

WAVE AND TIDAL ENERGY: THE POTENTIAL FOR EXTRACTION OF SUSTAINABLE ENERGY FROM THE OCEAN

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The ocean represents an enormous store of renewable energy – far more than could ever be used by the global population. The challenge is: how do we go about extracting this energy in a sustainable and economical way?

It is the sun and the moon that give us this energy, in the form of waves, tides and thermal gradients. The amount of energy stored in the ocean, and continually replenished by the sun and moon, is well quantified, and certifiably massive. Despite decades of effort, attempts to extract meaningful quantities of energy from these ocean sources continue to be met with monumental challenges. Given the anticipated growth in energy demand, and continuing concern with the use of fossil fuels, it is now time to push through the barriers.

The most widespread and easily tapped sources of ocean energy are surface waves and tidal currents. This presentation will focus on these two sources only.

Wave and tidal energy resources in Australia have been recently quantified by the CSIRO in a report entitled *Ocean Renewable Energy: 2015–2050*. This report indicates a vast quantity of available wave energy along the entire south coast of Australia. Tidal energy is more localised, with some potential sites located in Tasmania, Western

Australia and the Northern Territory. Tidal energy holds limited promise for Australia, although some extraction may be possible.

For Victoria, the potential for wave energy extraction is very promising, with high levels of consistent energy along most of the coastline, particularly west of Cape Otway. On this stretch of coast, which includes Warrnambool, Port Fairy, Portland and several other communities, as well as several industrial power users, the wave energy climate is considered world-class. Waves have the benefit that they provide more consistent energy, relative to wind and solar. However, wave energy is still a nascent industry, and technology costs are high. BioPower Systems is currently developing a 250 kW pilot trial project, using bioWAVE technology, to be located near Port Fairy, Victoria.

The future prospects for ocean energy in Victoria are good, if several of the challenges can be overcome. Competing energy sources and the policy landscape can both affect the rate of development of ocean energy in Australia, but it is likely that some grid-connected commercial projects will be completed within the next decade.