

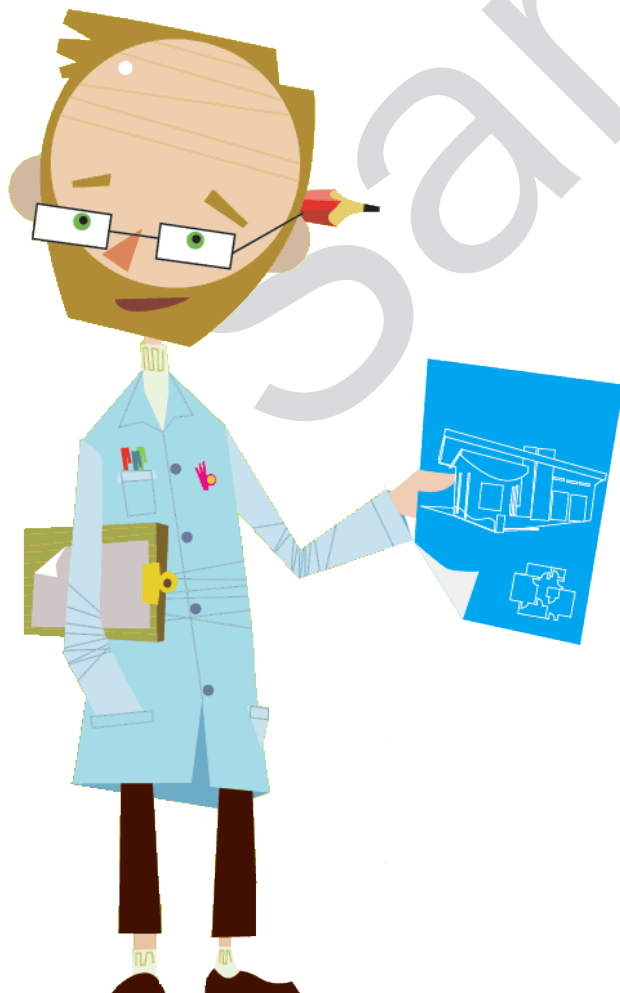
ENERGY ASSESSMENT REPORT

For
Mrs Right, Energy House
Rightsborough, New Zealand

Report Date: September 2008

Report Version: 1a

Project Id: Sample



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Dear Homeowner,

Thank you for considering a Right House for your home energy assessment.

We believe that we can offer you a unique service which will guarantee you the best possible comfort and energy efficiency performance analysis of your home. Our energy audits are fundamentally different from any other energy efficiency products and services which you may have seen before. Right House auditors consider all energy and comfort aspects of your home instead of only one or a few selected technologies.

The Right House Daisy on the right illustrates the four considerations affecting the performance of every Right House assessment. The **'Aspect'** has to do with the location of the house on the building site, access to sun and wind, and other location issues. **'Design'** deals with the building layout, access of rooms to solar gains and other features which allow you to harness the free natural energy resources. **'Passive Systems'** cover technologies that work by themselves such as insulation, advanced glazing, thermal mass and others. Finally **'Active Systems'** are the products and technologies which you will be familiar with through advertising from retailers, such as heat pumps, solar water heating systems, energy efficient appliances and others. At Right House we assess the optimum performance of these 'Active Systems' as a last step to complement the other three components.



This document is a customised report about you and your home. It covers the four aspects of our Right House Daisy. The report covers provides details of the thermal design features and advanced energy efficiency technologies we recommend for your home.

It is our intention to take complex issues and make it as straight forward as possible. We do this by presenting you the best options alongside their tangible benefits and any associated costs.

Once you have reviewed your report, Right House can provide solutions based on our recommendations, we look forward to supplying and installing all the specified systems and products to make the whole process as easy as possible for you. It is important for us to install the solution which you have selected because in that way we can ensure you receive the promised benefits.

We want you to live comfortably ever after!

Hamish Sisson
CEO, Right House



20 July 2008

Project Reference Number: 1234

Right House Energy Audit

For

Mr and Mrs Homeowner
80 Mystreet Road
My Town

Dear Mr and Mrs Homeowner

Re: Your Energy Audit

The Benefits of a Right House Home Energy Audit

Overview

A Right House auditor has visited your home to assess the energy efficiency of your house and appliances. We have assessed all aspects of your home including insulation, heating, hot water, lighting, and appliances. As a result we have now put together this report describing improvements you can make, whatever your budget.

Objectives

- Understand your energy consumption
- Reduce your environmental impact
- Lower your energy bill
- Find the best energy efficient solutions for your home and lifestyle

Deliverables

Your Right House auditor visits your home, follows a checklist to assess energy efficiency and delivers a report to you with our findings.

Turning our Recommendations into a Customised Solution

The Right House Solution delivers much more than simply supplying a product without consideration of the particular house design and interactions of sun, building and lifestyle. The specified active systems (heating, cooling, water heating etc.) make optimal use of passive design features.

There are costs for replacing conventional technologies with the energy efficient solutions. These costs occur in particular for better insulation, a more efficient hot water system, energy efficient appliances and more.

The benefits for energy efficient solutions include significant financial benefits; with lower running costs for your home; potential increased capital value for your home; and many non-financial benefits such as a warmer, dryer and healthier home.

Our aim is to ensure that your home is as comfortable as possible without costing the earth. Over the long term you will obviously also recoup the additional capital cost in ongoing energy savings.



Your House and Site Description

House Location:	80 Mystreet Road. My Town, Khandallah	
Age of the house:	1930's	
Floor area of the house:	200 m ²	
House Type:	Bungalow	Number of Levels: Two
Roof Type:	Low pitch hipped concrete tile	
Cladding:	Weatherboard	
Foundation/Floor:	Suspended Timber	

House features:

- A moderate open plan living/kitchen area with free standing gas fire.
- The house has four bedrooms over both floors.
- There is carpet through most of the house.
- There is a moderate amount of glazing all single glazed however there no sun during the winter for solar gains due to the location and vegetation around the house. The original parts of the house are all wood frame joinery.
- The house has been added on to over time which consists of the master bedroom and which includes aluminium joinery.
- The external construction consists of a rendered masonry ground floor and timber weatherboard first floor.



Key Issues and Priorities

The details of your house and site are contained in the previous section. This section summarises the information you have provided us about your key concerns and priorities for your home and family.

On 15 July our energy auditor undertook an energy audit of your property. This report outlines our findings and recommendations.

We have taken these factors into consideration in the specification of our Right House Solution.

If you would like to discuss any part of this report in detail or require assistance with the implementation of a recommendation in this report please call the energy auditor who undertook your energy audit.

In any event we will contact you within 2 weeks of the date of this report to discuss it with you.

YOUR KEY ISSUES FOR YOUR HOME ARE:

- Significant condensation problems
- Cold conditions throughout

YOUR HOME ENERGY CONSUMPTION:

The average New Zealand house uses approximately 8,000 – 10,000 kWh of electricity each year.

You have told us that your monthly average home energy consumption is:

Gas:	<100kWh>average summer	<1,000kWh >average winter
Electricity:	<350kWh>average summer	<800kWh>average winter

Your Overall Assessment

Based on the recommendations outlined above, we believe that an energy efficiency management plan for your household should include the following activities:

The audit of your home has shown that structurally your home could use some improvements from an energy efficiency perspective.

Recommendations in order of priority:

1. Add Ceiling Insulation and refit existing – Estimated Cost \$2,000
2. Add Underfloor Insulation to back of house where accessible – Estimated Cost \$800
3. Improve Draught Proofing on windows and doors– Estimated Cost \$500
4. Install thermally lined curtains on all windows and glass doors – Estimated Cost \$2 – 5,000
5. Improve Water Heating and Water Use Efficiency – Estimated Cost \$500
 - a. Low Flow Shower Heads
 - b. Repair and extend pipe lagging
6. Improve Space Heating by adding two small heat pumps downstairs– Estimated Cost \$7,000-9,000
7. Consider a True HRV System to treat condensation – Estimated Cost \$3,000
 - a. Vent dryer to the outside
8. Replace incandescent bulbs with energy efficient bulbs – Estimated Cost \$200 – 400
 - a. Replace halogen downlights with LED
 - b. Replace the remaining incandescent bulbs with CFL
9. Assess the surrounding vegetation to assist in winter sun access

Other issues that you might consider to help keep your power bills to a minimum are: When purchasing appliances, look for Star Rating Labels and the ENERGY STAR mark - the more stars, the more energy efficient to run they are. The ENERGY STAR mark tells you which are the most efficient. More efficient appliances will cost more upfront but will be cheaper to run.

Don't leave your electrical appliances on stand-by - switch them off! - standby costs the average New Zealand home \$75 per year. Put timers on appliances like towel rails or switch them off during the day.

Think about replacing the light bulbs you use most often - energy efficient bulbs come in a variety of shapes and sizes to meet the needs of most households.

Think about how you use energy in the home. Use it smarter and you will save more!



Recommendations

1. INSULATION:

CEILING INSULATION

<p>No / <75mm / poor ceiling insulation present - easy access</p>	<p><i>Recommendation - Install ceiling insulation. (Main House)</i></p> <p>A large portion of the heat in your home is escaping through the ceiling. Well fitted insulation in the roof space will trap that heat, making it easier and cheaper to heat your home. You'll also reduce mould and mildew and make your home healthier. Access to the roof space in your property is good.</p> <p>The recommended minimum 'R-value' of the insulation product is R2.6 if you are in the North Island (except Central Plateau) and R3.2 if you are in the South Island and Central Plateau. NZS4246 "Energy efficiency - Installing insulation in residential buildings" provides information about health-and-safety requirements and best-practice installation methods.</p>
<p>No / <75mm / poor ceiling insulation present - no access without lifting the roof</p>	<p><i>Recommendation - Install ceiling insulation. (Flat roof area of house extension)</i></p> <p>A large portion of the heat in your home is escaping through the ceiling. Well fitted insulation in the roof space will trap that heat, making it easier and cheaper to heat your home. You'll also reduce mould and mildew and make your home healthier.</p> <p>Unfortunately, in properties like yours where either there is no roof space or no access, installing insulation is extremely difficult – unless you're at a stage where you need to re-clad the roof or re-line the ceiling in your house.</p>



Photo of accessible ceiling space. The existing insulation has been disturbed over the years and has also settled reducing its insulation value.

WALL INSULATION

Unknown wall insulation

Recommendation - Insulate walls where alterations or redecorating are planned or if external cladding needs to be replaced.

1. *Where accessible insulate external walls of the ground floor bedrooms in the storage area*

Your house was built before 1977 it will almost certainly not have insulation in the walls. When you're doing alterations that involve removing internal linings, when you're re-decorating or when you're planning to replace the cladding (weatherboards) on large areas of the house (Remember – it's important to replace the building paper as well!) make sure you insulate your walls. Wall insulation traps heat, making the home easier to heat. It also stops dampness and mould from forming on the walls. Remember it is only the walls that face the outside (ie. external walls) that need insulating. Cost depends on the product you choose and its 'R-value'.

Choose an insulation product with a high R-value and the same thickness as the wall cavity. NZS4246 "Energy efficiency - Installing insulation in residential buildings" provides information about health-and-safety requirements and best-practice installation methods.

UNDERFLOOR INSULATION

No / Some / Poor underfloor insulation – partial access easy or difficult

Recommendation – Insulate under your floor and replace the foil layer

1. *Where accessible add underfloor insulation*
2. *Replace foil under the master bedroom with batts insulation*

Installing insulation under the floor will make your house easier to heat and generally means a more comfortable home. Underfloor insulation also greatly reduces the amount of moisture rising into your home and thereby helps prevent mildew and mould growth. By stopping that cold coming in it provides greater warmth close to the floor, particularly effective for keeping your feet warm and where there are small children and elderly people. It is particularly effective where the underfloor area is exposed to winds which cause draughts and increase heat loss through the floors. Carpets and underlay provide some extra insulation. Installing underfloor insulation is not recommended for DIY. It is difficult to install well and there are safety issues involved, making it speciality work. Underfloor insulation is best fitted by a professional.

Unfortunately, in properties like yours where either there is no subfloor space in some areas of the house, installing insulation is extremely difficult – unless you're at a stage where you need to replace the flooring in your house. However, insulation could be installed in some places where access is possible.



Photo of accessible area that would benefit from underfloor insulation. This is directly under the hallway, bathroom entry and kitchen.



Photo of the foil layer directly below the master bedroom. The installed foil is not effective and needs to be replaced. The foil should be fit flat across the floor joists with no draping.

2. WINDOWS:

<p>Single glazing only / no double glazing</p>	<p><i>Recommendation - Replace existing windows with double glazing or fit other double-glazing product.</i></p> <p>Glass has no heat retention value on its own. And if you've already insulated the ceiling, walls and underfloor, around 50% of your heat loss is through single-glazed windows. Double glazing will reduce this loss by half. It will reduce the direct coldness you feel when you're next to single glazed windows during the winter. It will also stop condensation on your windows. And it has the added benefits of reducing noise and adding to the value of your property. Double glazing needs to be done by a professional glazing company, preferably one that specialises in retrofitting double glazing into homes. Retrofitting with double glazing is the best way to reduce heat loss through single glazed windows. However, it is also the most expensive option. If the cost is holding you back, you may want to consider retrofitting only certain windows.</p> <p>Choose rooms that you heat most (probably the living areas), or those where condensation problems are worst. If you are still discouraged by the expense, install thermal-lined curtains that neatly touch the walls along the sides and touch the floor at the bottom.</p>
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3. DRAUGHT PROOFING:

<p>No window or door draught-proofing</p>	<p><i>Recommendation – Install weather-stripping around windows and doors and draught stoppers at the bottom of the external doors.</i></p> <ol style="list-style-type: none"> 1. <i>There are several windows that have broken or ineffective latches for closure</i> 2. <i>Many of the wood framed windows do not close tightly or close with significant gaps</i> 3. <i>Many of the windows do not have curtains and it is recommended that curtains be installed to assist in the reduction of heat loss</i> 4. <i>Keep door to laundry closed to the downstairs bedroom</i> <p>Gaps around your doors and windows are creating draughts that are both unhealthy and uncomfortable. The cold air that comes in through the cracks is forcing out the warm air you have paid to heat. Draught-proofing windows with self adhesive weather-strips and installing draught stoppers onto external doors will eliminate these unhealthy and uncomfortable draughts, and help keep your home heating costs down. Draught excluders and weather strips are cheap and easy to install - a classic and simple DIY job because it mainly involves time, rather than skill and equipment. Measure the size of the gaps to seal and check out your local DIY store for appropriate products. It is important to clean the area around the windows and doors where you are going to apply the self-adhesive product. If you are only heating one room of your house consider a draught stopper "brush" to block the gap at the bottom of internal doors.</p>
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Photo of ground floor rear door which has a significant gap particularly around the door catch and does not close tightly.



Photos of broken window clasps that do not allow the windows to be closed tightly and blown open when windy. There are also significant gaps around the windows.

4. HOT WATER SYSTEM:

New cylinder or cylinder wrap installed	<i>Well Done - Your existing cylinder insulation is appropriate for your installation.</i>
Old or Incomplete lagging on pipes	<i>Recommendation - Install lagging on the first two metres of exposed pipework.</i> Hot water pipes lose heat rapidly if they are not insulated. You should install foam or insulation lagging around the first meter of hot water delivery piping (if access is limited at least as far as you can reach from your cylinder cupboard).
High shower flow rate (>10 litres/min)	<i>Recommendation - Install an efficient AAA shower head.</i> Installing a water-efficient showerhead will help prevent you running out of hot water, save money on energy bills and give you a better shower by delivering a stronger but finer spray. It will use less than 6-9 litres of water a minute, compared with 10 - 20 litres for an ordinary showerhead. Most new showerheads for sale now are water-efficient showerheads - look for the AAA water rating. They are easy to install and can be used on all pressure systems. Even if you bring in a plumber it is a very good investment.

5. SPACE HEATING:

Electricity for heating but not a heat pump	<i>Recommendation - Consider installing a heat pump.</i> <ol style="list-style-type: none">1. Small heat pump unit in hallway2. Second small heat pump unit downstairs, possibly two one in each bedroom <p>Have you thought about installing a heat pump for heat in winter and cooling in summer? Heat pumps are one of the most efficient forms of heating available on the market. The best 6 star heat pumps can produce up to five times more heat than conventional electric heaters per kWh electricity. This is energy efficiency at its best. A 4 star heat pump will not perform as well as a 6 star unit; however it will still be far more efficient than conventional electric heaters.</p> <p>Like any heater you will need a heat pump that is suitable for your house. Make sure you purchase a unit with a high star rating and have it sized correctly for your home. Choose one with the blue Energy Star mark on it to be sure of getting maximum savings and performance. For more information go to http://www.eeca.govt.nz and follow Products & Appliances to Heating & Cooling.</p>
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6. MOISTURE AND CONDENSATION:

Moisture / condensation / mould problems	<i>Recommendation – Replace the existing ineffective DVS system with a true HRV system</i> A damp house is harder and therefore more expensive to heat. Moisture in the air creates condensation on windows and walls as it cools. It's all about minimising the moisture released and replacing moist air from inside the home with fresh dry air from outside. The latter can be achieved most effectively by the right balance of heating and ventilation. Heat your house to a minimum of 18 °C and air your rooms frequently for a few minutes with wide open doors and windows. A significant amount of the moisture in your home comes directly from cooking or boiling water. A rangehood helps eliminate steam, directly reducing the amount of moisture and solving problems with condensation, mould and mildew. Make sure the ducting is to the outside of the house and not into the roof space. Showers and baths also create a lot of moisture in your home. A correctly sized and installed extractor fan helps eliminate steam, directly reducing the amount of moisture and solving problems with condensation, mould and mildew. Again make sure the ducting is to the outside of the house and not into the roof space. It should be either out through the eaves, roof or through the wall. If you have a clothes dryer it should also be vented to the outside. Some types of heating can release high amounts of moisture - unflued gas heaters are a particular problem. Reduce moisture getting into your home by keeping the subfloor space dry - keep vents clear from debris and plants, check your pipes are draining properly and not leaking. If you live in a damp area a ground vapour barrier might be required. It acts as a barrier
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to the moisture evaporating and coming into our house. It reduces moisture in your home, helping to prevent mould and mildew while making your home easier to heat. This can be a DIY job, however it is difficult to ensure there are no gaps and the polythene fits tightly round the piles. We recommend you have it installed by an expert.



Photo of condensation on the master bedroom windows.

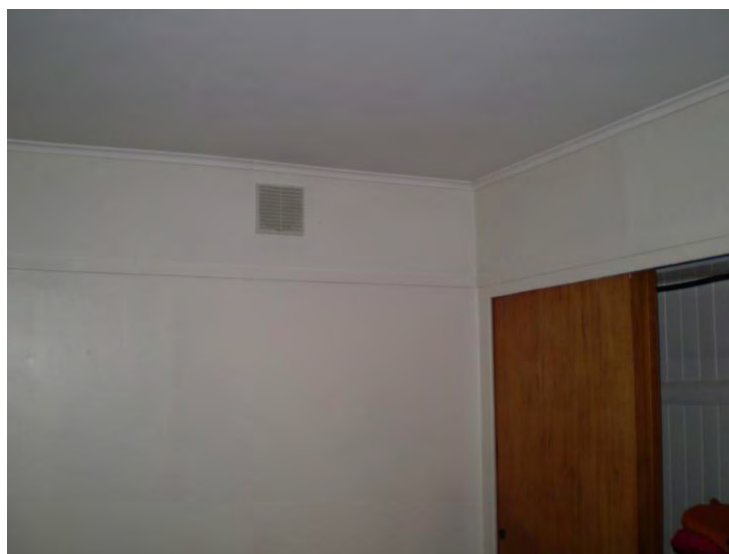


Photo of the duct outlet from the DVS system in the ground floor bedroom. This vent is too small for the size of the room and not contributing enough air flow



Photo showing the laundry room/ensuite directly off the ground floor bedroom. The dryer and shower should be vented to the outside. This is adding to internal moisture content.

7. LIGHTING:

<p>None or only some energy efficient light bulbs</p>	<p><i>Recommendation – Fit energy-efficient light bulbs.</i></p> <ol style="list-style-type: none"> 1. LED halogen replacement 2. CFL for incandescent <p>Approximately 10% of your energy use is for lighting. You can reduce that dramatically with energy-efficient compact fluorescent light bulbs. Compared to standard light bulbs, they use about a fifth of the energy, while producing the same amount of light. They also last up to ten times longer. If you have recessed lights and heat lamps think about replacing them. They use a lot of energy and cannot be covered with insulation material, making the ceiling insulation less effective. Or buy ones that are sealed and use compact fluorescent bulbs.</p> <p>Compact fluorescent bulbs are now also available for recessed downlights, however, as they operate on 240V you may need an electrician to change your wiring.</p>
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8. ENERGY CONSUMPTION:

<p>Power bill relatively high</p>	<p>The power bills you showed the auditor indicated that you have a relatively high power usage. The average New Zealand household spends \$1,200 per year on home energy. Some of this is fixed costs, and the rest is costs associated with how many units of energy are used. New Zealand households using electricity for hot water and space heating are estimated to use: 7,700 kWh per year (1-2 people households); 11,000 kWh per year (3-4 people households); 16,000 kWh per year (5 or more people households).</p> <p>Right House can help you plan the steps you can take to reduce your energy bills. It doesn't have to be at the expense of your comfort. Many measures are free or low cost.</p>
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Your Right House Solution

As a result of your home energy audit, Right House can help you in developing a strategy and solution for your home to address the key issues and recommendations.

Right House have a wide range of products and systems as part of our services and based on this we are able to develop well integrated solutions for you to choose from.

From our assessment we recommend the Right House 'Preference Solution' as the option which best accommodates your needs and key issues for improvement. We can include multiple options, to ensure you receive a solution that is appropriate for you and within your budget.

Because the various components are closely integrated it is generally not possible to drop individual components without affecting the overall building performance. However, we are happy to assist you to develop alternative solutions if the suggested solutions do not suit your needs or your budget.

What to do next

Once you are happy with the Right House Solution, we will create a Specification and Quotation Acceptance Form for you to sign. The Specification and Quotation Acceptance Form will contain full details of the specified systems and products as well as information for your builder.

Then all you have to do is tell your builder/architect or designer that you would like to include the Right House Solution as part of your building specifications.

Finally you need to provide us with the contact details of your designer so that we can arrange the timing of the installation of the Right House Solution with the rest of the building schedule.

We'll do the rest, keeping you informed on all the stages of the project

Thank you for the opportunity of preparing this energy audit and we look forward to working with you to implement the recommendations outlined in this report. Please feel free to get in touch with me if you have any questions about this report.

Ken Rice

Your personal Right House consultant

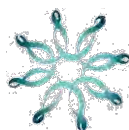
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