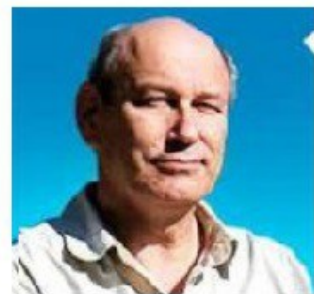


GILBERT - InTech - PV

French
version



4morePV



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INNOVATION IN THE MANAGEMENT OF SURPLUS PRODUCTION OF PHOTOVOLTAIC GENERATORS

As it becomes more and more important to save energy, two French engineers file a clever patent that will allow boxes for managing surplus photovoltaic solar production to become compatible with all types of environments and inverters whether in On-Grid or Off-Grid mode.



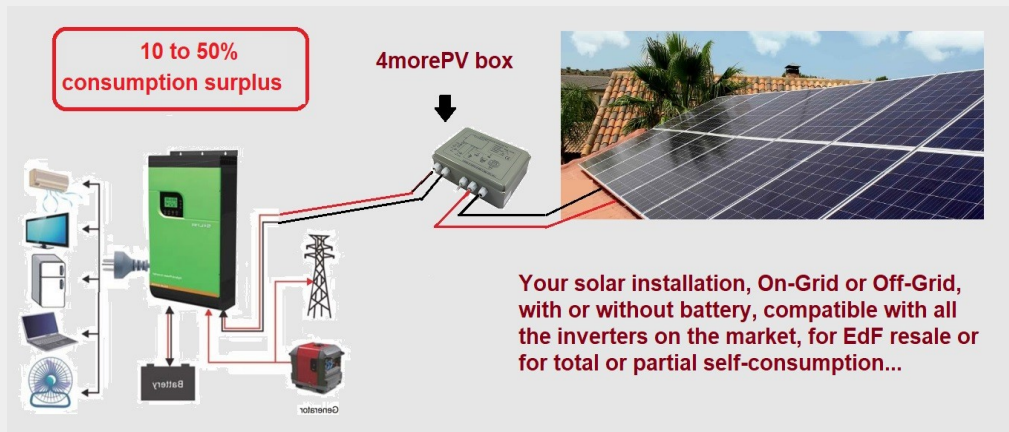
CLICK SUR
IMAGE
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**An opportunity
for manufacturers
management boxes
production surplus
photovoltaic !**

*Operating licence
of the 4morePV patent
are still available
in France and abroad*

4morePV is an innovative device, protected by an international patent, which makes it possible to measure the surplus of solar energy from a photovoltaic generator, and to direct it towards applications for storage, water heater (immersion heater), or the production of potable atmospheric water !...

The installation of the **4morePV** box is easy, even in an Off-Grid installation (on an isolated site without an electricity network or in self-consumption without reinjection into the network). The maximum power is defined by the connected device and is **3 kW**. But it is possible to put several **4morePV** in parallel if the electrical network of the house allows it.



Global off-grid solar market A business opportunity for distributors of the 4morePV box



« The off-grid solar industry is key to achieve universal access to electricity. We step up our support for African countries by helping them to take advantage of this potential thanks to innovative solutions... »

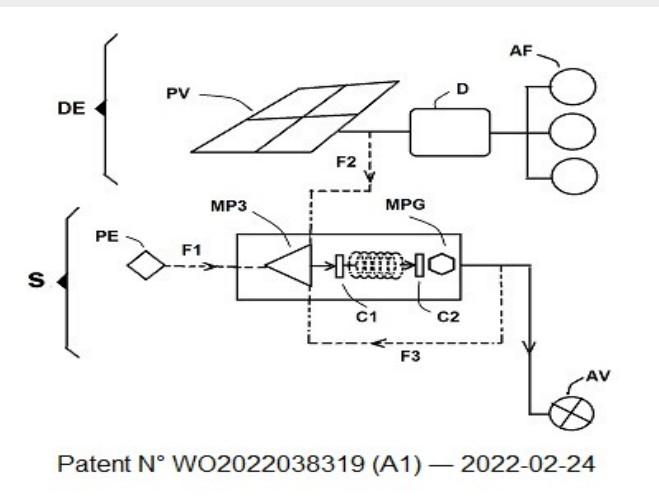
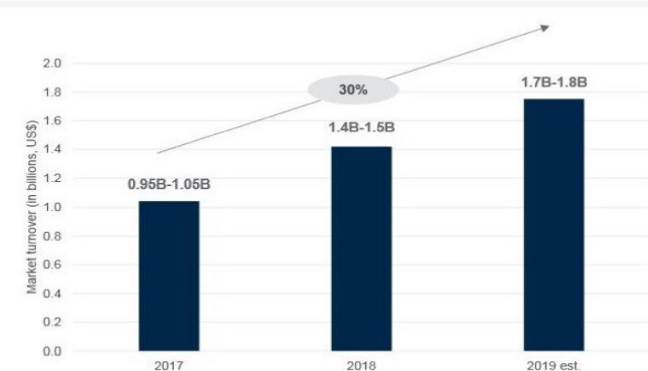


Figure 1: Estimated OGS Annual Market Turnover (2017-2019 est.)



The PV surplus market

The 4morePV, which allows the management and consumption of surplus electrical energy produced by a photovoltaic generator, is aimed at all producers of photovoltaic electricity. Currently, inverters on the market manage this excess electrical energy in two ways: by injection into the public electricity network (e.g. EdF), free of charge or purchased at a lower cost than the market cost.

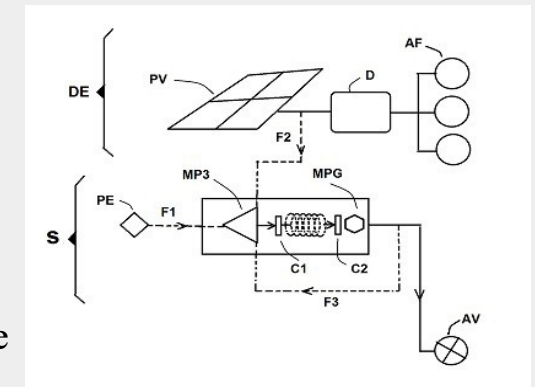
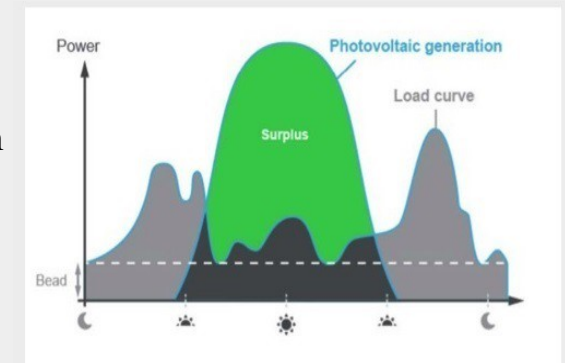
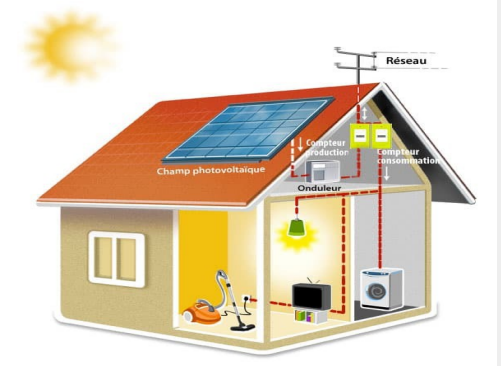
by charging batteries for storage and use at another time of the day or night. But the cost of batteries being high, the sizing is calculated as accurately as possible and the batteries are generally full quite quickly during the summer period, when electricity consumption is lower than production. As the surplus of potential solar energy is poorly or not managed, the shortfall (shortfall in consumption) is on average around 35% or more.

To optimize the consumption of green and free energy produced by solar panels, the user, if connected to an electrical distribution network, can purchase for a few hundred euros, a production surplus management box, in generally with a power of less than 3.5 kW. The most interesting saving then is the heating of domestic hot water (electric tank) which represents up to 50% of household energy expenditure.

The 4morePV is a serious competitor to these electrical boxes because it has the same functions, at an equivalent or even lower cost, and with the advantage that it can also operate in Off-Grid mode, i.e. without connection to a electricity distribution network. It is this possibility of operating off-grid which was patented in France in 2020, and internationally since 2023

Geographically

There is a high demand for PV installation worldwide. For reasons ecological and also practical (even essential in remote areas like in Africa). New installations like old ones will be able to benefit from this increase in electricity production thanks to at 4morePV. In certain developed countries, such as France, contracts for the resale of electricity to a public electricity supplier (EdF) for a period of 20 years end soon and users will then be able to opt for self-consumption. This self-consumption will be more efficient (more profitable) thanks to 4morePV.



Patent : 4morePV N° FR 20 08557

By Applications

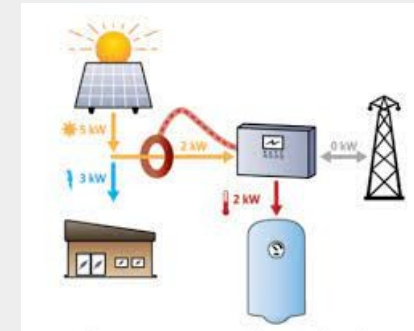
As seen above, the primary application for consuming excess solar energy is the heating of domestic hot water. So heating a hot water tank using an electrical resistance. But heating can also be carried out for all other applications which require heating, even in summer, such as heating swimming pool water, heating for drying (and preserving) food, etc. Electricity can also generate cold for air conditioning of premises, greenhouses, freezing, etc.

The ideal would be to be able to store this surplus electrical energy. Large investments in research and development are currently being made to improve storage costs. Batteries will get cheaper and cheaper; new electrical or thermal storage technologies are already appearing...

The strong point of 4morePV is that it solves a particular problem in terms of storage: in fact current users of photovoltaic plants who already have batteries (lead or Lithium, etc.) and who will want to add new generation batteries at a lower cost will not be able to do so because they will be forced to buy batteries of the same type as those they already have! In fact, inverters are not designed today to manage batteries of different types at the same time. With 4morePV, surplus production can be stored in batteries of a different technology than that already used by the inverter (the charge manager). This is particularly interesting in terms of buffer storage of solar energy for charging electric cars. Tesla already offers its PowerWall as a buffer battery for photovoltaic recharges. It could quickly face competition from low-cost batteries which would charge thanks to the management of the solar surplus by 4morePV; while retaining the original batteries of the PV generator.

We also see that the countries with the greatest demand for PV in Off-Grid zones are also those with the greatest shortage of drinking water. Applications related to water purification are therefore the most “obvious”.

In fact, the applications for using the excess energy thus saved are innumerable and will make it possible to effectively combat global warming.



By entity:

> personal production and individual housing

Small isolated homes around the world that already have a few solar panels can easily equip themselves with a 4morePV

box to increase the efficiency of their self-consumption.

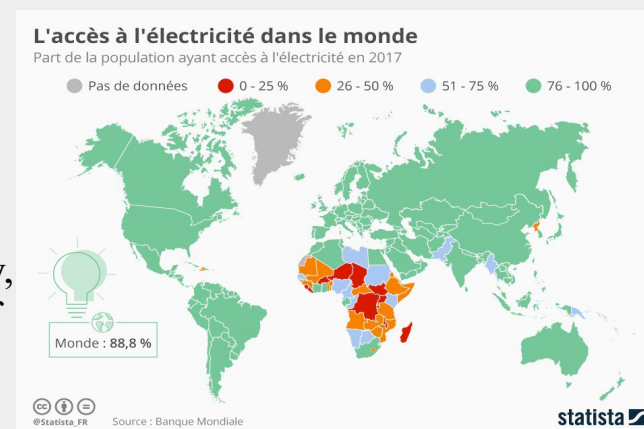
>> the old PV electricity resale contracts in France began in 2005 and for a period of 20 years. In 2025, contractual users will be able to switch to self-consumption mode for their PV production for another ten years considering the lifespan of solar panels. Two cases will arise: those who resold their entire production. In this case the inverters will switch to self-consumption mode without managing the surplus electricity. By not re-injecting into the EdF network, the small surplus management boxes will not work! The 4morePV him YES!. Those who only resold surplus energy to EdF will be able to continue to reinject their surplus but free of charge (which would eventually allow the use of commercial surplus management boxes which will measure this surplus in order to consume it!). But with the trend being to no longer have a PV contract with EdF, users will want to become more independent and therefore self-consume. Here too, only the 4morePV will allow this surplus management, whatever the type of inverter. The potential for EdF “customers” for resale of PV production is estimated at more than 200,000 homes for installations with a power between 1.5 and 9 kW.

> ONG

>> In the world, developing countries (especially Africa), solar installations are mostly in self-consumption mode, and without connection to an electrical distribution network. Batteries provide overnight storage. Consumption of the solar surplus (35%) can only be done through 4morePV because the inverters are not designed for this management. This surplus can be used either to recharge other batteries (but at a significant additional cost), or to power devices “powered by the sun” as is made possible thanks to 4morePV. Including pumping or sanitation of water, or production of atmospheric water, drying of food, refrigeration, etc.

> Companies, businesses, agricultural, administrative buildings, etc...

>> Particularly on an isolated site or because the injection of PV into a public electricity network is difficult (remote) or impossible; the management of surplus solar energy will allow the creation of new applications related to commercial activity, or even “comfort” applications such as recharging electric car batteries, production of drinking water (atmospheric) in premises, offices, watering plants, air conditioning, etc.



> Companies that already manufacture solar PV surplus management boxes

At least a dozen companies already market PV surplus management boxes. (see a non-exhaustive list below in the appendix). They could purchase a license to modify their boxes to make them compatible with OFF-Grid use. Which would open up a previously impossible market for them!

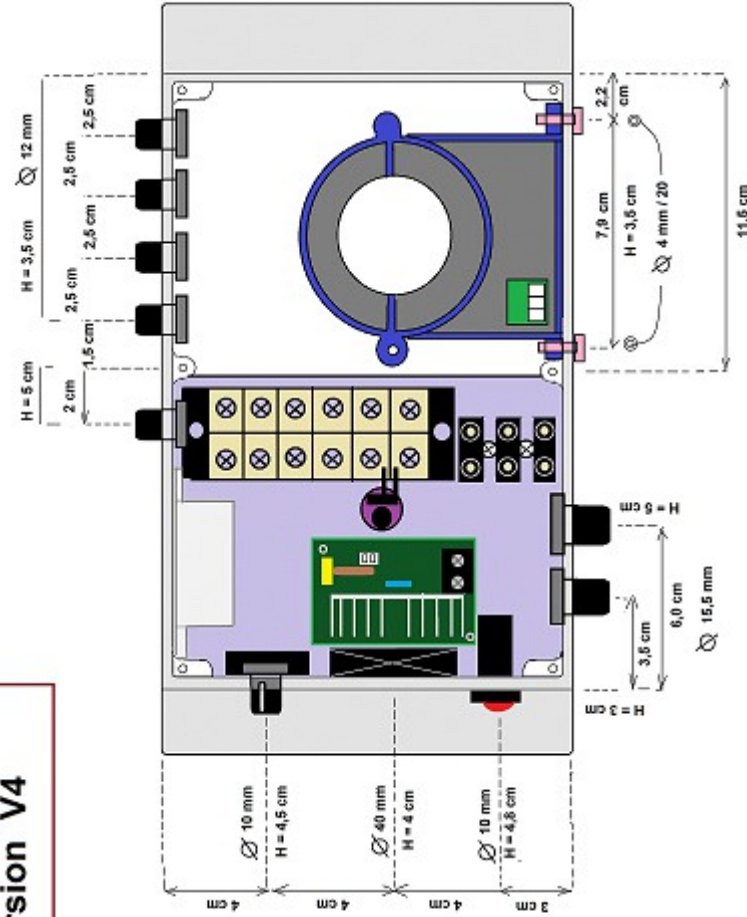
The making of 4morePV

The 4morePV management box (object of this invention) contains practically no modules to create. It is simply an assembly of electrical modules that can be found easily on the internet (Amazon!) and at a lower cost (AliExpress). So little, or no, development is expected for the marketing of the product.

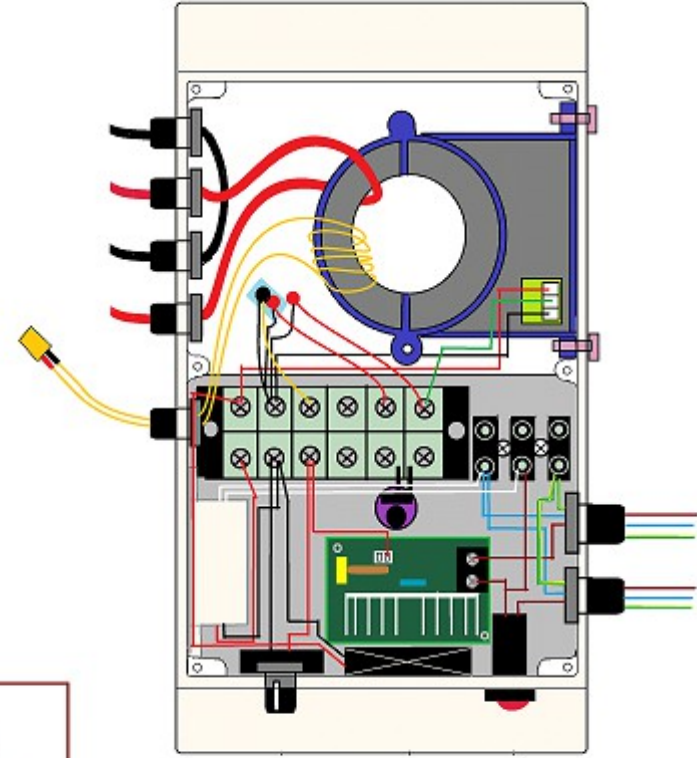
The installation will still require a minimum of handling to connect the box to the solar panels (two cables to connect to MC4) and possibly make adjustments (potentiometer) to adapt and upgrade the box according to the PV power installed.

First production of prototypes

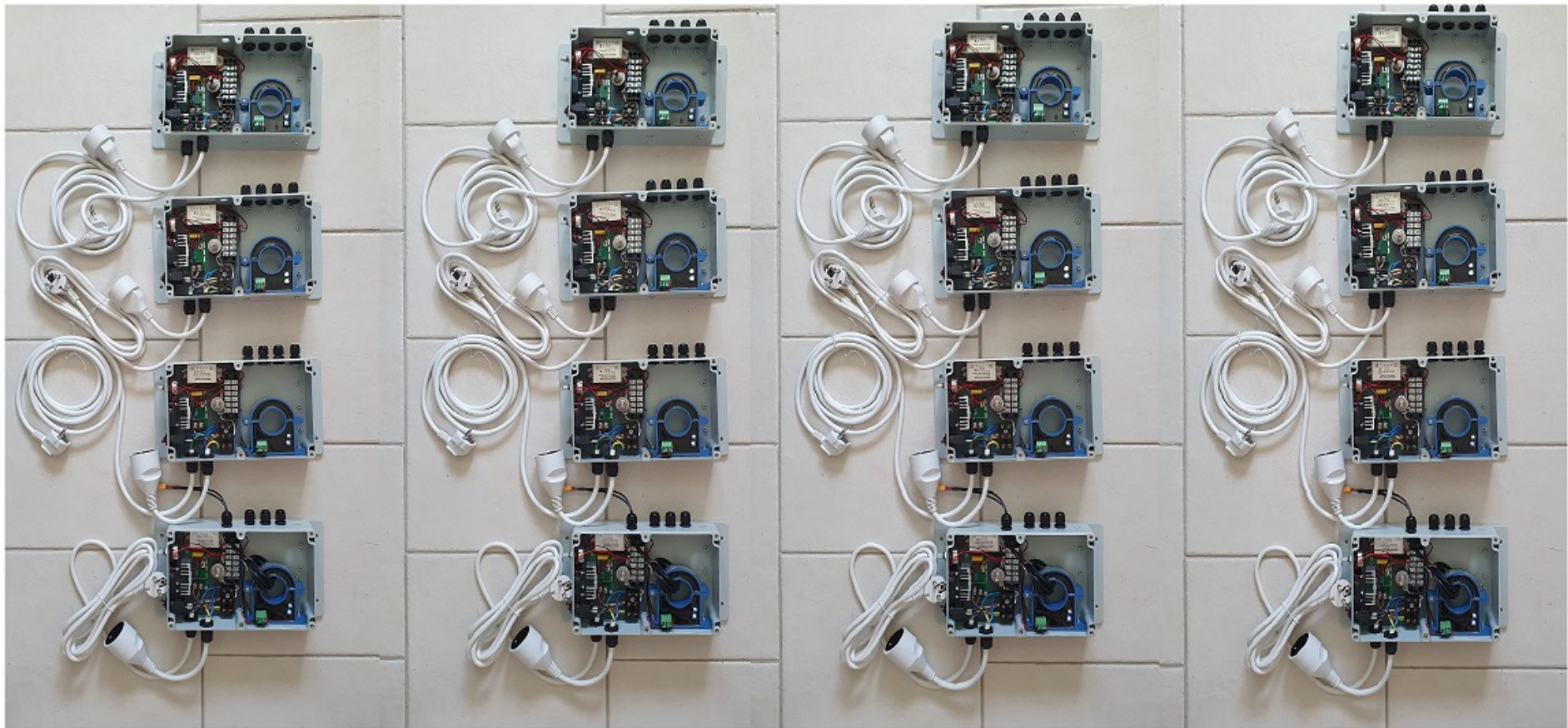
**Boitier 4morePV
Version V4**



**Boitier 4morePV
Version V4**



Première série de fabrication du 4morePV



The sale of licenses

The applications being very diverse, the market geographically very extensive, the users probably very different... and a very significant global commercial potential; it would be desirable to rely on an internationally renowned manufacturer of electrical modules with support from a network of installers trained in this technique and with whom the license contract would be very “modular” depending on the expected results.