

MARINE ENERGY IN NEW ZEALAND

Harnessing energy from marine waves and tides has become an attractive proposition as new technologies have been developed since the 1990s.

Resources

Offshore swells and waves contain large amounts of energy. The main islands are exposed to the open Southern Oceans and capture the full effects of the 'Roaring Forties', which bring energetic waves to our west- and south-facing coasts. New Zealand's wave resources are 'world-class'.

New Zealand's tides sweep anticlockwise around our coast roughly twice a day, but give only a small rise and fall (2 – 3 m). Consequently, tidal currents have lower velocities than in other countries and tidal currents are patchily distributed around New Zealand. Offshore islands, passages and seabed irregularities can provide a focussing mechanism and there are some areas of significant tidal current flow, for example, Cook Strait.

Technologies

Marine energy technologies are under development in a number of countries but most technologies are not yet mature. The first offshore commercial 'wave farm', utilizing a Scottish wave device called Pelamis, will be operating before the end of 2006. The first full-scale trial of a tidal energy device is being conducted in Northern Ireland. British Government forecasts that there will be over 100 MW of operational marine energy devices by 2009.

Investment in R & D and Demonstration Projects

The United Kingdom, Ireland, Portugal and Denmark are currently investing significantly in marine energy with the UK being the current leader in technology developments. Canada, the United States and Australia all have active projects to develop marine energy technologies and particular sites.

New Zealand has to date invested very little in marine energy but our natural resource advantage could make marine energy a significant contributor to future energy supply. Possibly as much as 20% of New Zealand's electricity could be generated from marine energy sources.

Projects

There are currently fourteen active wave and tidal energy projects in New Zealand. All are in the early stages, all are relatively small. There are two publicly announced tidal projects, and two wave projects, one developing a wave device and a second seeking to import an overseas technology.

Challenges for Marine Energy

Marine energy faces some unique challenges: the harshness of the marine environment, the regulatory environment and willingness to invest.

Current draft Government strategy and policy documents recognize the potential for marine energy but we need to see those strategies and policies implemented to deliver the investments in marine energy projects. A dedicated marine energy strategy, combined with a supportive R & D investment regime, would do much to promote uptake. AWATEA is also proposing a marine energy centre – for testing and demonstration projects. A space allocation regime, similar to the oil and gas permitting regime, should be implemented to avoid the ‘land grab’ and subsequent moratorium, which have adversely affected aquaculture investment.

Blue Energy and Climate Change

Marine energy is a renewable energy resource. In operation it generates no greenhouse gases and may thus help New Zealand meet its Kyoto and other ongoing obligations to mitigate climate change. Most marine energy technologies will be submarine and thus have no visual impact and very little impact on surface activities. Marine energy technologies are designed to eliminate or minimize any environmental effects. More data needs to be gathered to assess the environmental impacts on marine ecosystems and marine fauna. However, it is already clear that marine energy devices will have a light ‘footprint’ on the areas in which they are deployed.

Uptake of Marine Energy

Uptake of marine energy will be gradual and progressive. The development of wind energy in New Zealand provides a good template. The first wind turbine, at Brooklyn in Wellington, was an R & D demonstration project. Having established the potential at that site, growth in wind farm developments is now accelerating and locally developed turbines are being constructed. A similar path is likely for marine energy technologies – early demonstration projects, followed by larger and widespread commercial developments, including the development of domestic technologies. Indeed the opportunity for the latter may be greater in marine energy technologies because the technologies are not as mature as the Brooklyn turbine was when it was constructed.

Summary

New Zealand has capable and qualified industries with the creativity and flexibility to grasp the marine energy challenge. The response to the America’s Cup challenge in 1995 and 2000 is a good example of what can be achieved. Oceans dominate New Zealand – 94% of New Zealand’s sovereign territory is ocean. New Zealand’s prosperity in the 21st Century is likely to be increasingly derived from our oceans.