

Do you have your own property?

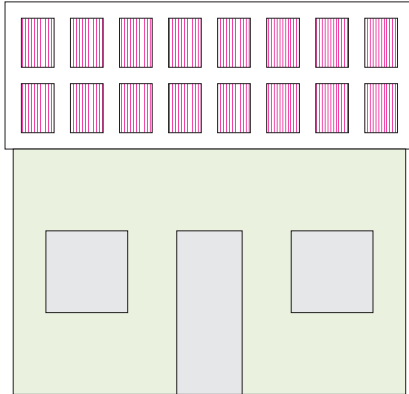
Do you want to convert it into 'Green-Tech'?

Are you choosing the method of solar collectors?

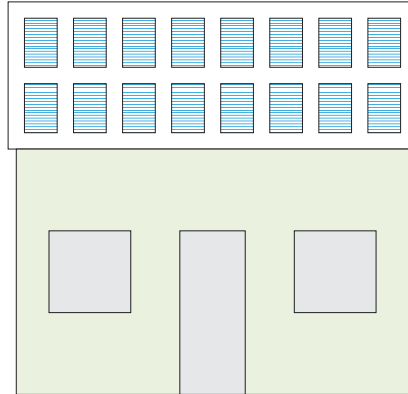
Is the available roof space area small or limited?

What kind of solar collectors will you give priority?

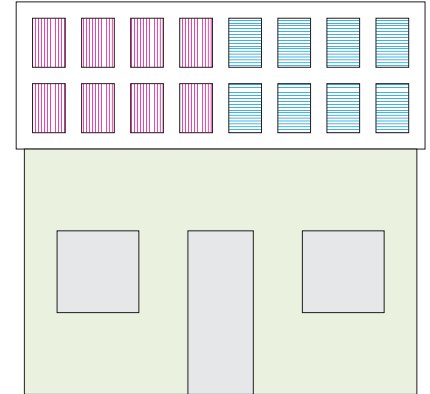
Thermodynamics



Photovoltaics



Fifty - Fifty



What will be the 'outcome' of each alternative?

Good in winter time, but useless in summer time

Good in summer, but useless in winter time

Good all year around, but only with half the output

Here comes the solution to the space problem!

Now you can 'functionally double' the available space area!

Rotatable solar collectors - double faced - double functioning!

Thermodynamic on the one and Photovoltaic on the other side!

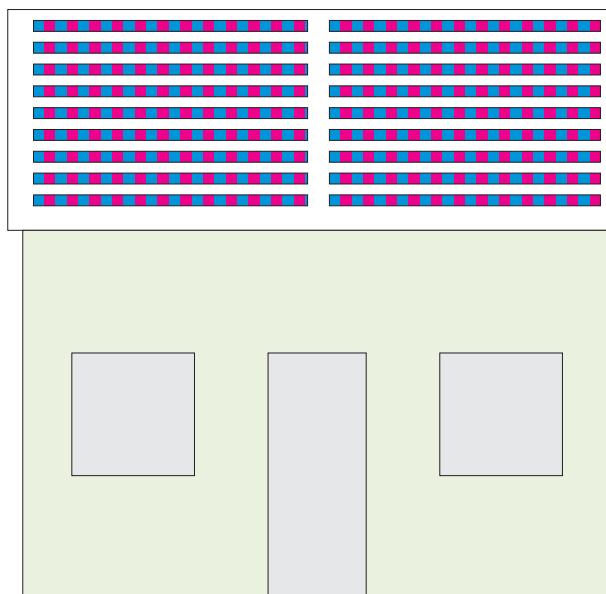
Total yearly energy output >200% compared to other makes!

ROTATING 360'

altering function on season demand or according to the default energy need or requirements.

Thermodynamics in winter time for the space heating.

Photovoltaics in summertime for the electrical supply to the air conditioners.



WINTER season:

Functioning 100 % thermal for heating or 100% electrical with >200% hybrid a low temperature space heating.

SUMMER season:

Functioning 100% photovoltaic with an 10-15% increase due to hybrid cell cooling and dhw heating pipe +30% by solar tracker

European patent protected

At last a fantastic revolution in Green Tech applications

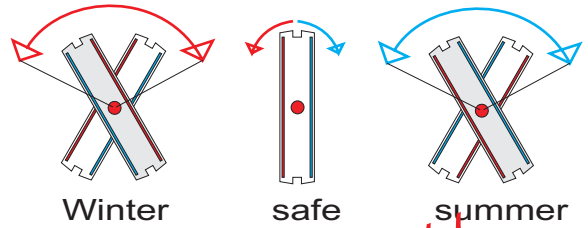
More Info on www.tp4-enersol.com or mob. 0030 6932 231959

New thermo-electric double-faced solar collector TP4-TD/PV

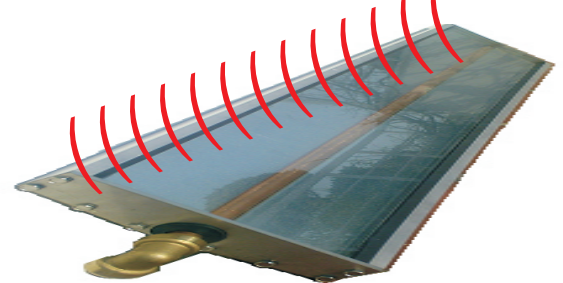
Capable to collect more than twice >200% solar energy compared to all other systems

All-European patent granted for the double utilisation of a specific available building area

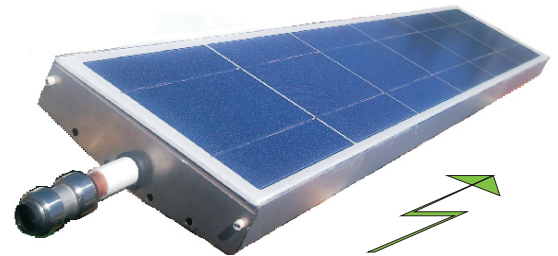
The new solar collector Tp4 consists of two reversible functioning sides, which exchange their position, facing the sun, depending on the seasons or on your own energy requirements, each functioning side can be turned towards the sun, e.g. in winter time it works with the thermodynamic (TD) side to produce hot water and in summer time it works with its photovoltaic (PV) side to make electricity.



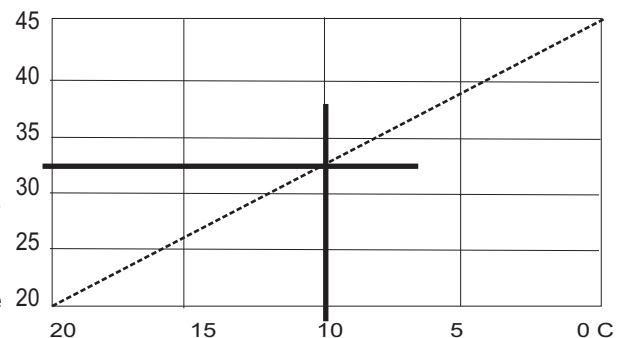
Space heating during the winter season, when there are needs to support hot water to the central heating system then the solar collectors are turned with their TD side towards the direct solar insolation, producing primarily domestic hot water and secondly warm water for the Floor Heating System, Fun Coils or Low Temperature Radiators, either by direct utilization of the water flow or by storing the water in well insulated hot water tanks.



Electricity production during summer season, when there is no requirements of space heating and the demand of hot water is considerably reduced, then the solar collectors are turned with their photovoltaic (PV) side towards the direct solar insolation, producing DC electricity which then can be inverted into 220VAC current, which preferably can be used directly for the covering of electric energy demands for any cooling equipment, such as Cool Heat Pump and Air Conditioning units. It is possible to keep part of the solar panels in TD-position whilst the other will be turned into their PV-position.



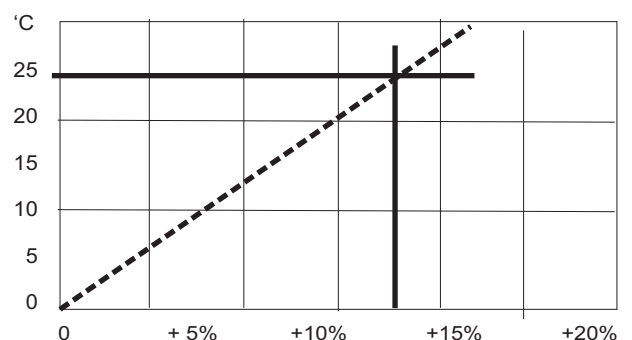
The Thermodynamic TD side of the solar collector Tp4 can during winter time, produce hot water for heating at a temperature of appr. 50-60°C to be stored in big hot water heating tanks, in order to be used for floor heating systems and heat pump with fancoil units, where a low temperature heating is required. During sunny winterdays, when the outside temperature is above <10°C, a system temperature of 30-35°C is enough for space heating. Thermal collection of hot water is 3-4 times more effective than photovoltaics.



The Photovoltaic PV side of the TP4-collector consists of weather-proofed lamelled PV modules with 12 or 18 cells 79 x 158mm in glassed units without any framing, with the connection box sealed with 4 mm prewired connectors Mc4 Mc3 for interior serie connection of up to 3 moduls in each solar panel, which is manufactured in extruded aluminium with an incorporated waterpipe in the middle, converting the thermodynamic solar panel into a photovoltaic solar panel with hybrid cooling effect on the PV cells.



The output of electricity from the monocrystalline cells is increased by two means, first from the hybrid ability to cool down the air space behind the PV modules as much as 20-30°C, whilst producing either domestic hot water or heating the swimming pool water and secondly by the ability of the solar panels to rotate automatically facing the sun, by the incorporated 1-axis solar tracker system, which may increase the energy output as much as 30% compared to stationary no hybrid collectors.



The rotatable solar collector TP4 can rotate around its central thermodynamic water copper pipe up to 360°C allowing either functioning side to face towards the direct solar radiation. Panels are preferably lined South to North working from East to West, from early morning until late in the evening, increasing the solar input time from 5 to 10 hours. This is achieved by the incorporated endless screw mechanism and the 1-axis motorized solar tracker which increases the total daily energy collection by approximately +30%

The efficiency of the Thermodynamic side is about 6 times higher (>300W/m²) when producing 35°C floor heating water, than the revers photovoltaic side which in winter time produces much less (<50W/m²), and often even less due to inadequate angle towards the sun, whilst the TP4-collectors automatically moves its functioning side correctly towards the sun and as a result the total saved energy increases considerably.

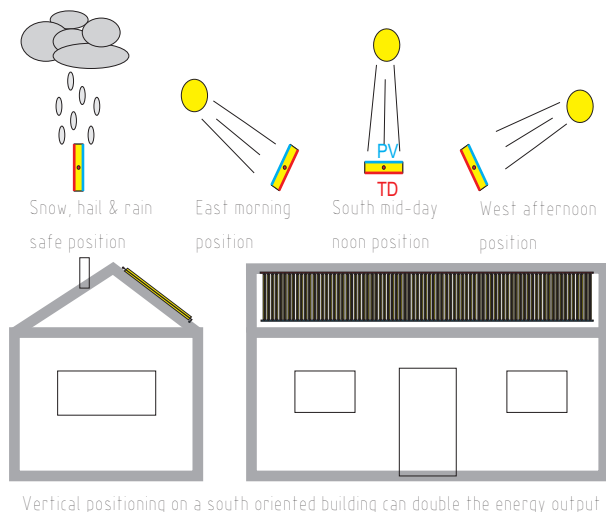
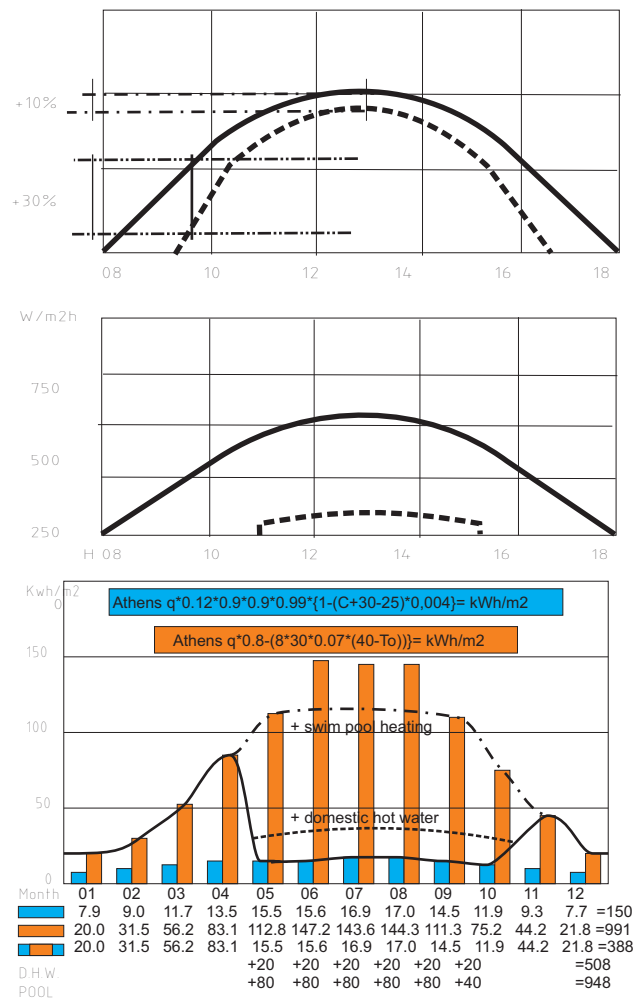
Simple math will confirm that as the TP4-collectors have two functional modes allowing the collection of solar energy either as heat or electricity depending on season and energy needs, collecting 5-6 times more heating energy in winter time during 6 months period and as well producing much more electrical energy in summertime, due to its unique hybrid and tilting function, giving a high electric output 100%+10%+30%= 140%, conclusively the combination of TD and PV modes increases the yearly energy output to at least 200% compared to other existing solar panels. Additional energy saving can be obtained for domestic hot water and swimming pool heating whenever needed.

The solar tracker system is specially constructed for the double faced TP4 solar-panels with 4 light sensors, directing the solar panels on a 1-axis base, to follow the sun all day by tilting the panels by the worm gear drive controlled by an electronic differential heliostat..

The moving mechanism is tilting the panels by a stainless steel (worm gear) mechanism, moved by a single or a double weatherproofed electric 12 VDC motor with terminal and intermediate position switches, allowing the panels to move into the 'safe' vertical position in case of hail and snow, also offering an automatic rain-cleaning of the collector surfaces.

NZEB challenge of using the new double faced thermo-electric solar collector TP4-TD/PV is not the production of electricity for delivery to the local grid, but making your own home, energy independent all year around, as you can install both TD and PV solar panels in the same area, which area often is strictly limited and normally forces you to choose the one or the other solar collecting method and not both.

The innovation which combines two well known but different methods in one double faced rotatable unit has a lot of technical advantages a very aesthetical appearance, easy to apply to all buildings without any severe architectural disturbance to the building and its surrounding, producing both central heating and cooling electricity depending on the season and on your own default domestic energy demands.



Vertical positioning on a south oriented building can double the energy output



Installation on flat roof for central floor heating system, hot water and pool heating.



Installation as shadowing pergola for floor heating system, hot water and pool heating.



Installation as shadowing pergola for floor heating system, hot water and pool heating.