



Make the most of the sun. Go Hybrid. By Solimpeks.

Hybrid PV-Thermal Solar Power

A short description

The Solimpeks Hybrid PV-Thermal (PV-T) solar panel is a combination of Solar PV and Solar Thermal in one unit. It has been designed to maximise PV performance by keeping the cells cool, whilst creating usable Thermal energy. We use standard PV laminate and attach it to a scaled down version of our best selling Solar Thermal flat plate collector. This is then encased as a standard solar panel for a standard roof top install. It can be used in any application where hot water and electricity are required.

A long description

The Solimpeks Hybrid PV-T solar panel is a European concept that was borne from the frustration of PV degradation over 25 degrees centigrade and the inefficient roof space issues created by using separate Solar PV and Solar Thermal.

By attaching the PV cells to a flat plate Solar Thermal collector, it is possible to moderate the operating temperature of the module - the cooling of the PV cells creates enhanced PV performance as degradation above 25 degrees centigrade is limited; the 'waste' of this process, the cooling agent, is used as Thermal energy for any application which requires it.

The original model was designed using a patented high efficiency heat transferring adhesive to attach PV laminate to a high performance Solar Thermal flat plate collector (Solimpeks is one of the largest OEM Solar Thermal manufacturers in the world). Recent iterations have been created using a newer method, discovered through product R&D in our manufacturing plant, which has resulted in a more efficient heat transfer; the net result of this is cooler PV and more efficient Thermal.

In Europe it is standard to use a water/glycol mix. In Australia, glycol is not commonly used. Although the Hybrid PV-T has passed every test for PV and Thermal in Australia (inc CEC

register and AS2712/ AS4020), Europe and the UK (including SolarKeymark and MCS), our recommendation is to use a water/glycol mix in Australia for 'best practice' (approximately 17% glycol maximum). By doing this, any issues around frost/solar controller failure are eradicated.

There are two models - PowerVolt and PowerTherm. They are almost identical 'under the bonnet'. PowerVolt has been designed to be PV biased, it has standard 3.2mm PV glass and is designed for warmer climates where it needs to lose heat, it has an ideal operating temperature of 30c-50c and will not stagnate much above 70c. PowerTherm has been designed to be Thermally biased, it has standard Thermal glazing for high wind or cooler climates where heat losses are high, it has an ideal operating temperature of 40°C-60°C and will not stagnate much above 80°C.

The Solimpeks Hybrid PV-T panel has been in R&D since 2003 and sold commercially in Europe since 2010. We have been accredited in Australia since May 2012 and 'properly live' since March 2013.

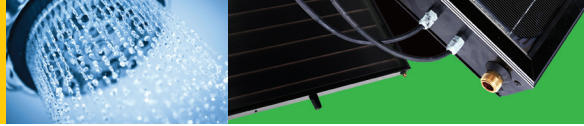
The market for Hybrid PV-Thermal

Our potential market place is vast, and specific. In essence, anywhere that requires hot water and electricity can utilise the Hybrid PV-T. For residential applications it can be used for PV, domestic hot water, hydronics heating and pool heating.

We have three distribution channels. Firstly, we're speaking with the major utilities, which can give us a great spread and access to millions of consumers.

Secondly, we're signing up independent dealers across the country, which gives us a 'shop front' presence.

Thirdly, commercial work. For commercial we're speaking direct with eg councils for their pools, dairy farms etc, and also



a lot of energy audit firms 'green consultants' who are working with us to approach commercial ventures.

Our research has told us that the market is looking for a differentiator, but at the same time is not keen on a product that isn't accessible. We believe that one of the major appeals of the Hybrid PV-T is that it's 'just a solar panel'; it can be installed by normal solar installers and doesn't require any additional training (note: we supply customised installation instructions to avoid errors in this process). It can also be installed using industry standard components eg mounting, inverter, tanks etc.

Innovations provided by Hybrid PV-Thermal

We have taken the concept of combining PV & Thermal and done what a lot of innovative concepts have failed to do – make it a commercial reality.

Some examples of the concept's innovative aspects are below:

- Space saving – Hybrid PV-T maximises roof space. Many people who want Solar PV + Solar Heating simply don't have enough roof space. Using 25m² of Hybrid PV-T would require 44m² of separate Solar PV and Solar Thermal to generate the same kWh output.
- Enhanced PV – by moderating the temperature of the PV cells, we generate more output as the PV suffers less heat degradation.
- Flexibility – the Hybrid PV-T can be optimised for PV or Thermal. For example, a dairy farm in Victoria with no natural gas has horrendous electricity bills; they install PV-T and optimise for heat as this is the best way they can save their electric bills, and the balance is picked up by the PV side of the panel. In another example, a householder in Cairns wants PV-T to do the 'heavy lifting' of hot water to about 40 degrees, but he has two fridges and air con on all the time; so he optimises for PV and gets his PV running more efficiently than the performance curve says he will.
- Easy to install – because the Hybrid PV-T is 'just a solar panel', it can be installed by accredited electricians and plumbers,

there's no need to re-train or hire specialised labour. Falls under accreditation – although it has been a huge effort getting PV-T through testing and accreditation, it has been done. In Australia, this is one of the biggest barriers to entry.

- Balance of PV & Thermal – our research tells us that most other companies who try to make PV-T don't pay enough 'respect' to each component i.e. it's either too hot for the PV or the Thermal doesn't work properly. We have designed our model to have balance, creating enough of both to be fully usable. As well as optimising a PV-T for PV or Thermal by adjusting flow rates, there is also a choice of models, one optimised further for PV and the other for Thermal.

Environmental benefits from Hybrid PV-Thermal

There are many Environmental Benefits that the Hybrid PV-T creates. These benefits are largely aligned with standalone rooftop Solar PV, Solar Thermal and Solar Pool heating, and so everything associated with those can also be associated with the Solimpeks Hybrid PV-T.

Where we stand out from this crowd, however, is carbon displacement per m². This is because we generate the PV and Thermal energy, and therefore carbon displacement, from one combined unit instead of two standalone units.

As an example of this, if we were to install a 5kW Hybrid PV-T system on a house in Sydney, it would contain 32.5m² of absorber area solar array, and would generate approximately 34,000kWh per year in Solar PV and Solar Thermal energy.

To create the same output from standalone Solar PV and Solar Thermal systems would require approximately 68.4m² of solar array. This means that by using Hybrid PV-T you are using less than half the space required of separate system.

The end result of this for the 5kW Hybrid PV-T system in terms of carbon displacement is 9.5 tonnes of carbon from electricity saved and 5.3 tonnes from natural gas saved, making a total of about 14.8 tonnes per year. If you were to use the same amount of roof space of standalone Solar PV and Solar Thermal you would only save about 7 tonnes.