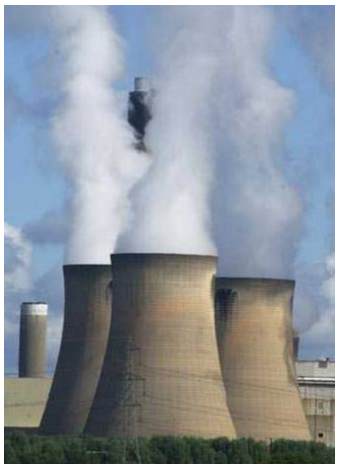
SOLAR POWER IN BRIEF

"It is estimated that just one hour of solar energy received by the earth is equal to the total amount of energy consumed by humans in one year" (Source: "Designing with Solar Power" Deo Prasad & Mark Snow, Images Publishing, 2005)

According to the Clean Energy Council, 1 MWh of solar-derived electricity avoids approximately 1 tonne of CO_2. Given the threat of climate change driven largely by burning fossil fuels, it is would be illogical and irresponsible not to tap into an energy source that is essentially free, clean and renewable.



Solar energy is produced using solar cells to convert sunlight directly into electricity. The panels capture sunlight, converts it into DC power which in turn is then converted, using an inverter, into AC power making it suitable for household use and, if connected, feeding back into the power grid. Electricity is generated in daylight hours when it is most needed to operate air conditioners, office lighting, factory equipment, etc. During daylight hours any excess power produced by households goes to the grid then at night the same households draw from the grid. As a result householders should see a significant reduction in their usage of reticulated electricity as well as their power bills.

Until recently the take-up of solar power panels by households in Australia, has been constrained by the fact that solar energy has not been economically viable. There was a high initial cost and it took many years to recoup the upfront costs. That, however, has now changed. In 2008, 7.6% of households nationally used solar energy (solar hot water or PV). (Source: "Clean energy Australia 2009" Clean Energy Council.) In 2009 the installation of solar panels increased dramatically in the light of the incentives, price reductions, etc. mentioned above. Solar power not only has many environmental benefits, it now makes good economic sense.

Solar Panel Technology

Solar modules come in two distinct categories: crystalline silicon and amorphous silicon.

Crystalline cells made from wafers cut from silicon blocks and then modified in a process called 'doping' which changes the structure of the silicon to make it a semiconductor. A fine array of electrically conductive wires is then applied to each side. Crystalline solar modules are covered with tempered glass on top and tough ethylene vinyl acetate material on the back to protect the solar cells.

There are two types of crystalline cells: monocrystalline and polycrystalline. Monocrystalline cells are made from pure silicon and are more efficient than polycrystalline cells but because of the more complex production processes, they are more expensive to produce.

Amorphous silicon is one of a number of thin film technologies and the most commonly used. It is applied as a film to low cost substrates such as glass or plastic.

While generally not as efficient as crystalline modules, thin film has other advantages such as easier deposition and assembly, low cost of substrates and building materials, ease of production and suitability for large applications. More recent developments in thin film technology include fabrication as building materials such as roof tiles, walls and glass.

Unfortunately, choosing a PV panel is not a simple task. It involved a fair amount of research and analysis taking into account factors such as cell type, quality, rated output, efficiency, durability, warranty, rated lifetime, and much more. Costs will vary significantly and it would be unwise to choose a panel on price alone. It really boils down to determining the annual energy output of the panel versus the cost of the system and ensuring going to last the rated lifetime.

Government Incentives

The Federal Government has committed to a Renewable Energy target (RET) whereby 20% of the nations electricity supply will be generated by renewable energy sources by the year 2020. The RET legislation establishes a framework to encourage investment in renewable energy with financial incentives through Renewal energy Certificates (RECs).

RECs are an electronic form of currency, created online by eligible parties such as the owners of solar hot water systems or small generation units. Once validated and registered, they can be sold for a negotiated price or traded via the REC Registry. However, RECs are usually surrendered to installers when systems are purchased to lower the upfront costs. RECs are ultimately purchased by liable parties such as power stations then surrendered to acquit their legal obligations under the RET scheme.

Briefly, one REC is equivalent to 1MWh of electricity generation. As an incentive until 30/6/2012, RECs are issued with a multiple of 5 for the first 1.5Kw of generating capacity. Above that the multiple is 1.

If you would like to determine the panel size for your household, check your latest electricity account to find out your average daily usage. Let's assume 20KWh per day. In Brisbane a 1KW PV system will produce about 4.8KWh per day, so to generate around 50% of your needs you will need a 2KW system. To calculate the number of RECs for a given capacity, click here (https://www.rec-registry.gov.au/sguCalculatorInit.shtml). A 2KW solar panel in Brisbane over 15 years, entitles the owner the 165 RECs. At a price of around $30 per REC, a discount of around $4,950 off the system cost could be expected.