

SOLIMPEKS

Volther Hybrid PV-T Panels

OUTLINE



- Problem: PV Paradox
- Solution: Hybrid Panels
- Types of PV-T Panels
- Types of Mounting
- System Components
- Certification
- Warranty
- Volther on World Media
- Case Studies

PROBLEM

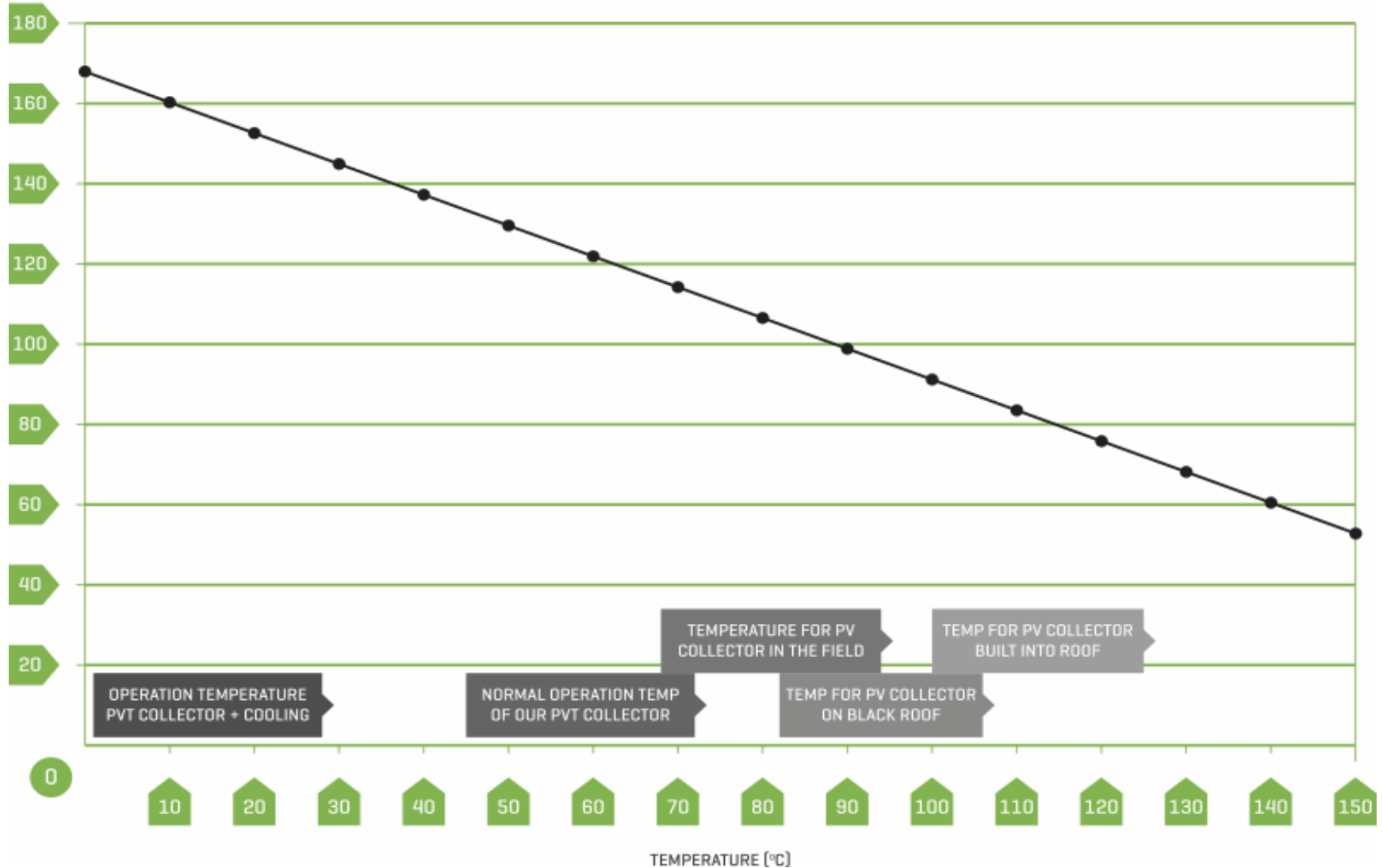


PARADOX

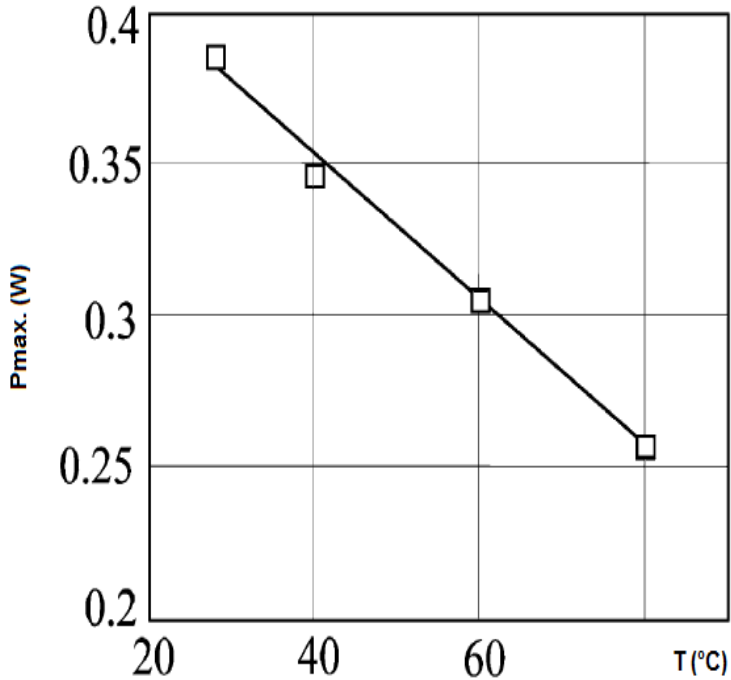
Photovoltaics (PV) are semi-conductors and operate in a paradox – they need sunlight to generate electricity but suffer a degradation in performance as they get hotter.

PROBLEM

OUTPUT [Wp]



PROBLEM



Maximum power/heat curve of Monocrystalline Cells

GOING FARTHER AND FARING WORSE

Unfortunately, yes! A typical PV panel on a bright sunny day will reach temperatures in excess of 110°C. This can reduce efficiency by as much as 43% on a hot day or 0.5% for every 1°C temperature rise.

PROBLEM

BACKING WRONG HORSE

Standard PV Panels typically only convert 10-15% of solar radiation into electricity and the rest is dissipated as waste heat.



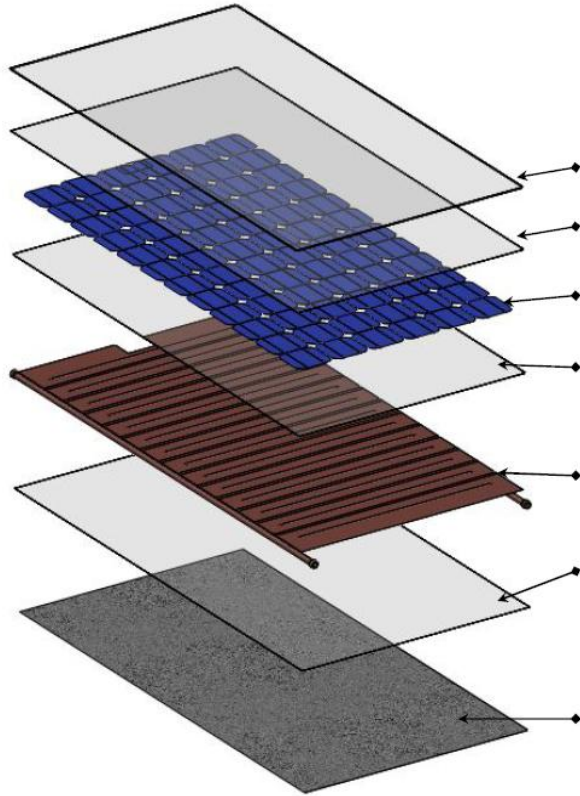
SOLUTION



MORE THAN KILLING TWO BIRDS WITH ONE STONE

PV-T stands for Photovoltaic-Thermal. It generates both electricity and usable thermal heat at the same time from one panel.

These systems combine a photovoltaic cell, which converts electromagnetic radiation (photons) into electricity, with a solar thermal collector, which captures the remaining energy and removes waste heat from the PV module.

SOLUTION**PV-T HYBRID TECHNOLOGIES**

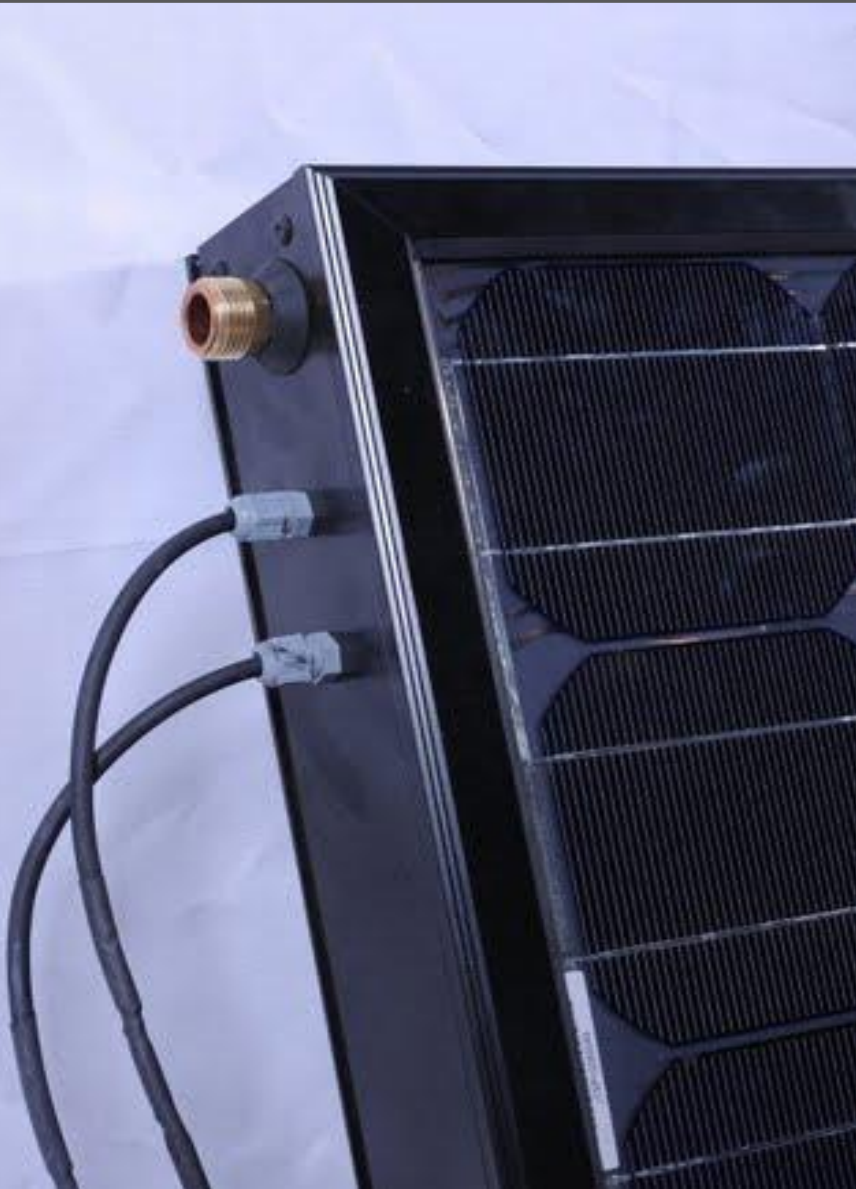
Photovoltaic (PV) cells suffer from a drop in efficiency with the rise in temperature due to increased resistance. Such systems can be engineered to carry heat away from the PV cells thereby cooling the cells and thus improving their efficiency by lowering resistance.

In the PV-T system by cooling the PV cells electrical generation is increased and the waste heat is captured for utilization in the building, thus maximizing the return from the available solar radiation.

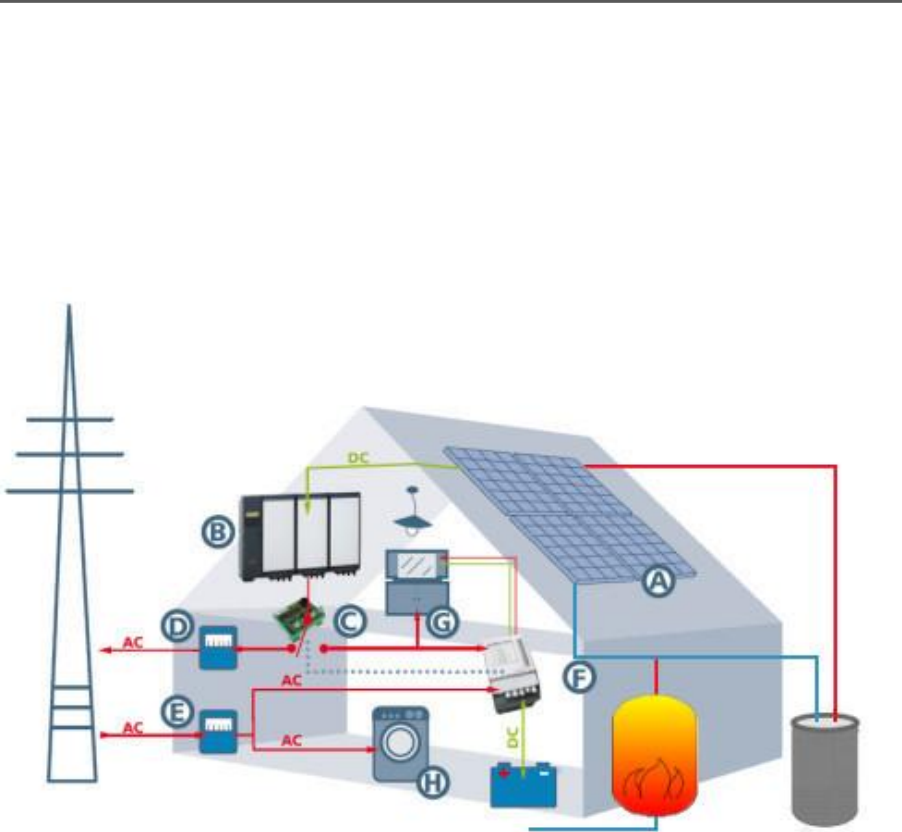
SOLUTION = HYBRID TECHNOLOGIES

PV-T TECHNOLOGY VS PV TECHNOLOGY

- Front side of PV-T panel collects solar radiation and generates electricity and heat.
- The high efficiency copper flat-plate solar collector on the back of the PV-T panel collects the heat and transports it away using a liquid coolant.



SOLUTION = HYBRID TECHNOLOGIES



PV-T TECHNOLOGY VS PV TECHNOLOGY

The electricity flows into an inverter for use in the building or export to the grid as per a standard PV configuration.

The temperature is regulated via a control sensor and the coolant is transferred using a pump to a heat exchanger which heats water in a storage tank for use in the DHW and heating systems.

ADVANTAGES

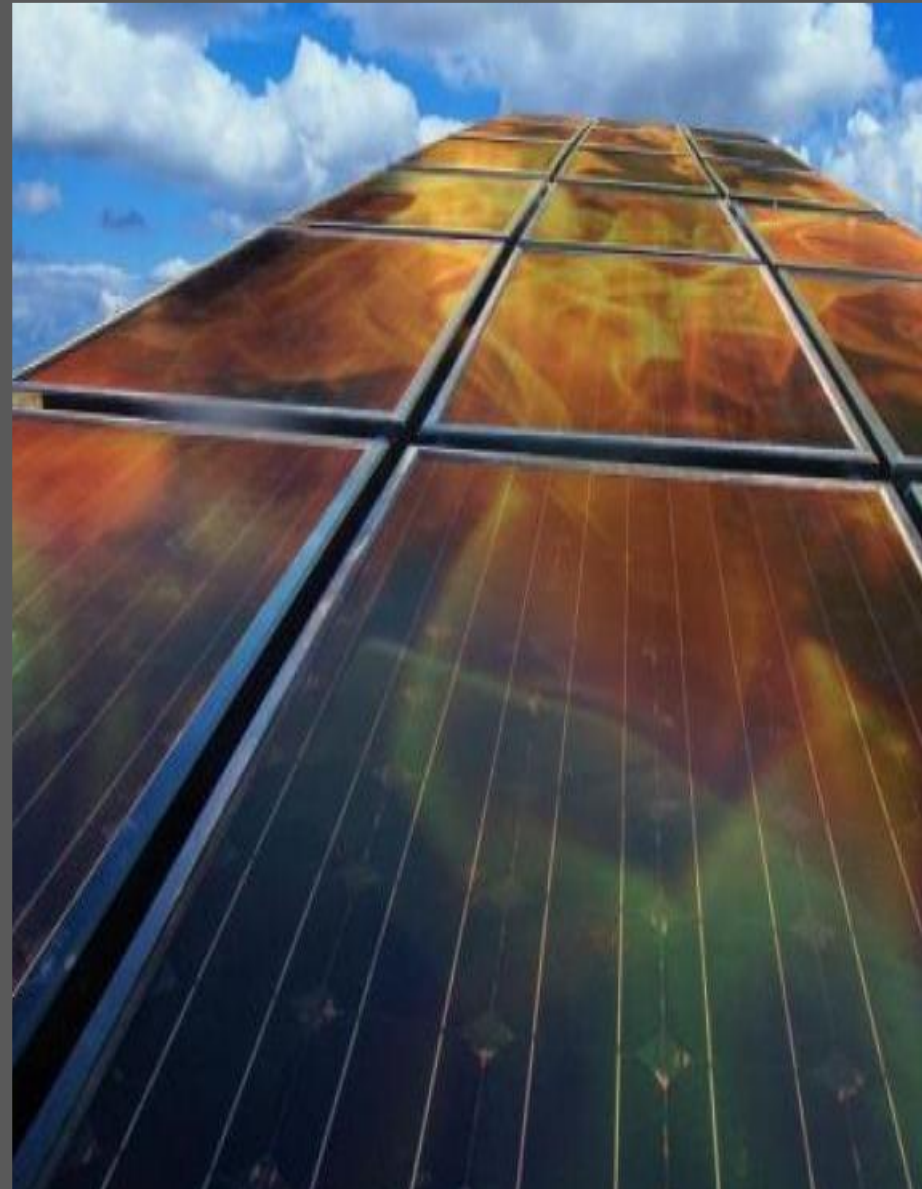


Dual solar collection – 2 usable energy outputs with one collection system.

Improved PV generation– up to 50% more electricity than an equivalent conventional PV system with same peak output.

Lower installation cost than an equivalent performance system comprised of a separate Solar PV and Solar thermal systems.

ADVANTAGES



- Less roof space required than equivalent system comprised of a separate Solar PV and Solar thermal systems. In the UK this equates to approx 16m² of PV-T panels compared to 25m² of combined separate systems (21m² PV and 4m² solar thermal).

- Hybrid PV-T system's ROI (Return On Investment) is shorter than standard PV systems due to higher electrical yield and off-set heating costs.

- Lifetime of PV cells is lengthened because cell operating temperature is reduced.

DISADVANTAGES



PROBLEM

The cooler the panel the greater the PV generation, however, this means the coolant fluid is also at a lower than optimal temperature for heat generation.

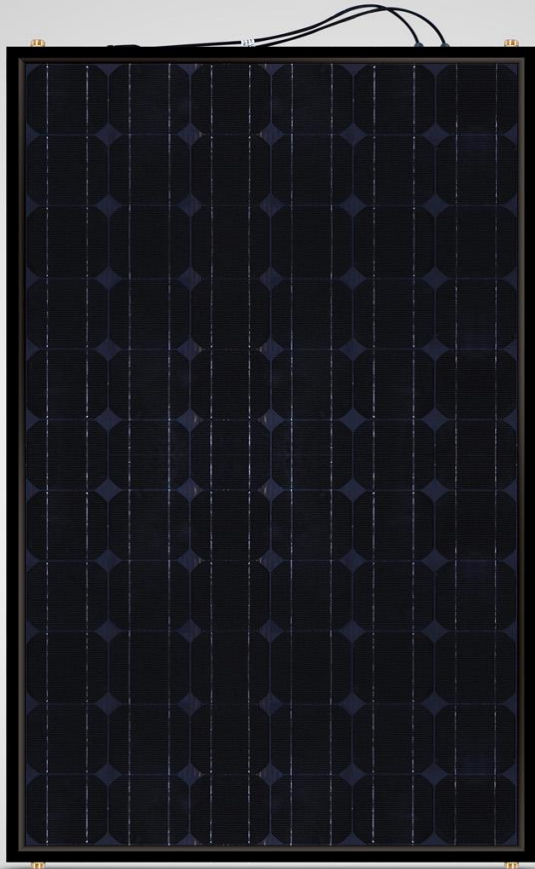
SOLUTION

Two types of PV-T Panel have been developed:

- PowerVolt - biased towards electrical generation.
- PowerTherm - biased towards thermal heat production.

Customer and project priorities can be used to determine which is more appropriate or a combination of both panels can be used.

TYPES OF PV-T PANELS



POWERTVOLT

Developed to maximize the electrical return of the hybrid panel

Produces up to 50% more than an equivalent standard PV collector and also produces a reasonable amount of usable heat

Peak Panel Outputs:

- 190w Electrical
- 460w Thermal (1,570 Btu/hr)

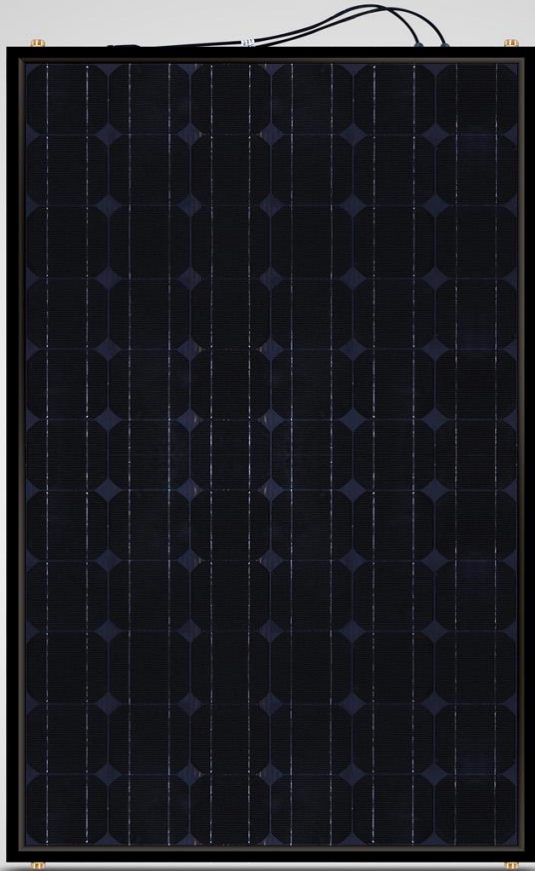
16m² of PV-T panels give equivalent performance to 21m² of standard PV panels and 4m² of standard thermal collectors

Size of Panel = 828x1655x90mm

Type of PV cells: Mono-crystalline

Weight: 24,4 kg.

TYPES OF PV-T PANELS



POWERTHERM

- Developed to maximize the thermal return of the hybrid panel
- Contains an extra layer of low-iron solar glass to aid heat retention
- Produces approx 80% of an equivalent standard thermal collector and also produces electricity.

Peak Panel Outputs:

- 170w Electrical
- 610w Thermal (2,080 Btu/hr)

Size of Panel = 860x1660x105mm

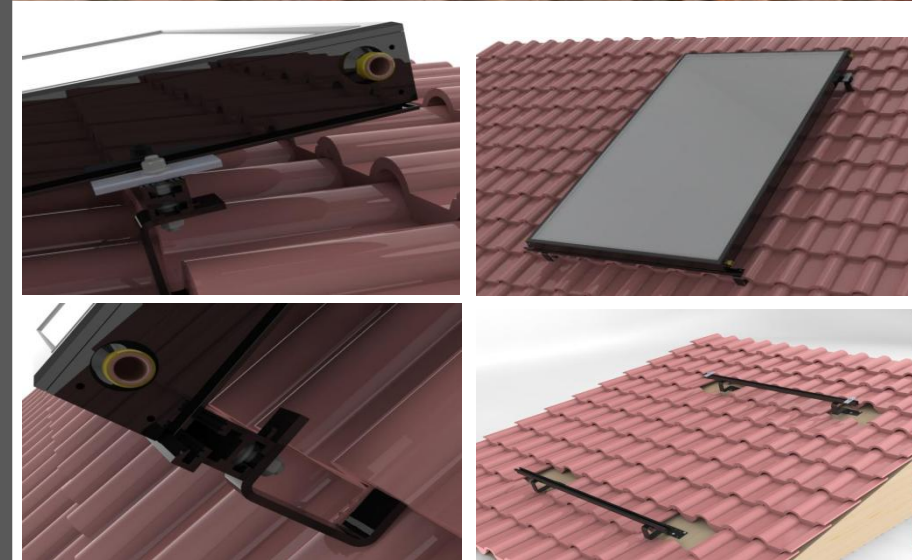
Type of PV cells: Mono-crystalline

Weight: 34,4 kg.

TYPES OF MOUNTING

FOR PITCHED ROOFS

Pitched roof mounting kits are designed with ease of installation and aesthetics in mind. We developed mounting systems with hanger bolts and roof brackets as well as accessories for all roof types.



TYPES OF MOUNTING

FOR FLAT ROOFS

- Using the Premium Flat roof mounting system, PV-T panels can be installed on flat roofs of every type.
- Together with the module frames, the rear supports of the mounting elements form a static unit capable of bearing particularly heavy loads.
- It is possible to make installation horizontally or vertically.



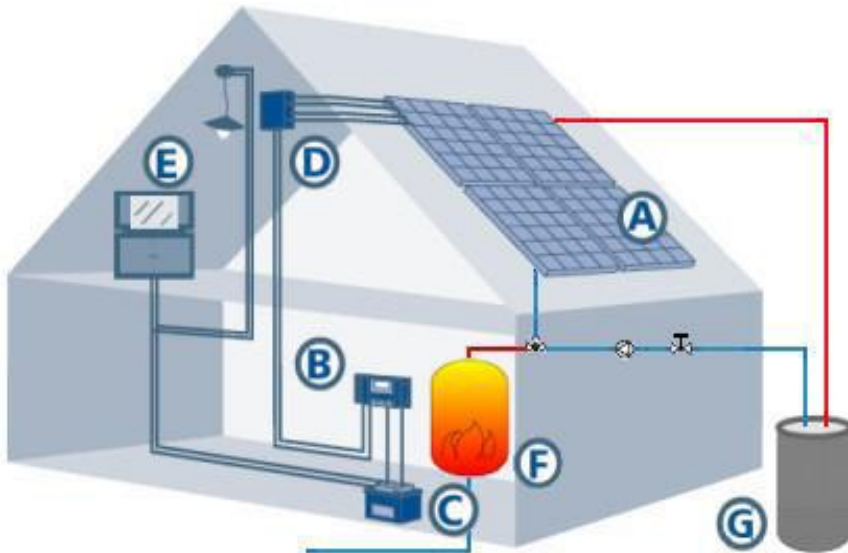
TYPES OF MOUNTING

FOR ROOF INTEGRATION

- Roof integrated mounting option allows highest flexibility to choose between landscape and portrait orientation and to arrange the respective PV-T modules according to your own preferences.
- The advantages of this method of installation include perfect integration of panels so they lie particularly flat on the roof, and the very slender appearance of the system.
- While aesthetic considerations take precedence, the performance of the cells will never be a problem.



SYSTEM COMPONENTS



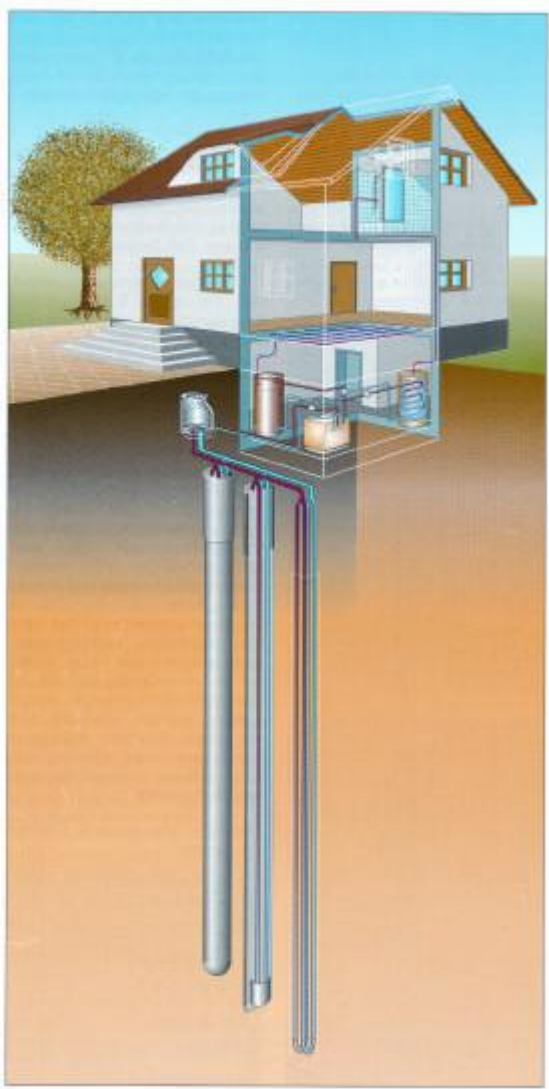
Typical system components are listed below. Actual configuration will vary according to each application:

- PV-T Panels
- Inverter
- Control System & Sensors
- Pump Station
- Heat Exchanger
- Hot Water Storage Tank
- Mounting kit
- Cables and Pipes

Please note that nothing is special for PV-T panels. All is standard components used for PV or Solar Thermal Panels.

According to project type and size, the components may vary.

OPTIONAL SYSTEM COMPONENTS



The PV-T panels can be used in conjunction with other technologies to further enhance energy efficiency if desired. Examples are:

- **Geothermal Heat Storage:** Excess heat produced by the PV-T panels can be stored in the ground for use at a later time => summer heat can be used into the winter to maximize energy use.
- **Battery Storage System :** Can be used to create an off-grid system => excess electricity generated during daytime can be stored and used at night.
- **Fuel Cell Storage:** Excess electricity from daytime can be used to generate hydrogen for use in a fuel cell system at night.

CERTIFICATION



The “Solarkeymark” denotation, which is issued by the ESTIF and is considered the most widely accepted certificate for solar thermal products in Europe.

The “CE” (Conformité Européenne) approval certifying health and safety in Europe.

British Board of Agreements has recently approved MCS (Microgeneration Certification Scheme) certification. This is designed to independently certify microgeneration products and services in accordance with consistent standards.

The “ISFH” (Institute für Solarenergie forschung) certificate issued by the Leibniz University Solar Energy Research Institute.

WARRANTY



Both PowerTherm and PowerVolt panels come with a 10 year manufacturers warranty.

Both have a guaranteed output of 80% after 20 years.

VOLTHER ON WORLD MEDIA

Forbes

BusinessWeek

Ianacion

SUN & WIND ENERGY

ENERGYBOOM

greentechmedia:

INDUSTRYWEEK.COM
IW
LEADERSHIP IN MANUFACTURING



BuildingGreen.com

RENEWABLE ENERGY
WORLD.COM

WORLD ARCHITECTURE
NEWS.COM

AZcleantech
The A to Z of Clean Technology

buildaroo.com

Cremer Media's
ENGINEERING NEWS Online
mobile: <http://m.engineeringnews.co.za> on your cellphone

techthe future

SolarServer
Online Portal to Solar Energy

CONSTRUCTIONWEEK

A Cutting-Edge Hybrid Solar-Thermal-PV Collector from Turkey (BuildingGreen)

In this scheme, water is circulated among the PV panels, making them more efficient by cooling them and then providing the home with hot water. (Forbes)

Product of the Week. (World Architecture News)

Product of the Week. (BuildingGreen)

An advancement in photovoltaic solar power.(Energyboom)

Two for the Price of One (North American Clean Energy)

Where Solar innovation runs in the family: Solimpeks from Turkey. (Clean Energy Project)

That is competent to heat water and produce electric power concurrently. (AZ.Cleantech)

The hybrid modules produced by Solimpeks Corp. allow extra module heat to be absorbed to produce hot water, thus optimizing efficiency. (PV Magazine)

Microgeneration Certification Scheme lists PVT Collectors. (Solar Thermal World)

Solar company Solimpeks deploys hybrid collector system in UK. (New Energy World Network)

Solimpeks Hybrid Solar Panel Raises PV Efficiency to 28 Percent. (Buildaroo)

Solimpeks is considered a leader in the renewable energy market. (Generaccion)

CASE STUDIES**CROSSWAY**

Country	United Kingdom
Status	In Operation
System Size	2.95 kW
Annual Output Electrical	3,408kWh
Annual Output Thermal	12,064kWh
Buffer Storage	400lt Tank
Pellet Boiler	22kg/annum

Integrated PVT system designed with pellet boiler for top up heat, MVHR (Heat recovery ventilation) for thermal recovery and heat distribution and PCM buffer storage to store excess thermal energy. Crossway is a Grand Designs project - officially Kent's first Zero-Carbon House.

CASE STUDIES**KUMLUCA**

Country	Turkey
Status	In Operation
System Size	3.55 kW
Annual Output Electrical	3,808kWh
Annual Output Thermal	14,064kWh
Buffer Storage	400lt Tank
Pellet Boiler	22kg/annum

Integrated PVT system designed with boiler and heat exchanger. The stored excess thermal energy used for pool heating. The project is the first hybrid application of Turkey.

CASE STUDIES**SUNNYBANK**

Country	United Kingdom
Status	In Operation
System Size	3.41 Kw
Annual Output Electrical	3,751kWh
Annual Output Thermal	13,289kWh
Buffer Storage	1850l.
Pellet Boiler	

Integrated PVT solution with a Genvex Combi 185 EC MVHR/Air Water Heat Pump and an 1850lt buffer cylinder.

The project is situated in Scotland on the borders and is the first to use the new Volther Hybrid PowerTherm PVT panels.

CASE STUDIES

CHETWODE



Country	United Kingdom
Status	In Operation
System Size	3.30 Kw
Annual Output Electrical	3,988kWh
Annual Output Thermal	9,992kWh
Buffer Storage	
Pellet Boiler	

The largest Hybrid PVT installation in the UK to date and the first to use the new Vother PowerVolt panels. The installation has a combination of PowerTherm and PowerVolt, making this installation a world first by using both types of Hybrid collector.

The heat from the system is being used for the building with excess heat being vented through a 30kW fan assisted heat dump.

ABOUT THE MANUFACTURER



SOLIMPEKS

Solar thermal panels manufacturer since 1979.

Is a leading supplier of solar collector systems worldwide and presently exports to 60 countries.

Holds 22 certificates worldwide for quality in solar products such as Solarkeymark, SP, SRCC, FSEC, Sei, ISFH, Inta, ISO 9001:2000, Cener, TÜV Cert etc.

Leading solar technology producer.

Fastest growing brand name in solar energy industry.

THANK YOU

For more information: info@solimpeks.com



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