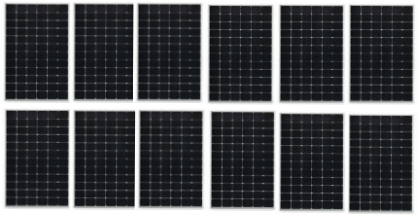
Solar (PV – photo voltaic) Panels

Solar (PV) Panels



Inverter
(turns DC to AC for consumption)

Options &/or	1	2	3	4	5
Using solar power	Heat water tank	Use in house eg run a heat pump	Store power in battery	Charge a car	Passback to grid
Options	• Traditional • Mixergy • Sunamp	• Air or Ground source • Heat water for central heating	• 5-20KwHrs • ..	• Via charging outlet	• Receive credit from electricity provider

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1 Options – Heating your hot water for washing etc

Traditional Cylinder	• Heats all the water to set temperature • Can use solar to heat as well as grid electric or gas
Mixergy Cylinder	• Heats from top, heats only what you need • Measures daily usage at heats water used at that time of day • Can use solar
Heat Battery	• Like a big shower or • Sunamp (see appendix) which uses different technology to provide instant hot water • Can use solar

Examples overleaf

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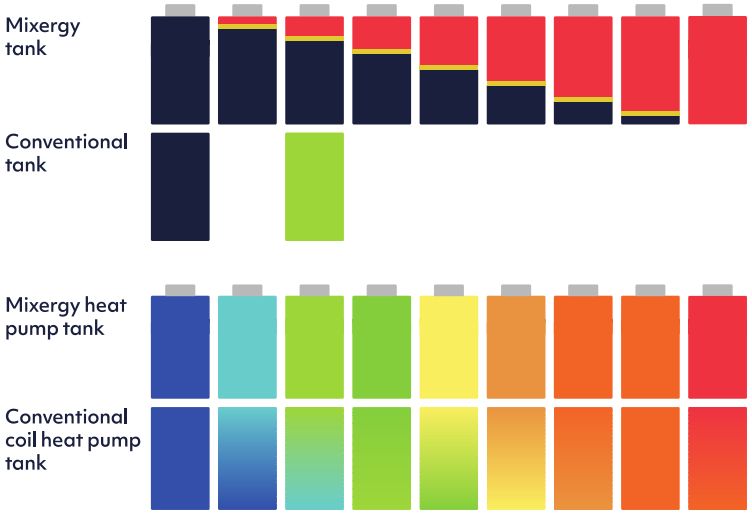
Mixergy Hot Water tanks – heat what you use

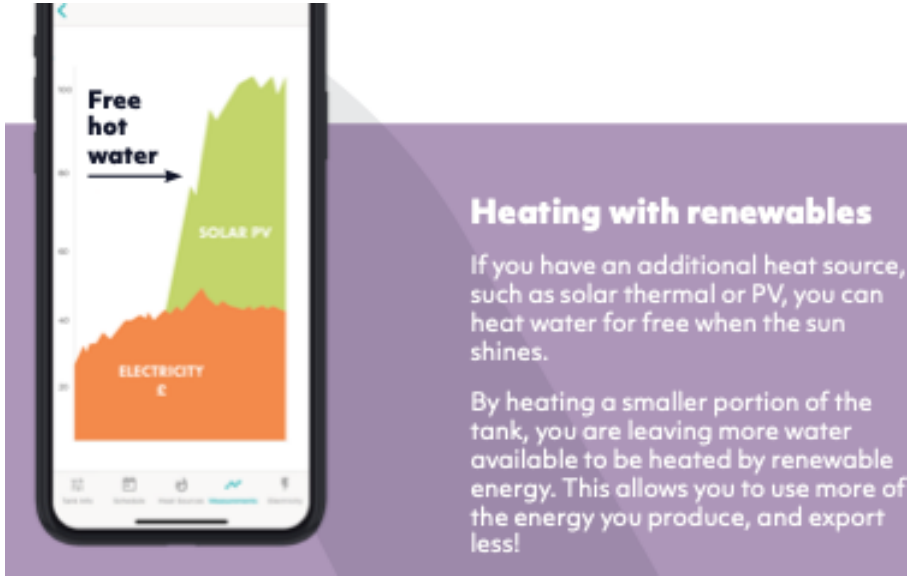
How it works (electric and gas)

Mixergy electric and gas powered tanks use novel top-up technology to 'float' hot water on top of cold. This means you can selectively 'heat what you need', rather than the whole tank. A sensor within the tank ensures you'll always know how much hot water is available. Top-up reduces heat losses and improves reheat speed from cold (5x for electric, 2x for gas). This helps save money, time and energy.



How it works (heat pumps)

Mixergy heat pump tanks heat using an external heat exchanger and circulating pump to heat the full contents of the tank from the bottom up evenly via convection. This has the benefit of improving the efficiency of the heat pump (while heating hot water) by up to 8% and can increase the amount of hot water stored by the tank by up to 20% in some cases.



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Alternative ways to heat water

Thermal stores

Thermal stores are highly insulated water tanks that can store heat as hot water for several hours. They usually serve two or more functions:

- Provide hot water, just like a hot water cylinder.
- Store heat from a solar thermal system or wood-fuelled boiler, for use later in the day.
- Provide a 'buffer' function for heat pumps.
- Store heat from multiple sources, for example a heat pump, solar thermal system, and wood-fuelled stove with a back boiler.
- House an immersion heater, which could be powered by solar PV panels, a wind turbine or a hydroelectric turbine using a 'diverter switch'. The immersion heater heats the water in the thermal store.

Thermal stores can vary in size from 250 litres up to 500 litres or more.

You can read more about thermal stores and how they can be integrated with different renewable energy systems.

Heat batteries eg Sunamp

Heat batteries store either spare heat or electricity, often generated by renewable energy systems. Heat can be stored in a material when it changes phase from a solid to a liquid. These materials are called phase change materials' (PCM). Spare heat or electricity is used to charge the PCM inside the heat battery. When the heat is needed, the phase change material changes back into a solid with a release of heat, which is used to provide hot water.

What are the benefits of heat batteries?

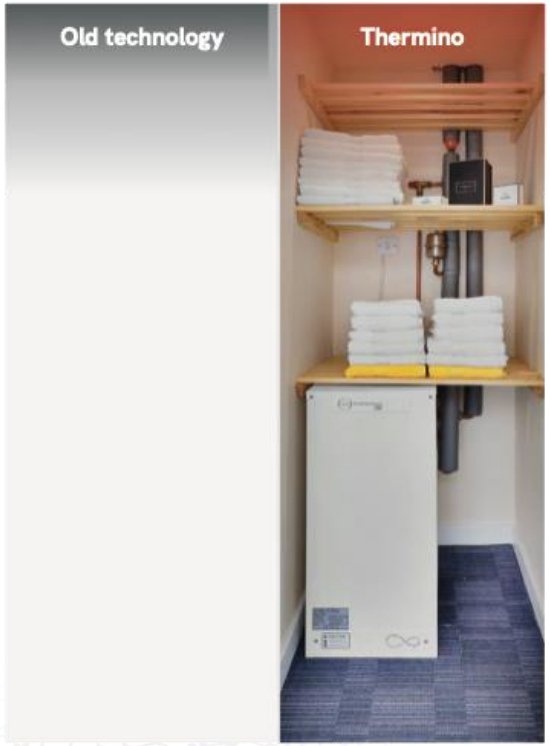
Heat batteries are generally smaller and lighter than filled thermal stores. This means you might be able to install one in a convenient location even if you can't find space for a traditional hot water cylinder. Heat storage batteries do not degrade in the same way as electrical batteries and should have a far longer lifespan.

Options – Instant Hot Water heating to replace gas combi or traditional system

SUNAMP

THERMINO

Thermino ePV – Replaces a direct cylinder to deliver hot water efficiently from solar PV. With grid electricity for greater flexibility when needed.



- Space-saving – up to 4 times smaller than the hot water cylinder it replaces
- Hot water for free - stores surplus energy from solar PV that would be otherwise lost back to the grid
- Lower heat losses – up to 4 times higher energy efficiency
- Low heat losses – from only 0.48 kWh a day
- High flow rate hot water
- Instantaneously heated for hygiene and freshness
- Fast and easy to install – no tundish, no high temp discharge pipework and T&P safety valve to maintain
- No mandatory annual maintenance
- Market-leading 10-year warranty on the heating element

Heat Source Thermino ePV

PV plus grid electricity

A SUNAMP THERMAL TECHNOLOGY SUSTAINED WITH PLENTIGRADE

Quality assured

SUNAMP

World leading thermal storage technologies

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Thermino ePV technical data and dimensions

	70 ePV	150 ePV	210 ePV	300 ePV
Manufacturer's part number	SGP-BAW-ATZ-1	SKP-BAW-ATZ-1	SNP-BAW-ATZ-1	DRP-BAW-ATY-1
Equivalent hot water cylinder size (L)	71	140	212	306
V40 volume of hot water*	105	199	301	436
Water content	3.2	3.2	5.9	12.8
Heat loss rate (kWh/24) (W)	0.48 (20)	0.67 (28.1)	0.77 (32.1)	0.84 (35)
Energy efficiency rating class	C			
Recommended flow rates (LPM)	6	15	20	25
Minimum mains supply pressure	1.5 bar (0.15 MPa)			
Maximum mains pressure	10 bar (1.0 MPa)			
Hot water temperature	45-55°C			
Connected load at 230v, 50hz (W)	2,800			
Annual electricity consumption (kWh/annum)	542	1,398	2,690	2,701
Product weight (empty) (kg)	75	136	172	220

*This data assumes an incoming mains water temperature of 10°C
NOTE: In line with UK Building Regulations, Sunamp advise the installation of a suitable hot water supply tempering valve at the outlet of the appliance, to prevent the risk of scalding.

(mm)	70 ePV	150 ePV	210 ePV	300 ePV
Dimension 1	575	575	575	575
Dimension 2	365	365	365	365
Dimension 3	440	640	870	1,050
Dimension 4	37	37	37	37
Dimension 5	78	78	78	78
Dimension 6	50	50	50	50

Optional Extras

500ml expansion vessel C5407

Tempering valve C5388

myenergi Eddi energy diverter C2160

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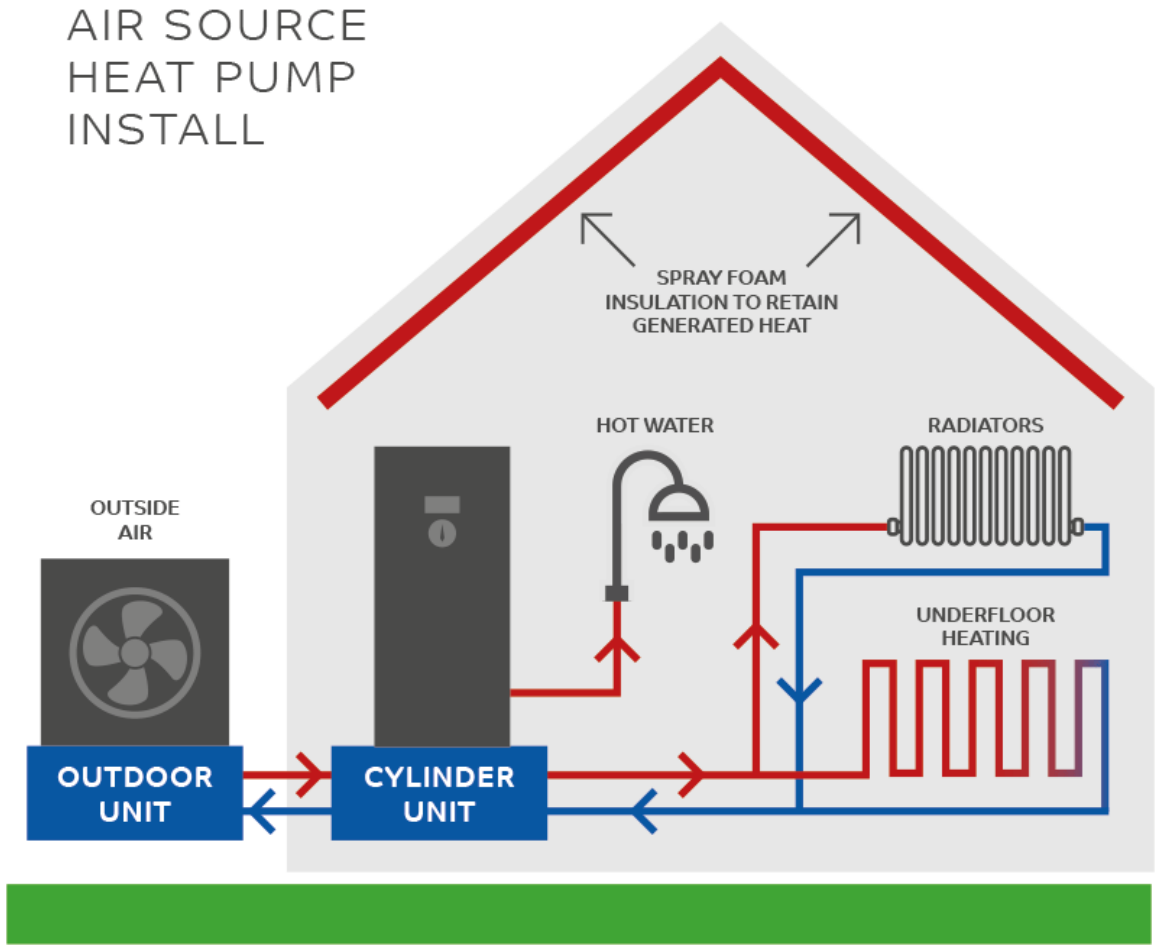
2 Options – Use Heat Pump to replace boiler (gas / electric or oil)



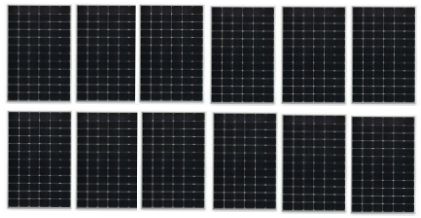
- Outdoor Unit is Heat Pump
- Air sourced or Ground Sourced
- Cylinder unit is pressurised hot water used for washing and heating
- Replaces (unvented traditional hot water cylinder where there is water tank in loft)
- Radiators may need expanding, internal cleaning or replacing to ensure heat flows

Insulating your house is best first step

- EG 16Kw Air to Heat Pump and Hot Water Tank
- 4-5 bedroomed house

3 Solar Panel (PV Panel – photo voltaic) to Battery

- 15-20sqm = 3-4 KW



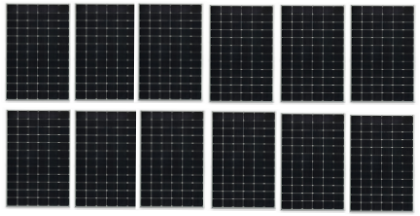
- 10KwHr example
- Fed by solar panels
- Can be fed from low overnight tariff and PV during daylight hours
- Reduces grid consumption
- provides back up if mains power is cut

Opportunity

- Reduced CO2 and energy running costs of oil & gas
- Take advantage of low cost tariffs during the day and night

4 Solar Panel (PV Panel – photo voltaic) to Vehicle Charging Point

- 15-20sqm = 3-4 KW
- PV panels feed batteries and house.
- Inverter converts from DC to AC.



Direct

Indirect via battery

- Consider EV (Type 2) charging points
- Lockable
- Tethered (cable connected) or untethered – plug in when you need
- Fed by batteries from overnight power and topped up with PV
- For Plug-in (PHEV) and fully electric vehicles

Opportunity

- Reduced CO_2, NOx
- Reduced petrol & diesel costs