

PHOTOVOLTAIC AND HYBRID KITS FOR THE ELECTRIFICATION OF RURAL AREAS (mountain refugees, homes in developing countries, ext.)

In an isolated site, not connected to the public electrical grid, the use of a generating set is not always the best solution. In fact it causes pollution, noise, it can have mechanical problems, you should take care of the removal of filters and oils, the supplying of fossil fuel and spare parts for the maintenance ext. These problems do not exist using a photovoltaic or hybrid system.

Moreover, the generating set is a bit cheaper but the functioning and maintenance costs are expensive. On the other hand you can amortize the cost of a photovoltaic or hybrid system within 6-8 years and the system has a life time of 25-30 years considering only a batteries' exchange every 6-8 years.



"KM" SERIES KITS DEVELOPED BY ENERECO SRL

ENERECO srl has developed a series of standard KITS for the electrification of isolated areas (mountain refugees, homes in developing countries ext.). KM kits are easy to be installed and they are complete with the various electrical devices such as lamps, refrigerators, freezers, pumps ext. They are divided into 2 types: "KM-F" Series, using only photovoltaic modules, and "KM-I" Series, using the hybrid technology (photovoltaic + wind).

In the KM kits the pv arrays, the batteries and the electrical load have been calculated for the following periods:

- **OCCASIONAL USE** (3 days per week) in periods with solar radiation of less than **4,5kWh/m²/day**
- **CONTINUOUS USE**, in periods with solar radiation of more than **4,5kWh/m²/day**

"KM-F" KITS RANGE

Characteristics	KM-F 1	KM-F 2	KM-F 3	KM-F 4	KM-F 5	KM-F 6	KM-F 7
Photovoltaic power	18Wp	30Wp	50Wp	110Wp	330Wp	350Wp	525Wp
Supporting structure	no	no	Head pole	Head pole	Oz/Vz	Oz/Vz	Oz/Vz
Junction box	no	no	no	no	JB3/24	JB2/24	JB4/24
Charge regulator	SLS6.6	SLS6.6	SLS8.8	SLS8.8	SOL J12	SOL S20	SOL T30
Batteries	12V/15Ah	12V/42Ah	12V/65Ah	12V/100Ah	24V/100Ah	24V/230Ah	24V/600Ah
Lamps (1)	2x5W	3x7W	3x11W	5x11W	5x11W	8x11W	10x11
24Vdc refrigerator	no	no	no	no	50 lit	150 lit	150 lit
24Vdc freezer	no	no	no	no	no	no	150 lit
Inverter – 230Vac 50Hz	no	no	no	290VA	470VA	1kVa	2,3kVA+CB(3)
Pump or autoclave - 24Vdc	no	no	no	ACB61	ACB61	ACB61	ACB61
Other	no	DC/DC (2)	DC/DC (2)	no	Radio	TV 14"	TV 14"

We can develop further "KM-F" kits according to the customer's demand.

(1) In the 12Vdc systems the lamps will be fluorescent, complete with 12Vdc electronic ballast. In the 24Vdc systems the lamps will be type DULUX EL and they will be supplied at 230Vac by the inverter inserted in the kit.

(2) DC/DC converter allows to use a radio device.

(3) The inverter has a bidirectional function and it can be also a battery charger if connected to a diesel generating set.

The electrical material for the installation is not included in the KIT but it can be supplied on request.

"KM-I" KITS RANGE

Characteristics	KM-I 10	KM-I 20	KM-I 40	KM-I 40
Photovoltaic	480Wp	525Wp	700Wp	1200Wp
Supporting structure	Oz/Vz	Oz/Vz	Oz/Vz	Oz/Vz
Junction box	JB3/24	JB3/24	JB2/48	JB4/48
Wind generator ⁽⁴⁾	400Wp	900Wp	1000Wp	3000Wp
Charge regulator	SOL S20	SOL S20	TAR30	PWT4055
Batteries	24V/300Ah	24V/600Ah	48V/800Ah	48V/1200Ah
Lamps 230Vac	10x15W	10x15W	10x15	10x15
Combined refrigerator 230Vac ⁽⁵⁾	250lit + 86lit	250lit + 86lit	250lit + 86lit	250lit + 86lit
Freezer 230Vac	no	193lit	261lit	378lit
Inverter – 230Vac 50Hz	2.3kVa+CB	4kVa+CB	5kVA+CB	8kVA+CB
Pump or autoclave	0.5kW	1kW	1kW	2kW
TV	TV 28"	TV 28"	TV 28"	TV 28"
Other household appliances	no	no	Dishwasher 1,5kW	Dishwasher 2.5kW Kitchen robot 0.3kW

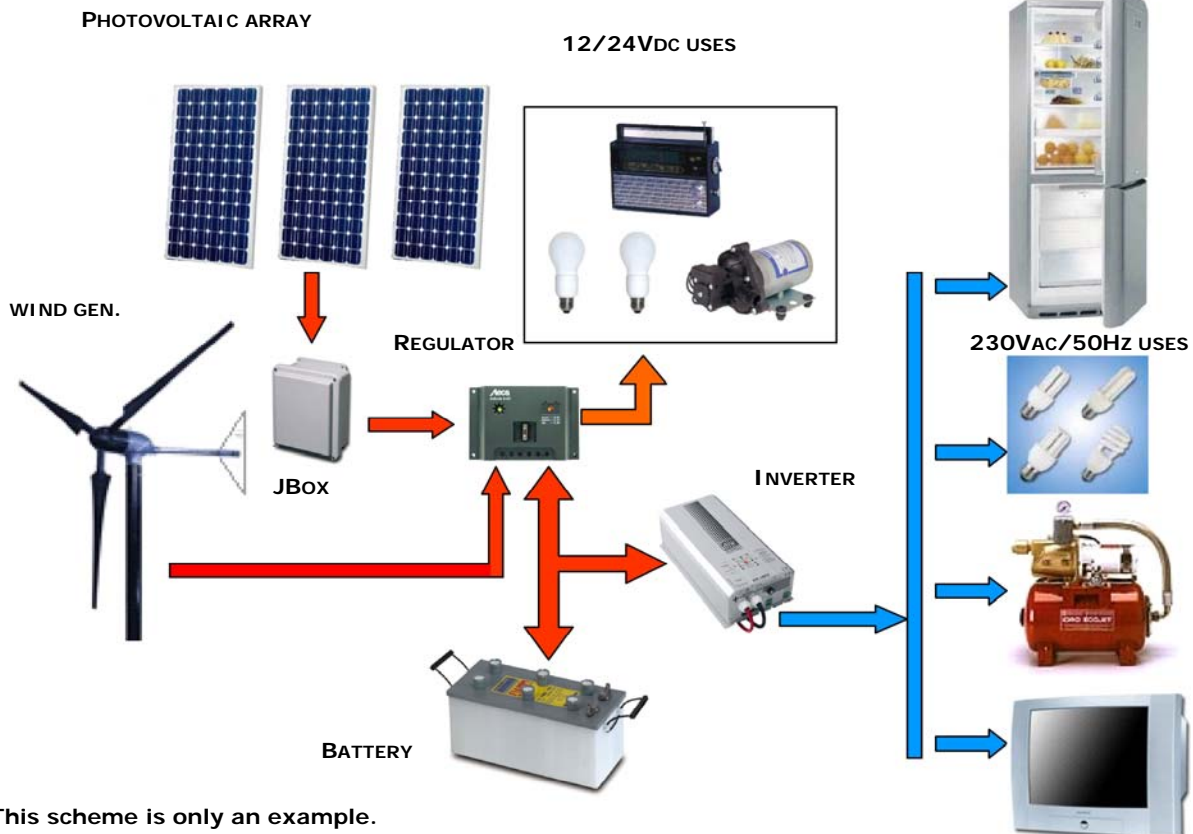
We can develop further "KM-I" kits according to the customer's demand.

(4) The wind generator is supplied complete with control system; pole and mechanical fixing system are not included.

(5) It is a refrigerator complete with freezer. The first value defines the capacity in litres of the refrigerator, the second one defines the capacity in litres of the freezer.

The hybrid kits complete with wind system can be mostly used in sites with average wind characteristic of more than 5 m/sec, where the wind part can produce the energy demanded to be combined to the photovoltaic array. For sites with a smaller wind characteristic we will have to do a proper dimensioning.

EXAMPLE OF HYBRID PHOTOVOLTAIC KIT



This scheme is only an example.