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## First Look: iSmart Hot Water Controller

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If your water cylinder is draining your bank account, the iSmart Hot Water Controller claims to have the answer. We trialled it to see how effective it really is.

Since running on-demand hot water became widespread in the mid-20th century, Kiwis have mainly used electricity to heat their water. 88% of households have an electric hot water cylinder, according to the Building Research Association of New Zealand.

*Many cylinders maintain far more hot water in reserve than is usually required.*

But the trouble is most cylinders still use technology that wouldn't be out of place in the 1950s. The result? Needlessly high power bills.

Generally, our cylinders are powered by an electric heating element that fires up when a thermostat signals the water temperature has fallen below 60°C. However, constantly keeping a cylinder of water hot when it's not needed isn't efficient. No matter how well-insulated a cylinder is, it will always lose warmth, and many cylinders maintain far more hot water in reserve than is usually required.

It's often more efficient to let the water temperature in the cylinder cool down during times of low demand until about 30 minutes before you need hot water – much in the same way you only boil your kettle right before you want a cup of tea. Even when you're at home you may only need to keep as little as a third of your tank kept hot, especially in the evenings when you only need a bit of hot water for cooking and washing up.

The idea behind the iSmart Hot Water Controller is to get your cylinder acting more like a kettle to slash your water heating bill. It achieves this by only keeping a little more hot water in reserve than you usually need during certain times of the day.

## How it works

The iSmart replaces the antiquated thermostat/switch form of control used by most cylinders with a digital electronic control system.



The system is comprised of a controller and LCD user interface, both housed in a small box mounted on or near the cylinder, along with two temperature sensors. You'll need an electrician to retrofit the iSmart to your cylinder's power supply and install the sensors.

Since the iSmart is fed information by two sensors, one each at the top and bottom of the cylinder, it can calculate how much reserve hot water you have in your cylinder. This “reserve hot water” measurement underpins most of the iSmart's functionality.

Its home screen displays a hot water gauge telling you how much water is still in the cylinder. You need to enter your “hot water profile” into the controller, which is your typical daily hot water usage pattern.

The iSmart divides the day into four adjustable time bands where you set your expected demand as zero, low, medium, high or maximum. The idea is to only have enough hot water available for when you need it with a small amount in reserve, saving you from wasting money by heating large amounts of water that never gets used.



It also includes a “boost” feature for when you’ve got unusually high demand, along with a holiday mode that keeps the cylinder off except for an occasional boost to stop legionella bacteria growing.

But all this doesn’t come cheap – you’re looking at \$920 for the controller and approximately \$290 for the sparky. This means it needs to offer some serious long-term savings to be worth your while.

# Our trial

We asked two households to give the iSmart a whirl: a working family with two young kids, and a retired couple.

Our family ran the controller on its default setting (high demand in the morning, low until mid-afternoon, medium from mid-afternoon to evening, zero heating overnight). Before the installation, they used an average of 32.5kWh of electricity daily. After, their usage fell to 30.3kWh. This works out as a yearly saving of \$223, meaning the iSmart would take around five and a half years to pay itself off.

### Average daily energy consumption (working family)

	Energy used per day
<b>Before iSmart</b>	32.5 kWh
<b>Default iSmart settings</b>	30.3 kWh

Our family is on a fixed-rate electricity plan, so their savings arise from avoiding needlessly keeping large amounts of hot water in reserve. In contrast, the retired couple gets their power from Flick Electric Co., which charges based on the half-hourly spot price of electricity, so in an effort to maximise their savings we took a slightly different approach.

Because Flick’s rates are lowest overnight and in the middle of the day, we lied to the iSmart and told it the couple’s demand was highest between midnight and 6am, with medium demand

between 11am and 2pm. Our aim was to run the cylinder as much as possible when power is cheapest in the hope they could coast through the hours when electricity was expensive (the mornings and evenings) by using water heated a few hours earlier.

And it worked. Even though we kept a large amount of water hot overnight when it wasn't required, their cylinder is sufficiently well-insulated that they could get through the morning without running out of hot water, before heating the water again in the afternoon in time for the early evening when electricity again becomes expensive.

### Average daily power bill (retired couple)

	Cost per day
<b>Before iSmart</b>	\$4.83
<b>Optimised iSmart settings</b>	\$3.74

This reduced their daily power cost by about \$1.09, an annual saving of almost \$400, meaning the iSmart will pay itself off in a little over three years, in our view a good return on investment. Surprisingly, this approach didn't lead to increased energy consumption, even though we were keeping water hot when it wasn't required. By judicious tweaking of the amount of hot water kept in reserve, we were able to reduce their energy consumption by an average of about 7kWh per day.

## Verdict

You might expect heavy users of hot water, such as our working family, to get the most benefit from the iSmart. But it may be homes with lower hot water demand that reap the biggest benefits, as they're the ones most likely to be keeping needlessly high volumes of hot water in reserve. Regardless, households on a time-of-use electricity tariff will enjoy better returns than those on a flat rate.

We think the main thing the iSmart lacks is the option to "learn" your hot water usage and adjust your settings accordingly, though this wouldn't have allowed us to trick the controller into heating water only at night for our retired couple who use Flick Electric Co. Most tech-savvy users will have little issue working out optimum settings for the controller within a week or two.

Note: iSmart also sells a hot water cylinder with an integrated controller.

## Key specs

- Price: \$920 for the controller and approximately \$290 for installation, both including GST
- Can be retrofitted to low-, medium- or high-pressure cylinders
- Power supply: 230/240V, 4VA+Load, 13A, maximum power 3.6kW.
- Version available which works with solar hot water systems showing pump activity
- Fully compatible with ripple control relays
- Seven-day historical data memory

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**By George Block.**

