

CALCULATION OF THE ENERGY SAVINGS ACHIEVED WITH EKOVAR COMPARED WITH THE ENERGY PRODUCED BY A PHOTOVOLTAIC GENERATOR

Is necessary to keep in mind that a plant with a 1 kWp of a pitched roof, takes about 8 m² of photovoltaic modules on flat roofs are always needed 8 m² of photovoltaic modules but arranged on a surface of about 16 m² to avoid' effect of shadowing between the modules themselves.

RECOVERED ENERGY FROM EKOVAR

In a common housing unit, an apparatus Ekovar is able to recover on average about 1-1,5 kVAh/day, for a minim of 360 kVAh / year, (these evaluations, they are part of other documents).
 The project to install Ekovar to all single-phase meters from 3-4,5-6 Kw 115/230 Vac 50-60Hz or 6/10/15 kW 230/400V ac 50-60 Hz, would have a very low cost for the same energy recovered, compared to other projects aiming to achieve a high efficiency energy (ex., installation of frequency inverters for electric motors in general). Seen from the perspective of energy conservation, to make sure you download a generator of kVAh 3.600/year you can install a photovoltaic 3 kWp or n° 10 Ekovar to get the same result, in the amount of energy, but with a considerable difference in costs.
 With the solar energy is produced, with Ekovar instead is saved energy.
 Ekovar can be installed on all supplies of electricity, new and existing, has an expected life of over 12 years and an estimated cost of around € 120,00.

ECONOMIC EVALUATION

ENERGY PRODUCED BY PHOTOVOLTAIC (Central/Northern Italy)

Installed Power	Energy Produced	Installation Cost	Durability	Feasibility	Incentive GSE*
1 kWp	1200 kWh/year	€ 3.000,00	20 years	Solo case singole	-
2 kWp	2400 kWh/year	€ 6.000,00	20 years	Solo case singole	-
3 kWp	3600 kWh/year	€ 9.000,00	20 years	Solo case singole	-

* The GSE is the Energy Services Manager which pays the energy produced.

Looking at a 3 kWp Photovoltaic System, with the same economic investment we have:

- 1 PV generator 3kWp (€ 9.000,00) which generates kVAh 3.600/year,
- With the same amount of € 9.000,00 you could install n° 75 Ekovar could facilitate save an amount of energy equal to: 360 x 75 = 27.000,00 kVAh / year.

Since **the first energy saved is not consumed**, in terms of energy saving and emissions into the atmosphere it can be said that with the same economic investment is best to remove from the network kVAh 27.000 / year (lightening power grids) instead of entering 3.600 kVAh / year (although of energy produced from renewable sources).

THE ATMOSPHERE EMISSION OF CO₂ + NO_x

From official data provided by Energy Producers, a thermal power plant enters into the atmosphere about 0,7 kg of CO₂ (carbon dioxide) and NO_x (oxides of nitrogen) to produce 1 kWh.

A 3 kWp photovoltaic system avoids about:

$3.600 \times 0,7 = 2.520 \text{ kg} = \mathbf{2,52 \text{ ton/year of CO}_2 + \text{NO}_x}$.

A device Ekovar allows you to avoid:

$360 \times 0,7 = 252 \text{ kg} = \mathbf{0.25 \text{ ton/year of CO}_2 + \text{NO}_x}$.

You can avoid entering into the atmosphere the same amount of gas avoided by installing a photovoltaic system: $2,52 : 0,252 = 10 \text{ Ekovar}$

The financial investment of a 3 kWp photovoltaic generator is equivalent to **75 Ekovar**.

The amount of 75 Ekovar therefore allow an avoided emission of:

$75 \times 0,252 = \mathbf{18,9 \text{ ton/year of CO}_2, \text{NO}_x}$

PLEASE NOTE:

1 - You need to remember that to build a photovoltaic generator must be available at a roof with the ability to orient the modules, as much as possible towards the south zenith with a tilt of 30°.

2 - A good part of users to domestic use are concentrated in residential condominiums, then the construction of a photovoltaic system can only serve to feed the common areas, as there is sufficient surface area to distribute the modules.

3 - For the construction of photovoltaic modules factories have already polluted greatly the environment, in order to produce aluminum; tempered glass and silicon cells.

4 - The disposal of photovoltaic modules is a problem that is gaining considerable importance but which in a few speak or face, as the tempered glass and aluminum are easily recyclable, instead for the construction of the cells, in order to increase the yield, silicon is typically doped with gallium arsenide, for which the disposal of such photovoltaic cells is to create industrial chains to achieve the separation of the silicon from gallium arsenide (consequently high costs and pollution).

5 - In a not too distant future, with the increase of small generators, solar and wind power, the power grid, will be made by producers and consumers at the same time also. Self hypothetically a family has its own photovoltaic generator on the roof of the house draws energy from which, **becomes very important that energy must be exploited to the maximum**. With an electric system with PF (power factor), tending to 1, the energy is fully exploited; with an electric system with Power Factor to 0,9, the energy is exploited at 90%; with a PF 0,8 is exploited to 80%, with a PF 0,7 is exploited to 70%, and so on.

With the observations listed above it is clear that should be taken into due consideration to a mass installation of Ekovar of domestic energy-intensive users, as it would provide surprising results in terms of energy saving and environmental pollution.

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