Residential Solar Energy Systems: Solar Hot Water and Solar PV

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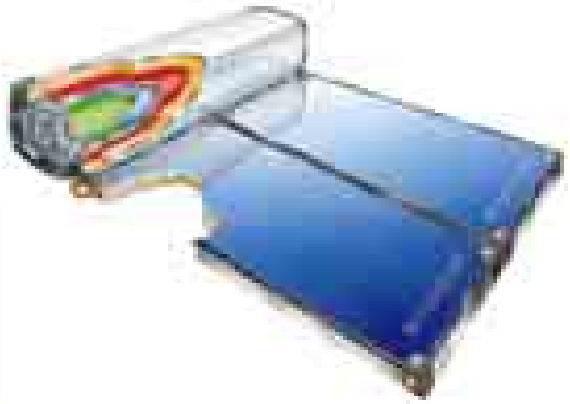
Solar Hot Water (SHW) Basics:

- SHW systems use radiant heat energy from the sun to heat water which can be used in the home (directly or indirectly via a heat exchanger).

- There are two basic types of SHW collectors - Flat plate and Evacuated Tube. Another type of system uses heat pumps to extract heat energy directly from the air.



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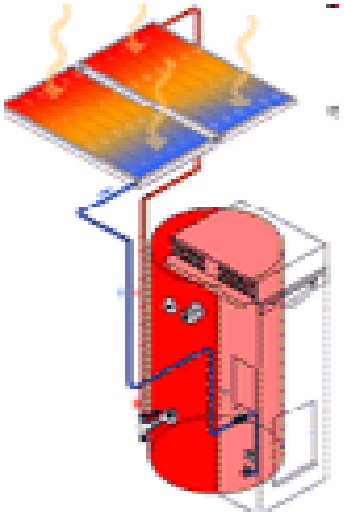
SHW Basics:

- SHW systems can be *passive* (i.e. thermosiphon) or *active* (i.e. pumped system) and can incorporate electric or gas 'boosting' to bring water up to desired temperature on low radiation days. Solar energy alone can supply >80% of annual domestic hot water needs.



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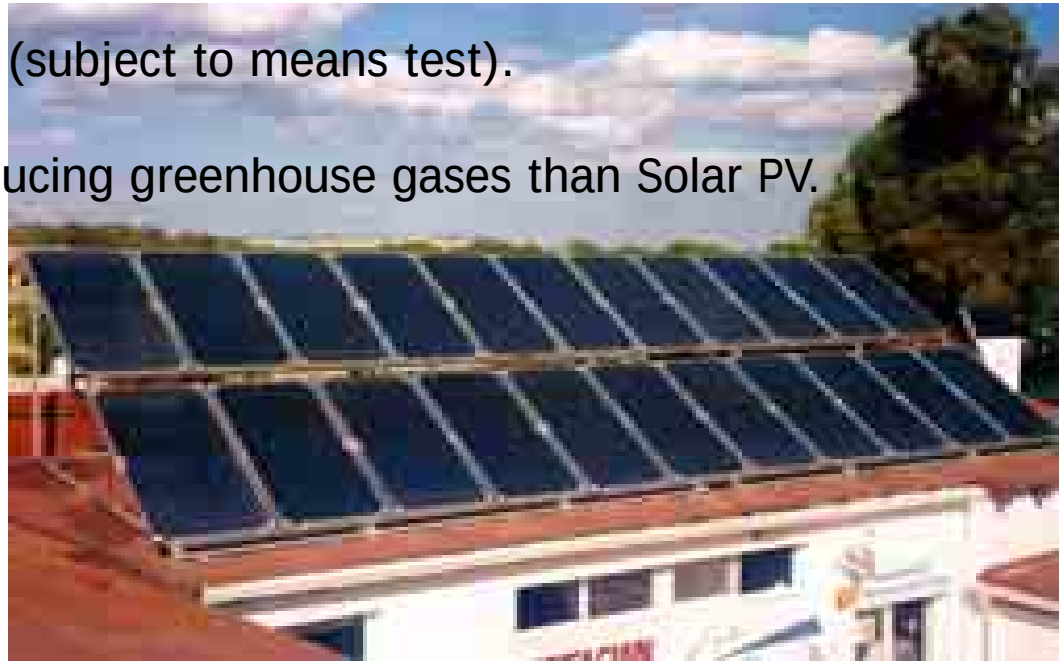
Benefits of SHW

- Using a free, renewable, clean source of energy.
- Converting an electric water heater to solar is the same as taking one car off the road each year in CO2 reduction.
- Cuts greenhouse gas from domestic hot water by 2/3.
- Lifetime cost is cheaper than conventional water heaters (payback of less than 10 years without rebates.)
- Federal Gov't rebate of $1000 available (subject to means test).
- State Gov't rebate of $500 available.
- More effective at saving money and reducing greenhouse gases than Solar PV.



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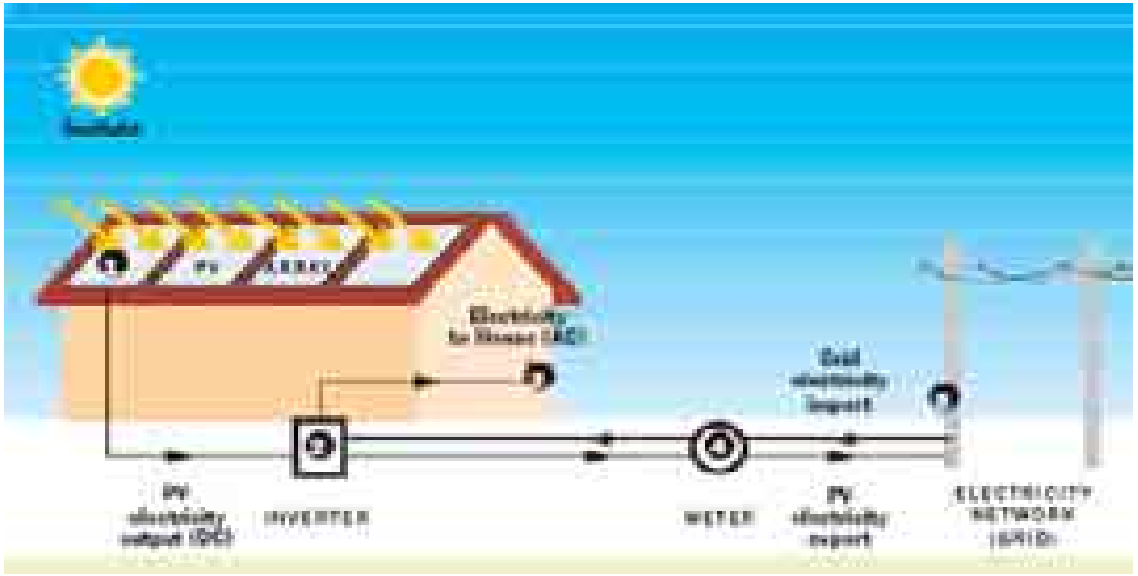
Solar PV Basics:

- Solar panels convert light energy from the sun into electricity.
- There are three basic types of solar systems: Grid-Connected, Grid-Connected with Battery Backup, and Stand-Alone (Off-Grid).



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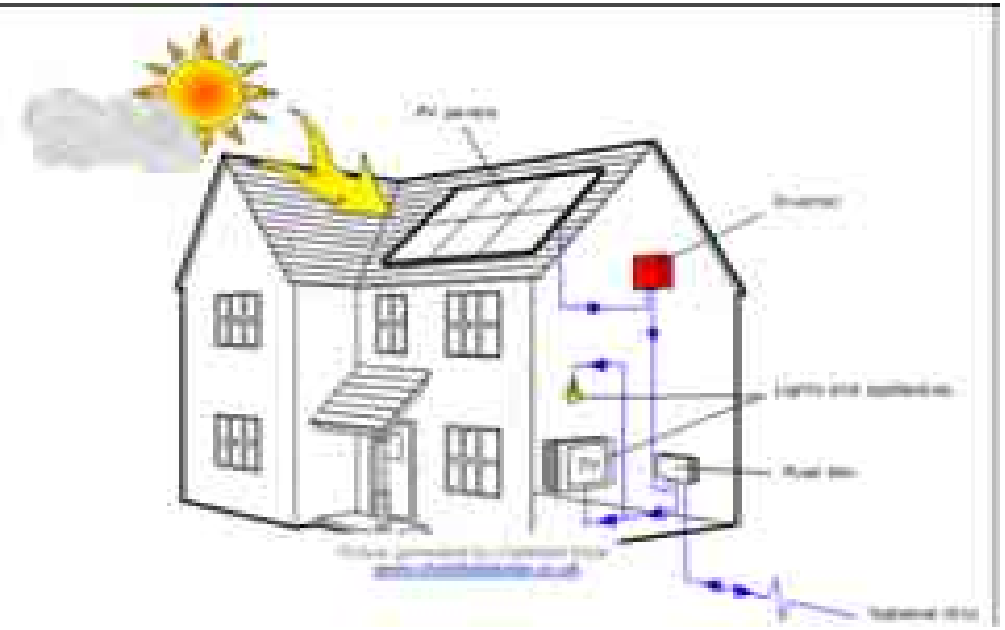
Grid-Connected System Components



1. Solar Array – generates DC electricity from sunlight.

2. Inverter – converts DC electricity into AC for use in the home.

3. Monitor – displays energy production (usually incorporated into Inverter).

4. Meter – can move forwards or backwards depending on energy use in the home.

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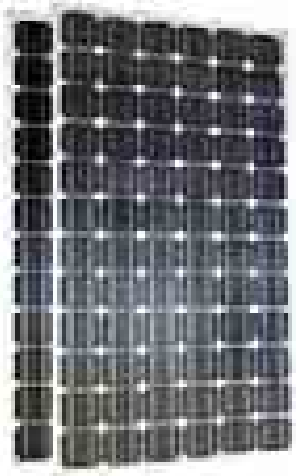
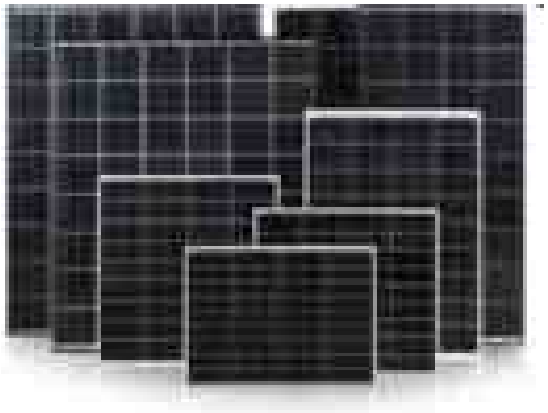
Benefits of PV

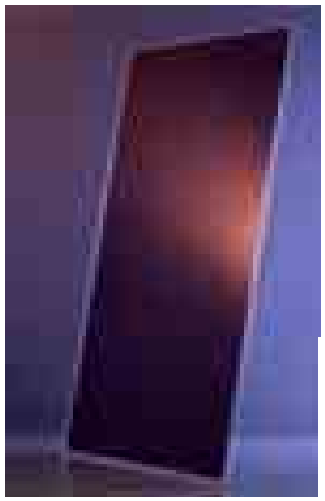
- Solar electricity is generated without emitting greenhouse gases.
- Solar electricity is generated on-site from a free renewable energy source.
- Energy security.
- Buffer against future increases in energy costs.
- Solar modules should last 20 to 30 years.
- Solar electricity helps stabilize the grid and provides peak power.
- Unobtrusive and silent.
- Increase the value of your home/business.
- Qualify for Green Home Loan (Bendigo Bank)

Solar Panels

- Also called Solar Modules, or Photovoltaic (PV) Panels.
- There are three basic types of solar panels: Monocrystalline, Multicrystalline, Thin Film







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Solar Panels

Monocrystalline Panels

- Highest conversion efficiency (12 to 17%).
- Usually most expensive.
- Most common panels on the market.
- Common brands:
  - Sharp
  - Sunpower
  - BP
  - Webel
  - SunTech

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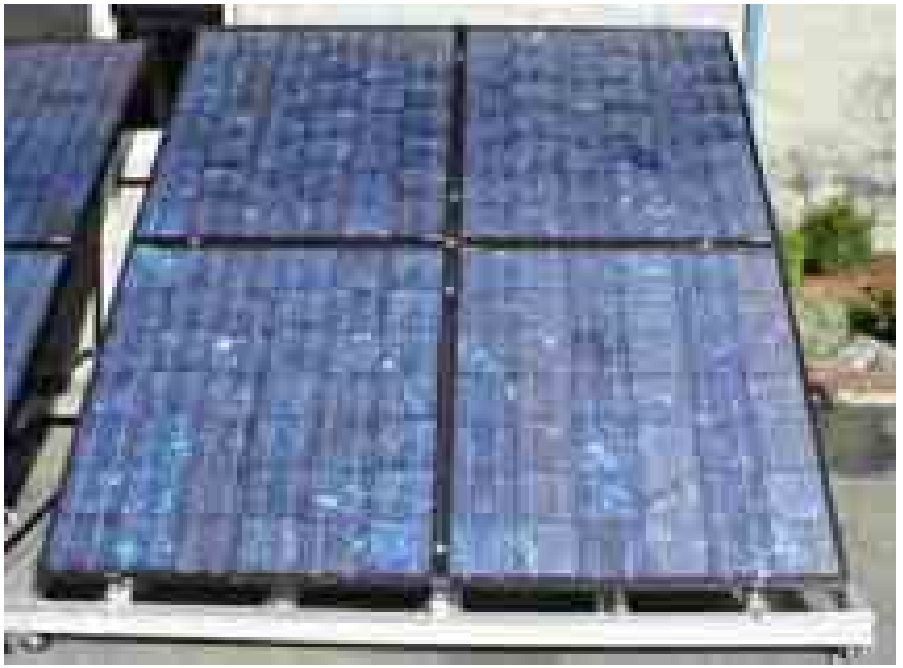
Solar Panels

Multicrystalline Panels

- Medium conversion efficiency (9 to 16%).
- Usually less expensive than mono.
- Also common.
- Common brands:
  - Kyocera
  - BP
  - Mitsubishi
  - Sharp



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Solar Panels

<u>Thin Film Panels</u>

- Lowest conversion efficiency (3 to 10%).
- Usually least expensive (per Watt).
- Becoming more common due to attractive features (shade resistance, low cost, different materials).
- Common brands:
  - Uni-Solar
  - Kaneka
  - EPV

Rebates & Incentives

- SHCP - As of May 2007 there is an $8000 government rebate available for new 1kW PV Grid-connected PV systems.
- Only available for primary residence and subject to means test.
- RRPGP - For Fringe-of-Grid areas there is a 50% rebate from the State government.
- SA, QLD, and the ACT have proposed feed-in tariffs. WA's labour party have made it an election promise. Feds may try to harmonise and coordinate a national program.

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The Renewable Energy Buyback Scheme (REBS)

- Both Synergy and Horizon offer the REBS on systems up to 5kW – larger systems are negotiated.
  (Could increase to 100kW).

- It is a net metering program whereby you only pay for the net amount of energy you consume from the grid.

- You get credited for excess energy you produce (at the price of power less GST).

synergy

HORIZON POWER

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Renewable Energy Certificates (RECs)

- Energy produced from renewable energy sources is eligible to become Renewable Energy Certificate (1MWh = 1 REC).
- RECs can be sold to liable parties who need to generate renewable energy as part of government targets under the MRET (i.e. Utilities.)
- The current value of RECs for a typical SHW or PV system is about $1000.
- Most installation companies retain the RECs so that they can charge you less for the installation.
- Some homeowners choose to keep the RECs and 'retire' them so that more renewable energy is created than is mandated by the MRET (9500GWh by 2010).

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Listing of Perth supplier of Grid-connected Home Solar Power Systems

from the ENERGYSMART DIRECTORY www.energysmartdirectory.com

Company Name	Better Living Energy Solutions	Electrical Renewable Energy	Green Grid Power	Renewable Logic	Solar Energy Systems Ltd	Solar Sales Pty. Ltd.	Solar Unlimited	Solarshop Australia	WA Solar Supplies
Contact Name	Alex Bruce	Markus Enkler	Glen George	Ramon Gregory	Tony Martin	Bob Blakiston	Kieron D'Arcy	Nathan Stone	Daire Barrett-Lenard
Address	39 Louise St Nedlands 6009 Nedlands, Perth WA 6009	PO Box 241 Rockingham City, Rockingham WA 6968	4/9 Boag Rd Morley, Perth WA 6062	7 Irvine St Bayswater WA 6053	3/81 Guthrie St Osborne Park, WA 6017	16 Belgravia Street Belmont, WA 6104	P O Box 359, North Perth 6906 North Perth WA 6906	4/146 Carrington St, O'Connor, Fremantle WA 6163	5/83 Hector Street (West) OSBORNE PARK WA 6916
Phone	0400 134 694	+61 8 9527 5969	(08) 9376 1163	9371 5111	(08) 1800 454 161 (country) 08 9204 3521 (metro)	08 9477 5888	(08) 1300 765292 (1300 SOLAWA)	08 9331 2200	(08) 9244 2669
Email	alexb@bles.com.au	renewableenergy@dorimus.com.au	Greengridpower@bigpond.com.au		info@sesltd.com.au	info@solarsales.com.au	kieron@solarunlimited.com.au	nathan.stone@solarshop.com.au	energy@waasolar.com.au
Website	http://www.bles.com.au		http://www.greengridpower.com.au	www.renewablelogic.com.au	http://www.sesltd.com.au	http://www.solarsales.com.au	http://www.solarunlimited.com.au	http://www.solarshop.com.au	http://www.waasolar.com.au

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Some possible questions to ask suppliers:
Do they provide performance warranty on the solar panels over 25 years, replacing panels if they drop in performance?
What is the inverter warranty and expected lifetime?
Do they provide emergency (post-sales) maintenance on the system, especially inverter?
How do the solar panels perform in cloudy conditions or part-shade conditions (if this is relevant to your Northern roof)?
Do they have any systems you can see or visit on public buildings?
What is the price with you holding onto the renewable certificates (and getting the greenhouse benefit) rather than them onselling the certificates (REC's)?
What is their installation history like?