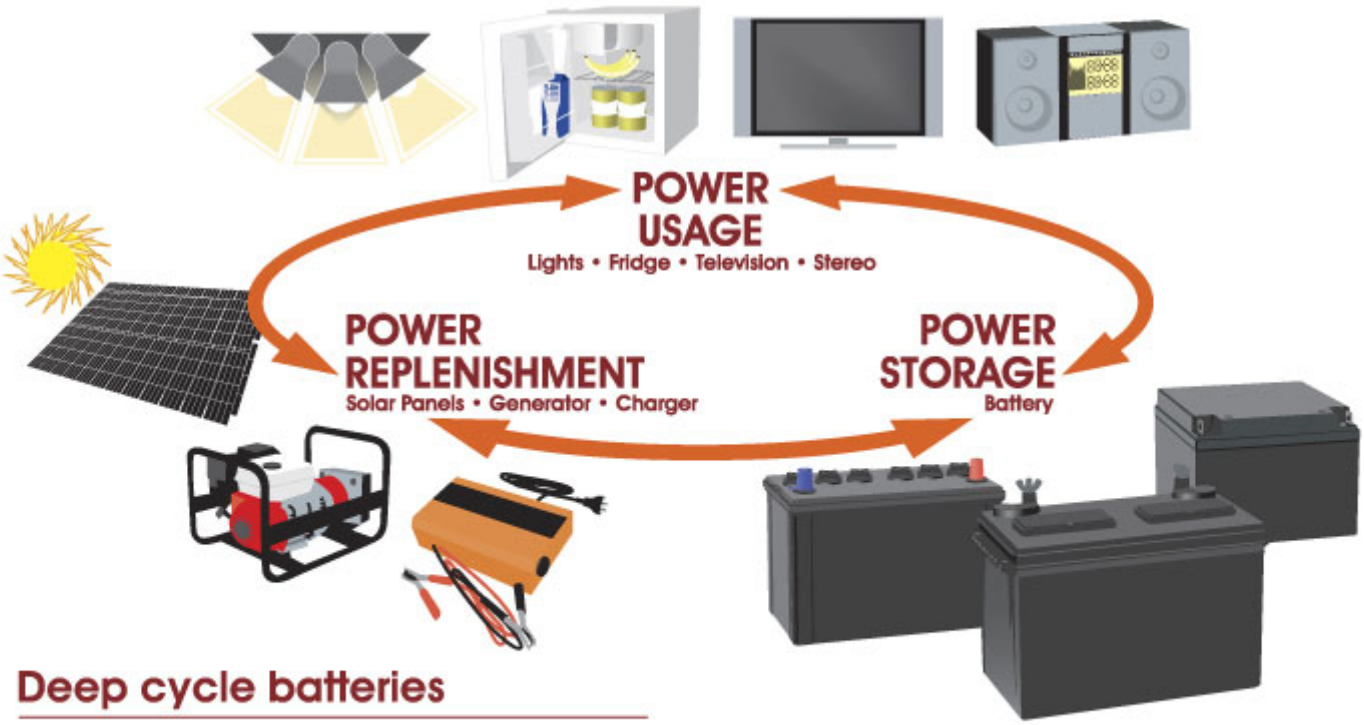
recreational power

battery power for a mobile lifestyle

Mobile power for recreational activities...

Indulging in outdoor recreational activities should not mean you have to do without all the usual conveniences of home. "Deep cycle" batteries provide a great solution where there is no mains power connection. You can still use appliances such as electric fridges, lighting, power tools and enjoy entertainment systems with DVD's, amplifiers and plasma screens, etc.

When using a battery system for recreation it pays to consider all the issues to maximise the life of the system and to avoid unwanted disruptions to your leisure time.



Deep cycle batteries

As opposed to car batteries, which are designed to start an engine, deep cycle batteries are built to provide sustained power over extended periods of time, and can be repeatedly discharged and recharged. This makes them ideal for providing mobile power for recreation.

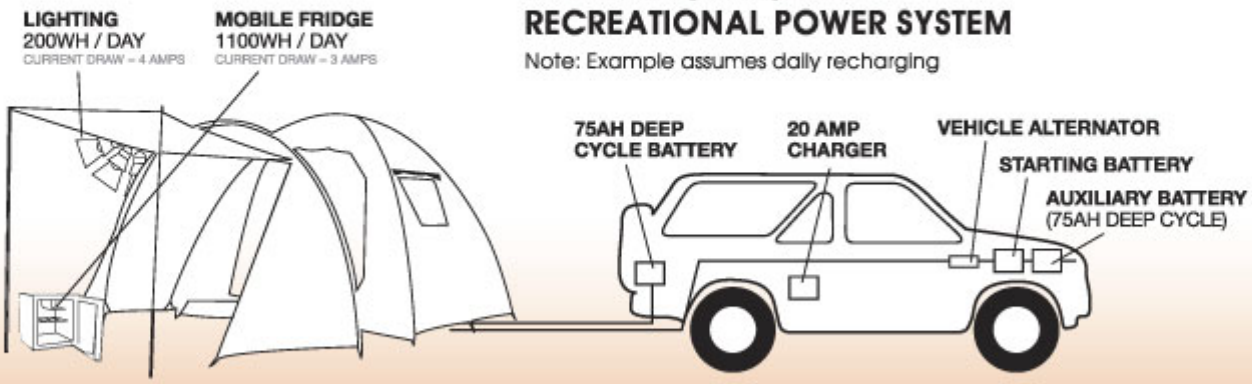
Flooded deep cycle lead-acid batteries are widely used for serious outdoor recreation. Lead plates are suspended in wet acid which means electrolyte levels require periodic topping up. Flooded deep cycle batteries are fairly tolerant of a range of charging rates and depths of discharge.

Gel lead-acid deep cycle batteries are also used for recreational activities. Gel batteries are completely sealed and the electrolyte is immobilised in the form of a gel substance which cannot spill, even if the battery is tipped upside down or fractured. Therefore there is no need for concern about liquid acid spills or corrosion.

For information on other available types of deep cycle batteries, refer to CenturyYuasa's Deep Cycle Batteries brochure.

EXAMPLE OF A SMALL RECREATIONAL POWER SYSTEM

Note: Example assumes daily recharging



Battery power systems

You may choose to incorporate an auxiliary battery into a system where a standard battery provides vehicle starting capacity and a deep cycle battery provides longer lasting power. Dual battery systems are common with motor homes, caravans, boats and 4WD's because they are ideal for supporting the power requirements of mobile accessories such as fridges and lighting.

A battery isolator controls the charging of batteries and separates them when the engine is turned off. This means you can get the most out of your deep cycle battery without running your starting battery flat.

You will need to be aware of how long it will take for your vehicle's alternator to fully recharge your auxiliary battery. For example, it could take up to 5-6 hours of driving to fully recharge an 85Ah deep cycle battery with a standard vehicle alternator.

Plan to fully recharge your battery based on your daily power consumption requirements. The alternator should easily restore the power consumed in the previous day. Seek expert advice for your requirements.

AC power anywhere

An inverter can be used to convert the stored energy of a lead-acid battery (typically 12VDC) into 240VAC, which means the battery can be used to power almost any 240V appliance. In many cases, using a 240V appliance with an inverter can be less expensive than purchasing a special 12VDC version of the same appliance.

A standard battery charger uses a transformer or rectifier to covert household 240VAC (alternating current) power down to a voltage of approximately 13.8VDC (direct current) to recharge the battery. An inverter works in reverse, converting 12VDC to 240VAC.

The size of the inverter you will require depends on the type of appliance to be used and the Watt power rating it consumes. In determining the power rating, surge power must also be considered. For example, a drill may be rated at 500W but under load may draw over 800W.

FOR EXAMPLE:		
Appliance	**Rating (W)**	**Surge (W)**
Mobile phone charger	150	Limited surge
Television	55	75W for 3 sec start up
Video recorder	40	50W at tape start

The total running Wattage in this case is 245W. Because of the surge rating of 275W, a 300W inverter may be the most suitable option.

Inverters provide two main types of power: modified square wave and pure sine wave. Pure sine wave inverters can be used with all appliances, whereas modified square wave inverters have relatively fewer applications and are therefore generally less expensive. If you plan to use an inverter always seek expert advice for your requirements.

Note that when using an inverter, there is typically power consumption in converting DC power to AC of about 15%. You will need to take this into account when determining the size of battery for your requirements.

For more information on sizing deep cycle batteries, refer to CenturyYuasa's Deep Cycle Batteries brochure.

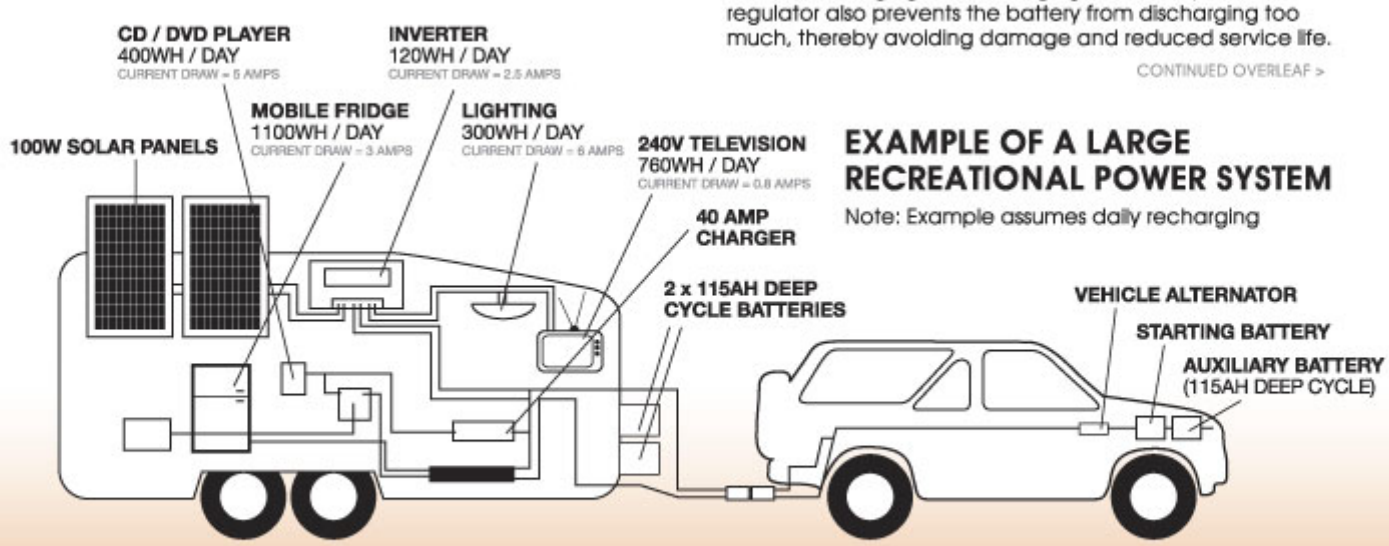
Using solar energy

A typical solar module will collect an annual average of approximately 5.5 peak sun hours in New South Wales, providing the panel is fixed facing north, with an elevation towards the sun. Further north in Queensland, the panel would collect closer to 6 average peak sun hours. Sun hours are simply the number of sunlight hours collected by your solar array.

Increased sun exposure can be achieved by positioning the panel on an angle facing north-east in the morning, due north during the middle of the day, and north-west in the afternoon. This practice may result in collecting 7.5 to 8 sun hours per day, or even more.

A regulator should be installed to prevent the solar panel from overcharging and damaging the battery. The regulator also prevents the battery from discharging too much, thereby avoiding damage and reduced service life.

CONTINUED OVERLEAF >



EXAMPLE OF A LARGE RECREATIONAL POWER SYSTEM

Note: Example assumes daily recharging

USING SOLAR ENERGY CONTINUED >

Before you consider a solar setup, you will need to calculate your total power consumption. Refer to the CenturyYuasa Deep Cycle Batteries brochure for guidance. Once you have determined the correct battery for your application, you can easily calculate your solar requirements. The collected power from a typical 60W solar panel can be measured in Ampere-Hours (Ah):

FOR EXAMPLE:		
60 Watts x 7.5 Sun Hours / 12 Volts	=	37.5 Amp Hours (collected power)

The total amount of collected power (Ah) should exceed the total Amps consumed per day so that the solar array can easily replace all your daily power needs.

The following example shows that if the charging system is inadequate, the battery will not be returned to a fully charged state. If there is a power demand on the second day, the battery will never be fully recharged, because the solar array can only return a maximum of 37.5Ah to the battery. Continually usage like this will damage your battery.

FOR EXAMPLE:	
Fully charged 85Ah Deep Cycle battery	**Full power (85Ah)**
Day 1: 30Ah consumed	**Capacity Remaining = 55Ah**
Day 2: 30Ah consumed 37.5Ah replaced (solar array)	**Full power (62.5Ah)**

In this case, a higher Wattage solar panel may be required or a lower capacity deep cycle battery, to ensure the battery is adequately recharged based on the previous day's power consumption.

Another issue to consider is that solar panels tend to gradually become less efficient over time. Always remember to seek expert advice before installing a solar charging system to ensure adequate battery capacity and solar arrays for your requirements.

Battery chargers

In situations where mains power is available, or when using a 240VAC generator, you may choose to recharge your battery with a standard 240V battery charger. A "constant voltage" type charger is recommended.

A variety of generators are also available which can be connected directly to a 12V battery, without the need for an add-on battery charger.

Generally a 10 amp charger will be adequate for batteries up to N70 size. For charging larger deep cycle batteries, the minimum requirement is a 20 amp constant voltage charger due to higher internal resistance.

A good general rule to follow is that a discharged battery will require 12-15 hours of charging to adequately restore its charge capacity. See your battery outlet to find the most suitable charger for your application. Follow the instructions on the charger for the correct procedure to maintain optimum charge levels.

Battery maintenance

When the battery is not in use for prolonged periods of time it should be maintained in a fully charged state for maximum life. There are 'trickle', or 'float' chargers available which are designed to keep batteries fully charged, without overcharging.

The following table can be used as a guide in determining the state of charge of your battery. Charge levels can be measured by determining either the Voltage (with a multimeter) or Specific Gravity (with a hydrometer).

Ask your battery outlet to show you how to accurately measure the charge of your battery.

Measuring State of Charge		
State of Charge	Specific Gravity (SG)	Voltage (12V Battery)
100%	1.265	12.65
75%	1.225	12.45
50%	1.190	12.24
25%	1.155	12.06
0%	1.120	11.89
* Table assumes a fully charged specific gravity of 1.265.		

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CC103-320