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LOW CARBON LIVING CRC

Project SP0019p6:
Guide to Low Carbon Households

Friends of Industry Forum:

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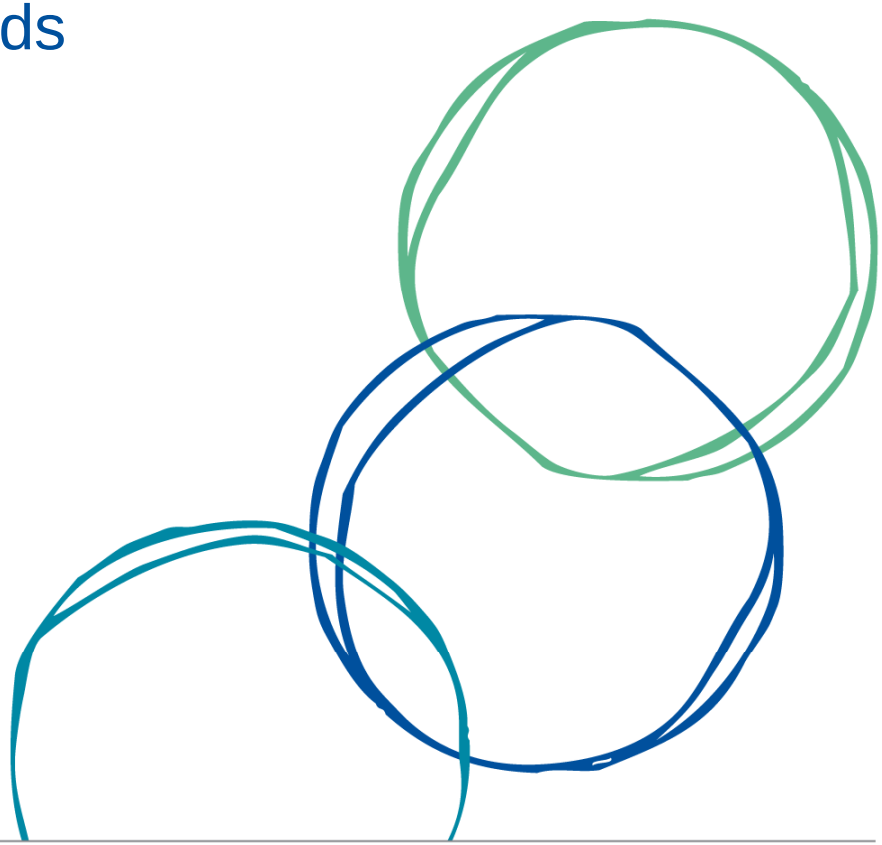

Guide Series: 6

A guide for every situation

Each Low Carbon Guide summarises best practice in various phases of the building lifecycle—construction, retrofit, operation—for a range of building types in the residential and commercial sectors and at the level of precincts. The series includes:

Guide to Low Carbon Residential Buildings – New Build
Options for homeowners, builders and designers during the planning and construction of new homes.

Guide to Low Carbon Residential Buildings – Retrofit
Retrofit solutions for existing homes, tailored for homeowners and their contractors.

Guide to Low Carbon Households
Advice to homeowners and renters on operating households using low carbon living approaches.

Guide to Low Carbon Commercial Buildings – New Build
The design and construction of low carbon commercial buildings.

Guide to Low Carbon Commercial Buildings – Retrofit
Methods for retrofitting commercial buildings to improve performance while reducing energy and carbon use.

Guide to Low Carbon Precincts
Frameworks and options for councils and developers when planning and implementing low-carbon neighbourhoods.

Further Guides cover Landscape, Urban Cooling, Value-chain and other topics.

For further information go to: builtbetter.org/lowcarbonguides

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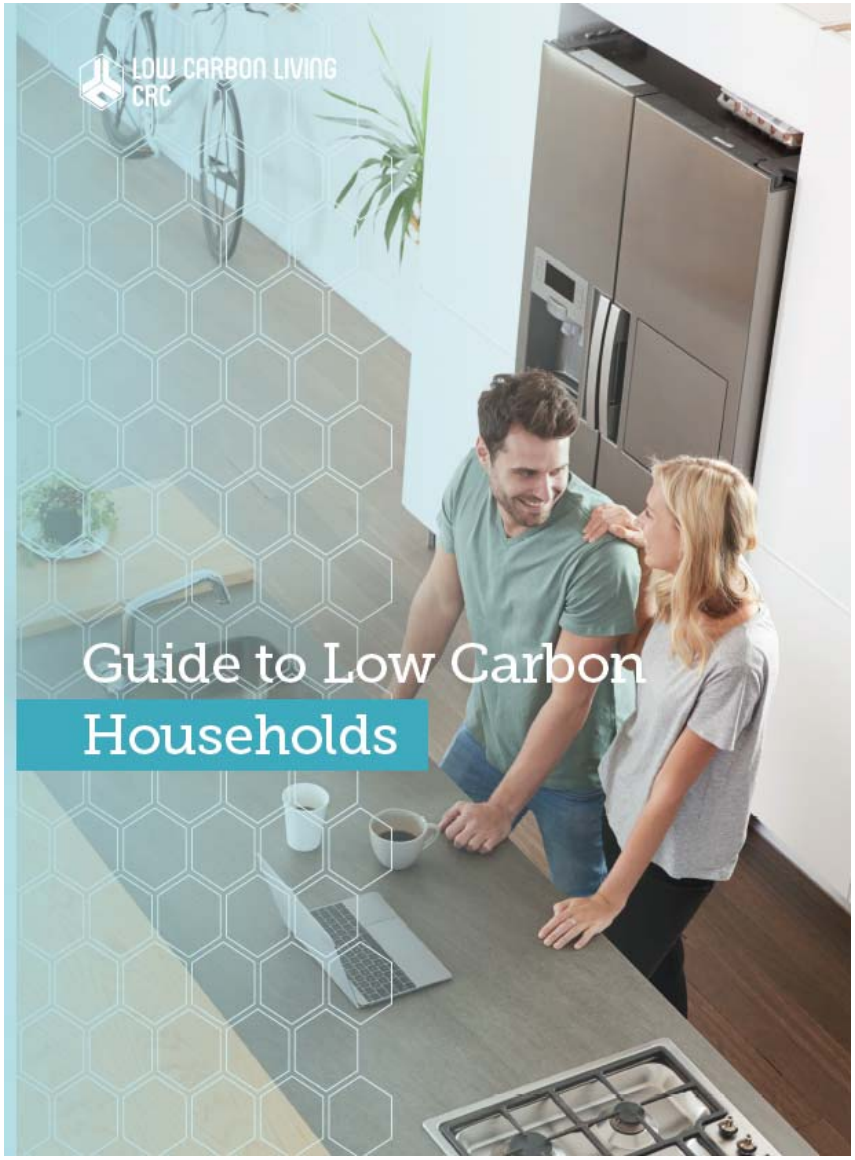
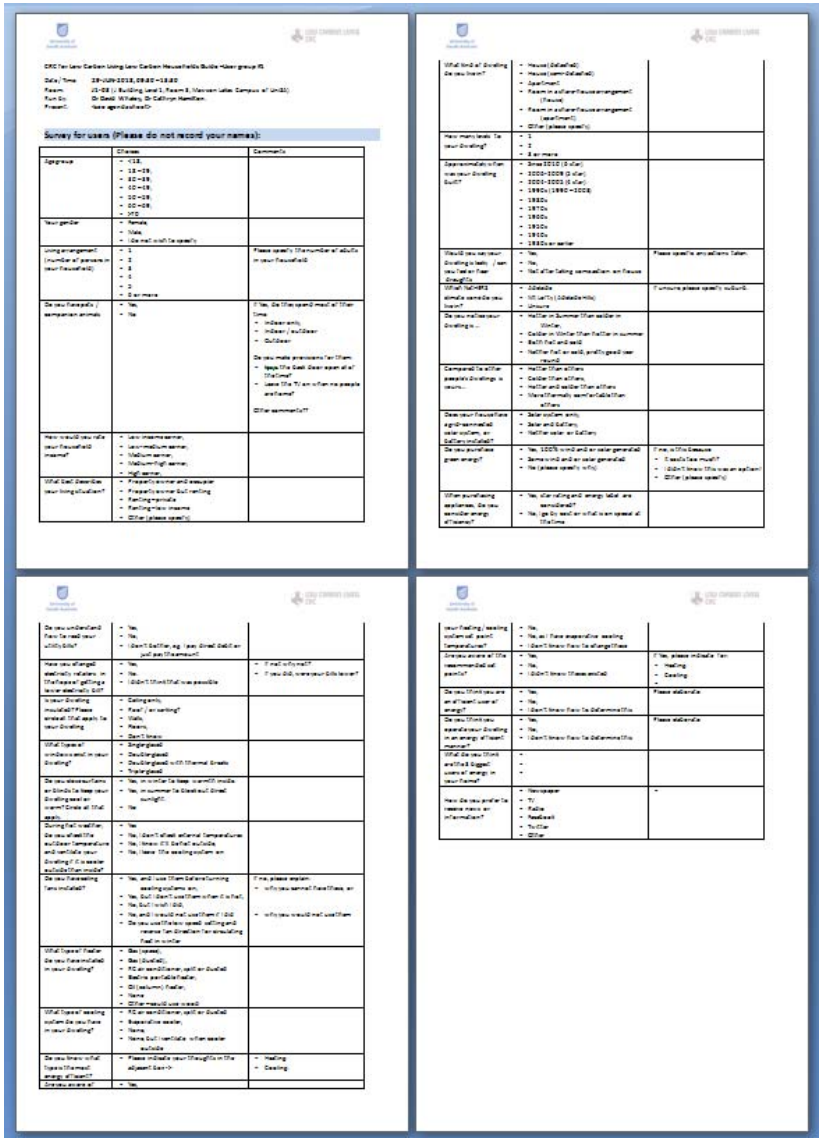
Overview of this guide

- Aims to help occupants of a home reduce amount of energy they use and, help curb carbon emissions and save on bills.
- Easy to read 67-page user guide on low-carbon and comfortable living, within an existing dwelling
- Gives examples of energy and cost savings by changing behaviour (unplug 2nd fridge)
- Gives tables of easy->more difficult actions to take that can save you energy, emissions



Overview of Project

- Recruited steering group of industry experts, and user groups to gain understanding of people want included. Presented at:
  - Friends of Lochiel Park Group,
  - ATA (now Renew) event.
- Ran a number of workshops:
  - Researcher Group,
  - User Group x 2
  - Steering Group x 6
- Surveyed and interviewed user group and steering group members
- Steering and user groups provided feedback regarding content and level of writing

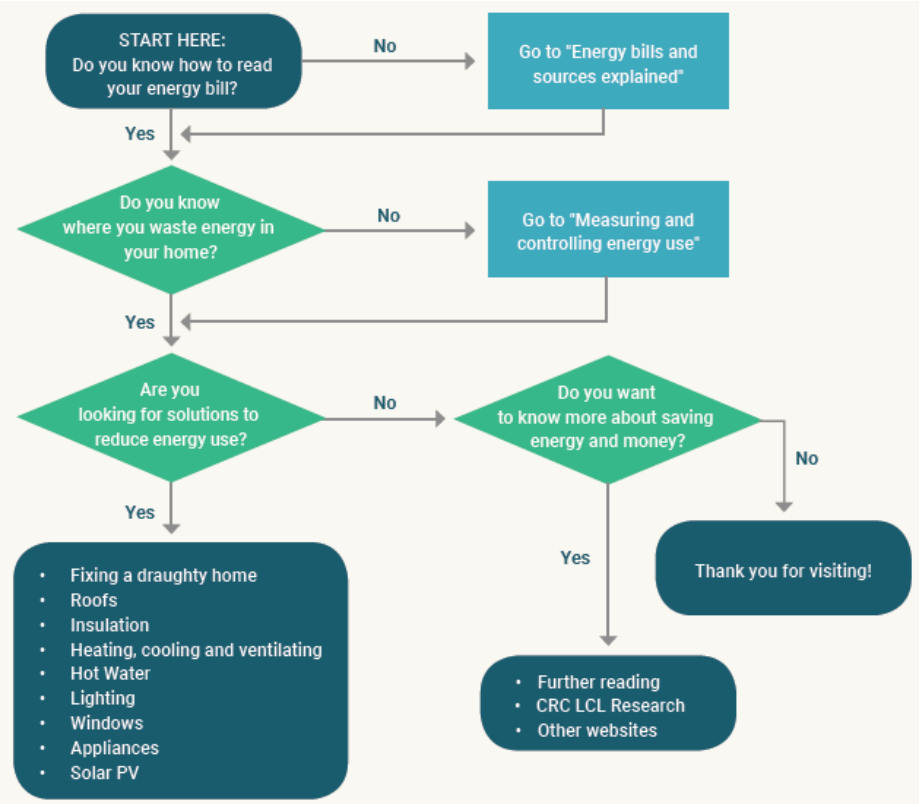


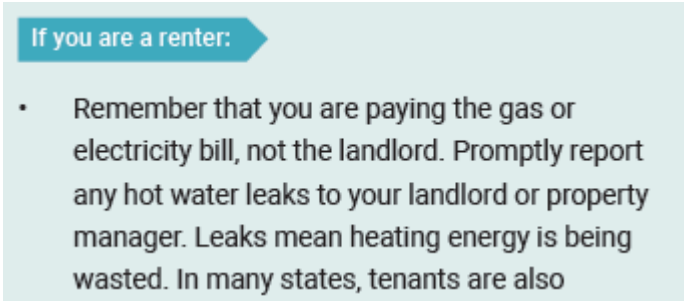
Guide Contents

- Energy bills and sources explained
- Measuring / controlling energy use
- Reducing energy use
- Heating, cooling and ventilation
- Water heating
- Appliances
- Lighting
- Further reading

- Where to start flowchart

- Options for renters





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Information about your Bill and Concessions

Bill concessions – are you eligible?
The Australian Government website yourenergysavings.gov.au can help you search for rebates and incentive programs. A summary of concessional rebates available in each state/territory is shown in the table below. If you are entitled to a concession, contact your retailer.

State/Territory	Concessional rebate information as at 31 July 2018
Australian Capital Territory (ACT)	actsmart.act.gov.au • Energy concession • Emergency relief voucher
New South Wales (NSW)	energy.nsw.gov.au • Low income household rebate • Life support rebate • Medical energy rebate • Family energy rebate • NSW gas rebate • Energy accounts payment assistance scheme
Northern Territory (NT)	powerwater.com.au • Pensioner and carer concessions
Queensland (QLD)	qld.gov.au and for regional customers energymadeeasy.gov.au • Energy rebate • Medical cooling and heating electricity concession scheme • Electricity life support • Home emergency assistance scheme
South Australia (SA)	sa.gov.au • Energy bill concession • Emergency financial assistance • Medical heating and cooling concession
Tasmania (TAS)	auroraenergy.com.au and momentumenergy.com.au • Annual electricity concession • Life support concession • Medical cooling concession
Victoria (VIC)	sustainability.vic.gov.au • Life support concession • Medical cooling concession • Service to property charge concession • Controlled load electricity concession • Annual electricity concession • Excess energy concession • Transfer fee waiver concession • Utility relief grant scheme (URGS) • Winter gas concession
Western Australia (WA)	erawa.com.au and synergy.net.au • Energy assistance payment • Hardship utilities grant scheme • Dependent child rebate • Account establishment fee rebate • Air conditioning rebate • Life support equipment electricity subsidy • Thermoregulatory dysfunction energy subsidy

Example of Measuring Standby & Operational Power

Figure 2.2 A power meter measuring the standby power drawn by a smart power board (0.8W) and a smart kettle (2.39kW). Source: DM Whaley

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Energy and Cost Saving example – Standby Power

How much are you paying for standby power?

You have many new* appliances that are permanently switched on at the wall. Excluding the fridge/freezer and security system, which must remain on at all times, all other appliances** are wasting energy by drawing standby power. The following chart shows the amount of standby power (W) used by appliances.

Appliance	Standby Power (W)	Appliance	Standby Power (W)	Appliance	Standby Power (W)
Amplifier 1	0.7	Kettle	0.3	Printer	1.3
Amplifier 2	6.5	LCD screen	0.7	Rain water tank pump	1.2
Coffee machine	0.2	Microwave	1.6	Toaster	0.4
Desktop computer	1.1	Milk frother	0.7	TV	0.2
Dishwasher	0.4	Panel lift door	2.2	Washing machine	0.2
Electric toothbrush	1.2	PC speakers	8.1	Water heater pad	9.7
External HDD	2.2	PlayStation 3	0.4	Total	39.3

* New appliances are more tightly regulated than older appliances and therefore draw smaller amounts of standby power.
** Ducted and split-system air conditioners also draw standby power, but these are difficult to measure. Turning the circuit breaker on and off regularly can be inconvenient.

In the above example, the total standby energy used over one year is 344.2kWh. That is a lot of wasted energy. To calculate how much standby power your household is using, find your electricity tariff on your bill and match it to the table below.

Electricity tariff (c/kWh)	20	25	30	35	40	45	50
Standby energy cost (per year)	$68.85	$86.07	$103.28	$120.49	$137.71	$154.92	$172.13

Source: DM Whaley

Energy and Cost Saving example – Energy Efficient A/C

Is upgrading your air conditioner worth it?

Can replacing an old two-star reverse-cycle air conditioner with a new six-star* system *really* save you energy and money? The short answer is yes, and it's probably a lot more than you think. But it depends on a few variables:

- the purchase cost of the new system
- your climate zone and whether you need heating, cooling, or both
- the efficiencies of the new system and how often it is used
- the age, build quality and thermal rating** of your home
- the cost of electricity.

The figures listed below are based on anticipated heating/cooling requirements over a typical year for a 30-year-old house located in either Darwin, Brisbane, Perth or Hobart. To make the comparison fair, the home is the same size*** and has the same thermal performance**,*** rating in each city.

To see how much you could save each year by upgrading to a six-star system, locate your current unit of electricity cost on your electricity bill and consult the table below. If, for example, you live in Darwin and are paying 35c/kWh for electricity, the six-star air conditioner would save you $1,403 a year in running costs, when compared to the two-star option. The same house in Hobart would save $1,074.

Even after accounting for the upfront costs of purchase and installation and the payback period, the six-star air conditioner is a worthwhile investment.

Electricity tariff (c/kWh)	20	25	30	35	40	45	50
$ saved							
Darwin	$802.00	$1,002.51	$1,203.01	$1,403.51	$1,604.01	$1,804.51	$2,005.01
Brisbane	$172.04	$215.04	$258.05	$301.06	$344.07	$387.08	$430.09
Perth	$310.05	$387.56	$465.07	$542.58	$620.09	$697.60	$775.11
Hobart	$613.95	$767.43	$920.92	$1,074.41	$1,227.89	$1,381.38	$1,534.87

Source: DM Whaley

* The air conditioner star ratings of 2 or 6, apply for both cooling and heating modes.
** For more information visit the nationwide house energy rating scheme website nathers.gov.au
*** House has a floor area of 196m², and is equivalent to two stars, in each climate zone.

Examples of Where Energy is wasted in a home

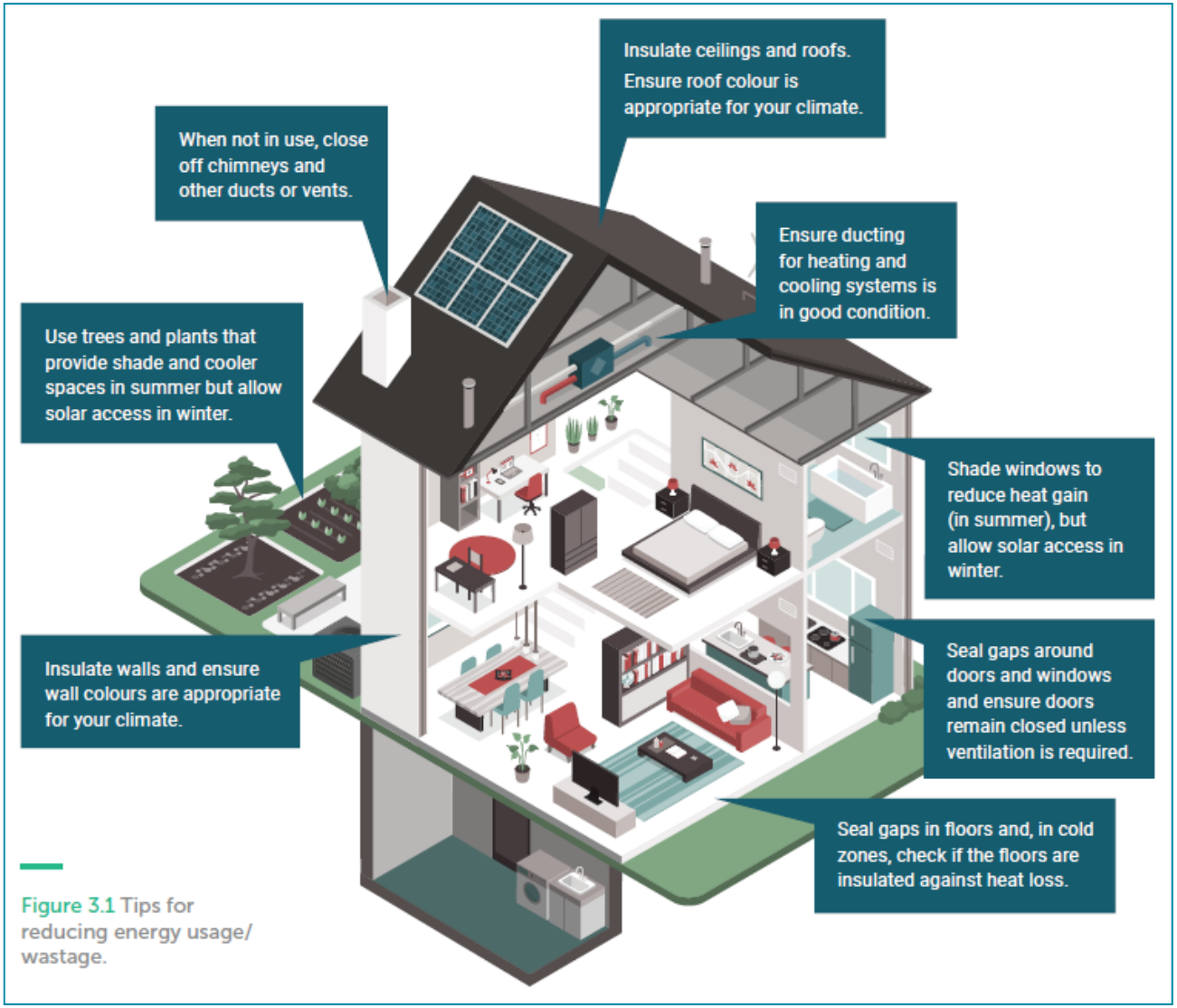

Figure 3.1 Tips for reducing energy usage/ wastage.

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Examples of Thermal Imaging, and what it may reveal

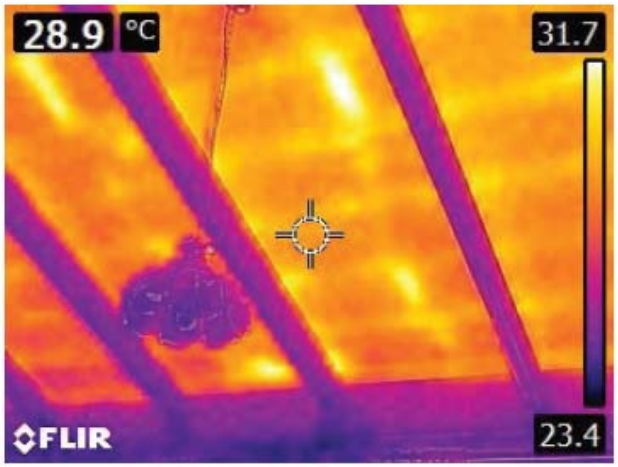

Figure 3.5 How a thermal camera captures lack of insulation and heat gain in a roof line.
Source: DM Whaley

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Action Tables – one example

- Understand your energy usage
- Improve air tightness
- Reduce energy:
  - Heating
  - Cooling
  - Hot water
  - Standby
  - Kitchen
  - Laundry
  - Home Office
  - Lighting

Actions to minimise the need for cooling energy in summer

Simple actions →			Harder/more costly actions
Close curtains and blinds to stop heat entering the home during the day.	Lower shades on external windows to block the sun. If windows face east, shade in the morning; north, shade all day; and west, shade in the afternoon and evening.		
Use pedestal and ceiling fans instead of air conditioners, particularly at night.	Try fans for 5-10 minutes before turning on the AC. Sometimes the movement of air is enough.		
Cool one space at a time rather than the whole home–cool living areas during the day and bedrooms at night. Use zones if you have a ducted system.	Ensure heating ducts are covered or closed during summer to reduce air leakage.	Inspect ductwork to ensure cooled air is not leaking into roof space; replace ductwork as required.	Regularly service air conditioner units, ducting and pumps to ensure they are operating efficiently.
Use a door snake to reduce loss of cooled air from a room (applies only to split system or refrigerated unit, not evaporative unit).	Direct cool air from evaporative units into adjacent rooms.	Plant gardens on the south side of a home where AC units or vents are located to draw in cooler air.	
Wait until outdoor temperature is lower than indoor temperature to open doors and windows.	Set temperature on thermostat to no less than 23°C–higher if possible–and only reduce if needed.		

Thank you

Available at builtbetter.org/lowcarbonguides