

# Christchurch family builds an *affordably* toasty warm and *healthy* home



## \\ THE DREAM

Building a toasty warm and healthy home without costing the Earth was priority number one for expectant parents Johannes and Jo.

With a lot more time at home and many loads of hot water nappy washing on the horizon, the Christchurch couple wanted stable, constant, and energy-efficient heating through the colder months, but also affordable electricity bills and a reduced environmental impact.

Working with Smart Systems, the young family have seamlessly ticked all these boxes in their new home and the results have been far better than they ever could have dreamed.

## \\ THE CHALLENGE

With their desire for stable, constant, set-and-forget heating, and their joint income set to drop for the next year and beyond, the family needed a heating and hot water solution with more affordable monthly costs to fit within their smaller budget.



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## \\ JOHANNES AND JO'S CHECKLIST:

- Keep the entire house at a stable warm temperature 24/7 throughout the colder months and during unseasonal cold snaps
- Reduce hot water heating costs
- Keep electricity bills at a minimum
- Solar panels to further reduce ongoing monthly costs, as well as minimise the impact of future electricity price increases
- Reduce their households' carbon footprint

### SMART FACT

Heating and hot water make up nearly

# 70%

of a standard home's electricity bill



Figure 1: Pre-piping for in-slab underfloor heating

## \\ THE SOLUTION

Firstly, Smart Systems calculated the energy required to heat Johannes and Jo's home and their hot water, along with all other planned appliances, to ensure sufficient solar power would be generated for their needs.

We discovered the best heating for their home was a water-based hydronic in-slab system. This solution provides a wonderful form of radiant heat and has much lower running costs than standard electric heating. The system warms the home's entire concrete slab, transforming it into a heater providing underfloor warmth throughout.

Powered by a heat pump that channels hot water through pipes laid in the slab, the water and concrete make the perfect medium for energy-efficient heat throughout the home as they both retain heat far longer than traditional electric heating elements.

Using the energy requirement calculation, a solar power solution was designed to maximise energy production on their roofline and meet their home's power requirements.

## \\ HYDRONIC CENTRAL HOME HEATING AND HOT WATER

With the pipes installed before the slab was laid, an energy efficient Mitsubishi Ecodan heat pump system was later installed to power the combined central and hot water heating.

Compared to standard electric heating, the Ecodan requires only a quarter to a third of the electrical energy to generate the same heat output. This nearly halves a household's energy requirement.

To further aid in heating efficiency, Johannes and Jo lined their walls and ceilings with extra insulation and insulated the slab to ensure heat didn't escape and dissipate into the ground.

## \\ SMART SOLAR TWO SOLAR PANEL ARRAYS

Energy calculations showed the best solar panel arrangement for Johannes and Jo's home was 10 northeast facing panels and 8 panels facing northwest, for a maximum 6.16kW of power.

This design spread the solar gain wider to maximise their energy generation from sunrise to sunset.

Figure 2: Solar panel layout



## \\ THE RESULT

Johannes and Jo are absolutely delighted with their very warm, healthy, and affordably run home.

Aside from their daily fixed electricity costs (average \$27.16 per month), they paid only \$711 in electricity usage charges for their entire first year. Their overall electricity bills (including daily fixed charges) averaged \$86.41 a month.

This is an amazing result, especially given this includes the cost of running central heating for the entire home 24/7 for months on end, and daily long hot washes of reusable nappies.

In addition, for four months the family were in credit. This was because they generated more solar energy than they used and were paid by their electricity provider for the energy they put back into the grid.

The family have recently switched to a new energy provider with more competitive rates and are looking forward to seeing how their bills drop even lower over the next year.

*"It's amazing that, without breaking the bank or lifting a finger, we have a warm and healthy home at the same beautifully toasty temperature day in and day out while it's freezing outside," says Jo.*

*"All three of us have been healthier as a result and we never have to worry about the temperature of our daughter's bedroom or what we are spending. We cannot recommend these amazing Smart Systems solutions enough – they really will change your life."*



# Want a similar result?

Smart Systems was established in 1997 as an electrical company by David Gilbert. From the very beginning David recognised the importance of technology in the home and how it can be used to improve our clients' lives.

Smart Systems prides itself on delivering excellent solutions for all our customers, from the design stage right through to implementation and training. With a team of experts in the electrical and technology fields the Smart Systems team is well equipped and ready to handle any job.

Smart Systems for your home, family, and wellbeing.



Contact Smart Systems for a no obligation consultation about your building dreams.

Visit the Smart Systems website or call **(03) 338 4238**.

We can meet you in our Sockburn showroom (**1/19 Ngā Mahi Road**) or in the show home at **Home Ideas Christchurch (37 Mandeville Street, Riccarton)**.

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