

FAMILY UPGRADES TO SOLAR WATER HEATING SYSTEM

Tracey and Robbie Torrance have lived in their Richmond home for twelve years. Two years ago they decided to upgrade to a solar water heating system to reduce their power bills and increase the availability of hot water.

The Torrances have two children, aged six and eight. Tracey works as an events coordinator at a local retirement village, and Robbie works in despatch at a local building supplies company. Like many young families, they need lots of hot water 'on-tap' at any time. Tracey says:

"We'd had enough of the old system. We were constantly running out of hot water and our power bills were rising."

"The new solar water heating system has saved us money, and we've paid off the EECA assisted loan in two years."

This case study describes how Tracey and Robbie:

- reached the decision to upgrade to a solar hot water system,
- covered the costs of the project,
- worked closely with their installer for a hassle-free upgrade, and
- live comfortably with solar water heating throughout the year.



Solar water heating and energy efficiency makes good financial sense to Robbie and Tracey.

Robbie's also quick to point out, "We're not passionate greenies, we're doing it because it makes financial sense, and it is a bonus to know we're doing something good for the environment."

The case study concludes with Robbie's practical tips for other families thinking about getting the most from solar water heating.

THE DECISION TO UPGRADE TO SOLAR

When Tracey and Robbie moved into their home twelve years ago its 180 litre hot water tank was sufficient for their needs. However, the addition of children to the family meant many more baths, and they soon found themselves regularly running out of hot water.

They had thought about solar water heating several years earlier and had felt that the capital cost made it unachievable for them at the time, but they remained receptive to the idea.

In Robbie's job at the building supply company he came into regular contact with many of the tradesmen in the Richmond district. Just over two years ago Simon Kneebone came into the store and Robbie got chatting to him about their hot water problems. Simon is the local SolarPeak installer, and encouraged Robbie and Tracey to investigate the solar option further, pointing out that a subsidised finance package from EECA could help them overcome the problem of the initial capital cost, and that solar would give them more plentiful and cheaper hot water in the long run.

The local Home Show provided a great opportunity for Tracey and Robbie to investigate the different solar water heating systems on offer. The package that appealed to them most included:

- Design and building consent organised by the supplier.
- High efficiency evacuated tube solar panels.
- A 300 litre mains pressure solar hot water tank and electrical boost (to be fitted into their old hot water tank cupboard).
- The option of upgrading at a later date to a solar powered electric pumping system to ensure the system works entirely without power from the national grid.
- A subsidised loan from the Energy Efficiency and Conservation Authority (EECA).
- A high level of manufacturer and installer guarantees on the product and installation.



Hot baths are part of the family's daily routine.

Simon Kneebone, the SolarPeak installer who had first discussed the idea with Robbie, was one of the Solar Agents displaying at the Home Show.

COVERING THE COSTS OF THE PROJECT

The additional cost of upgrading to SWH:

The cost of replacing the old 180 litre low pressure hot tank with a standard electric 300 litre one was going to be in the vicinity of \$1,500 for low pressure, and \$2-2,500 for mains pressure. This would have resolved their problem of constantly running out of hot water, but would also likely have increased their electricity bills. However, Tracey and Robbie wanted their electricity bills to drop, not increase, so they decided to spend just over \$8,000 in total to get a full solar mains pressure water heating solution. The additional cost of choosing the solar option was therefore around \$6,000.

Project cost:	\$8,000
Less cost of electric only replacement	\$2,000
Additional cost of Solar upgrade:	\$6,000

Solar water heating savings and return on investment:

Tracey and Robbie haven't kept detailed records of their electricity bills, but they estimate their average electricity bill has dropped from around

\$200 per month before the upgrade, to around \$130 per month. If that saving of \$70 per month could be entirely attributed to the solar water heating, then their \$6,000 investment would be providing them with a 7 year return, or the equivalent of putting their money in the bank and getting 14% after tax.

This level of return is slightly greater than the Solar Calculator on the ENERGYWISE™ website for a 'typical' family installing this system (it calculates an 11 year return, which is still a good investment for any family to make). The higher savings that Tracey and Robbie have experienced may be due to them having a slightly higher use of hot water than other families, and also due to some other changes they made after installing the solar system.

CO-OPERATIVE INSTALLER ENSURED A HASSLE-FREE UPGRADE

Because the old hot water tank cupboard was also going to be the location of the new solar water heating tank, it was inevitable the family would be without hot water for some time while the upgrade took place. The challenge was to minimise that inconvenience as much as possible.

The installer studied the plumbing layout of the house, investigated the position of roof purlins suitable for bearing the load of the solar panel, and designed the intended installation in discussion with Tracey and Robbie. He also organised the necessary building consent with the local council.

A date for the changeover was agreed. The installer did some preparatory work the day before, without disrupting the existing water supply. The next morning he arrived immediately after breakfast to drain the old tank, remove it, build new framing for the new tank, install the new tank, and connect up and test all the plumbing. The new system was up and running by early afternoon, and the electrical boost

turned on to give the family hot water by evening. By the end of the next day the electrical boost was switched off and the family enjoyed ample quantities of hot water heated just by the sun.

LIVING WITH SOLAR WATER HEATING

When asked how she finds living with solar water heating, Tracey says, "I wish we'd put it in sooner". The two biggest changes she's experienced since putting in the new system are more available hot water and lower electricity bills.

The other change was learning when are the right times of year to switch-on and switch-off the electric boost system. There's no hard and fast rule that applies to all solar installations because it depends on the times of day a household uses most of its hot water, the timing of the arrival of winter and spring, and the position of the solar panel.

In the winter months the electric boost needs to be switched on to top-up the heating done by the system. This means the children can have a bath before bed and there's still enough hot water for Tracey and Robbie to have showers in the evening or following morning.

Safety Tip: The Building Code requires that water in the storage tank must be protected from legionella bacteria growth.

One way to achieve this is to heat all the water so that it reaches 60°C for at least one hour each week.

While solar water heating systems normally heat the water to over 60°C, it pays to check the temperature shown on the controller to ensure this temperature is being reached. If it's not, then the electrical boost should be used.

If using the electrical boost, it is best to use it in conjunction with a time-switch or controller to maximise the use of free solar energy, and minimise the use of electricity.

Tracey and Robbie had to experiment with the electric boost as their first winter approached. By organising their showers before the children have a bath they've managed to reduce the number of months the electric boost needs to be switched on. They now find they can rely solely on free energy from the sun to heat their water to over 60°C for most of the nine months from October till the end of June.

The other change Tracey and Robbie have made is to replace their old washing machine with one that heats its own water. The old washing machine used to draw a lot of hot water from the system, and wasn't as efficient as modern machines. This change contributes to them always having hot water 'on-tap' when they need it.

ROBBIE'S TIPS FOR OTHER FAMILIES CONSIDERING SOLAR WATER HEATING

Robbie says:

"You need to think about how and when you're going to use your hot water to get the most from solar... you've got to apply common sense."

What he's talking about is understanding when most of the sun's heat energy is available to heat the water, the orientation of your house, and when hot water is needed, and then getting these three factors aligned properly. Robbie says that:

"In our case we don't have a roof area facing directly north, they face either north-east or north-west.

We chose north-west to catch all of the late afternoon sun which will top-up the heat after the kids baths so we still have plenty in the evening and next morning.



The roof surfaces on Tracey and Robbie's house face to north-east, or to north-west.

There's other simple things to think about, like the position of young trees in yours or your neighbours garden. When we put in solar, we replaced a young Nikau with a lemon tree because we knew the Nikau would eventually grow big enough to shade the solar panel."

Robbie's practical common sense approach also now includes a long term project to progressively replace the standard windows in the house with double glazing, starting with the south facing bedrooms. Robbie says:

"I know energy's going to cost more and more and so we're setting ourselves up to be better off in the future."

Efficiency Tip: Generally, the most efficient position for solar collectors is due north. This is most easily achieved if the house is oriented directly to the north. For houses without a north facing roof, erring towards the west of north (rather than east) is the next best option.

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