

Marine Renewable Energy

Effectively Balancing the Needs of Developers and Potential Environmental Impacts

An Australasian Perspective

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The Environmental Interactions of Marine Renewable Energy Technologies
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My Research

- What are the key elements of a suitable regulatory framework for facilitating the sustainable deployment of marine renewable energy systems?
 - **Environmental Impact Assessment**
 - **Managing competing uses**
 - Permitting/licensing/exploitation
 - Consenting processes
 - Grid connection
 - Feed-in tariffs and incentive mechanisms

Overview

- Context
- The importance of good regulation
- General schema of approaches to EIA
- Resource and projects in Australasia
- **New Zealand: Crest Energy's tidal project**
- **Australia: toward a framework for marine energy in Victoria**
- Concluding thoughts

Marine Renewable Energy

- Least developed of the renewable energy technologies
- Uncertainty regarding environmental impacts
- No 'winners' yet: technology and regulatory methods varied
- Need to:
 - facilitate the deployment of small-scale prototypes
 - look to the future: plan for potential environmental impacts, human use conflicts and likely competition over sites
 - ensure balance between sustainability and exploitation
- Marine renewables enter an already congested marine environment:



The Importance of Regulation

- Good regulation can help facilitate the development and deployment of marine renewable energy:
 - Certainty
 - Sustainability
 - Investor confidence
 - Development of knowledge
 - Equitable use
 - Timescales
- The regulatory process is the mechanism by which research into impacts is put into practice
- Success of marine renewables “*dependent upon government policies to support the development and deployment of these emerging technologies... the sector requires a comprehensive policy framework*”

Approaches to Impact Assessment

- Requires high scientific certainty
- Preferred by conservation groups
- But:
 - disregards the environmental benefits of renewable energy
 - we can never be 100% certain

Precautionary

- Elements of precautionary and deploy and monitor approaches
- SEA and MSP
- Adaptive management
- Factors in broader policy considerations
- Allows for some 'paradoxical harm'
- Attempts to strike a balance

The Middle Way

- Deploy devices and conduct ongoing monitoring
- Assumes minimal environmental impact
- Allows for fast deployment
- Perhaps preferred by developers
- Suitable for small-scale and prototypes

Deploy and monitor

Precautionary

Developer friendly

Marine Renewable Energy in Australasia

- New Zealand
 - Strong wave resource potential at most South- and West- facing coasts
 - A number of significant tidal energy sites
 - Wave energy prototype deployed, a number of tidal projects proposed
- Australia
 - Excellent wave resource along Western and Southern coastline
 - Sufficient tidal resources for local electricity production in many areas
 - Four deployed wave pilot projects, totalling around 1MW capacity, range of tidal proposals



Impact Assessment in New Zealand

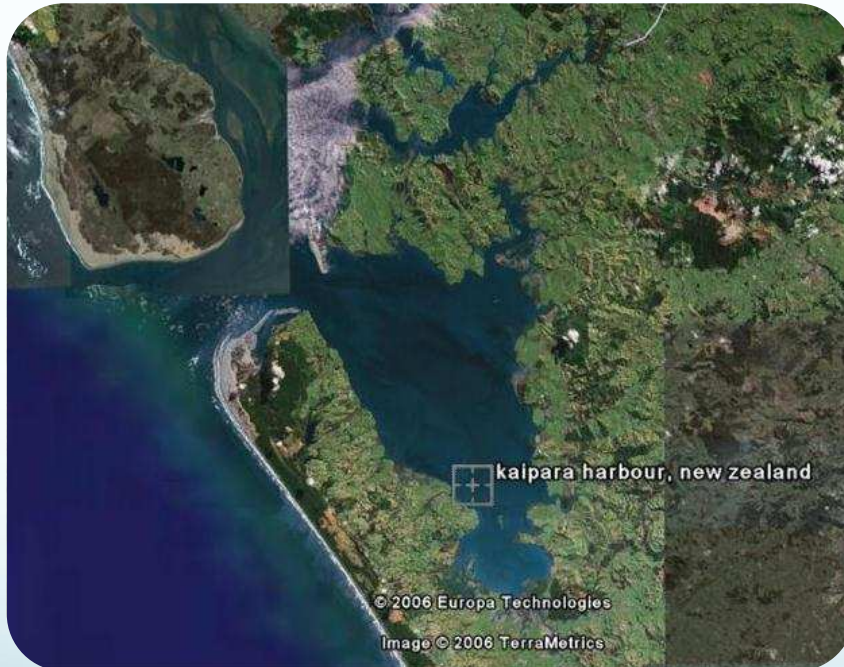
Crest Energy's Tidal Power Project

- Crest proposes to establish an array of 200 turbines in the seabed of the Kaipara Harbour; ultimate nameplate capacity of 200 MW
- No specific marine renewable energy legislation/processes as yet – approvals made under range of existing legislation
- Applied to local council for consents under the Resource Management Act 1991

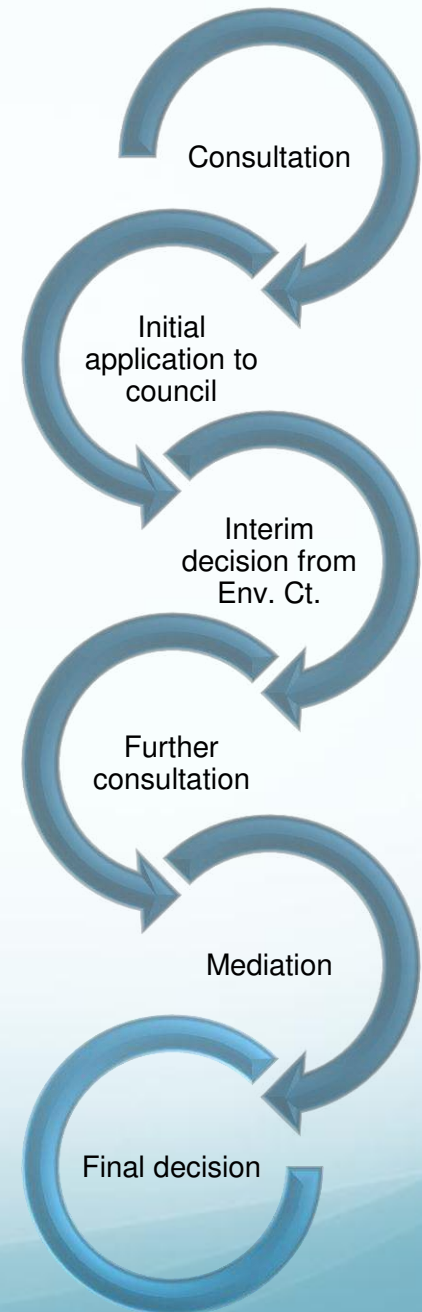


Openhydro turbine
Courtesy of Crest Energy

Crest's Tidal Power Project Process Outline



Kaipara Harbour
Courtesy of Crest Energy



Crest Energy's Tidal Power Project Environment Court

- Main parties: Crest; Council; Maori group
- Key issues:
 - marine life
 - fish and fisheries
 - sustainable management
 - navigation
 - coastal planning processes
 - Maori cultural issues
- Court acknowledge from the outset that the project:
 - is an “efficient use and development of natural and physical resources”; and
 - will reduce carbon emissions
- Crest was very proactive in engaging stakeholders



Maui's Dolphin
Courtesy of Kaitiaki

Crest Energy's Tidal Power Project

Interim Decision

- Effect of the project on marine fauna and fisheries particularly important
- Crest's research regarding fisheries considered insufficient
- Noise monitoring must take place: determine baseline/monitor
- Crest discharged duties to Maori group through extensive consultation
- Court very much in favour, but Crest's position precarious

Mediation

- Time consuming, but did solve some outstanding issues



Image courtesy of Crest Energy

Crest Energy's Tidal Power Project Final Decision

- Staged deployment: 3, 20, 40, 80 and 200 turbines; three year gap between each addition
- Adaptive management:
 - collect baseline data
 - setting objectives
 - monitoring results
 - changing environmental management plan to reflect new knowledge
- Effects should be “no more than minor”
- Financial viability of project is not incompatible with sustainability considerations

Impact Assessment in New Zealand

- Insight for industry into best approach to consent process:
 - Strong, early and continued consultation
 - Baseline monitoring
 - Comprehensive effects statements
 - Plan for long process
- A number of points in favour of marine renewables:
 - Some consideration of financial viability
 - Acknowledgement of climate benefits
 - Willingness of Court/cooperative process
- Does it strike the balance?
 - Slow process
 - Onus heavily on developer to prove sustainability of technology
 - Costly
 - Quite precautionary approach to deployment = long time until project is profitable/commercially sustainable
 - Strong opposition to project – process inept at managing this; again, developer shoulders burden

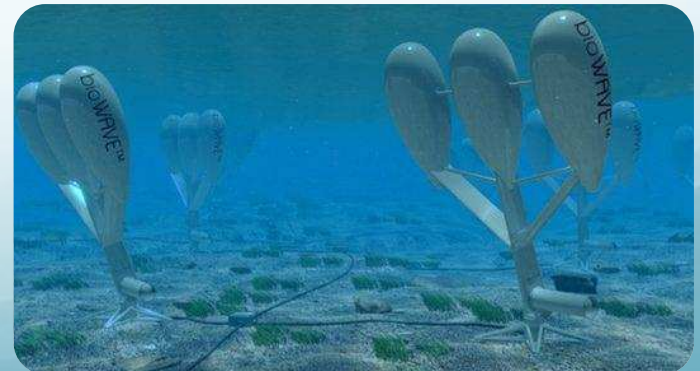
Impact Assessment in Australia

- Perhaps the least proactive of all marine renewable energy countries – less impetus to develop
- Ad hoc approach: local government authorities assessing projects on a one-off basis as and when companies approach
- Simply applying existing laws to new technology
- *“The absence of an existing framework for regulating marine energy... means companies working in the sector are required to ‘forge a process’ for approval of their projects.”*

Victorian Government

- 2-3 years for basic consents for test devices

BioWave device
Courtesy of BioPower Systems



Impact Assessment in Australia Victoria

- Victoria keen on developing renewables (but, note change of state government)
- Inquiry on approval processes for renewables generally and discussion paper on marine renewables specifically
- Current process involves the following approvals:
 - *Environment Effects Act 1978*: fully integrated assessment of social, economic and environment outcomes
 - *Planning and Environment Act 1987*: planning schemes and development controls
 - *Coastal Management Act 1995*: use of coastal Crown land
 - *Heritage Act 1995*: permits and consents where heritage sites are to be disturbed.
 - *Aboriginal Heritage Act 2006*: Cultural Heritage Management Plan
 - ...and more for tenure!

Victoria's Marine Energy Discussion Paper

- Current framework not apt to facilitate development
- Key principles moving forward:
 - Maximise public benefit
 - Facilitate development of resource
 - Minimise negative impact
 - Attract investment
 - Minimise speculation
 - Shorten timescale for approvals
 - Ensure transparency
- Committed to a whole-of government approach
- Three proposed options for reform within existing laws: focus on tenure allocation, not environmental impact
 - Assumes that existing frameworks for EIA will remain
 - Onus remains on developer: reform actually increase burden
 - Third option suggests Strategic Environmental Assessment – a step toward better balance

Port Fairy, site of BioWave prototype deployment, courtesy of David Kleinhart



Concluding Thoughts

- Australasia is an interesting case study: using existing regulation to attempt a 'middle way': will it work?
- Neither jurisdiction has tailored requirements for initial pilot phase
- Need to consider specific options for marine renewables
- Adaptive management and modular deployment can be used to balance competing interests, but must not place too much onus on developer
- Strategic Environmental Assessments and Marine Spatial Planning could take some pressure of developers - more work needs to be done to determine best practice approach
- Feed-in tariffs and other incentives should be considered to ensure greater impetus for development
- No easy answers for regulation – will likely be some time before approach is standardised
- Much more research into suitable regulation needed

Thank You

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