APOLLO solar electric

Get the most from your solar PV system

Introducing the Apollo GEM Generated Energy Management system.

Micro-generation systems are at their most efficient when all of the energy produced is used at the point of generation, i.e. within the household where the generator is sited. This results in the minimum possible use of imported energy.

There are many systems on the market which monitor your generation system and allow you to see how much energy is being generated and how much is being used at any given time but getting savings from these systems relies on you to adjust demand to match supply. Since generated energy (supply) and demand change minute by minute throughout the day achieving the balance is near impossible and completely impossible when you are not at home.

GEM can increase savings from your solar PV system by over 25% per year.

APOLLO GEM

GEM is a product that continuously monitors energy supply from your generation system and household energy demand and automatically, second-by-second, adjusts demand to balance supply.

The way GEM does this is by storing excess generated energy which is not required by the household appliances as heat in the hot water cylinder rather than allowing it to be exported to the grid. Every unit of power used to heat the hot water in this way reduces imported energy by the same amount resulting in a significant saving in imported energy costs.

Most micro-generation systems often produce more power than can be used directly in the household with the result that the surplus is exported to the electricity distribution network. The current FITs scheme for systems under 30KW assumes that 50% of all power generated is exported to the grid. During the summer months PV installations in households which are unoccupied during the day could be exporting 90% or more of the energy generated. GEM automatically uses any surplus energy available to heat your hot water instead of exporting it. This means you don't have to pay to import power later for water heating, and with hot water heating costs amounting to 25% of some household energy bills that's a big potential saving.

Even more good news is that because export energy is not metered but assumed to be 50% of all energy generated you still continue to get the export tariff on half of all units generated by your system even if GEM ensures that no energy is actually exported!

What's more, the lower the FITs rate that applies to your system the higher the savings as a proportion of the system income.

Example savings with GEM installed:

4KW System without GEM installed*

	FITs Rate/Unit	43.3p per Unit	21p per Unit	16p per Unit
		Income / Savings		
	Units Generated 3434	£1486	£721	£549
	Units Used 1717	£220	£220	£220
	Units Exported 1717	£54	£54	£77
	Total Annual Income & Savings:	**£1760**	**£995**	**£846**

4KW System with GEM installed

	FITs Rate/Unit	43.3p per Unit	21p per Unit	16p per Unit
		Income / Savings		
	Units Generated 3434	£1486	£721	£549
	Units Used 1717	£220	£220	£220
	Units Diverted to HW 1717	£220	£220	£220
	Units Exported 0	£54	£54	£77
	Total Annual Income & Savings:	**£1980**	**£1215**	**£1066**
	% additional saving with GEM installed	**12.5%**	**22.1%**	**26%**

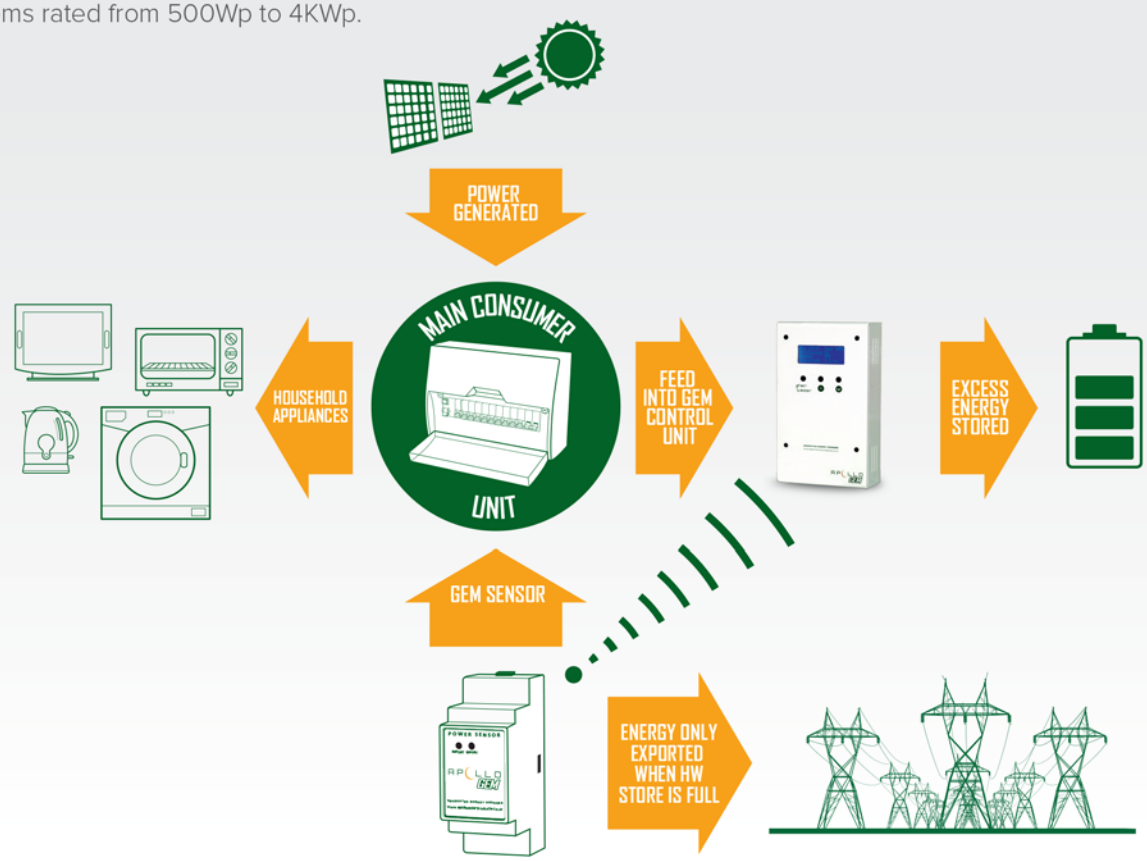
*4 person household with hot water provided by electric immersion heater

With GEM installed the amount you can save is independent of the FITs rate you receive. Even if you have a "free solar" system and get no FITs payments at all you will still get up to £200 additional savings per year with a 4KW system.

How GEM works

The GEM system works by accurately monitoring the power being imported or exported and always diverts sufficient power into the hot water system in order to keep the exported power to as near zero as possible whilst at the same time ensuring that no additional power is ever imported to supply the hot water store. Priority is always given to the energy demands of the household appliances and only surplus energy that would have otherwise been exported is stored in the hot water system.

Some "smart switching" systems can only use the full immersion power, i.e. on or off, and therefore can only save exported energy when the generated excess is over 3KW. For many days in the year excess power does not exceed 3KW even for a 4KW system. GEM is different and is able to precisely control the amount of power diverted to the immersion heater meaning that even small amounts of excess power can be continually saved and so GEM will work well in both summer and winter and with PV systems rated from 500Wp to 4KWp.



In addition to performing the generated energy optimisation functions GEM also functions as a full featured immersion timer controller with 7-day or 5/2-day operation and 3 on/off times per day together with smart temperature control enabling different temperatures to be set depending on whether the water is being heated by on-site generated energy or imported energy. This enables the cost of timed water heating to be minimised whilst maximising available free energy from the generation system. A 1-4 hour boost function is also provided.

GEM has two independent variable power outputs so that a second water tank can be heated or power can be diverted to a second heater, e.g. a storage heater if the first water tank becomes fully heated.
GEM can even be programmed to equally share any available surplus PV power between the two outputs

The GEM system is simple to install and can be retrofitted to existing PV, wind or hydro micro-generation systems as well as installed with new installations.

Your Questions Answered

Is GEM easy to install?
Yes! GEM can be installed by PV installers, electricians or a competent DIYer. GEM does not need to be installed by an MCS certified installer and will not affect the MCS certification of your micro-generation system. Only one clip-on type import/export sensor is used and this links to the control unit using a wireless connection to reduce wiring and means that **no dedicated immersion circuit is required with the GEM system.**

What energy savings can I expect?
This will depend on the size of your PV system and the amount of hot water you use. For a 4 person family with a 4KW PV system you can expect savings of around £200 per year.

Will I still get my export tariff payments?
Yes. Currently FITs export payments are paid for 50% of all units generated regardless of how many units are actually exported. This means you can use all your generated energy and still receive all the export payments!

Do I need a hot water tank?
Yes, you do need a hot water system which uses a hot water storage tank. GEM stores the excess energy generated as hot water.

Do I need an immersion heater?
Yes, GEM will control your existing immersion heater.

Do I need a dedicated circuit from my consumer unit?
No, GEM will work from your existing immersion supply whether it is a dedicated circuit or a switched and fused spur from a ring main.

If no excess energy is generated do I still get hot water?
Yes, GEM works in conjunction with your normal hot water system whether gas, oil, immersion etc. on days when excess power is not available from the PV system your water is heated in the normal way.

Can I see how much energy I have saved?
Yes, GEM records and displays how much energy has been saved and which would have otherwise been exported.

Can I still use my Economy 7 water heating?
Yes, GEM has a built-in immersion timer which allows 3 different on/off periods to be programmed for each 24 hours so you can still take full advantage of your off-peak or Economy 7 supply.

Does GEM have a second output?
Yes, GEM has two independent variable power outputs so that a second water tank can be heated or power can be diverted to a second heater, e.g. a storage heater if the first water tank becomes fully heated. GEM can even be programmed to equally share any available surplus PV power between the two outputs.

What is the GEM warranty?
All GEM systems are supplied with a 5 year RTB warranty.

Specifications	
Microgeneration System Size	0.5-4KWp
Operating Voltage	216-253 VAC
Control Unit	
Immersion or Heater Power	100W - 3500W
Optimising Power Range	50W - 3500W
Optimising Power Adjustment Period	Every 2 seconds
Variable Power Outputs	2 Outputs, both fully variable up to 3500W
Secondary Controller	Supports 2nd GEM controller on same wireless link
Timer Functions	7-day or 5/2 day, 3 on/off settings per day
Boost Function	1 to 4 Hours
Temperature Setting	Independent settings for timer / boost heat and Optimiser
Display	4 line x 20 characters back lit LCD
Mounting	Wall mount, bottom or rear cable entry
Dimensions	198h x 132w x 68d
Power Sensor Unit	
Current Sensor Rating	80A
Mounting	Non-invasive clip-on, 16mm max cable diameter
Module mounting	2W DIN Module or Stand-alone wall mount
Module Dimensions	85h x 35w x 57d
Radio Data Link	868MHz, Range 30-50M typical in-building
Indicators	LEDs for import/export and power level display