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# Chatham Island Wave Power Project

Aotearoa Wave and Tidal Energy Association  
5th Annual Conference  
May 2011

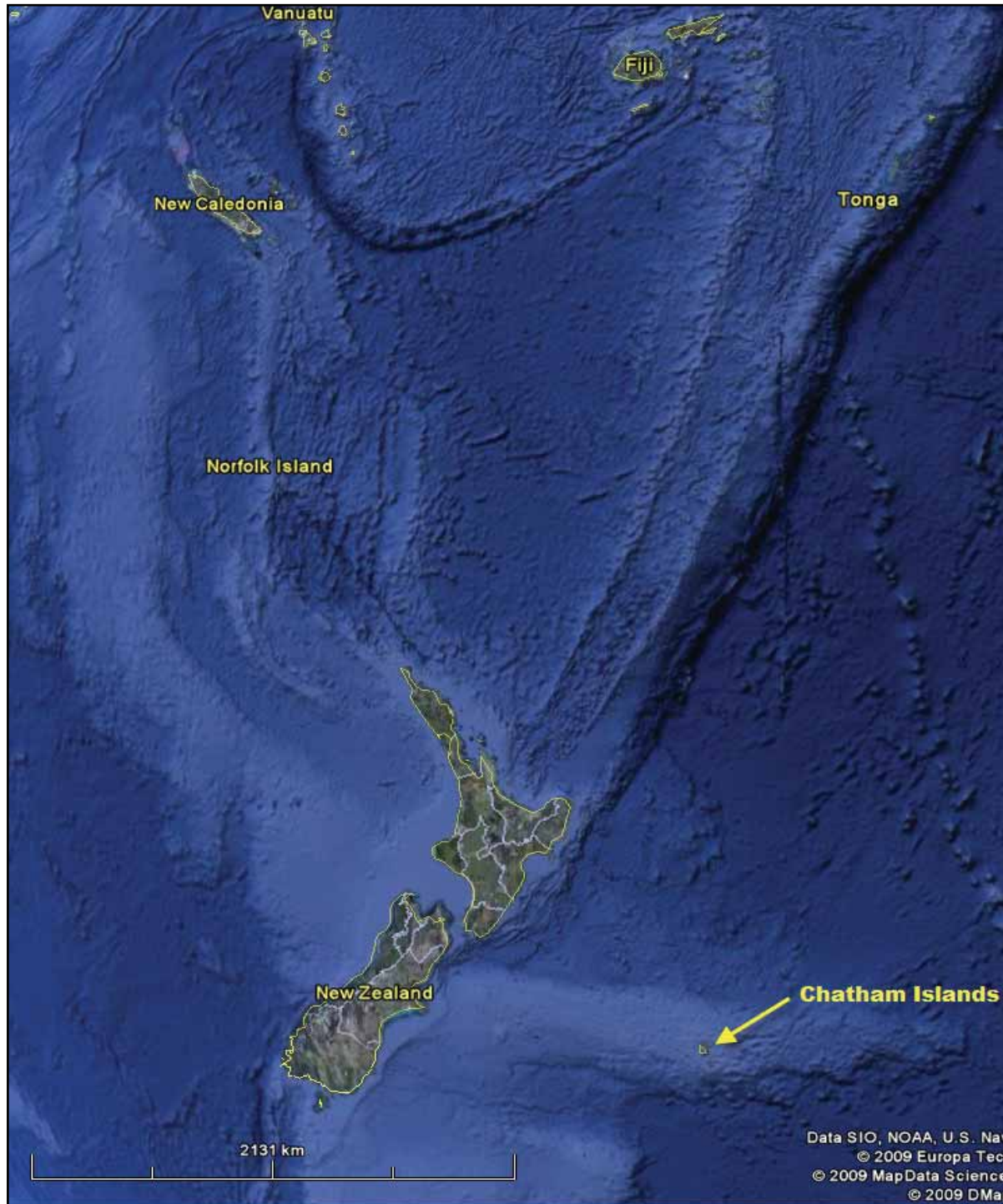
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## Chatham Islands

- 800 km east of NZ mainland
- Population ~750
- Electricity demand ~2.0 GWhr/yr
- Diesel generation
- Retail price >\$0.80/kWhr
- Recent 2x225 kW wind turbines

## Point Durham Wave Project

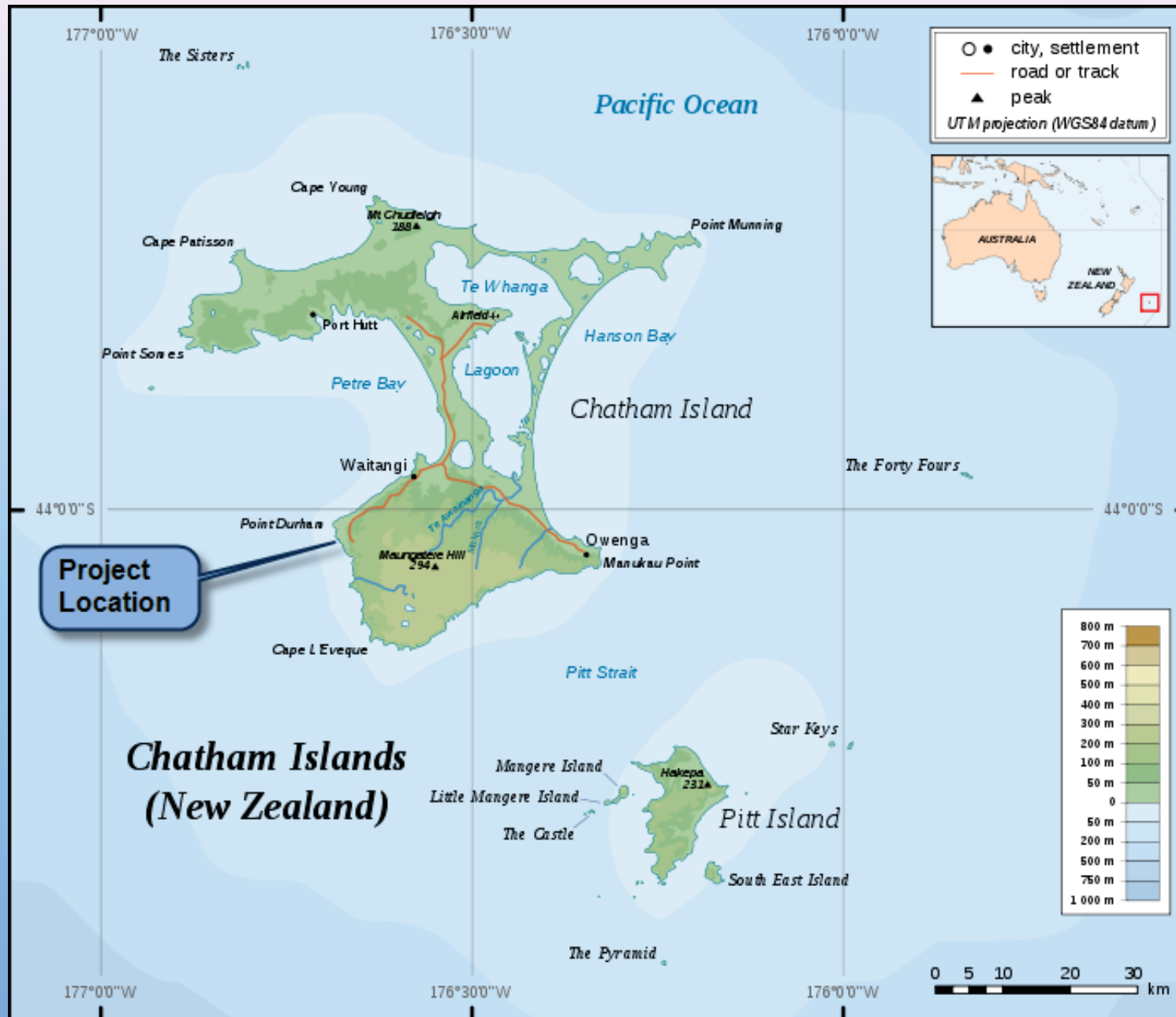
- Oscillating Water Column Concept
- Shore-based facility
- Based on Wavegen plant at Islay
- 220 kW capacity
- Close to grid connection



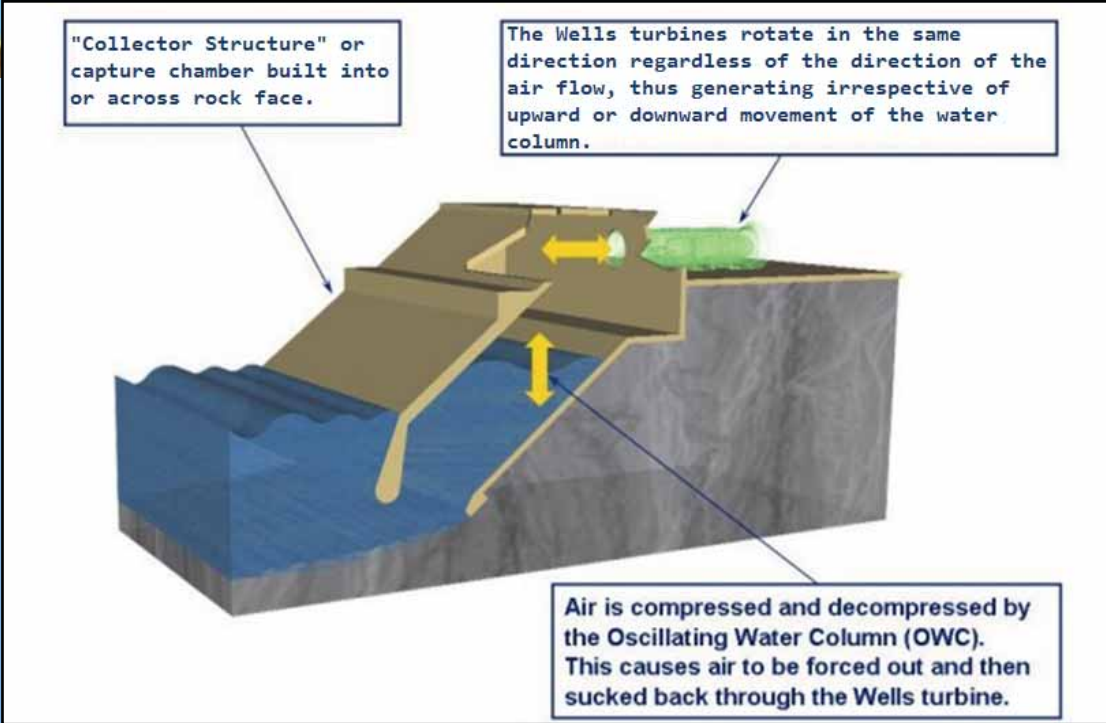
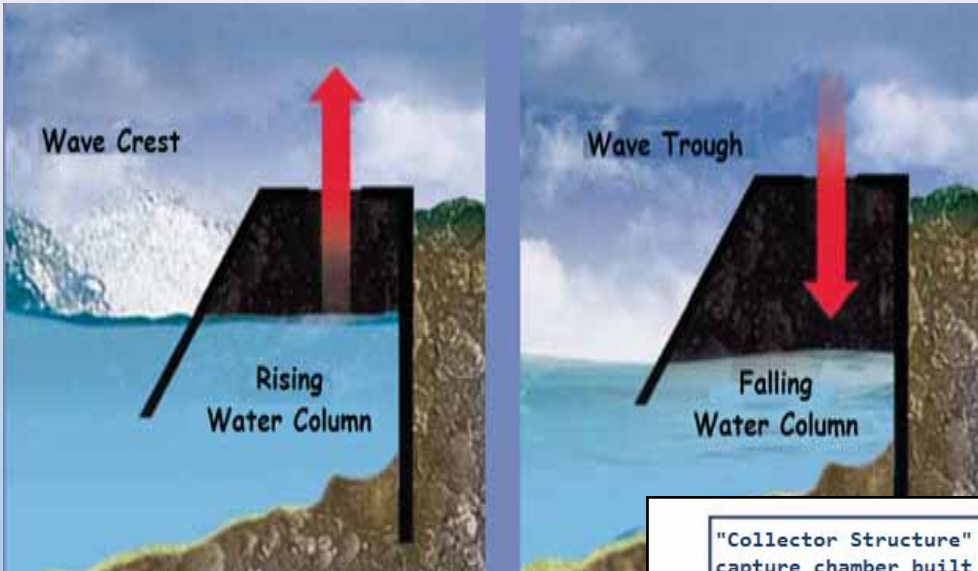


# Project Location

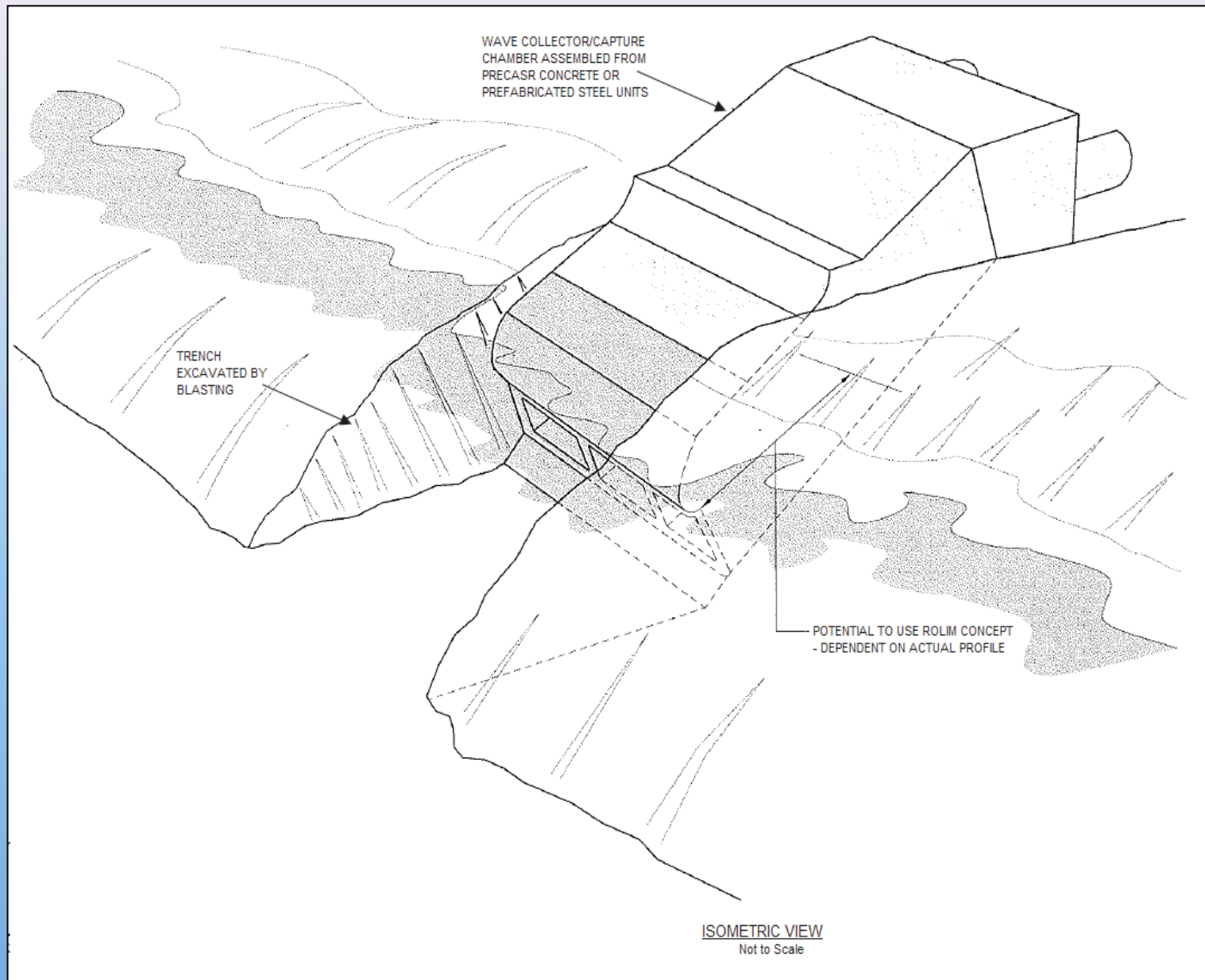
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# Technology



# Design



# Indicative Layout

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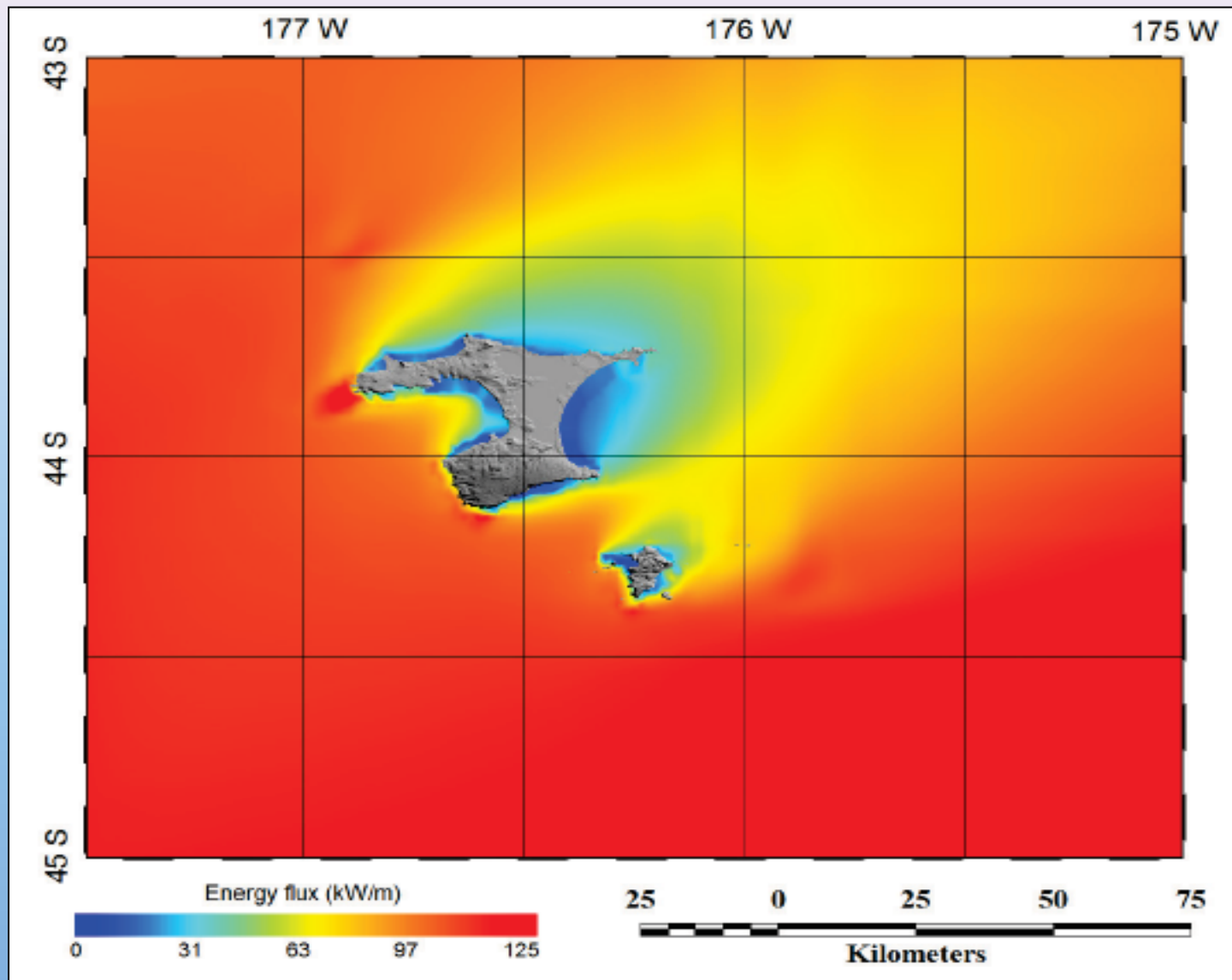


Various images of Wavegen Facility at Islay (Photographs ©Voith Hydro Wavegen 2010)



# Wave Energy Distribution

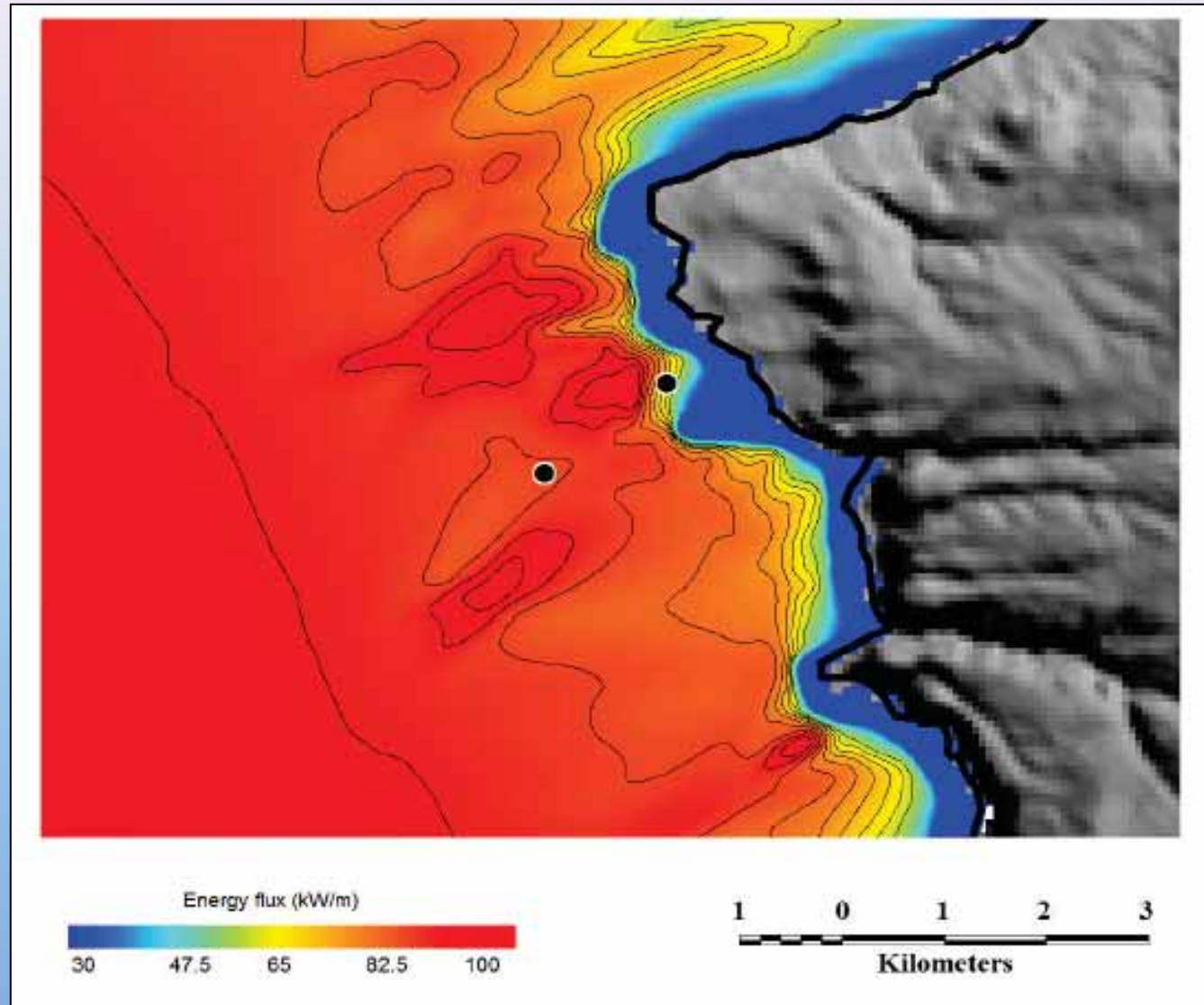
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Mean annual wave power (1998-2007) for the Chatham Islands Region



# Wave Energy Distribution



Mean annual wave power (1998-2007) south-western region Chatham Island

# Point Durham Site

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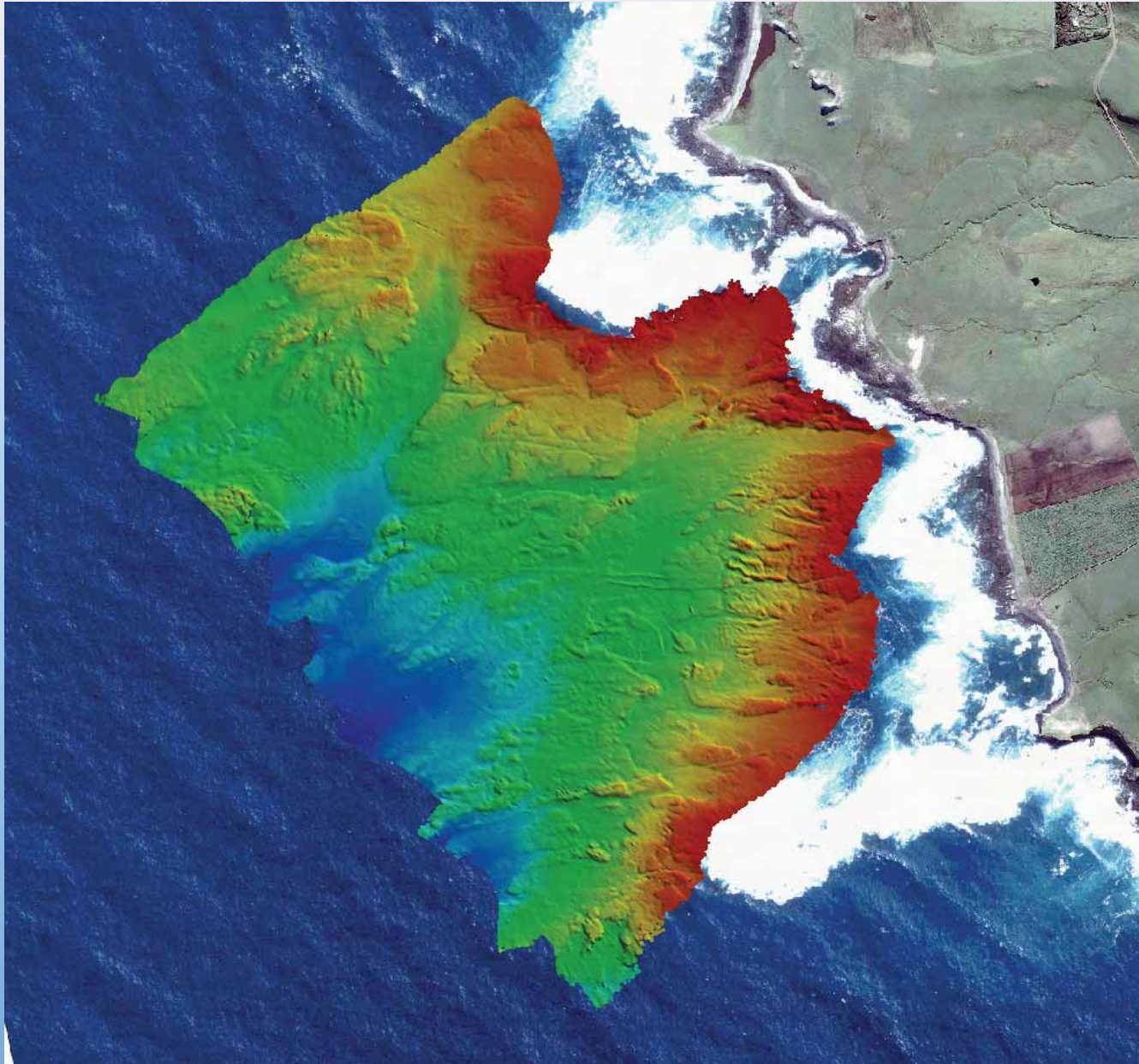
# Work Since May 2010

- Bathymetry
- Wave recorder
- Resource Consents
- Doc License to occupy
- Grid connectivity issues and PPA



# Bathymetry

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# Wave Modelling

- Wave recorder deployed Jan – Mar 2011
- Undertake model verification based on revised bathymetry and field data collection.
- Confirmed hindcast estimates
- Enabled fine tuning in relation to site specific contours

# Resource Consents

**March 2010:** Resource consent applications lodged

**August 2010:** Resource consents granted – no appeal - 35 Conditions

**Expiry:** 3 August 2045

## **CONSTRUCTION AND OPERATIONS MANAGEMENT PLAN (COMP)**

### **CONSTRUCTION**

- No exposure of Koiwi (human skeletal remains), taoka or artefact material - Ngati Mutunga o Wharekauri and Hokotehi Moriori Trust and their advisors to be advised. The Council in conjunction with Ngati Mutunga o Wharekauri and Hokotehi Moriori Trust shall arrange a site inspection by the appropriate Tangata Whenua and their advisors who will determine whether the materials will be handled and removed by tribal elders responsible for the tikanga.

# Resource Consents

- All practicable steps shall be taken to minimise the area of disturbance to the seabed in the CMA.
- Construction noise to comply with NZS 6803P:1999 "The Measurement and Assessment of Noise from Construction Maintenance and Demolition Work".
- Aerial surveillance of the area within 1.5 kilometres of the construction site for a period of one hour prior to the time of blasting... if marine mammals are seen within the 1.5km distance, blasting can only commence once the animals move further away, or have not been seen for 30 minutes.
- Surveillance of the area within 200m to landward of the excavation site for a period of one hour prior to the time of blasting... if at-risk bird species are seen within the 200m distance, blasting can only commence once the animals move further away.
- Ensure that, as far as practicable, any paua located within the area of disturbance prior to excavation shall be removed from the site and relocated to a suitable habitat environment away from the vicinity of the channel, by divers competent in paua translocation techniques who have been approved by the Department of Conservation Area Manager, or his/her delegate.

# Resource Consents

## Noise

- District Plan limits plus ensure that the operation does not create any noise which displaces terrestrial at-risk bird species outside 200m of the Project.

## Lighting

- Any outdoor work lighting or security lighting installed at the Project site shall be fitted with screens / shields so that, as far as practicable, light does not spill upwards.

## BIOSECURITY MANAGEMENT

- Weed inspection and control regime to be implemented for two years subsequent to any construction work involving imported gravel.
- All imported dive equipment used in relation to the project shall be clean and dry
- The consent holder shall ensure that all on-island machinery used during construction is inspected prior to entry onto the site, and if necessary water blasted, to ensure no new noxious weed species are introduced to the area.



# Resource Consents

## MANAGEMENT OF HAZARDOUS SUBSTANCES AND WASTE

### MONITORING

- The Consent Holder shall carry out monitoring, of the distribution of terrestrial birds in the area within 300 metres of the project.
- The Consent Holder shall carry out monitoring, of the distribution and abundance of fish and benthic flora and fauna in the area of the proposed collector channel and concrete collector device, before excavation, one year and five years after excavation of the collector channel.

### REMOVAL CONDITIONS

- Within 3 months of ceasing activities under this Consent, the Consent Holder shall remove the structures associated with activities under this Resource Consent and shall notify the Council in writing that the removal has been completed

### REPORTING and REVIEW

# DOC Concession Easement

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**October 2010:** Agreement from DOC for Concession Easement for a right of way and power cable over the Pacific Ocean Marginal Strip.

# Island Grid Issues

- CIEL currently use one of their diesel units operating under 'constant voltage control' to support two x 225 kW wind turbine asynchronous generator machines.
- Important for Wave Plant to integrate with this system
- Current discussions underway regarding wave power plant providing system support via the two x 110 kW, 415V, 3-phase, 50 Hz synchronous generators [integrally coupled permanent magnet generators and large inertia flywheels]

# Timeline

## Target: Generating useable electricity by Mid-2012

- Power Purchase Agreement May-June 2011
- Design completion by Nov 2011
- Pre-fab Construction Jan – Mar 2012
- Procurement and delivery of turbines by Mar 2012
- Onsite construction Jan 2012-May 2012
- Install and commissioning Jun-2012



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