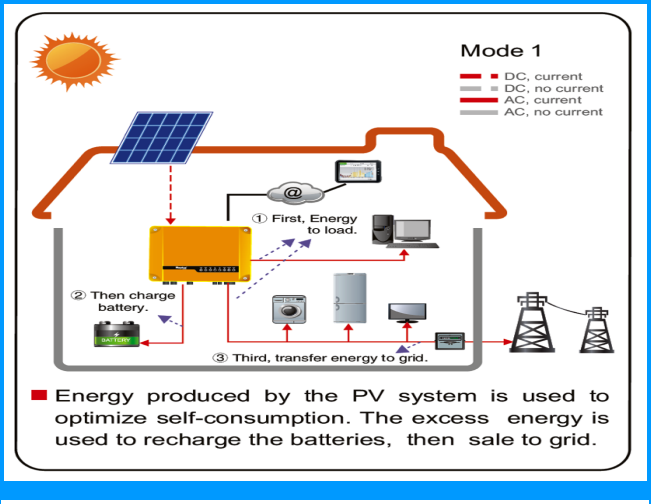
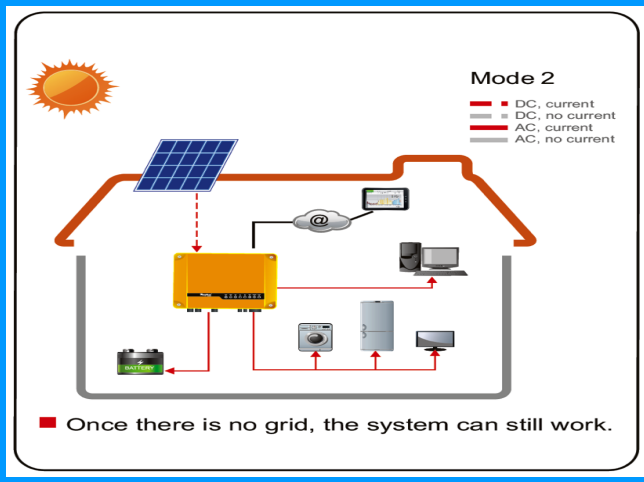
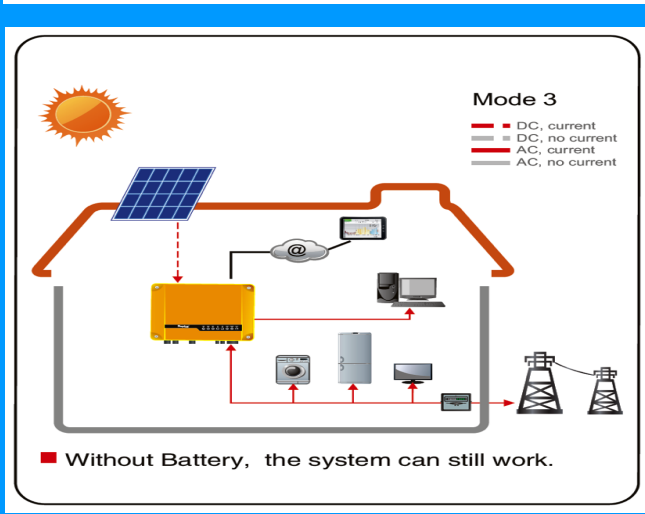
RENEWABLE FUTURE

Rural Solar Solution

- ✓ Ground Mount, No Concrete, Timber or DuraGal SubFrame
- ✓ Hybrid Inverter
- ✓ Batteries now or later







Hybrid Inverters

The Solar Industry is making the next step from grid connected to hybrid inverters. This will allow you to store power in

Ground Mount Solar

Standard solar systems are roof mounted. Unfortunately most rural properties have large trees around the farmhouse for sun and wind shelter making roof mounting impractical. RenewableFuture has developed a range of ground mount systems suited to rural properties.

A standard 5-6kW system needs 20 panels (1.64x1m). They can be arranged as:
a: 20 across in portrait (20x1.64m)
b: 5 up in landscape and 4 across (5.1x6.6m)
c: 2 up in portrait and 10 across (3.3x10.2m)

All cabling, including Solar DC, is placed insided conduit to protect it from birds and rats.

Sub-Frame can be made of timber or DuraGal with footings in timber or gal-screw pile. No concrete is used.

Average power output is 20-24kWh/d. The angle of the panels can be increased to improve winter performance.

Delayed Battery Installation

At present the new generation of Lithium-Ion batteries are expensive. The price should drop significantly in the next few years. When this occurs the number of solar installation will greatly increase and the STC credits for systems will probably be removed to slow loss of demand from the grid.

Therefore, investing in a hybrid system now with no batteries and then adding the batteries later is a wise investment. Households obtain the STC credits, get cheaper batteries and spread the cost of the investment over a few years.

Battery Types

Recommended batteries are Lithium-Ion or Lead-Carbon. They currently cost approximately $1000/kWh of usable charge. This cost should drop by 50% in a few years. For Hybrid systems we suggest approximately 75% of daily demand as a reasonable storage target.

Typical performance for 5kW Hybrid System

Electric Hot Water	Tariff $/kWh	Demand kWh/d	Charge $/ann	5kW Hybrid	Tariff $/kWh	Demand kWh/d	Charge $/ann
House	$0.22	15	$1,205.00	Solar Used	$0.00	14	$0.00
Hotwater	$0.11	12	$482.00	Peak	$0.34	4	$496.00
Pool	$0.22	0	$0.00	OffPeak	$0.12	9	$394.00
Export	$0.05	0	$0.00	Export	$0.05	-6	-$110.00
Supply Charg	$0.95	1	$347.00	Supply Charge	$0.95	1	$347.00
Total		27	$2,033.00	Net Grid		7	$1,128.00
				Estimated Saving			$905.00

Pool & Solar HW	Tariff $/kWh	Demand kWh/d	Charge $/ann	5kW Hybrid	Tariff $/kWh	Demand kWh/d	Charge $/ann
House	$0.22	15	$1,205.00	Solar Used	$0.00	17	$0.00
Hotwater	$0.11	2	$80.00	Peak	$0.34	3	$372.00
Pool	$0.22	10	$803.00	OffPeak	$0.12	7	$307.00
Export	$0.05	0	$0.00	Export	$0.05	-3	-$55.00
Supply Charg	$0.95	1	$347.00	Supply Charge	$0.95	1	$347.00
Total		27	$2,435.00	Total		7	$971.00
				Estimated Saving			$1,464.00

Auxiliary Power

In Southern Australia many cloudy days are experienced. Power is 50-85% lower when cloudy and is also low in winter. Modern solar systems are oversized to compensate for these issues. (A 5kW system might generate 500W for 8-12hours on a cloudy day, 4-6kWh.)

RenewableFuture plans to develop a small vertical axis wind turbine. Cloud and wind are highly correlated. Also there is more wind in winter. Thus filling in the generation holes in the solar system and resulting in a large fraction of renewable energy. The danger with this approach is the reliability of the wind turbine.

Personal

Dr M Fleming, PhD in Solar Energy with 30 years experience in the Renewable Energy Sector.

Mr Luke Distefano, Electrician
REC 19075, Lic No: A39879

Warranty

The hybrid solar system has a 4 year warranty for parts and repair but not accidents.

Contact

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Water Pumping

RenewableFuture is also developing Stand Alone Solar PV Water Pumping that uses standard 3 phase a/c water pumps.

Meaning standard electric pumping units can be installed in remote locations and remotely controlled.

##Photo

FAQ (Frequently Asked Questions)

Lost Grid

If the grid goes down the hybrid system will maintain a local grid upto its peak power (5kW) and while the batteries have charge. During the day the solar will supply power and recharge the batteries.

Why not go Off-Grid?

Off-grid solar systems are more expensive and limited in peak power. They require backup generation. Power from backup generation is more expensive than mains power and requires supply of petrol/diesel and maintenance.

Hybrid systems export excess power to the grid at a small feed-in-tariff. (For example a 5kW hybrid generated 20kWh/d 50% of which was exported. Then the $0.95/day service charge would be reduced by10*5=50cents/day).

The downside of hybrid systems is households tend to be much less efficiency conscious than standalone households. It is too easy to get more appliances.

Fine Tuning Household Setup

To take maximum benefit of your hybrid system some load adjustments may be needed. These include:

Hot Water (7-14kWh/d)

Many rural properties do not have solar hot water and use offpeak power. Distribution companies generally move households from split metering to ToU 'Time of Use' tariff. The offpeak times are 11-7am and weekends. The peak tariff is very high and puts people off. They tend to forget about the low night & weekend rate. The table below illustrates a more reasoned response. A hybrid solar system removal of load will be strongly biased to the peak periods (~70%).

	Tariff c/kWh	Percentage	Average c/kWh
Standard	22	100%	22
Peak	34	50%	
Wkend/Night	12	50%	23

RenewableFuture can fit a hot water timer with a solar sensor. The sensor will turn on the hot water element if there is more than 3kW of solar power. As a rough estimate 60% of hot water would be supplied by solar power and 40% off-peak. This approach is not needed if the house already has solar hotwater.

Ideally a heat pump should be used to make the hotwater however, this would require a significant investment.

Swimming Pool Pumps (5-15kWh/d)

It is not uncommon for 50% of household load to be used in pool pumps. RenewableFuture can install solar sensors to only run the pool pumps when the sun is shinning thus removing the load from the grid.

Washing/Vacuuming

Shifting these and other loads to sunny or weekend periods will reduce peak demand.

Also turning off extra fridges will save power.

Is it affective to shift Hot Water/Pool/Other loads before the batteries are installed?

Yes. Household day time load is very small. Demand shifted to sunny periods saves on grid call.

What is the quality of the Solar Panels and Inverter?

They are known as first tier products in the industry.

Portfolio
Small sample from over 80 installation on and around the Mornington Peninsula.

11.4kW Ground Mount, Merricks

5kW Metal Roof, Tyabb

##Photo

Fully Conduited Solar DC cabling
For bird and rat protection

1.1kW Tile Roof, Mornington

1.7kW Garage Metal Roof, Mornington

4.4kW Metal Roof, Mericks

3.3kW Metal Roof, Mt Eliza