FAQ about renewable energy

What about night-time and cloud cover?

Solar thermal technology is able to provide electricity after dark and under cloud by using stored heat energy to power a steam turbine or heat engine. Solar PV is helping to supply electricity during our costly grid peak summer demand caused by increased air-conditioner use on hot days.

What if the wind drops?

Wind variability is partly addressed by installing turbines at diverse geographical and windy locations, as well as by predicting wind strength hours ahead. Wind farms complemented with gas turbines or diesel generators that can idle down to five per cent of their full rated power can be integrated to supply up to 90 per cent of a location's electricity. Likewise, 'baseload' or 'dispatchable' renewables can also be used to complement wind.

What if the swell drops?

Carnegie Wave Energy estimates that the wave energy on WA's west and south coasts would be sufficient for the CETO system to supply 20% or more of its rated power continuously around Perth and 100% on the southern coast.

What about carbon capture and storage (CCS) or 'clean coal'?

Renewable energy technologies such as wind turbines, photovoltaics, solar thermal and biomass are proven and widely implemented, while even proponents of carbon geo-sequestration admit it is 10–15 years away. The extra energy required for CCS and limited availability of suitable geographical sites are also obstacles.

Aren't renewable energy technologies expensive?

Wind and solar PV are already competing with gas and new coal generation. These, and other renewables' costs are reducing significantly as production increases. Fossil-based electricity generation will become more expensive as fuel and pollution costs increase.

Does switching to renewables mean fewer jobs?

Renewable energy technologies generate more jobs (employees per kilowatt hour) than coal, and particularly benefit rural areas. The Australian Geothermal Energy Association and Carnegie Wave Energy predict that 17,000 Australians could be employed in geothermal and 14,000 in wave energy by 2050. This compares to 24,000 Australian coal workers in 2007, a number continuing to be reduced by the industry.

About us

SEN's diverse and active membership undertakes:

Promotion of renewable energy technologies appropriate for WA.

Research into the potential of renewable energy technologies to meet WA's electricity needs.

Simulation of the SWIS electricity grid to show how WA's needs can be provided from a mix of renewable energies. Using a technical computer simulation developed by SEN members, users can create their own scenarios for the adoption of renewable energy in WA. Graphics show energy supply versus grid demand, as well as projected electricity costs, infrastructure costs, jobs created and other useful planning information. The underlying mathematical model will use real-time meteorological data.

Education/Advocacy of the general public, schools, industry and governemnt via the simulation, the website, frequent presentations. and submissions to government.

Our definition of sustainable energy

'Sustainable Energy' is renewable within a human lifetime and can be produced safely and equitably for all time with minimal impact on the environment and future inhabitants. This does not include nuclear power with its many unresolved issues.

Membership

We welcome new members. To learn more or join us, please visit:

Website: www.sen.asn.au
E-mail: contact@sen.asn.au
Post: PO Box 341, West Perth WA 6872

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www.sen.asn.au

Sustainable Energy NOW

SEN aims to promote practical, affordable strategies for the adoption of renewable energy and a sustainable global future. In particular, we aim to show that renewable energy can meet Western Australia's energy needs, with a focus on the State's main electricity grid, the South West Interconnected System.

Together we can make a difference!

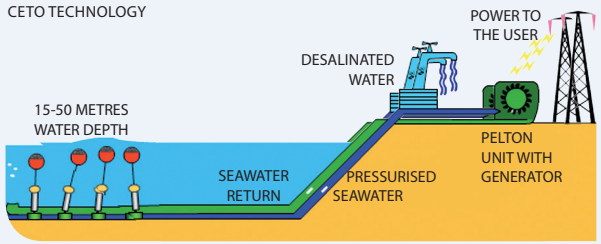
Renewable energy opportunities in WA

WA has abundant renewable energy resources including wind, solar, wave, geothermal and biomass. Here we summarize the technology available to utilize these. For detailed information, including references, please visit our website at www.sen.asn.au.

WAVE

CETO technology developed by Carnegie Wave Energy Ltd in Fremantle uses sub-surface buoys that move in the swell, causing pistons below the buoys, anchored to the seabed, to pump seawater at high pressure to shore. This water can turn a generator to create electricity, or pass through a desalination membrane to create fresh water, or any desired combination of these.

Available energy: Carnegie Wave Energy estimates that there is enough wave energy along WA's coastline to provide baseload electricity more than five times the SWIS peak demand.



Carnegie Wave Energy Ltd

BIOMASS

Electricity is produced when plant matter is burned. The heat is used to create steam which drives a steam turbine and electrical generator. In addition to producing electricity, oil mallee can be used to combat dryland salinity and soil erosion, enrich soils and sequester carbon.

Available energy: Cultivated oil mallee and other sustainably harvested biomass from non-native plantation waste could provide a small portion of baseload energy for the SWIS grid.

Narrogin Biomass Plant. Photo: Verve Energy.

WIND

By rotating turbine blades that drive an electrical generator, wind produces up to 40 per cent of electricity in several countries linked to large grids and a similar share in several WA towns on the fringes of, or off, the grid. The UK plans to install 30,000 MW of offshore wind farms by 2020, equivalent to seven times peak demand on the SWIS.

Albany Wind Farm. Photo: Brian Yap

Available energy: There are about 500,000 sq km in WA's South-West that have average wind speeds above six metres per second at a height of 60 metres. Just 2,500 sq km (50 km x 50 km) in this area would on average, produce energy equivalent to the peak demand, continuously on the SWIS.

GEOTHERMAL

Australia has extensive hot granites and suitable geological formations that can be used for heating, cooling and to generate electricity. Geothermal energy directly under Perth is already being used to heat some of Perth's swimming pools, such as Challenge Stadium. In the Cooper Basin in South Australia, Geodynamics has demonstrated the use of deeper 'hot rocks' 3–5 km underground. The rock is fractured hydraulically and water is pumped down and circulated repeatedly, transferring heat to the surface with each circulation to generate electricity.

Available energy: Geoscience Australia estimates that one per cent of the geothermal energy shallower than five kilometres and hotter than 150°C could supply Australia's total energy requirements for 26 000 years. In the Cooper Basin, the Habanero field alone could produce 10,000 MW of baseload power, equivalent to the SWIS peak demand nearly three times over. Exploration of WA's hot granite rocks is in the early stages.

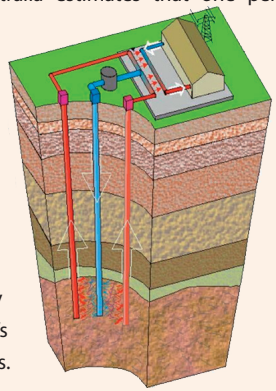


Diagram: Australian National University

CONCENTRATED SOLAR THERMAL (CST)

First developed in the 1970s, solar thermal/concentrated solar power uses mirrors to concentrate the sun's thermal energy, heating water, oil or molten salt, which is used to make steam for powering an electrical generator. Solar thermal technologies include the parabolic trough, power tower/heliostat reflectors and linear fresnel reflectors. Their built-in heat storage enables thermal energy to provide 'baseload' or 'dispatchable' power 24/7.

Available energy: It is estimated that all electricity demand on the SWIS could be supplied by just 200 sq km (14 km by 14 km) of solar thermal collectors in sunny, clear-sky areas.

Solúcar PS10, Spain. Photo: Afloresm

PHOTOVOLTAIC (PV)

Solar photovoltaic (PV) cells convert solar energy directly to electricity. Solar PV is ideal for residential or commercial use in the metro area, and reduces transmission losses and energy costs. Its simplicity, reliability and rapid cost reduction are significant benefits.

Available energy:

As of 2013 Perth's rooftop solar PV capacity was about 350MW (and growing rapidly), comparable to the larger WA coal-fired power station.

Solar PV, UK. Photo: David Blaikie

GLOSSARY

SWIS stands for South-West Interconnected System, the publicly-owned electricity grid supplying much of southern WA.

MW signifies megawatt, or one million watts.

Baseload is the minimum continuous demand for electricity over a typical 24 hour day.

Load-following/mid-merit describes the varying daily demand above 'baseload', which requires a varying generation supply.

Peak demand is the short, sharp additional demand for electricity placed on a grid at a particular time, such as air-conditioning on hot days. WA's peak demand is presently met by gas turbine or diesel generators, but could be supplied by other 'dispatchable' renewables.