



BREAK-THROUGH HOT WATER TECHNOLOGY with our iSmart Controller™

HEAT YOUR HOTWATER FOR FREE WITH YOUR SOLAR PANELS DURING THE DAY BY USING YOUR HOT WATER CYLINDER AS A STORAGE BATTERY & EXPORT LESS BACK TO THE GRID.

You could save up to \$500+ per year on your power bills

To maximise the benefits of your Solar PV system you should use as much renewable electricity as possible within your own home. It makes sense both for the stability of the power grid and financially that you use as much of the power you generate from your solar panels as possible for your own use. With a grid-tied system the obvious choice is hot water heating. With our break-through technology the **iSmart Hot Water Controller™** is a more affordable solution for you and your customers. As battery backup storage solutions can be expensive.



What is an iSmart Hot Water Controller™?

We have come up with some very smart technology helping customers to manage their hot water heating. Saving customers money without impacting on their hot water availability. Introducing our break-through technology, the iSmart Hot Water Controller™ which can be easily retrofitted to any hot water cylinder by a qualified electrician, so no need to replace the cylinder.

The simple version of how it works is that it heats the water for when you need it . The customer sets the Profile based on their usage and history and in doing so doesn't waste electricity heating the water when its not needed. The science behind the operation of the controller is based about what we term 'stagnation control'. In brief, water in a storage vessel stagnates. Hot water will rise to the top. By measuring at two locations within the cylinder we know how far down the cylinder the level of useful hot water is, then efficient control can be achieved.

The most obvious solution is to heat water with the surplus renewable electricity and use it later. Almost nothing holds more energy than water as we use it daily.

The trouble is the peak solar activity doesn't often occur at the same time as your peak electricity load. So you need to store the energy.

FACTS

- Water can store more heat energy than, almost nothing holds more energy than water as we use it daily.
- You can increase your storage capacity by a further 50%. A standard 180L hot water cylinder can hold at least 14kWh*
- The Smart Controller™ always monitors the amount of hot water available, it will avoid overheating (and waste) or under heating with the risk of running out of hot water
- It is quite capable of safely increasing the storage capacity of your cylinder up to 50% beyond what it is set to as standard.
- Once a week the hot water cylinder does a tank sterilization, so killing any legionella bacteria

The **iSmart Hot Water Controller™** is always calculating if you have enough hot water while still allowing plenty of scope to make best use of renewable power for the cylinder.

With the **iSmart Hot Water Controller™** savings control, the power is in your hands to save as much as possible, for example; if you consistently have a full or nearly full fuel gauge of hot water (as shown on the in home display) then increase the savings % some more until you find the best balance of savings and reliable supply of water.



Will it draw too much power during the day?

- It is important to match the (lower) electric element to the size of the Solar PV system. E.g. a 3kW system will work well with a 2kW electric element.
- The water needs to be heated anyway; this is simply shifting the bulk of it to peak sunshine hours.



1. Diverter and iSmart Hot Water Controller – The Best of Both Worlds

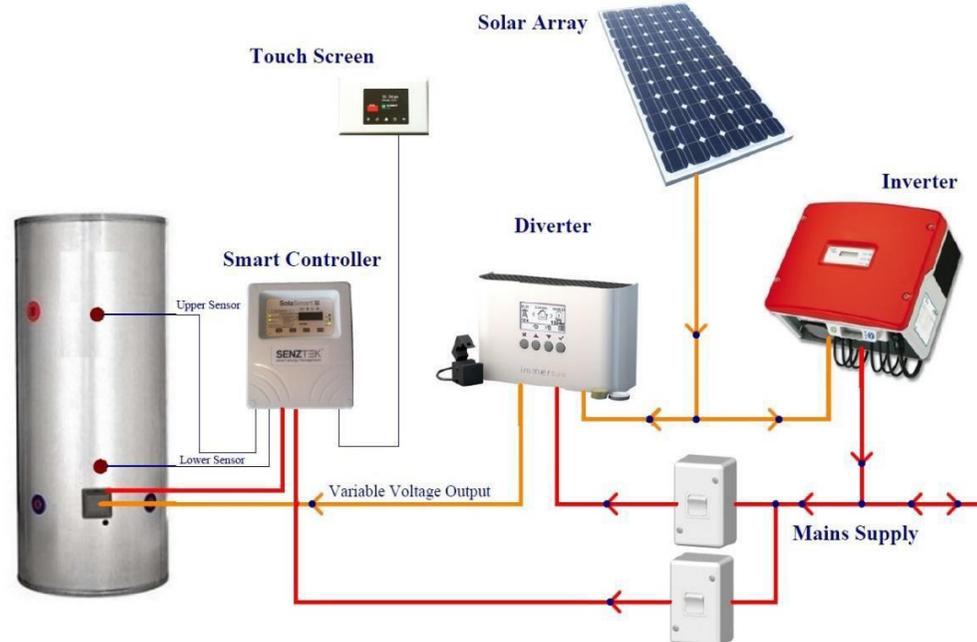
a. Single element cylinder

Diverter work well at 'diverting' surplus electricity but fail in cylinder hot water management, most don't even have sensors on the cylinder so act more like dumb 'Timers' which can only either 'divert only' or 'heat at full power only'.

You have the same problems as using a timer which are unaware of how much hot water you have so can let you run out of hot water (especially on a cloudy day) or overheat if not manually set correctly. Sure some have a button to press once you find out you have actually run out of hot water, only a few hours' delay while the tank heats, but is that really acceptable for most people in 2016? There is also the same Legionella issue.

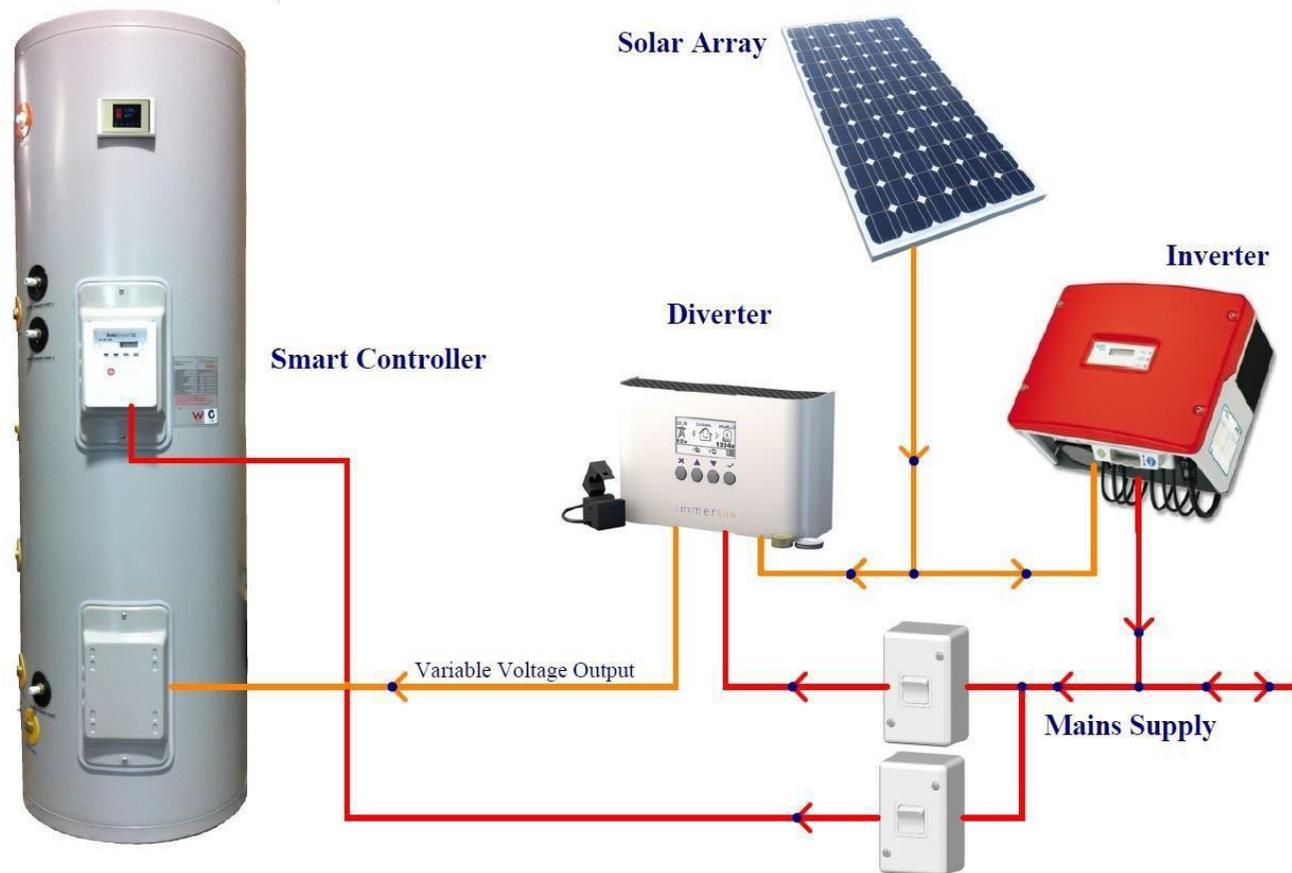
We have a solution for this. Take the best of the iSmart Hot Water Controller™ and the best of the Diverter and combine them in one package. You now can efficiently divert your surplus solar electricity and store it in your cylinder for later use AND ensure you don't run out of hot and don't over heat your cylinder after sundown. There are all the other benefits as well including keeping your family safe with the iSmart Controllers BioSafe® Legionella control.

This solution requires 2 elements. One dedicated to the iSmart and the other to the Diverter. On a single element port cylinder (most common cylinder) it is possible to fit a dual blade element. Elements are wired to the Diverter and iSmart controller respectively



b. Dual Element Cylinder

Similar to number 2 above except there are dual element ports available. We recommend a Smart Cylinder for this



* 180 litre cylinder heated from 12°C to 70°C holds 70°C - 12°C = $\Delta 68^\circ\text{C}$
1 litre of water heated 1°C takes 4146 joules. 180 litres requires 4146 x 180 = 746280 joules
 $\Delta 68^\circ\text{C} = 50,747,050$ joules or 14kWh

** It is required under New Zealand law that any (management) device for domestic hot water services must keep the hot water safe from dangerous Legionella infection. There are 3 solutions allowed under The New Zealand Building Code clause G12. If the power is interrupted, then the cylinder temperature must be measured and heating actioned such as to comply.