

Sustainability, 20 years of the 'LE VIVRAY' Project, Normandy, France. Renewable Energy Creation.

We are at present a '**Independent non-commercial Sustainability & Renewable Energy Project**', and been doing the research and development for over 20 years now. And NO, we do not just throw money at this stuff, and if necessary, we will re-invent the wheel if it works out more cost effective. Our Mantra **Keep it Simple, Make it Robust, and keep it Cost Effective.**

When we started here at 'Le Vivray' in 2001, we knew we had the opportunity to start from a clean plate, as the land and old buildings, local red brick and oak framed barns were basic constructions, and in the past 50 years had only received limited emergency maintenance. Therefore, we had the opportunity to design and implement sustainability strategies at the project's creation.

Please find below a brief explanation of each of the renewable energy generation source that we developed here at 'Le Vivray'

In 1988 while still in the UK I investigated a VAWT, vertical axis wind turbine, with a diameter of 4m and 8 sails of 1m high, this design was based on the ancient Chinese design. My designs for a VAWT were discarded as the machine was very inefficient.

In 1988 I also obtained Amorphous Silicone PV panels, and these were later incorporated into a larger 240w Amorphous array that was fixed onto the re-built 'Lavoir' building slate roof in 2008. This was a small 12v system pumping water up to a 8 meter high tower that then gravity fed 200 meters to the wall garden. This system was disconnected in 2015, and replaced with a single well pump that uses our 240vac supply. I have No data/meter energy output for that 12v system.

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2off 240vac Utility type Meters installed at the Main Mini Grid Inverter.

No1, New, ISKRA made in Slovakia, ser No 7171341, Installed 2007 removed 2015,	5193kwh.
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No2, New, ISKRA made in Slovakia, Bi Directional, ser No 3332396, Installed 2015,	13896kwh.
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AC coupling, reverse flow to OzInverter to become 50 -60v DC battery charging volts,	(10903kwh.)
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Wind Turbine No 1, Diversion load Controller, Tristar USA, 45 PWM. Installed 2007, Only records DC diverted to dump loads when batteries are fully charged.	8121kwh.
New Kwh meter installed for total generation 28oct 2021.	9kwh.

Wind Turbine No 2, Diversion load Controller, Tristar USA, 45 PWM. Installed 2011, Only records DC diverted to dump loads when batteries are fully charged.	4465kwh.
New Kwh meter installed for total generation 28oct 2021.	15kwh.

Wind Turbine No 3, Diversion load Controller, Tristar USA, 45 PWM. Installed 2012, Only records DC diverted to dump loads when batteries are fully charged.	16354kwh.
New Kwh meter installed for total generation 28oct 2021. Under maintenance.	2kwh.

PV Solar Tracker, Tristar MPPT, USA, 3Kw PV. Installed 2011. PV panels are Mono Sharpe/Panasonic seconds. No 4 Controller for direct charging the 50-60DC batteries.	17752kwh.
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PV Solar Tracker, Midnight Classic 200, USA, Tristar MPPT, 2Kw PV. Installed 2012. PV are Yingli Monos, No 5 Controller for direct charging the 50-60DC batteries.	37830kwh.
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PV Static Array, test array, metal support frame south side Wall garden, Mono's, Knive, Solarworld, other unbranded low price above 250w panels. 2.75Kw PV.

Grid tied Inverter/Controller, GTI, Used/second hand re-set, Takes DC high voltage and converts to 240vac. Needs stable Ac voltage and 50HZ Mini Grid to work. AC coupled to our MINI GRID.

GTI, SMA SB3000, Ser No692, German, installed 2014, 15270kwh.

PV Roof Rail Mounted, Sheep Lecture Theatre, 4off 265w Mono's Solarworld, German, 1.1Kw PV.

Grid tied Inverter/Controller, GTI, Used/second hand re-set, Takes DC high voltage and converts to 240vac. Needs stable Ac voltage and 50HZ Mini Grid to work. AC coupled to our MINI GRID.

SMA SB12000, Ser No ...708, German, installed 2017, Re-set to zero readings Dec2020. 5076kwh.

PV Roof Rail Mounted, Sheep Lecture Theatre, 12off 265w Mono's Solarworld, German, 3.2Kw PV.

Grid tied Inverter/Controller, GTI, Used/second hand re-set, Takes DC high voltage and converts to 240vac. Needs stable Ac voltage and 50HZ Mini Grid to work. AC coupled to our MINI GRID.

SMA SB3800, Ser No ...574, German, installed 2017, Re-set to zero readings Dec2020. 5841kwh.

Wooden 2 storey 2 car Garage, PV Roof Rail Mounted, 5off 360w Mono's Longi, China, 1.8Kw PV.

Grid tied Inverter/Controller, GTI, Used/second hand re-set, Takes DC high voltage and converts to 240vac. Needs stable Ac voltage and 50HZ Mini Grid to work. AC coupled to our MINI GRID.

SMA SB1700, Ser No ...560, German, installed and Re-set to zero readings Dec2020. 1004kwh.

Wooden 2 storey 2 car Garage, PV Roof Rail Mounted, 5off 360w Mono's Longi, China, 1.8Kw PV.

Grid tied Inverter/Controller, GTI, Used/second hand re-set, Takes DC high voltage and converts to 240vac. Needs stable Ac voltage and 50HZ Mini Grid to work. AC coupled to our MINI GRID.

SMA SB1700, Ser No ...352, German, installed and Re-set to zero readings Dec2020. 956kwh.

TOTAL = 221758kwh

Total renewable energy created at 'Le Vivray' = 221758kwh or 221.758 Megawatts.

EDF charge 0.25e per kwh = 55,439 euros. Over 14 years = 3,959e per year saved.

Notes, However, about 20% kwh is lost charging the lead acid batteries. Up until this month No real data of the Wind Turbines was known so the Meter readings have been used. Some AC coupling devices were re-set so their previous data of generation at 'Le Vivray' is unknown.