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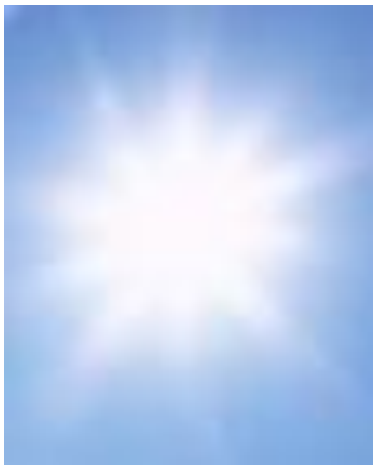
Minimum roof space: Next generation solar technologies and the Hybrid Approach

By Anthony Morgan
MD Newform Energy Ltd

Where's the Energy?



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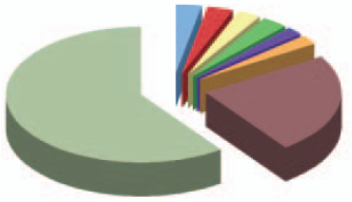
The average UK house and where the energy is being used



- Cold Appliances
- Consumer Electronics
- Cooking
- Lighting
- Wet Appliances
- Misc.
- Hot Water
- Space Heating

More than 80% of energy typically consumed in Europe is for Heating and Hot Water.

[1] Source: The DTI 2004

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solar thermal (SHW)

panels to produce heat from the sun

evacuated tube

flat plate

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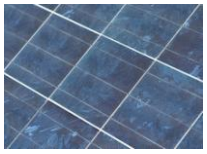
Photo Voltaic (PV)

Photovoltaic's are semi-conductors that produce electricity
The three main types of PV used in the UK:

thin film



polycrystalline

monocrystalline

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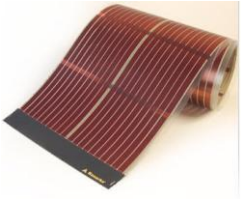
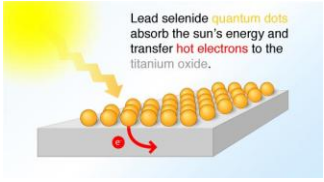
Photo Voltaic (PV)

Next generation photovoltaics:



Organic Photovoltaics

CIS or CIGS



Quantum dot 60% efficient solar cells

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What is PVT?
photovoltaic thermal

- **hybrid technology** that combines, photovoltaics and a high efficiency thermal collector **simple low cost**, low maintenance energy solution able to facilitate the governments zero-carbon strategy
- **Higher output** efficiency at lower temperatures than equivalent PV
- **space saving** as only one panel producing heat and electricity **paybacks** better than the combination of PV and solar thermal
- **Higher Energy Density** extracting more useful energy per m^2 than conventional PV, meaning a far higher CO_2 savings / m^2

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Types of
photovoltaic thermal (PVT)

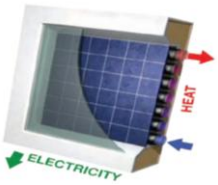
•Liquid PV/T Modules

•Air PV/T Modules

•PV/T Concentrators

•Ventilated PV Facades

These systems each have pros & cons



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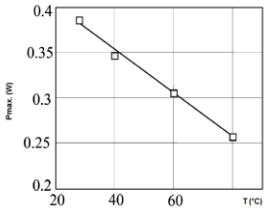
The theory behind PVT

Studies show that the electricity obtained from solar cells reduces as the temperature of the solar cells increases.

Monocrystalline modules lose <u>0.45 – 0.50% electricity production efficiency for every 1 C heat rise</u>.



Photovoltaics (PV) are semiconductors so have one draw back, degradation in performance due to temperature. In the UK on a sunny summer's day in the middle summer, when you hope to be making the most of your PV it's actually performing highly inefficiently. During these periods the system may produce only a small % of its maximum output rendering it largely useless for a much of the day.

By regulating panel temperature using a fluid cooling system, a balanced system can be produced trading off between PV efficiency and thermal output. Using this principle it is possible to obtain a higher electrical yield compared with the equivalent area of mono-crystalline PV and enough free heat to offset a low energy buildings annual heating requirements.

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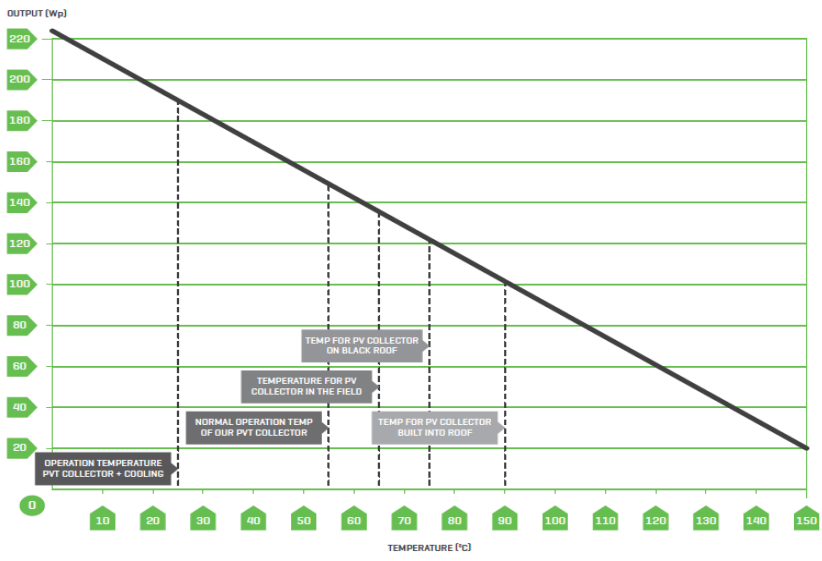

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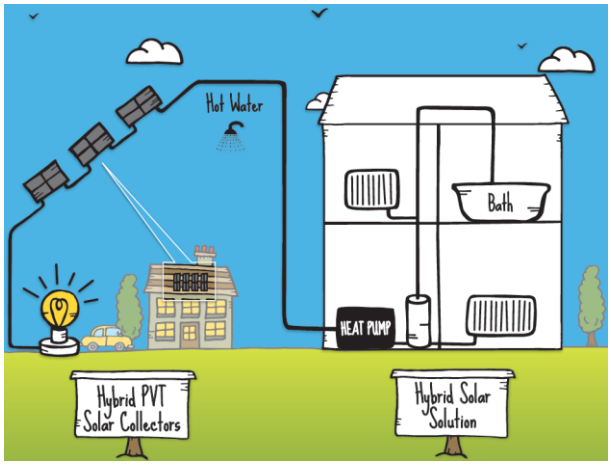
Hybrid Solar Solution



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Overview of Hybrid Solar Solution

- Using the PVT panels on the roof as a heat exchanger, decouples the relationship between the sun and the heat being generated, meaning year round heat can be generated from the roof of the building
- In combination with the PVT providing a rinsing of all available solar gain
- Greatly improved COP (Coefficient of Performance) relative to air source and Ground Source, cheaper than ground source and no ground works required
- The only heat pump solution to generate its own electricity

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Solar Hybrid Solution Benefits

- Year round heating and hot water solution
- Along with energy saving measures, a solution that will alleviate energy poverty
- Space Saving – one system for the efficient generation of both heat and electricity
- Significantly improved CO_2 benefit
- Significant paybacks vs. other renewable technologies
- The only true zero-carbon heating solution

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Maintenance of Solar Thermal Systems

- For a period immediately after installation it is advisable to monitor system pressure. Any leaks should be quickly detected and rectified.
- Very little maintenance required.
- Antifreeze protection – change of fluid once in 5 years (generally) and a periodic check of the level of mix of solar fluid to ensure adequate frost protection.
- For piece of mind an annual inspection of system pressure, pumps, insulation and system operation is never a bad idea.
- Finally, if the installation is in a particularly dusty environment periodic cleaning of the panels is advised.

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stay in touch

Anthony Morgan – Managing Director
www.newformenergy.com
amorgan@newformenergy.com
+44 (0) 7903 323 569
+44 (0) 8458 622 143

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