

LED-ing the way to energy efficiency



In the second part of his report on green energy, Jerry Tyrrell turns his attention to photovoltaic installations, energy savings from LED lighting and other methods for reducing energy use.

In the last issue we looked at how photovoltaic (PV) technology works, and now we need to drill down to what happens on site.

At the moment several problems are being solved:

- Storing daytime power for night use is expensive. Battery efficiency will improve but it still requires major global investment and teamwork.

- Appliances are being redesigned from the very beginning to maximise efficiency.
- Cable size increases for long runs of low voltage, so planning a lighting layout is important. On the practical side, the best way to get a reliable installation is to use known brands and an experienced installer.

With most services you get what you pay for. Reputable companies generally offer a five-year basic warranty and 25-year warranty on the operation of the PV panels themselves.

Some people are concerned about the appearance of panels from the street. However, this is the best thing your roof should be 'wearing' for the next few decades – so show it off.

The diagram on page 24 shows the main installation tips.

LED lighting

Wikipedia describes a light-emitting diode lamp as a solid-state unit that uses LEDs as the source of light.

Because the light output of individual LEDs is small compared with incandescent and compact fluorescent lamps, multiple diodes are used.

LED lights have many advantages, including:

- High energy efficiency.
- Resistance to shock and impact.
- Operational life of 35,000 to 50,000 hours.
- The light dims slowly rather than failing suddenly.
- Frequency of switching has no effect. ➤

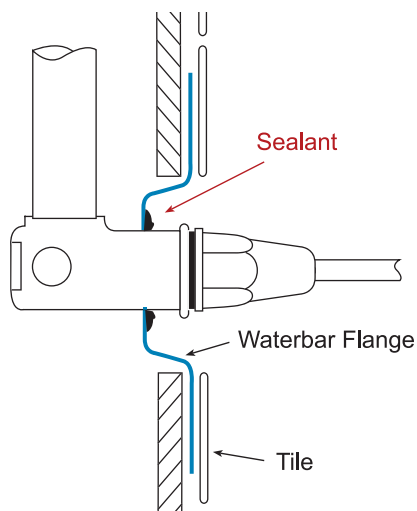


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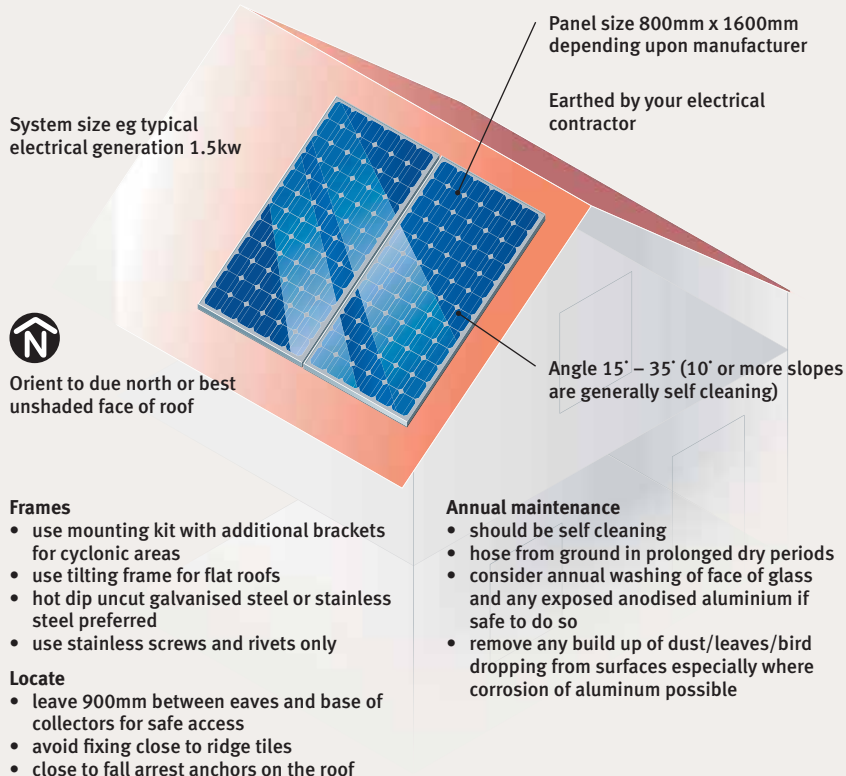
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Typical residential PV installation

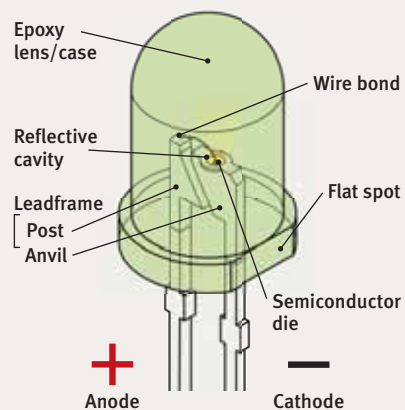


- Dimming is easy (not so for incandescent light replacements).
 - Up to 90% saving on electricity costs.
 - Much less heat than conventional lighting (saving on space-cooling costs).
 - Help to meet BASIX efficiency requirements in new homes.
 - Contain no hazardous mercury.
 - Produce more light per watt than incandescent bulbs.
 - Create much lower carbon emissions.
- Yet there are some teething troubles. LED lights are still expensive, and when a light fails you may need to replace the entire fitting (not a problem if it lasts 20 years and you want a style change).
- LED light used to be bluish and cold. However, the standard lamp recommended is now a warm white and quite acceptable for interior use.

There are replacement LED lamps for most conventional fittings of

incandescent bulbs, halogen downlights and fluorescent tubes. Wouldn't this make a great Christmas present for your entire household – change every light to LEDs?

LED bulb description



It starts with design

Prevention is the best way of avoiding mistakes. Well, we are not preventing excessive energy use in most appliances.

Fridges and heaters are the biggest culprits. And I have not seen one manufacturer step up to the plate with a grand plan to revolutionise their products using energy-efficient design principles and education.

The first step is shading and insulation of those bits of the house Peter Garrett has insulated.

For example, reflective film on western windows, sun shades on northern windows and sealing those obvious winter heat loss gaps in external walls.

Now to appliances. Why isn't there a closer on fridge doors? Is there a better way to retain cold in the fridge when the door is being opened? Why hasn't some smartie really worked on some space-age insulation? How can the heat from the compressor be used to preheat hot water?

Heaters and air-conditioning units are just as bad, although inverters have reduced energy use in modern air-conditioners.

One opportunity for free heating still has me stumped. I've crawled in roofs during 30 years or more. Often in 45° heat in winter under dark tiles.

Why hasn't someone worked out a simple way of ducting this heat down and across the ground-floor slab during the day? Or at least into the laundry or drying area?

This roof heat is clear, free energy, but it has to be drawn from the top of the roof to limit dust intake.

Photovoltaic and LED technology offer two immediate benefits to every new building project. Both will save money and carbon over the life of the building.

Other practical options will be driven by all of us: by the builder who suggests louvre windows to the client or places a self-sealing extractor fan in the apex of a raked ceiling.

Or the builder could stop and learn about thermal mass, and use the correct eaves width to get all the sun needed in mid-winter to heat the building.

Lighting is changing

I look at some of the best homes in Australia, and certainly all the best project homes. Designers are taking lighting very seriously. In the past it used to be 'one light fits all'. Not any more. The buzz words are 'mood' and 'task' lighting.

What designers do is this: they fit enough ceiling lights for people to see their way around at night. Just a little more than absolutely necessary. Lighting is soft and dimmable in family rooms or home theatres.

The secret of each space is the added task lighting – individual lights for specific purpose. Ideas include lights in the entry hall, specialist lights in bulkheads, strip LEDs under the kitchen wall cupboards to wash the benchtops, good desk and standard lights, higher lighting levels in dressing rooms, warm intense make-up/shaving lights on both sides of ensuite and bathroom mirrors, footlights above all external stairs and finally spot uplights to show off the landscaping.

An invitation for LED replacements?

Battery assault

I have invested in property all my life. But if I didn't, I'd put a bundle of money into rechargeable battery technology. The company that cracks this little puzzle will make a fortune.

It would allow efficient storage of PV energy and much more effective energy storage in electric cars.

Just a word of warning. Have you been watching the 300 or so different phone and power tool batteries? Dumb and getting dumber?

This doesn't need to continue. Governments could step in now and set up a standard framework of size, voltage, connectivity and recyclability.

It would mean less landfill, and great functionality between appliances and devices. Nature would be happier.

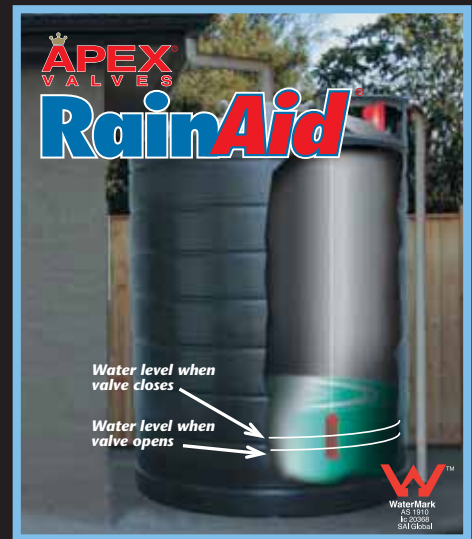
Doing these things can warm the heart, impress the client and make you money.

Please email me any thoughts or experiences at jwtyrrell@tyrrells.com ■

Jerry Tyrrell is co-founder of Tyrrells Property Inspections. He has more than 30 years' experience as a labourer, tradesman, contractor, architect, mediator, building consultant and author.

Next issue: Surveillance is coming to your next buildings.

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