, daily, monthly and lifetime imported and exported energy	✓
Wireless communication	✓
External input to activate boost mode	✓
User activated manual boost mode	✓
Built-in seven day timer for standard immersion heating	✓
Three-year warranty	✓

3 YEAR WARRANTY

The benefits of Free-E.

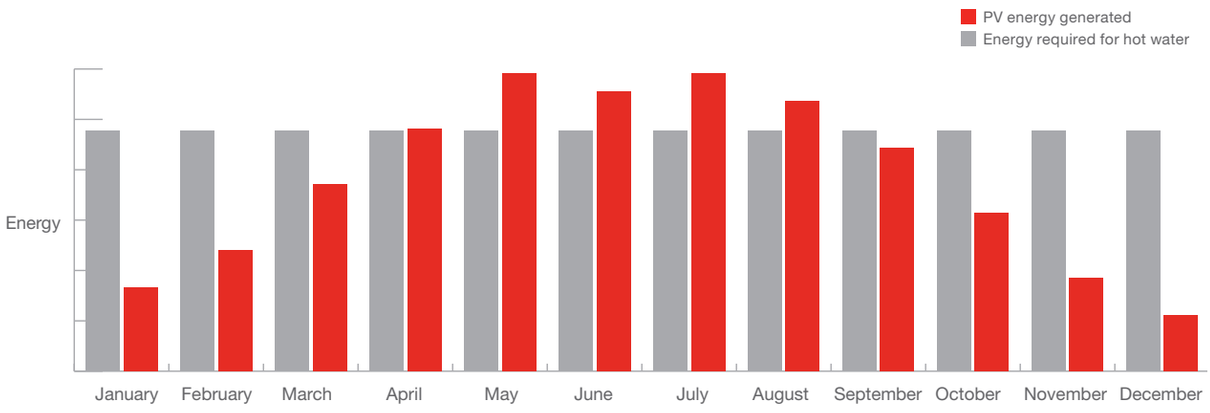
Let's take a closer look at the benefits of Free-E.

Reduced energy bills.

Once installed, Free-E can help reduce a household's energy bills by diverting surplus PV generation to the immersion heater in the property's hot water tank, instead of back to the grid. The hot water tank makes an ideal energy store as it is available consistently every day of the year and able to hold the energy until it is used.

Figure 3 shows that, during summer in a typical property, the PV generation could meet all of the household's hot water demands. Even in winter months, the contribution made by PV generation will help to reduce a property's hot water bills.

Figure 3: During summer, PV generation meets all of a household's hot water demands.



Increased return on investment.

PV installations are an attractive prospect for many due to the government's Feed-in Tariff (FiT). The perfect partner to a PV installation, Free-E enables homeowners to increase the return on their investment by maximising their energy usage – and all without affecting their 50% export revenue or the FiT.

Figure 4 shows the typical annual savings achievable in two types of property. These savings ensure payback of the capital costs of Free-E within a few years. Plus, don't forget: these savings will increase as energy prices rise.

Figure 4: Typical annual savings achievable with Free-E.

	PV array size	Current method of hot water heating	Typical annual savings
4 bed detached 5 people	16 panel 4kW system	Gas	£210
2 bed semi 3 people	12 panel 3kW system	Electric	£105

Assumptions: The PV is south facing on a pitched roof at 40 degrees. Gas boiler is 60% efficient for hot water production and costs 5.3p per unit. Electric water cylinder is 100% efficient and uses off-peak electricity and costs 6.5p per unit. 70% of energy was previously exported. Hot water demands are 45L per person per day.

Field trials have shown that Free-E could pay for itself in three years.
The exact savings will vary for every property dependent on central heating fuel, size of PV installation, amount of hot water consumed by the household and the current method used to heat hot water.

Reduced carbon footprint.

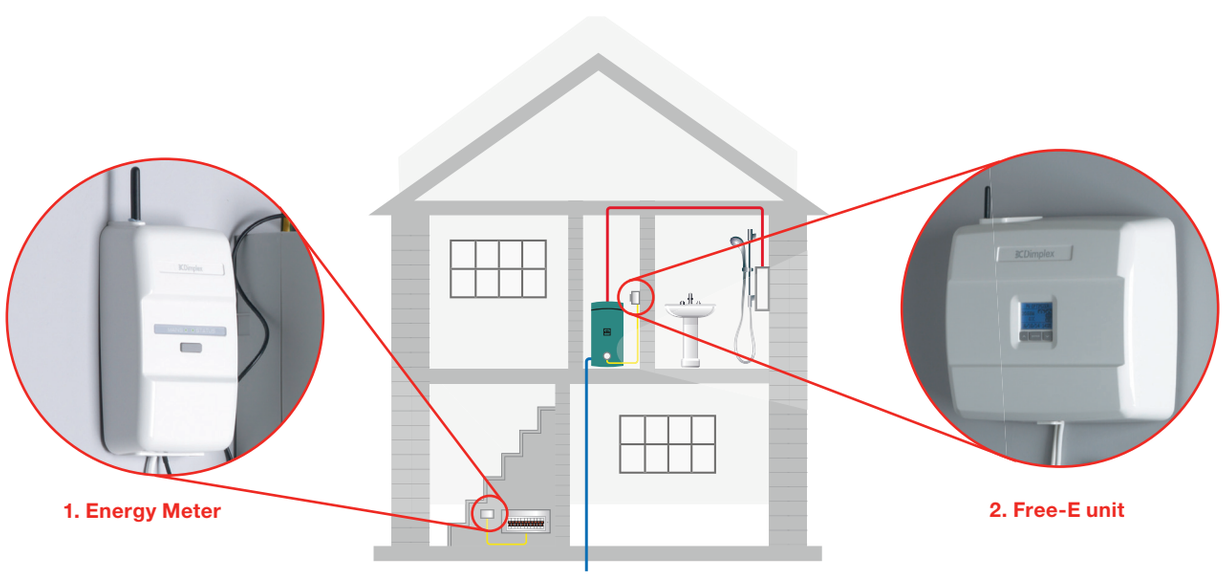
The energy generated by a PV installation has a carbon footprint of zero. In contrast, when burning a fossil fuel or by using electricity from the grid to heat water, carbon is emitted into the atmosphere. Simply by using the PV energy generated within the home, homeowners can reduce their carbon emissions significantly.

A closer look.

Free-E can be fitted retrospectively to homes with an existing solar PV installation or as part of a package with a new PV installation – no matter which PV system is used. It can also be used with other microgeneration systems such as hydro or microwind. And there's no need for the homeowner to change their current hot water tank or electrical supply.

The Free-E wireless energy management system comprises two parts, seen in **Figure 5.**

Figure 5: The two-part Free-E energy management system.



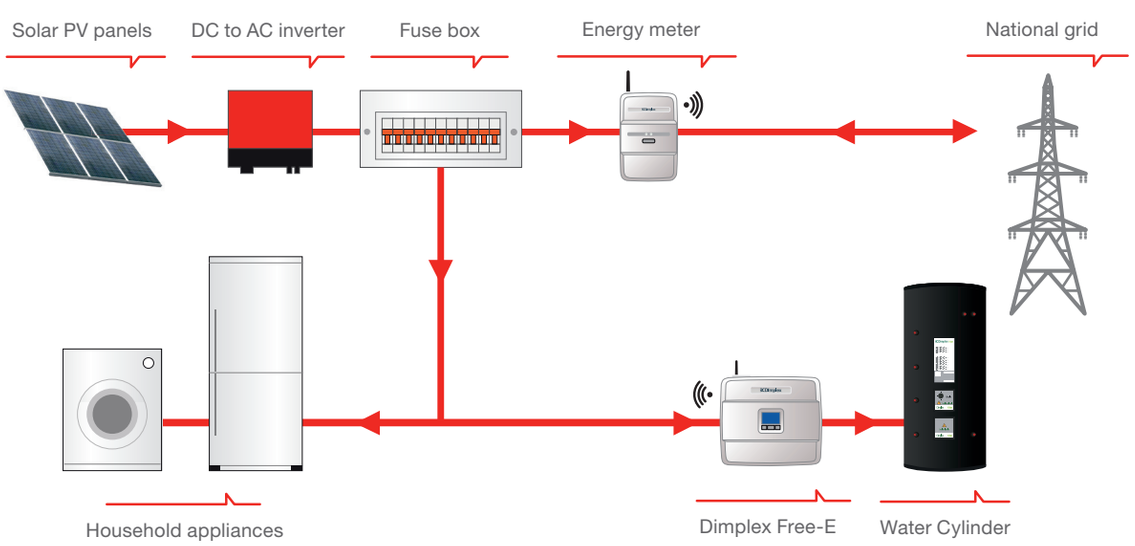
1. The **Energy Meter** sits adjacent to the incoming mains supply. It will typically be installed next to the fuse box. This monitors the flow of electricity and transmits this information wirelessly to the Free-E unit.

2. The **Free-E unit** sits next to the hot water tank. If surplus energy is available, it will divert this free energy to the immersion heater, rather than giving it away to the national grid. As a result, some of the household's hot water is heated for free.

Figure 6: Energy flow diagram.

1. The **solar PV panels** and **inverter** transform sunlight into electricity that can be used by household appliances.

2. The **Energy Meter** (typically installed next to the **fuse box**) monitors the flow of electricity and transmits this information wirelessly to the **Free-E unit**. That way, the Free-E unit knows exactly how much energy is available.



4. Free-E does not affect a household's FiT payments from their energy supplier. It is also unlikely to affect the export tariff payments until the roll out of Smart Meters. Up until then, energy suppliers will assume a household exports 50% of the energy generated — even if the reality is much less.

3. The **Free-E** unit diverts any surplus generated electricity not used by **household appliances** to the immersion heater in the **domestic hot water tank**. As the household appliances demand fluctuates throughout the day, Free-E will accurately adjust the amount of power being diverted to the immersion heater to match the power available.

Free-E features at a glance.

Free-E boasts a number of user and installer-friendly features:

Simple to install.

Quick and easy to install. As long as there is a hot water tank with immersion heater, there is no need for any replacement. Typically installed by an electrician in a couple of hours – no mess and no fuss.

Wireless.

No lengthy or unsightly cables are involved. The Energy Meter also runs on mains electricity, ensuring reliable, uninterrupted communication for trouble-free and low energy use without having to replace batteries.

Automatic.

Free-E adjusts the flow of energy to the immersion heater automatically as home consumption varies. This ensures only excess generated power is used to heat the domestic hot water tank. Even on cloudy days, Free-E adjusts the immersion consumption quickly to ensure it only uses free electricity.

Easy to use.

No need to monitor the system once installed – simply enjoy using free hot water. However, a clear back-lit display shows the PV generation breakdown for the property by export, import and energy used for hot water generation, if required.

3 Year Warranty.

Free-E is made from high-quality components but, in the unlikely event of a problem, every Free-E comes with a three-year warranty for complete peace of mind.

Compliant.

Unlike many other systems, Free-E uses innovative technology to ensure it does not create any electronic interference. Therefore, it is fully compliant with European regulations (EMC).

Install friendly.

Intuitive commissioning allows for simple set-up, while a self-check feature confirms correct installation of the energy meter. An intelligent self-protection system prevents over-current and overheating. Plus, wireless communication – using 868 IBM band with listen-before-talk technology – allows trouble-free installation of multiple systems in a small area.

Technical information.

Dimplex Free-E

Dimplex Energy Meter

	FREE-E AND ENERGY METER
Designated use	Hot water heating*
Maximum switch capability	3kW
Voltage	230V
CE certified	Yes
Approvals	Low voltage and EMC directive
Connection method	Wireless
Dimensions (L x W x H)	Energy Meter 231 x 125 x 48mm
	Free-E 316 x 279 x 110mm

*Dimplex Free-E is not designed for use with Dimplex's range of heat pumps or the Quantum space heating system.

For further technical information visit **www.dimplex.co.uk/Free-E**

Frequently asked questions.

Q: My PV system was installed via a PV-for-free scheme. Is this product still suitable?

A: Yes, the main benefit of these schemes is to provide homeowners with free electricity. Free-E will make it much easier to use this electricity and get the maximum benefits.

Q: I have a combination boiler, do I need a cylinder?

A: In order to store the energy you need to have a cylinder. If space permits it may be possible to install a pre-feed cylinder for a combi boiler.

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 time of printing. You are advised to consult your Dealer before purchasing.

Installation Guidance.

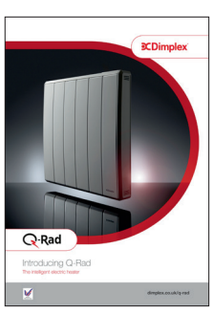
This brochure is designed to assist you with your choice of Dimplex products and it is not intended as an installation guide. For safety, products should only be installed by a competent person, in accordance with current regulations and the manufacturer's instructions.

The Dimplex Range.

Dimplex offers the widest range of renewable energy, electric space and water heating products in the world – over 700. 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.

Domestic heating brochure

Quantum off-peak heater brochure



Q-Rad electric radiator brochure

Quantum hot water cylinder brochure

LST brochure

Electric fires brochure

Renewable heat for installers brochure

Renewables at home brochure

Solid fuel brochure

For more information on Dimplex Free-E, please visit: **www.dimplex.co.uk/Free-E**

Email: **pre-sales@dimplex.co.uk** or call: **0800 028 6122**

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