

All about Ocean Power

Why we need clean energy

Australia's stationary energy sector, which includes electricity derived from coal-fired power, is responsible for around 50 percent of our greenhouse gas emissions. Australia's environmental, economic and energy security is at risk from climate change unless we can compete in a low carbon world. Any successful climate change solution must first target the energy sector specifically.

Australia has some of the world's best clean energy sources, many of which are already powering Australian homes and businesses. Our superior clean energy resources, like oceanic power, have the capacity to meet Australia's growing energy needs while providing a clean powered, sustainable economy.

Ocean Power – how it works

Ocean power uses the oceans' tides, currents or waves to produce electricity. Power comes from the water's movement, i.e. either the changes in height of the tides or the ocean's current.

Different technologies adopt different methods for harnessing the ocean's energy. However, the most common oceanic power generation system uses a turbine to drive an electrical generator. It is also possible to use oceanic power generation to desalinate seawater and produce drinking water.

Tidal

A tidal power station is part of a dam or barrage, built across a narrow bay or river mouth. As the tide flows in and out, it creates uneven water levels on opposite sides of the barrage. Water flows from the high side to the low side through turbines to generate electricity.

Wave

Surface waves and pressure variations below the ocean's surface can generate intermittent power. Floating buoys, platforms, or submerged devices placed in deep water, generate electricity using the bobbing motion of the ocean's waves.

Ocean Thermal

Ocean Thermal Energy extracts energy from the temperature difference between the ocean's warm surface waters and deeper colder layers of the ocean. Thermal energy conversion plants use the water to make steam and then pass the steam through a turbine generator to make electricity. Currently there are no plans to utilise this technology in Australia.



Greenhouse gas savings

Ocean power is a zero-emission electricity source. One megawatt hour (MWh) of ocean-derived electricity avoids approximately one tonne of CO₂.

In Australia

With its vast coastline, Australia's near shore wave energy resources could create around four times the nation's current national power needs. The Southern Ocean, in particular, is one of the world's largest and most consistent wave energy resources and could generate at least 35 per cent of our baseload power needs, according to the Carnegie Corporation. Regions such as Port MacDonnell in South Australia, Portland, Warrnambool and Phillip Island in Victoria, Albany and Geraldton in Western Australia and parts of the Tasmanian and NSW coastlines are optimal sites for wave energy plants.

The resource is so far almost completely undeveloped, but that is beginning to change. Currently there is only one wave powered generation plant operated by Oceanlinx Limited at Port Kembla in NSW, generating 0.5MW. Another plant is under construction in Fremantle, where Carnegie Corporation is developing a plant which will have installed capacity of 0.1MW. Another 915MW of ocean power is being evaluated around Australia. Carnegie Corporation estimates that its facilities along the southern coastline of Australia could ultimately generate 1500MW.

Did you know? Approximately one million GWh of wave energy hits Australian shores annually.

Potential

The USA, South America, Western Europe, South Africa, Australia and New Zealand are rated as having some of the best wave energy sites around the world. Given the majority of the Australian population live near the coastline, oceanic power provides a realistic solution to reducing the high costs of distribution and grid connection that other power sources face.

The intensity of ocean currents, tides and waves is able to be accurately forecast, making it easy for the energy market to balance supply and demand and thus provide a reliable energy source.

Global View

Internationally, ocean power is still a relatively new technology and most projects are at the prototype or testing phase. The total current world capacity for tidal power is estimated at 300MW. France has led the world with its project at the Rance River operating since 1966 currently delivering 600GWhs.



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Current Issues

The future success of ocean power in Australia is dependent upon government policies to support the development and deployment of these emerging technologies. The sector requires a comprehensive policy framework for emerging technologies to take them from research to full scale demonstration.

Renewable energy funding initiatives as well as the national Renewable Energy Target (RET) which aims to ensure that 20 per cent of Australia's electricity supply comes from renewable energy sources by 2020 are important to drive research and development into ocean power technologies.

About the Clean Energy Council

The Clean Energy Council is the peak industry body in Australia, creating a united strategy built on strong policy and direction in the clean energy sector.

We aim to find solutions that deliver abundant and affordable clean energy and efficiency solutions to Australia, as quickly as possible. For more information please visit www.cleanenergycouncil.org.au



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