

Let's start a PV revolution



Australia is probably the world's biggest solar collector, and it's time everyone shared in this renewable energy bonanza. Jerry Tyrrell reports.

This is the first of two articles on the new trade of green energy, or photovoltaics (PV).

If you already know about this stuff, you'll see I have kept the story simple and avoided technical jargon. There is now every reason for people in the industry to feel knowledgeable about PV.

The message is straightforward. Contractors can include PV in every home and renovation, and your clients can take advantage of government incentives and loans.

There are obvious reductions in energy costs and carbon use in the long term. What's more, this is something we can do *now*. Our efforts will generate the increased demand the industry needs, and in one step we will make a big difference to Australia's carbon footprint.

The sun is shining on Australians

Germany leads the world in PV. This has been achieved by giving owners incentives to install solar panels on their buildings.

Many northern hemisphere countries spend billions of dollars a year on this visionary technology. Australia lags a long way behind, yet it is much luckier in that it gets nearly twice as much sun energy as European countries.

Last month I visited the Suntech factory in northern China where the sun-exposed wall of the office building was made entirely of solar panels. To me it was like the pyramids or the Eiffel Tower – a wonderful thing.

This technology should be



everywhere in Australia. Every politician should stop talking and make sure that local council, state and federal buildings are draped in solar panels.

Such a solar showcase would tell

Australians their leaders are serious about low-carbon, renewable technology.

So it's up to us builders and designers to launch a PV 'tsunami' from the grass roots – in the structures we design, build or renovate.

Definitions

Insolation is how much sun energy is received in a particular location. It is measured in kilowatt/hours per square metre each day (kWh/m²/day). For example, Brisbane has 5.21, Sydney 4.69 and Melbourne 4.34. As a comparison, London has 2.61.

Types of solar cells are:

- **Monocrystalline** – pure silicon rods are sawn into thin plates, making the most efficient solar cell (18-23%).

- **Polycrystalline** – blocks of less pure silicon are sawn into plates, a less efficient method (16-19%).
- **Amorphous** – a silicone film is coated onto glass or another material, but this is the least efficient (6-9%).

An **inverter** converts the DC (direct current) power flowing from solar panels into AC (alternating current).

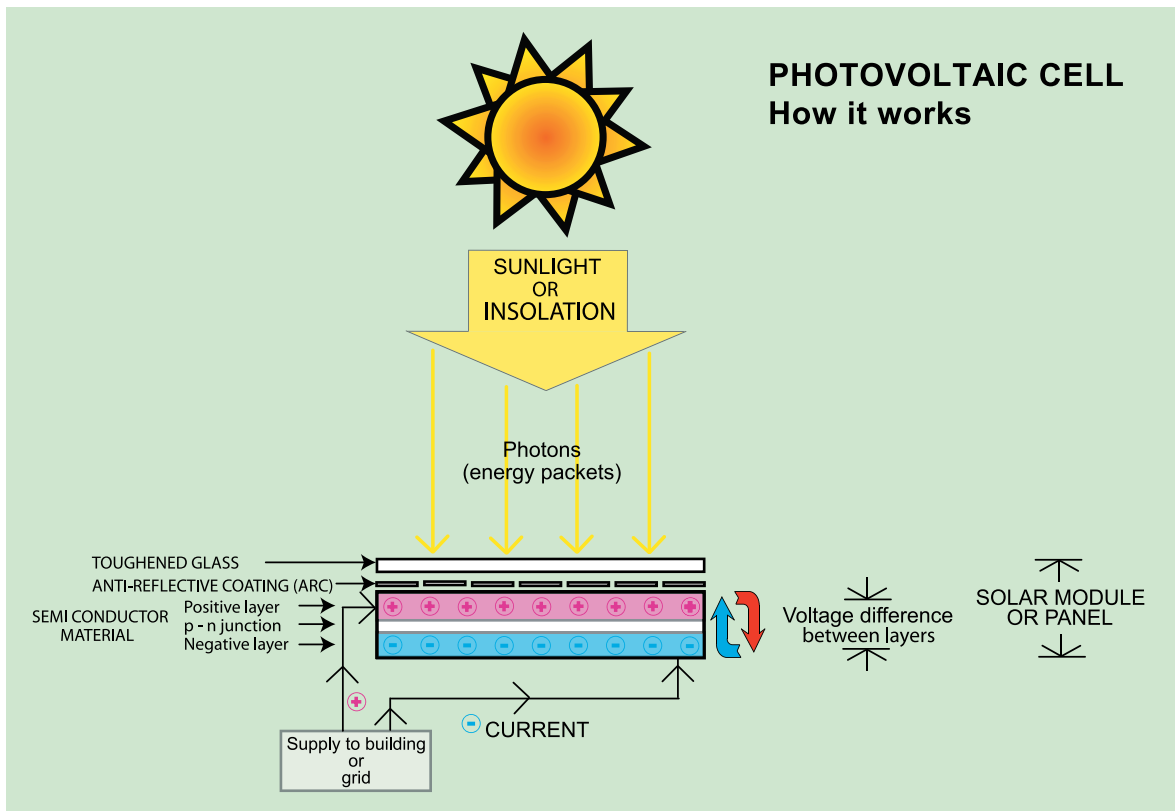
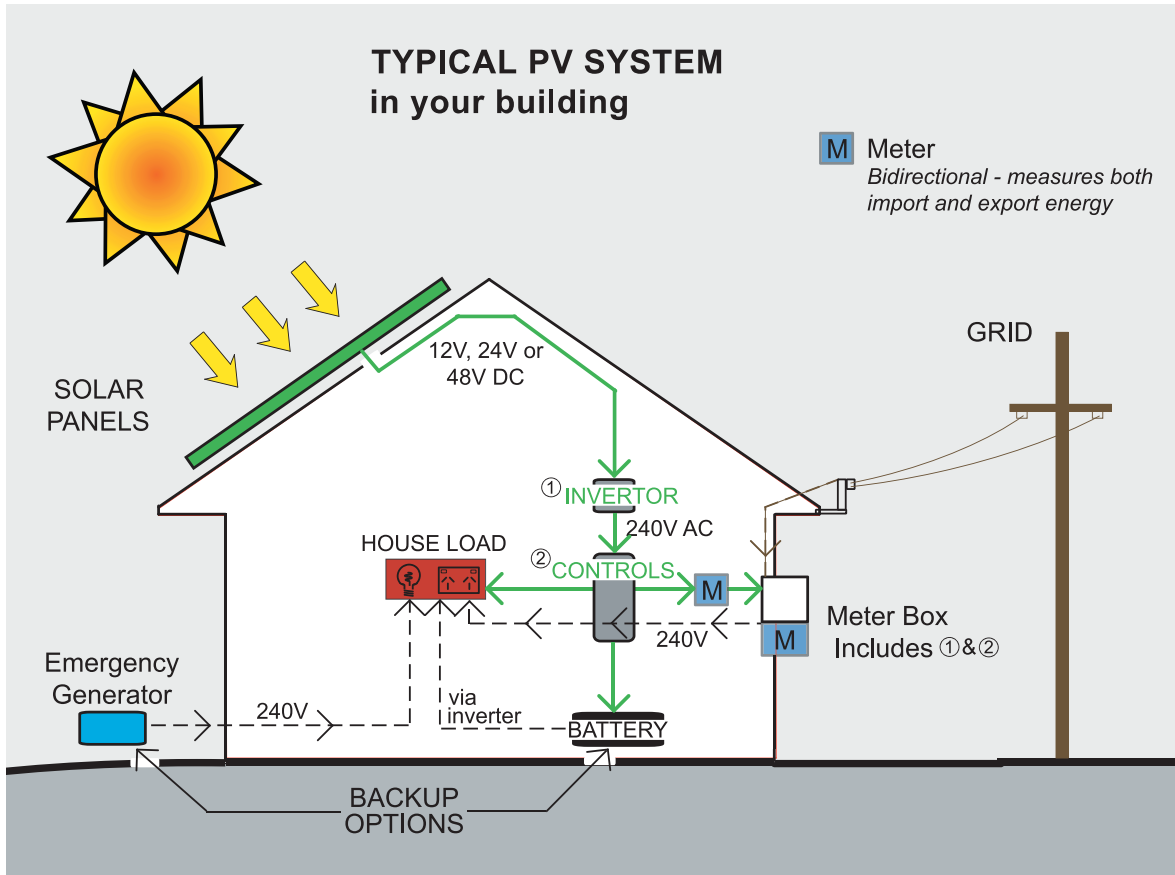
Power from solar panels can be put directly back into the public grid, and this is known as grid connected.



Rebates and incentives (as at 18-2-2010)

State schemes				Federal schemes		
State	Incentive	Feed-in tariff (starting at)	Conditions	Incentive	Rebate	Loan
				There are currently no national feed-in tariff schemes for photovoltaic energy		
NSW	Solar bonus scheme	60c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size 10kW	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
Qld	Solar bonus scheme	44c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size 10kW	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
VIC	Solar bonus scheme	60c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size 5kW	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
SA	Solar bonus scheme	44c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size 10kW	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
NT	Solar bonus scheme	45c/kWh for surplus power put back into grid by household in Alice Springs. 14.4c/kWh for surplus power put back into grid by household for other parts of NT	Incentives apply only to first energy-saving systems installed on property. Maximum system size NA. NT FIT capped at \$5/day – reverts to 23.11c/kWh	Solar credits scheme	From \$6200 (depending on zoning) for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
WA	Does not start until 1 July 2010	60c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size NA.	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
TAS	Solar bonus scheme	20c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size NA.	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.
ACT	Solar bonus scheme	50.05c/kWh for surplus power put back into grid by household	Incentives apply only to first energy-saving systems installed on property. Maximum system size 10kW	Solar credits scheme	From \$6200 for solar panels/power connected to the grid	NA – Systems must be paid for in full. After installation of system, apply for rebate.



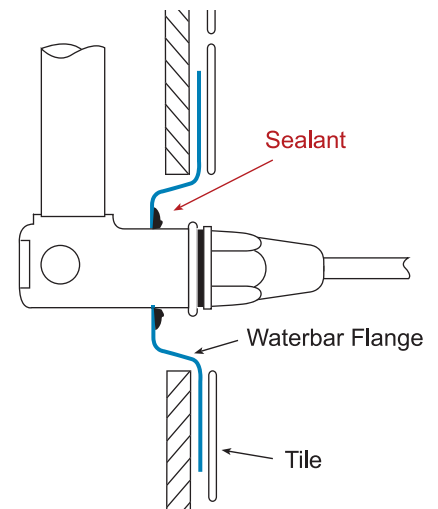


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Low voltage saves lives

Imagine never again having to worry about being killed or shocked in ceilings by 240V. Every year, at least four people are electrocuted and hundreds are injured, often from a rare mistake or accident on the part of individuals. Imagine if the lighting circuit – including ceiling and exhaust fans – was low voltage. There would be no more risk to

building owners and occupants, or the unsuspecting tradesman or insulation installer. Is this easy to do? Of course. LED lights need only a 24V supply, and 12V or 24V ceiling and exhaust fans are available.

What is needed is an innovative electrical company like Clipsal, HPM or SMA to add this function to the inverters and controllers they sell.

We can do it

I have included diagrams on how a system works in a typical building. Your clients can achieve several benefits when planning their systems. They can:

- Supply their home's power during daytime hours.
- Sell power to the grid.
- Use surplus power to charge a back-up system of batteries. (NB: Avoid this expensive option unless you live in a rural area where outage is common. Battery technology will improve dramatically in the next five years.)
- Install an emergency back-up generator if a constant power supply is necessary for refrigerators, emergency equipment, etc.
- Use combinations of the above.

Fortunately, the electrical industry knows what to do with PV.

There are sophisticated controllers and even devices to monitor efficiency and measure the amount of power delivered by the system.

Cables are generally the same size as for the mains supply, and I'm confident that the industry will quickly develop standards and protocols for PV systems, eg: colour-coded cables, and low-voltage appliances and devices.

And technical courses should introduce students to this area quickly, stressing the importance of using energy at its source – not burning

coal then sending it inefficiently over hundreds of kilometres.

PV energy is a wonderful, progressive area of global good work. When I bought my first diesel car on energy-efficiency grounds, my friends bagged me.

My first solar hot water system cost me a lot more money than I saved, but I would do it again – if only because someone has to get change going. And you people in the industry can make a vast difference to Australia's carbon footprint from 2010 onwards.

In the next article, I will provide more detail on the efficiency of solar cells, where battery storage is heading, and installation and maintenance tips. There will also be a heads-up on the latest LED, OLED and other low-voltage technology.

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

Next Issue: Solar Part 2

Where to find help

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