



ENVIRONMENTAL
PRODUCTS

2016

“Our newly developed environmental range provides our customers with products that improve their environmental footprint at reasonable pricing which will ultimately result in reductions in their long term expenditure.”

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SOLAR POWER (PHOTOVOLTAIC) SPECIALIST

Whether you are seeking an alternate source of energy for home or commercial use, our systems are designed to make your switch to PV Energy as simple as possible. Our PV System has been developed in the knowledge that appearance and aesthetics are important and that it should be easy-to-install. Once the number of PV panels required have been decided we can supply the complete package for the installation:

Panels; DC and AC isolators; Inverters; RCB0s and Monitoring Meters.



EV CHARGING SPECIALIST



Garo's comprehensive range of Electric Vehicle Chargers cover the complete range of EV charging requirements.

From the EV charger at your home, office, business or shopping centre to the versatile Fast Charger for that quick charge while on the road, Garo has the solution to meet your specific requirements.

01

SOLAR POWER (PHOTOVOLTAIC)

WHY SOLAR PHOTOVOLTAIC?

Solar Photovoltaic Panels convert the solar radiation from the Sun into usable electricity. These solar panels can be used to significantly decrease future electrical utility costs, and can also be used to meet Part L of the current building regulations.

In order to comply with Part L of the building regulations, all new dwellings must have a renewable energy source installed. A photovoltaic installation allows the developer, builder or home owner to comply with these building regulations. The building regulation states:

Part L *Building Regulations*

1.2 Renewable Energy Technologies

This section gives guidance on the minimum level of renewable technologies to be provided to provide compliance with regulation L3 (b) for domestic dwellings:

- 4kWh/m²/annum of electrical energy or
- 10kWh/m²/annum contributing to energy use for domestic hot water heating, space heating or cooling or
- A combination of both

The size of the photovoltaic installation is directly related to the size of the dwelling. The following table gives some guidelines on the Wattage required to satisfy the building regulations. The table does not allow for shading.

Square Feet	Square Meters	Annual kWh Requirement	South Facing Peak Power	SE/SW Facing Peak Power	East-West Peak Power
800	74	297	345	362	418
900	84	334	391	411	474
1000	93	372	433	455	525
1200	111	446	517	544	626
1350	125	502	582	612	705
1600	149	595	694	730	841
1800	167	669	777	818	942
2000	186	743	866	911	1050
2400	223	892	1038	1092	1258

This table is for estimation only

From the table, a 1200 ft² or 111m² New Dwelling, with a south facing roof, with no shading on the panels, would have a peak power requirement of 517Watts. This dwelling would meet Part L of the building regulations by fitting 2 x 260Watt panels.

DOMESTIC INSTALLATIONS

FOR INSTALLATIONS, WHEREBY THE HOMEOWNER OR DEVELOPER WOULD LIKE TO EXCEED PART L REQUIREMENTS, THE FOLLOWING CRITERIA APPLY.

Planning Restrictions

Statutory Instruments

SI 86-2007 Domestic Dwellings

The total aperture of area of any such panel shall not exceed 12m² or 50% of the total roof area, whichever is the lesser. (PV panel size 1.65 x 0.99) 7 Panels

Installations above 7 panels will require planning permission



ESB Requirements

Micro-generation Applicable standard EN 50438

Micro-generation is defined as 5.75 kW at 230 Volts

Installations above 5.75kW will require consultation with utility provider

COMMERCIAL INSTALLATIONS

Fitting Solar Photovoltaic panels to commercial premises is a means to significantly reduce future utility costs. It is also extremely efficient as the electricity generated by the solar panels is being generated and utilised during daylight hours. This makes it particularly simple to match the Photovoltaic installation to the local requirement. However, there are some additional criteria for commercial installations.

Planning Restrictions

Statutory Instruments

SI 235-2008 Business / Light Industrial Buildings

The total aperture of area of any such panel shall not exceed 50m² or 50% of the total roof area, whichever is the lesser. (PV panel size 1.65 x 0.99) 30 Panels

Installations above 30 panels will require planning permission



ESB Requirements

Micro-generation Applicable standard EN 50438

Micro-generation is defined as:

11.00 kW at 400 Volts

Installations above 11kW will require consultation with utility provider

PHOTOVOLTAIC – 2 SOLUTIONS

All Photovoltaic installations utilise solar panels coupled to an Inverter. However there are two different types of Inverter, Micro Inverters & String Inverters:

Micro Inverters

- Micro inverters are fitted to each panel and provide the following advantages
- No string sizing
- No minimum voltage considerations
- No direct current electrical work
- No location issues for inverters
- No single point of failure
- Increased safety
- 25 Year Warranty

String Inverters

A single String Inverter can be fitted for a total installation. String Inverters have the advantage that they have a lower cost base as the size of the installation increases.

GARO would recommend Micro-Inverters for installations up to 2kW and String Inverters for installations above 2kW. It is possible to use Micro-Inverters for any size of installation.

2 DIFFERENT INSTALLATIONS

Domestic Installations

GARO provide a full kit including Photovoltaic panels, Inverters, all roof fixings, metering & switchgear for the following sizes.

Product Code	Description	PV Panels	Micro Inverters	RCBO	Meter
GPVM1-260	PV Panel Kit c/w panel, Inverter, Meter & Fixings 260Watt	1	1	6A	GM1D
GPVM2-520	PV Panel Kit c/w panel, Inverter, Meter & Fixings 520Watt	2	2	6A	GM1D
GPVM3-780	PV Panel Kit c/w panel, Inverter, Meter & Fixings 780Watt	3	3	10A	GM1D
GPVM4-1040	PV Panel Kit c/w panel, Inverter, Meter & Fixings 1040Watt	4	4	10A	GM1D
GPVM5-1300	PV Panel Kit c/w panel, Inverter, Meter & Fixings 1300Watt	5	5	10A	GM1D
GPVM6-1560	PV Panel Kit c/w panel, Inverter, Meter & Fixings 1560Watt	6	6	20A	GM1D
GPVM7-1820	PV Panel Kit c/w panel, Inverter, Meter & Fixings 1820Watt	7	7	20A	GM1D
GPVM8-2080	PV Panel Kit c/w panel, Inverter, Meter & Fixings 2080Watt	8	8	20A	GM1D

Commercial Installations

For larger commercial installations, please consult us, as it will probably necessitate a site survey. GARO can provide commercial installations from 3 kW to 1mW. We can also provide full turnkey solutions to include all necessary Medium Voltage switchgear.

A PHOTOVOLTAIC SYSTEM IS ONLY AS STRONG AS ITS WEAKEST COMPONENT

GARO Photovoltaic Panels are manufactured in Europe and fully comply and are manufactured to IEC 61215 & IEC 61730. They are available from 260Watt to 310Watt, and feature a 25 year efficiency warranty as standard.

GARO Micro Inverters are manufactured in Europe and fully comply and are manufactured to IEC 50438, IEC 62109, IEC 61000 & G83/2. They have a maximum per panel output of 310Watt, and a 25 year warranty.

GARO String Inverters are manufactured in Europe and fully comply and are manufactured to IEC 50438, IEC 62109, IEC 61000, G59/3 & G83/2. They are available from 3kW to 1MEGA Watt. They can also be supplied with medium Voltage switchgear for turnkey applications.

GARO's comprehensive range of mounting systems have been fully tested for the worst weather conditions. All our components are stainless steel or marine grade aluminium, and have a 10 year durability warranty.

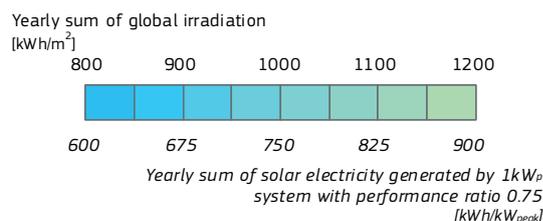
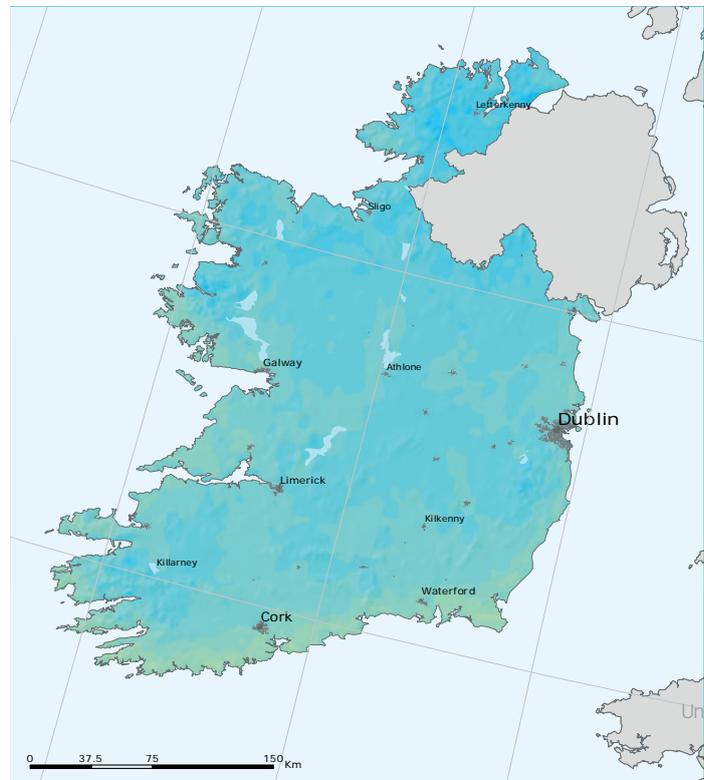
GARO also provide a complete range of safety isolation devices for both AC & DC installations. These products also come with GARO's comprehensive 5 year warranty.



HOW MUCH SUNLIGHT DO WE GET?

Photovoltaic (PV) systems convert solar radiation into electricity. Our systems are designed for use in both domestic and commercial environments. Our Micro Inverter 260 is for domestic applications up to 1.5kW and our Blue Planet Inverter is for use in commercial applications. Power is generated on site and replaces electricity purchased from your utility supplier.

The following solar map of Ireland gives the maximum annual amount of energy available on a horizontal surface.



*EC Joint Research Centre - Institute for Energy and Transport

PHOTOVOLTAIC SYSTEMS

A photovoltaic installation is composed of photovoltaic modules, one or more inverters, and isolation and protection devices. The Garo PV System provides you with all of these components ensuring the durability of the equipment and their safe operation.

Your photovoltaic installation is a long term investment and you can be assured of the quality of our panels which facilitate maximum overall efficiency and return on your investment, whether it is a residential or commercial installation.

THE PHOTOVOLTAIC PANELS

Polycrystalline

Anti-reflective glass
2-3% higher energy yield
Improved light absorbance

Monocrystalline

Power output tolerances: 0/+5 W
Back sheet: black / white
Frame: silver / black

Installation Video
Demonstration
available at
garo.ie/videocentre



Pin Connector Kits
for easy connections



EasyMount Roof Hook

Roof type: Any type of
tiled roof (except for
barrel tiles)
Roof incline: 15 - 45°

BISOL crystalline photovoltaic modules are recognised globally for their excellent performance, premium quality and aesthetic design. All products undergo strict quality control at every stage of the production process insuring higher energy yields over a longer life span.

- Made in Europe
- Higher Energy Yield
- 10 Year Warranty
- Lower Degradation Rate
- Extremely Aesthetically Pleasing

PV products are thoroughly tested and comply with the principal international standards IEC 61215, Ed.2 and IEC 61730

INVERTERS

An inverter is needed to convert the DC energy (generated by the PV panels) to AC power. Garo provides a selection of inverters to suit your particular installation.



Blue Planet - inverter fulfills all requirements expected of modern solar PV inverters. Using plug-in connectors on both the DC and AC sides ensure that they are just as quickly connected as they are mounted. Standard incorporation of RS485, Ethernet and USB ensures elegant communication and convenient monitoring. For commissioning and checking on the current data operation it also features a clearly laid out graphical display. System range is from 3Kw single phase to 1Mw three phase. Turnkey solutions are available with this system.

Micro Inverter 260 - High efficiency compact inverter is placed on the mounting rail behind each PV panel. It facilitates access to panel data through its communication gateway (WiFi, Ethernet gateway with embedded web server). The desired real power and power factor can also be set through the communication gateway allowing dynamic control of micro grid performances and adaptation to every grid quality. No DC Current electrical work. Compact waterproof design. 25 year Warranty.



ISOLATORS - TYPES DC & AC

Isolating switches for installation on the DC incoming cable bringing power from the PV panels to the inverter and on the AC outgoing cable bring power from the inverter to the distribution board.

DC Isolator Garo's DC isolators are available in 16A and 32A. Fully rated at 500V in DC21A and DC22A. Protection Class IP65

AC Isolator Garo's AC isolators are available in the range 16A - 125A. Fully rated in AC21A and AC22A. Protection Class IP65



DC Isolator



AC Isolator



PV MONITORING & CONTROL

GM1D Energy Meter

Single phase energy meter with LCD data display. Pulse output proportional to the active energy being measured. Provides constant monitoring of the energy production and the installation's overall efficiency.

GM3D Energy Meter

Single or three phase energy meter with LCD data display. Provides Voltage Current kW and kWh.

02

ELECTRIC VEHICLE CHARGING

Garo's comprehensive range of electric vehicle chargers cover the complete range of EV charging requirements. From the EV charger at your home, office, business or shopping centre to the versatile Fastcharger for that quick charge while on the road, Garo has the solution for your requirements.

THE HOMECHARGER

Designed with the homeowner in mind, it is compact, aesthetically pleasing, easy to operate and built to facilitate all makes of electric automobiles. The front has a built-in LED display for visual communication of the charge status. Homechargers are available with Type 2 sockets or with fixed cable Type1 or Type 2. European manufactured cars generally use Type 2 charging outlets and Type 1 is normally used for cars from Asia.

All EV car manufacturers in the world develop and currently deliver cars with either Type1 or Type 2 power intake. It is made of durable PC/ABS and designed for outdoor use. Protection rating IP54.



GARO LS PUBLIC EV-CHARGING STATION

Designed with versatility and ease of use in mind. It stands at just 130cms in height and facilitates the charging of two electric vehicles simultaneously. It is easy to operate and built to facilitate all makes of electric automobiles.

It is made of aluminium to meet the tough requirements on equipment installed in public places as well as places of business. The front has a built-in LED display for visual communication of the charge status and stations are available with sockets Type 2 or with fixed cable Type 1 or Type 2. Generally Type 2 outlets are for charging European cars while Type 1 outlets are suitable for cars from Asia.

This charging station is available with RFID function which facilitates payment for use, if required. They are also available in different versions with 1 or 3 phase, 16A or 32A.

Protection rating IP44.



THE EV FAST-CHARGER RANGE



Garo has been listed as the biggest supplier of EV charging solutions by ELBIL in Norway. We are also suppliers of eight fast-chargers for the new “Green Highway” between Sweden and Norway, so we know a thing or two about EV charging.

GQC 50 ECO Fast-Chargers

Both Japanese and European vehicles can charge from the same station.

The station's output is 50 kW, which means that an electric car can be charged in 15-30 minutes depending on battery size. The charger is equipped with a connector for CHAdeMO standard and one for the new German COMBO Standard.

The station comes in a variety of colours to suit your requirements. It can also be equipped with a Type 2 connector for Mode 3 AC charging.

For technical advice on any of our environmental products or to organise a site assessment, please contact a member of our sales team on 01-8665360 or at info@garo.ie

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ADDITIONAL RESOURCES ON GARO.IE

- Webshop
- Detailed Product Catalogue
- Video Installation Centre
- Energy Hub

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