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Welcome

Hello to you all. I hope you have enjoyed a great summer and have settled into the new year. My family and I have spent a lot of time at the beach, but luckily we've had enough rainfall for Gisborne to avoid the third summer drought in a row. Other parts of the country have not been so fortunate, so I know that those of you in Northland, Auckland and Canterbury, in particular, will be starting to see the effects of drought on your own local environments and water supplies.



We've also managed to avoid some of the incredible excesses of indoor temperature we had experienced in our last two summers – not for lack of heat (with temperatures regularly hitting 30°C outside) but because we have finally worked out how to operate our house successfully.

We've also just completed a major stage of our own renovations which you can read about later in this newsletter.

From our homeowner interviews, we know that many of you are well underway with your own renovations, and are no doubt taking advantage of the fine weather to do a few DIY improvements also. We hope the tips we provided in our last newsletter were helpful.

With the recent media attention on concerns about the potential for roof fires where insulation is installed over downlights, we have included some information about downlights in this newsletter. From your Renovation Plans, you may have already gathered that we are not a big fan of downlights for wide use, and generally recommend that people consider alternatives for lighting their homes.

Consumer NZ have also recently reported on the downside of downlights – you can access their report at:

<http://www.consumer.org.nz/reports/recessed-downlights/introduction>

If you need to contact me, email me at: loise@beaconpathway.co.nz or phone me at: (06) 867 4458

Lois



Update: HomeSmart Renovations

Monitoring Update

For those of you with monitoring equipment in your homes, this will start to be withdrawn from the end of March this year. This will enable our scientists to start putting all the data together so they can start crunching the numbers. We expect to finish the analysis in June and release the research findings after that.

It's been incredibly valuable to have your participation and we are very grateful. As we have mentioned previously, we aren't able to provide you with individual outputs of your house data because all the data is being processed as a group. We will make copies of the report available to you when it's complete.

Telephone Interviews

Some of you may have already had your second telephone interview, but if not, we expect to call you over the next month or so. This second interview is the last research information we will be collecting from you. We will then be collating the data, and our next homeowner newsletter will include some of the information we have gathered and let you know what we plan to do with it.

A big thank you from Nikki

I would like to say a big enormous thank you to all those homeowners who have had loggers in their homes. Your help and cooperation has enabled us to do the monitoring part of the project, and your efforts have been much appreciated.

From the end of March we are going to start withdrawing the loggers from homes, so you can expect to see a letter with courier bag included arriving in the last week of March, early April at the latest. If the letter doesn't arrive by Wednesday 7 April, please let me know (email NikkiBuckett@branz.co.nz or call 0800 925 347).

If you have any energy or water permission forms hanging around, you can pop those in the bag with the loggers.

Equally if you don't have any loggers on site, please let me know too (so we don't chase you for them later!). We've had a couple of cases where we have recorded a home as having been sent loggers, but none have arrived at the other end!

Nikki Buckett, BRANZ



Solar and Heat Pump Hot Water Interviews

Very few homeowners in the HomeSmart Renovation project indicated that they wanted to install a heat pump hot water system but more were interested in solar water heating.

We know from the interviews that some of you have gone on to install solar hot water. Some homeowners, who were interested in solar water heating or a heat pump hot water system, are still interested but haven't undertaken the installation step. Others have decided not to install these hot water systems despite being interested in the first place.

We are keen to explore why these different outcomes occur. To that end, if you have indicated an interest in solar water heating or heat pump hot water systems, we may ask you to talk to us in more depth about the different factors that have influenced your choices.

Your experiences and views are really important if local authorities and the industry are to make access to these alternative hot water systems easier.



The key to a good solar water heating system is ...

Use timers and controls

Solar water heaters allow electricity to kick in and heat the water if there is not enough sun. But if the system immediately reheats the water with supplementary electric heating after early morning water use, you miss out on using solar energy to reheat the water during the sunny parts of the day. Select a solar water heater with a timer that is set to exclude electric supplementary heating in the mornings.

Sizing system components

Ensure the panel area is sufficiently large for the demand. With a large panel area, a large hot water cylinder is also necessary to ensure solar energy collected during the day can be stored for later use.

Orient the panels to maximise sun

The sun shines from the north, so any surface facing north (preferably in a range of 20°W to 30°E of true north) will capture sun. True north can be found from local maps and street directories; or use a rough visual while on the site – the line between you and the sun at midday is an estimate of true north.

Angle panels at your site's latitude

Optimal installation for year-round hot water means installing the solar panel at the same angle as the latitude of the location. This latitude varies down New Zealand: Auckland 37°, Wellington 41° and Dunedin 45°.

Minimise heat loss

Ensure that insulation levels on hot water cylinders are appropriate for New Zealand conditions and that pipe lengths are kept short and well insulated.



The trials of getting solar water heating: Nick's story

We are still first time home owners, living in a 1920's bungalow for the last 27 years in Auckland. The house has been extensively extended as the family grew up but we have only recently started renovating to make it warmer.

Early in 2009 we added a 75mm Pink Batts blanket to the existing 75mm ceiling insulation. We had Novafloor (polyester and recycled plastic) insulation installed under the floor. We have noticed much warmer temperatures with a 2°C increase in temperature in our living room in winter.

Our latest challenge was to reduce our energy use from water heating. We had an old 180 litre electric cylinder which was nearing the end of its life. I evaluated water heating systems and decided to invest in an evacuated tube solar hot water heating system from Azzuro Solar. But I had no idea of the journey ahead!

Firstly I was dismayed to learn that, not only would a building consent cost me \$800, but Auckland City wanted a site plan, a floor plan, elevation, roof plan and a technical drawing showing how the penetrations through the roof would be addressed.

Fortunately, with our extensive renovations, we had a complete set of A1 sized plans. We gave these to Azzuro Solar who sketched in the technical details and submitted them to Council. Unfortunately our existing plans were rejected on the basis of "too much detail" and we had to resubmit plans in A3!

The good news at this point was that our Council had reduced consent fees for solar water heaters to a mere \$50.00 – a much better incentive.

We finally received our building consent in February this year and Azzuro Solar was ready to install our system. This proved to

be complicated. Our existing hot water cylinder was located in the basement of our one and a half storey house with a full storey between cylinder and roof. Our installer cleverly thought to bring the pipe work through a hall cupboard, only to find a block wall in the way. He ended up having to divert the pipes through a downstairs wardrobe.

When the existing cylinder was removed, we found that it was badly rusted and actually leaking badly – a couple of weeks later we would have had no hot water. Our new cylinder is a 280 litre, New Zealand-made Triumph stainless steel cylinder. Azzuro recommend larger volume cylinders as the additional volume helps keep the water hot. We chose a slightly more expensive stainless cylinder as they are better able to withstand hotter temperatures than enamel cylinders.

In the house is the solar controller which provides a temperature read-out at three points in the hot water system – on the roof panel, in the middle of the hot water cylinder and at the inlet into the cylinder. In the first three weeks of operation, with no electrical boosting, the tank temperature has not dropped below 65°C.



We are pretty chuffed with the system. All up, it cost almost \$8,000 (including \$1,000 EECA grant). We estimate that, at current power prices, it should have paid for itself in 8-10 years - considerably less if we discount the new cylinder we would have had to purchase anyway.



The problem with downlights

Hopefully many of you are taking up the Government's insulation subsidies under the Warm Up New Zealand scheme. But did you know that the improvements you may be making to your ceiling insulation can be undermined by the downlights in your ceiling?

Downlights create a hole in the ceiling. This doesn't matter in lower storeys, but when there is only roof space above the ceiling, they penetrate the thermal envelope that surrounds the home.

This is made worse by the need to leave a safety gap between the downlight and any insulation in the ceiling. Because the incandescent or halogen bulbs used in downlights run very hot, fire is a very real possibility. Safety regulations mandate a 150mm un-insulated gap around the downlights, and downlight cans should **never** be covered.

The result of these gaps is that your warm heated air is drawn up into the colder roof-space and your ceiling insulation cannot work as well as it should.

This is shown in a 2006 Standard for the installation of insulation: **NZS4246 (Energy Efficiency – Installing insulation in residential buildings: 2006)**. It includes a table which quantifies the effect on R-values of the number of downlights in a ceiling. To meet the Building Code, new homes in the South Island, for example, are required to have ceiling insulation rated at R3.3. Downlights installed every 3 square metres would reduce insulation effectiveness by R0.6 bringing the insulation rating down to R2.7. In most of the North Island, new homes should have ceiling insulation rated at R2.9. Install downlights every 5 square metres, and the insulation effectiveness is reduced by 10% to R2.6.

As well as leaking heat, downlights in wet areas, like bathrooms and kitchens, can allow moist air into roof spaces and around framing, resulting in condensation and possible moisture damage.



What should you do?

The best option: To get the most benefits from ceiling insulation, replace downlights with non-downlight fittings and fill in the hole in the insulation. You may be able to source a surface-mounted fitting which will cover and seal the downlight hole, or if you are undertaking major renovations, re-do the ceiling plasterboard.

In the meantime: Replace the old downlights with "CA-rated" downlights. These downlights allow insulation to be butted directly up to them ('closed abutted' or 'CA-rated'). They have an enclosed canister to stop the insulation being exposed to the heat from the bulb. However, you still cannot fit insulation over the top of the downlights. As well as changing the downlights, you should consider upgrading the ceiling insulation to a higher R-value to compensate for the lost warmth.

There is a range of CA-rated downlights available on the market. If you are not sure of the type you need, check with a registered electrical contractor. Further advice on alternative lighting options is available from www.rightlight.govt.nz.



Case studies show downlights reduce the performance of insulation

In a recent project, Beacon renovated and then monitored the performance of nine homes in Papakowhai, Porirua.

	Case study 1	Case study 2
No. of downlights	38 in living areas	47 throughout house
Coverage	1 downlight per 1.6m²	1 downlight per 1.2m²
Ceiling insulation level	R5.2	R4
Actual insulation level	R2.5 , less than the current Building Code minimums	R2.2 , less than current Building Code minimums
Temperature improvements	Low, improving only 1.1°C to a chilly average of 14.7°C	More heat was needed to maintain the temps in the living room having a direct impact on the electricity bill

Preparing for winter

Although it's still hot and sunny, it's time to start thinking ahead for winter. Our **March 09** newsletter gave a lot of information on weatherising your house, and this is a key activity you should get underway. If you've lost your copy of this newsletter you can download it from our website here: http://beaconpathway.co.nz/files/docs/Home_Smart_Renovations_homeowner_newsletter_Mar09.pdf

Autumn is a great time to check key weatherproofing systems in your house – the roof, your gutters, downpipes and windows. If you haven't yet installed a vapour barrier – and this is something recommended in your Renovation Plan, then it's a really good idea to prioritise getting this installed ahead of winter.

If you haven't yet accessed the EECA Warm Up New Zealand subsidies for insulation and heating, and plan to, now is also a good time to get into that programme and organising insulation and heating installation ahead of winter.

Find out more at:

<http://www.energywise.govt.nz/funding-available/insulation-and-clean-heating>

or phone 0800 749 782.



Cooling down in Auckland: Jeremy's story

When we moved to Auckland, we looked for a house which was facing north and sheltered from the southerly winds - based on our experience of living in Wellington. Little did we realise that one of our biggest problems was going to be in summer.

Summer came and so did the damp sticky heat. Our 1950s brick and tile house retained the heat really well, but its design meant there was no airflow. The house heated up and was still hot and airless at midnight – long sleepless nights followed!

When we renovated, we got lots of things wrong – but one thing we did get right was addressing summer heat.

We opened up the separate living room, dining room and kitchen, and instead of walls and windows, we put large opening doors at each end. In summer we have wide open doors opposite each other to capture the maximum breeze.

We were also concerned that about airflow while we were not in the house. All our windows have strong security stays which allow them to stay open all the time in summer. We also included shugs in the opening doors onto our deck – these are sliding windows included in the door frame. They can be left open with a gap at top and bottom when the doors are shut.



Probably the best thing we've ever done to cool our living area down is to increase the shading. We already had good eaves, but once the sun hit the windows, the temperatures soared. Over half our deck we had a large shade installed. It has the same material used in large marquees so does not reduce the light but is water-proof. It has a solid structure and does not flap like sails do. In effect it stops all but the latest afternoon sun entering the living area, and, as a bonus, provides an extension of our living space, even on wet days. We love it!



In each bedroom we have installed ceiling fans – for very little energy use, these make bedtimes bearable on muggy nights. We have also put in thermal curtains – as soon as the sun starts hitting the windows, we close these to keep it out. If we are going to be away all day over summer, we keep curtains on west-facing windows closed.



Overall we're very happy with our renovations from a summer point of view. Now we just have to sort out all those downlights we installed and now can't insulate over ...



In pursuit of a warm dry and efficient home – my home renovation

Looking back, I see that I last reported on the installation of my double glazed windows in September last year. At that time I expected them to be installed within the month! As it was, our busy tradespeople installed the first window in mid December, and our French doors were only put in a month ago - a story no doubt familiar to many of you.

But I have to say we are completely rapt about the result.

We've put in two different types of double glazing – reflecting our priority and our budget. On a draughty west-facing bedroom window, we have installed aluminium double glazing inserts in the existing window frame. We used this type also to replace a louvre window in our toilet. Our main reason for this approach was cost – it cost only \$400 for the toilet window, and \$1300 for the kitchen window.

We paid slightly extra (\$80 for the big window) for including low E glass; however, this has big thermal benefits, upping the R value (the insulation “factor”) from R0.26 to R0.31.

For the French doors, we decided that we'd pay the (significant) extra cost for a wooden frame which, combined with the low E glass, gives us an R value of R0.48. The outcome is fantastic – not only is our room warmer, it is also much more usable. We just have to save for the deck now!

Now that we have started to have cooler nights, we are feeling the difference – particularly in our bedroom. No longer are the windows radiating cold, with an intenseness that seems to suck all the

warmth from the room, and the whistling wind is gone.

In summer the new windows and French doors open much wider than the old ones, allowing a great breeze to blow through. And the inclusion of fly screens means that (in less security conscious Gisborne) we can leave our windows open day and night, without pesky flies or mosquitoes. This is a big help for cooling the house overnight in a hot summer.

And I am not just imagining it! My temperature sensors tell a good story too – the house has been cooler during the day than the previous two summers.

The real test, of course, will be winter – and I am hoping that, as well as helping reduce our hefty heating bill, I might wake up in the morning in my bedroom without the fear of getting out of bed because it's so cold.



Before and after – my draughty windows

Lois



Who is involved ...

... doing the research?

Beacon Pathway Ltd – we’re a research consortium dedicated to improving New Zealand’s houses. Government funding matches funds from our shareholders.

Key contact: Lois Easton

Phone 06 867 4458

Loise@beaconpathway.co.nz

CRESA – the Centre for Research and Social Assessment - is coordinating the monitoring and will be your main contact for surveys, homeowner agreements and monitoring.

BRANZ – the Building Research Association of New Zealand - will be undertaking the actual monitoring and analysis of how the homes perform.

Key contact: Nikki Buckett

Phone 04 238 1324

nikkibuckett@branz.co.nz

... doing the assessments?



Community Energy Action has done the initial Christchurch assessments. A charitable trust based in Christchurch, CEA is a leading installer of affordable insulation and offers a range of other home energy services.

Phone 03 374 5698

info@cea.co.nz



EcoMatters Environment Trust is doing the Auckland assessments and is finishing off the last Christchurch homes. EcoMatters is a charitable trust focused on sustainability initiatives.

Phone 09 826 4276

info@ecomatters.org.nz



Energy Options is a community owned organisation which is doing the Rotorua/ Taupo/ Marlborough assessments. They specialise in the retrofitting of insulation, renewable clean heating and solar energy solutions.

Phone 0800 151 561

info@energyoptions.org.nz



EnergySmart is undertaking the assessments in Wellington, Nelson, Dunedin and Invercargill. EnergySmart is a leading provider of energy efficient measures to New Zealand households across the country.

Phone 0800 777 111

info@energysmart.co.nz

... doing the renovations?

It’s your choice. Our partners, Community Energy Action, EcoMatters Environment Trust, Energy Options and EnergySmart are all experienced in energy efficiency improvements. They can help you with most energy renovations suggested in your HomeSmart Renovation Plan.

Or you can choose your own builder, plumber, or electrician to do the work for you.

