

6 SUMMARY AND CONCLUSIONS

RPS carried out a Stage 1 Site Assessment for the proposed deployment of a CETO array off the west coast of Ireland. This assessment highlighted the Liscannor Bay to Malbay coast off County Clare as the favoured area that best met the technical criteria set by Carnegie. RPS has subsequently undertaken a pre-planning environmental scoping exercise for this area of interest to highlight any environmental issues that may arise from developing the proposal. This environmental scoping study employed a 15km buffer around the potential CETO development areas to define the overall study area limit. This buffer distance is the standard study area normally requested by environmental authorities in Ireland and the UK for assessment of impact on designated sites.

From the initial desktop scoping exercise it can be concluded that there are no internationally, nationally or locally protected environmental designations within the potential CETO deployment areas between Liscannor Bay to Malbay, as highlighted in the Stage 1 assessment. This area is also not heavily fished or trafficked by either recreational or commercial vessels, does not contain any known heritage features or shipwrecks, and is not in close proximity to areas of high population density.

Within the vicinity of the potential CETO deployment areas and in the study area as a whole there are however a number of potentially sensitive sites and receptors. The impact of the construction, operation and decommissioning of the CETO proposal will require further assessment to enable quantification of the potential significance of environmental impacts on these sensitive sites and receptors. The main environmental issues requiring assessment would be as follows:

- The Carrowmore Point to Spanish Point and Islands SAC is adjacent to the potential CETO areas. The reefs (Annex I habitat code 1170) within the SAC would be the habitat most at risk from potential negative impacts from construction, operation and decommissioning of a CETO array within the area.
- The Mid Clare Coast SPA is adjacent to the potential CETO areas. Increased marine traffic within the area due to the development would be the most likely potential negative impact upon these protected bird species.
- The Carrowmore Point to Spanish Point and Islands pNHA is adjacent to the potential CETO areas.

- There is the potential for fishing activities such as line fishing, trawling and potting to occasionally operate within the area of interest. The installation of a CETO array will most likely preclude these fishing activities from the immediate area and a safety buffer zone around the development.
- There is the potential for cetacean and other marine mammal activity within the vicinity of the potential CETO deployment areas. Increased marine traffic due to the development could have potential negative impacts on marine mammals feeding or passing through the area. Noise and vibration from construction, operation and decommissioning of the CETO array may also have an impact on feeding or passing marine mammals.
- There is the potential for currently undiscovered heritage features, including shipwrecks, to be present in the vicinity proposed development area.
- There is the potential for the CETO development to affect coastal processes in the area. In particular, sediment recharge at the closest beach of Travaun (White Strand Milltown Malbay) and the nearby popular tourist beaches of Spanish Point and Lahinch have the potential to be influenced by the deployment of a CETO array in the area.

Within the vicinity of the potential landfall areas and terrestrial development associated with the project there are further environmental issues that will potentially be encountered, such as:

- This area of the County Clare coast is a protected landscape which is deemed to be sensitive to change. As the area is mainly pasture land with associated low density housing, any above ground installation (AGI) as part of the landside development will have to be sensitively detailed to ensure integration with the landscape.
- The landside of the development area is all of extreme or high groundwater vulnerability, however there are no source protection zones within the study area, or groundwater abstractions within close proximity to the coastal area.
- The potential landfall areas are relatively close to road and electrical infrastructure. There is also the potential to co-develop the infrastructure in conjunction with other renewable energy operations in the area, such as pumped hydro and wind energy.

Consultation and co-operation with other renewable energy developments within the area may therefore be required in the future.

Appendix B provides an Environmental Scoping Matrix which is a simple table summarising these potential impacts from construction and operation of the proposed CETO array.

To further progress this project it would be envisaged that the following studies and activities will need to be undertaken:

- Formal pre-planning consultations with competent authorities, in particular the Department of the Environment, Heritage and Local Government, Clare County Council and An Bord Pleanála.
- Further detailed survey work will be required to establish a true environmental baseline of the potential development area (including pipelines and landfall sites), particularly for bathymetry, marine and terrestrial ecology, marine mammal activity, fisheries activity, underwater and terrestrial heritage, landscape and visual impacts, seabed morphology, coastal processes, hydrodynamics and sediment transport.
- Licences from the competent authorities may be required to carry out some of the proposed surveys.
- Based on the current foreshore and planning processes, a Foreshore Licence will need to be applied for via the Department of the Environment, Heritage and Local Government and a Planning Application will need to be submitted to either An Bord Pleanála or Clare County Council, depending on whether it is viewed as a strategic development under the Planning and Development (Strategic Infrastructure) Act 2006. If not viewed as strategic the planning will be dealt with by the County Council.
- Formal Environmental Impact Assessment (EIA) of the development and submission of an Environmental Impact Statement (EIS) to accompany both the Foreshore Licence and the Planning Application. The EIA process will also involve statutory and non-statutory consultations.
- Article 6 Assessment of the potential impacts of the development which can be incorporated as an appendix within the EIS. This assessment will become a Natura Impact Statement.

7 REFERENCES

Clare Co Co, 2010. *Draft North Clare County Development Plan 2011 – 2017*. Clare County Council, June 2010.

Clare Co Co, 2011. *Clare County Development Plan 2011 – 2017*. Clare County Council, February 2011.

EPA 2010. *Review of Ambient Air Quality Monitoring in Ireland 2010*. Environmental Protection Agency. December 2010.

GSI, 1999. *Groundwater Protection Schemes*. DELG/EPA/GSI, 1999.

GSI, 2005. *The Geological Heritage of Clare. An audit of County Geological Heritage Sites in Clare*. Matthew Parks, Claire McAteer and Scott Engineering. Geological Survey of Ireland, January 2005.

Heritage Council, 2004. *Landscape Character Assessment of County Clare*. Environmental Resource Management for The Heritage Council, March 2004.

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Marine Institute, 2007. *Inshore Fisheries Atlas*.
<http://www.maps.marine.ie/inshore/default.aspx>

APPENDIX A

Consultee Responses

Richard Bingham

From: Richard Bingham
Sent: 23 May 2011 17:31
To: Richard Bingham
Subject: Carnegie CETO Wave Energy - County Clare

From: David Lyons [mailto:David.Lyons@environ.ie]
Sent: 01 April 2011 12:06
To: Richard Bingham
Subject: RE: Carnegie CETO Wave Energy - County Clare

Dear Richard,
I have notified our Development Applications Unit and I anticipate you will receive a response in due course. Please be aware that any acoustic surveys of the seafloor, which may be part of the planning phase of the proposed development, would require the application of mitigation to protect marine mammals. The relevant Code of Practice is available to download on <http://www.npws.ie/en/Marine/BestPracticeGuidelines/>

Best regards
David

Dr. David Lyons
Marine Ecologist
National Parks & Wildlife Service
Department of the Environment, Heritage & Local Government
Custom House
Druid Lane, Quay Street,
Galway, Ireland

T: +353 (0) 91 758434
M: +353 (0) 87 660 2159

23/05/2011



Comhshaoil, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government



Your Ref.: Ltr 110331
File Ref.: IBE0506

04 April 2011

Mr Richard Bingham
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
Northern Ireland

Re: Carnegie Wave Power Ltd – CETO

Thank you for your recent letter and enclosures in regard to the above project.

This Department is currently conducting meetings/discussions with potential developers on the basis of site investigations for potential offshore renewable developments within the context of the Offshore Renewable Energy Development Plan developed by the Department of Communications, Energy and Natural Resources. We would welcome the opportunity to meet with you to discuss your proposal further and to outline the policy and requirements in regard to potential renewable developments on the foreshore. I would appreciate if you could contact me at my details below to arrange a suitable date and time for the meeting.

It is important to note that the consent of this Department is required prior to the commencement of any site works, including site investigative works, on the foreshore.

Yours sincerely

Robert Hickey
Higher Executive Officer
Foreshore Unit
Department of the Environment, Heritage and Local Government
2nd Floor, North Block
Newtown Road
Wexford
00353 53 9117365 robert.hickey@environ.ie



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Richard Bingham

From: Fiona Murren [FMurren@clarecoco.ie]
Sent: 05 April 2011 15:50
To: Richard Bingham
Subject: FW: Carnegie CETO Wave Energy - County Clare

Dear Mr. Bingham

I refer to your email which was received by Mr. David Timlin on 31st March 2011 and received by myself on 4th April 2011. Your email refers to an environmental scoping request. The Planning Authority requires you to specify whether this request is to be carried pursuant to Art. 95 of the Planning and Development Regulations 2001, as amended.

The Planning Authority notes that you require a response by 15th April 2011. The Regulations require the Planning Authority give notice to the relevant statutory bodies of having received the request, and provides that submissions to the request may be made within 4 weeks of having received the notice. There is concern therefore that the statutory bodies will not have the opportunity to avail of the statutory time in which to make a submission to the request, should you require same by 18th April.

You might please advise whether you wish this request to be considered under Art. 95 of the Regulations or whether you require general pre planning advise in accordance with Section 247 of the Planning & Development Act 2000 as amended.

Kind Regards

Fiona Murren

Fiona Murren
Assistant Planner
North Clare Area
Planning, Land-Use and Transportation Department
Clare County Council

Tel: 065 6846247
Fax: 065 6892071
Email : fmurren@clarecoco.ie

-----Original Message-----

From: Gareth Ruane
Sent: 04 April 2011 10:48
To: Fiona Murren
Subject: FW: Carnegie CETO Wave Energy - County Clare

This appears to be mostly in your area.

From: congella mcguire
Sent: 04 April 2011 10:31
To: Helen Quinn; Gareth Ruane
Subject: FW: Carnegie CETO Wave Energy - County Clare

21/04/2011

Richard Bingham

From: Tim Ryan [t.ryan@CIL.ie]
Sent: 05 April 2011 15:03
To: Richard Bingham
Subject: RE: Carnegie CETO Wave Energy - County Clare

Dear Richard,

Thank you for you consultation document in relation to the proposed wave energy sites off County Clare.

Given the submerged nature of the proposed generators, our primary concern would naturally be that the sites are adequately marked with navigation buoys, taking into account the density of leisure, fishing and commercial ferry traffic in the area. As the generators themselves are invisible there may be merit in over-specifying the site perimeter markings.

I hope that this information is helpful to you at this early stage, and if you require clarification or any further information, please do not hesitate to contact me.

Best regards,

Tim Ryan
Local Aids to Navigation Inspector
Commissioners of Irish Lights
Harbour Road
Dun Laoghaire
Co. Dublin
Ireland
Phone 00 353 (0)1 271 5483
Fax 00 353 (0)1 271 5566
Email t.ryan@cil.ie
Web www.cil.ie

 Please consider the environment before printing this e-mail.

Tim Ryan
Local Aids to Navigation Inspector
Commissioners of Irish Lights
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 Please consider the environment before printing this e-mail.

From: Richard Bingham [mailto:Richard.Bingham@rpsgroup.com]

21/04/2011

Richard Bingham

From: Fiona Murren [FMurren@clarecoco.ie]
Sent: 06 April 2011 14:45
To: Richard Bingham
Subject: RE: Carnegie CETO Wave Energy - County Clare

Hi Richard,
 Below please see some comments on your proposed wave energy development.
 Should you have any questions on same, please feel free to contact me

Kind Regards
 Fiona

Fiona Murren
 Assistant Planner
 North Clare Area
 Planning, Land-Use and Transportation Department
 Clare County Council

Tel: 065 6846247
 Fax: 065 6892071
 Email : fmurren@clarecoco.ie

Having regard to its location on the Atlantic Coast and situated along the Shannon Estuary, Co. Clare has enormous potential to harness the potential of wave and tidal energy. The White Paper on Energy (2007) has a target of 500MW of electricity generation from ocean power which has to be met by 2020. Co. Clare's Atlantic Coast and Shannon Estuary offer ideal locations for researching and developing new technologies to harness wave and tidal energy. Clare County Council will also have regard to Sustainable Energy Ireland's "Offshore Renewable Energy Action Plan" upon publication.

In this regard, CDP10.4 states the following:

Development Plan Objective: Wave / Tidal Energy	
CDP 10.4	<p>It is an objective of the Development Plan:</p> <p>To promote and facilitate wave and tidal energy production and to seek to undertake a study during the lifetime of the plan to investigate ocean / wave</p>

21/04/2011

energy production in County Clare with a long term objective of facilitating such development along the County's Coastline.

- The site Freaghcastle has a number of recorded monuments as well as a protected structure in the vicinity. Any proposal should have regard to the impact of the development on same (in the EIS)
- The proposed development should specify and detail the type of power lines (above ground) being proposed. The visual impact of same would need to be assessed.
- The lands to the south of Cleedagh Bridge are located within a Special Area of Conservation (site code 001021). Any development on such lands will require an Appropriate Assessment. You are strongly advised to liaise with National Parks and Wildlife Section (NPWS) of the Department of Environment, Heritage and Local Government regarding the scope of same in this regard.
- The proposed buoys would require a foreshore license / lease - Section 255 of Planning and Development Act 2000, as amended.
- Planning Permission would be required once the cables reach the high water mark
- Details regarding the transportation of the CETO's and as well as manufacturing location of same would be required, and the impact of the transportation of the CETO's on the local road network would need to be assessed.
- You are advised to consult Schedule 7 of Planning and Development (Strategic Infrastructure) Act 2006 which states
An installation for hydroelectric energy production with an output of 300 megawatts or more, or where the new or extended superficial area of water impounded would be 30 hectares or more, or where there would be a 30 per cent change in the maximum, minimum or mean flows in the main river channel.
 If the development falls under the above schedule, the Strategic Infrastructure route will need to be taken.
- The exact location of all of the structures on the ground, including any proposed substations, would need to be provided for in the application, and a visual impact analysis of same should be undertaken and form part of the planning application.
- Details regarding the location of trenches which may be required to accommodate cables running from the CETO's to the pelton turbine would need to be included and assessed, including how the trenches (if proposing same) would be excavated. Underwater excavation of the trenches could have impacts on the marine wildlife in the vicinity of same, and these impacts would require assessment.
- You are advised to consult with Pat Stevens, Clare Limerick Renewable Energy Officer

Qualification

Please note that any advice is given in good faith and without prejudice to the formal consideration of any subsequent planning application. Article 247 (3) of the Planning & Development Act 2000, as

amended states that "the carrying out of consultations shall not prejudice the performance by a planning authority of any other of its functions under this Act, or any regulations made under this Act and cannot be relied upon in the formal planning process or in legal proceedings." Formal consideration of an application is necessarily more extensive than consideration at the pre-application stage including because of consideration of any internal technical reports e.g. environment section or submissions from a third party or prescribed bodies.

-----Original Message-----

From: Richard Bingham [mailto:Richard.Bingham@rpsgroup.com]

Sent: 05 April 2011 16:07

To: Fiona Murren

Subject: RE: Carnegie CETO Wave Energy - County Clare

Hi Fiona,

Thanks you for the response.

Sorry I did not clarify our position in my previous correspondences.

We are currently working at quite a strategic environmental scoping level, so we are only seeking general pre planning advice in accordance with Section 247 of the Planning & Development Act 2000 as amended.

If you have any further queries please feel free to contact me.

Thanks again.

Regards,

Richard Bingham

RPS

From: Fiona Murren [mailto:FMurren@clarecoco.ie]

Sent: 05 April 2011 15:50

To: Richard Bingham

Subject: FW: Carnegie CETO Wave Energy - County Clare

Dear Mr. Bingham

I refer to your email which was received by Mr. David Timlin on 31st March 2011 and received by myself on 4th April 2011. Your email refers to an environmental scoping request. The Planning Authority requires you to specify whether this request is to be carried pursuant to Art. 95 of the Planning and Development Regulations 2001, as amended.

The Planning Authority notes that you require a response by 15th April 2011. The Regulations require the Planning Authority give notice to the relevant statutory bodies of having received the request, and provides that submissions to the request may be made within 4 weeks of having received the notice. There is concern therefore that the statutory bodies will not have the opportunity to avail of the statutory time in which to make a submission to the request, should you require same by 18th April.

You might please advise whether you wish this request to be considered under Art. 95 of the Regulations or whether you require general pre planning advise in accordance with Section 247 of the Planning &

21/04/2011

Development Act 2000 as amended.

Kind Regards

Fiona Murren

Fiona Murren
Assistant Planner
North Clare Area
Planning, Land-Use and Transportation Department
Clare County Council

Tel: 065 6846247
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This appears to be mostly in your area.

From: congella mcguire
Sent: 04 April 2011 10:31
To: Helen Quinn; Gareth Ruane
Subject: FW: Carnegie CETO Wave Energy - County Clare

FYI

Congella McGuire

Heritage Officer
Clare County Council
New Road
Ennis
County Clare
Phone 065 68 21616

From: David Timlin
Sent: 01 April 2011 10:07
To: congella mcguire
Subject: FW: Carnegie CETO Wave Energy - County Clare

Congella,

Please co-ordinate a response

Thanks D

21/04/2011

Richard Bingham

From: John Butler [John.Butler@gsi.ie]
Sent: 06 April 2011 14:17
To: Richard Bingham
Subject: RE: Carnegie Wave Power Ltd - CETO

Dear Richard,

Please find enclosed letters acknowledging GSI receipt of documents relating to the above.

Regards,

John Butler

Clerical Officer

Quaternary & Geotechnical Section

Geological Survey of Ireland

Beggars Bush

Haddington Road

Dublin 4

Ireland

tel +353 (0)1 678 2785

fax +353 (0) 1 668 1782

<mailto:john.butler@gsi.ie>

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This is also to certify that this mail has been scanned for viruses.

Tá eolas sa teachtaireacht leictreonach seo (agus b'fhéidir sa chomhaid ceangailte leis) a d'fhéadfadh bheith príobháideach nó faoi rún. Is le h-aghaidh an duine/na ndaoine nó le h-aghaidh an aonáin atá ainmnithe thuas agus le h-aghaidh an duine/na ndaoine sin amháin atá an t-eolas. Murab ionann tusa agus an té a bhfuil an teachtaireacht ceaptha dó bíodh a fhios agat nach gceadaítear nochtaidh, cóipeáil, scaipeadh nó úsáid an eolais agus/nó an chomhaid seo. Más trí earráid a fuair tú an teachtaireacht leictreonach seo cuir, más é do thoil é, an té ar sheol an teachtaireacht ar an eolas láithreach.

Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.

21/04/2011



RE: Carnegie Wave Power Ltd - CETO

Dear Sir/Madam,

Thank you for your enquiry. Unfortunately, the Groundwater Section does not have the resources to assess, or make observations on, specific EIAs/EISs.

However, we do advise that when considering environmental impacts of planned activities/developments that all of the Groundwater Section's datasets are taken into consideration. These data comprise:

- 1) **National Maps**, which can be obtained from the GSI's website (www.gsi.ie), and include:
 - *Generalised Bedrock Map*, which groups the different Irish bedrock formations (>1000) into 28 classes based on their stratigraphy and the main lithological and structural properties that influence their groundwater flow properties;
 - *Bedrock Aquifer Map*: subdivides Irish bedrock into three main categories and seven sub-categories depending on their specific aquifer properties;
 - *Gravel Aquifer Map*: identifies the Irish sand/gravel deposits that function as aquifers and sub-divides them into two categories depending on their specific properties;
 - *Interim Vulnerability Map*, which is a composite map comprising (i) full¹ and interim² vulnerability mapping undertaken by the GSI for Local Authorities (i.e. the Groundwater Protection Schemes – 11 available digitally) and (ii) interim vulnerability mapping undertaken by consultants working for one or more of each of the seven River Basin Districts (RBDs);
 - *Source Protection Areas Map*, which constitute the outer (zone contributing groundwater to the abstraction point) and inner (estimated 100 day time of travel of the groundwater to the abstraction point) source protection areas delineated by the GSI (120 sources) and other consultants (5 sources).
- 2) **National Data**, which can be requested from Groundwater Section enquiries desk (Groundwaterinfo@gsi.ie), and include:
 - *Groundwater Body (GWB) Delineation and Descriptions*: subdivision of the aquifers based on their flow regime and no-flow boundaries. Each GWB is fully described, with all available data and information sources referenced.
 - *Wells Database*: c.36,000 wells and boreholes, from different sources, with varying amounts of information e.g. location, depth to bedrock, yields.
 - *Karst Features Database*: c.4,000 recorded features with varying amounts of information.
 - *Karst Tracer-Tests Database*: c.275 recorded connections with varying amounts of information.

¹ Full vulnerability maps comprise up to five vulnerability classes – E (Rock near Surface or Karst), Extreme, High, Moderate and Low).

² Interim vulnerability maps comprise three vulnerability classes – E (Rock near Surface or Karst), Extreme and undifferentiated High-Low.



3) Other Reports

- *Groundwater Protection Scheme (GWPS) Reports*: more recent (digital) GWPSs are available for 11 counties, older schemes are available for 4 counties and 2 are due to be completed in 2007 (Groundwaterinfo@gsi.ie).
- *Source Protection Reports*, which describe all available information for the particular source and how the source protection zones were delineated (Groundwaterinfo@gsi.ie).
- *Various historic reports*, which can be obtained on the Document Management System (via the GSI's Customer Centre).

It is hoped that most of these data will be soon available through the website. In the meantime, when making an enquiry, please supply a location map and/or grid coordinates in order to facilitate the data search.

Other useful and related data can be found on Water Framework Directive Ireland website (<http://www.wfdireland.ie>)

I hope that you find this information of use.

Yours faithfully,

Monica Lee.
Groundwater Section.

Suirbhéireacht Gheolaíochta Éireann
Tor an Bhacaigh
Bóthar Haddington
Baile Átha Cliath 4



Geological Survey of Ireland
Beggars Bush
Haddington Road
Dublin 4
Tel. +353 1 6707444
Fax. +353 1 6681782
<http://www.gsi.ie>

Richard Bingham
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

06/04/11

RE: Carnegie Wave Power Ltd - CETO

Dear Mr Bingham,

I would like to acknowledge receipt of your letter of March 31st, 2011 concerning the above scheme.

The Geological Survey of Ireland (GSI) is the national earth science agency and has datasets on Bedrock Geology, Quaternary Geology, Geological Heritage Sites, Mineral deposits, Groundwater Resources and the Irish Seabed. These comprise maps, reports and extensive databases that include mineral occurrences, bedrock/mineral exploration groundwater/site investigation boreholes, karst features, wells and springs. Please see our website at <http://www.gsi.ie> for data availability.

Please note that some maps/databases are available on the GSI website under "Online Mapping" or "Web Mapping"- direct link: <http://www.gsi.ie/Mapping.htm> Data currently available is for Bedrock, Groundwater, Karst, Geotechnical boreholes, Mineral locations and the Quarry Directory. Geological Heritage data is in the process of being migrated to this website, but please continue to contact Sophie Preteseille at sophie.preteseille@gsi.ie or Sarah Gatley at sarah.gatley@gsi.ie, directly.

Please note that it would greatly facilitate our database search if the site location in all EIS and related planning enquiries is given in Irish National Grid (ING) co-ordinates, i.e. as six-digit Eastings (X) and six-digit Northings (Y) [For example, O'Connell Bridge, Dublin would be X 315988 Y 234396]. Co-ordinates in this format can be obtained from GSI's online mapping service at <http://www.gsi.ie/Mapping.htm>

There is currently a 1-2 week turnaround for answering EIS enquiries. We will endeavour to meet your closing date. However, we would like to bring to your attention the frequent late arrival in this office of requests for input into EIS, etc for proposed developments, rendering GSI unable to comment within the specified timeframe.

If you need any further information, please do not hesitate to contact this office.

Yours sincerely,

John Butler/Ronnie Creighton
Senior Geologist, Head Geotechnical Programme

Richard Bingham

From: Paul McMahon [Paul.McMahon@environ.ie]
Sent: 04 April 2011 12:16
To: Richard Bingham
Subject: Carnegie Wave Power Ltd. - CETO

DAU Ref. No. G2011/135

A Chara,

I refer to your recent correspondence (Ref. No. IBE0506), with respect to the above, received by this office on 4th April 2011. I wish to advise you that your pre-planning enquiry has been forwarded to the Development Applications Unit's (DAU) nature conservation and underwater archaeological advisors, for the area, for comment and assessment.

A response from this office will be issued to you by **Friday, 15th April 2011**.

If you have not received a response from this office by this date, please contact the undersigned quoting your assigned reference number (see above).

Is mise le meas,
Paul McMahon

Paul McMahon,
Development Applications Unit,
Built Heritage & Architectural Policy,
Department of the Environment, Heritage and Local Government, Newtown Road, Wexford

Tel: (053) 911 7381
Fax: (053) 911 7609
E-mail: paul.mcmahon@environ.ie

21/04/2011



Comhshaol, Oidhreacht agus Rioltas Áitiúil
Environment, Heritage and Local Government



26th April 2011

Richard Bingham
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
Northern Ireland

Our ref: G2011/135
Your Ref: Ltr 110331
Re: Carnegie Wave Power Ltd. – CETO

A Chara,

I refer to your notification in relation to the above proposed wave energy development. Outlined below are the underwater archaeological recommendations of the National Monuments Service of the Department of Environment and Local Government.

As noted in the covering letter supplied, an Environmental Impact Assessment (EIA) is being drawn up for the proposed wave energy project. The Environmental Impact Statement shall include a definitive section addressing the coastal, maritime and underwater cultural heritage of the selected sections of coastline and offshore areas proposed for targeting by the project. Ireland has a long and varied maritime history with extensive records for shipwrecks along its coast, rivers, lakes and offshore waters. The Underwater Archaeology Unit (UAU) is in the process of compiling an inventory of shipwrecks for the coastal waters of Ireland, the records from which are stored in a shipwreck inventory database and housed in the UAU archive. The Shipwreck Database is accessible through the Archive Unit of the National Monuments Service. Over 10,000 wrecks have been recorded to date and the first volume, covering the coast of Counties Louth, Meath, Dublin and Wicklow was published in 2008. Though earlier sources have been included where obtainable, the Inventory is largely based on documentary sources available from after 1700AD. As such, previously unrecorded shipwreck sites, including those dating to earlier periods, may await discovery in the waters off the coast of Ireland.

Evidence for other types of maritime archaeology may survive in the form of ports, harbours, piers and jetties, coastal settlements, submerged cultural landscapes, fortifications, anchors, fish traps, shell middens, kelp grids and the material traces of other activities in the past that involved the exploitation of the coastal and maritime resource. Many of these site types are protected and can be identified from the Record of Monuments and Places for the relevant county and in the relevant Urban Archaeology Survey or Ports and Harbours Archive, all available for consultation by appointment in the Department of Environment in Dublin. Similarly, previously unrecorded archaeological sites other than wrecks may also lie undiscovered in Ireland's coastal waters.

The 1987 and 1994 (Amendment) Acts of the National Monuments Act 1930 – 2004 specifically address the protection of underwater archaeology. All wrecks over 100-years old and archaeological objects underwater are protected under the legislation and significant wrecks less than one hundred years old can be designated by Underwater Heritage Order on account of their historical, archaeological or artistic importance. Under the legislation diving on protected wreck sites or with the intention of searching for archaeological material underwater is subject to licensing requirements. Likewise, the use of detection devices, such as hand held metal detectors, geophysical surveying equipment, video or other camera equipment with locational devices attached, on protected sites underwater or for the purpose of prospecting for archaeology requires a specific detection device licence. Under the National Monuments Act it is obligatory to report all discoveries of archaeological objects and wrecks over 100 years old within 4 days of discovery. Dive and detection device licence application forms are available through the Department's web site (www.archaeology.ie).

Offshore wind energy devices may have the potential to negatively impact on known or potential submerged or buried archaeology. It is therefore recommended that a full Underwater Archaeological Impact Assessment be carried out as part of the Strategic Environmental Impact Assessment for all projects with the results of the assessments included in the EIA and forwarded to this office for review. This will enable the Department to make an informed archaeological recommendation before a planning decision is made. The overall policies set out in the Framework and Principles for the Protection of the Archaeological Heritage (www.archaeology.ie) are applicable to the type of developments under consideration here and should form the basis for dealing with its archaeological implications. In particular, there will be a need for an appropriate level of archaeological assessment of proposed windfarms and wave energy sites, etc.

Underwater Archaeological Impact Assessment shall be compiled as follows;

1. The applicant is required to engage the services of a suitably qualified archaeologist, with maritime/underwater experience to carry out an underwater archaeological assessment of the potential impacts of the development/proposed works on known or potential archaeology.
2. The assessment shall comprise of a detailed desktop study, with the archaeologist carrying out any relevant documentary research including consulting with the Shipwreck Inventory of Ireland, the Record of Monuments and Places and the Ports and Harbours Archive, all of which are held by the Department of Environment, Heritage and Local Government. GSI wreck data, local sources and the Topographical Files held by the National Museum of Ireland shall also be consulted.
3. Depending on location, nature and extent of the developments/works proposed in the Strategic Environmental Assessment, further archaeological assessment in the form of diving, intertidal, wading, metal detection or geophysical survey may be required. Once more detail is available on specific areas being proposed for development, this Department shall be consulted regarding the level of assessment required. The archaeologist compiling the assessment shall also be able to advise on the level of assessment required. It shall be noted that surveys like geophysical assessment can have a bias towards the WWII wrecks as they show up more distinctly on the geophysical imagery; these would not be representative of earlier wooden wrecks.
4. Any archaeological assessment undertaken as part of an SEA for such proposed offshore developments shall include assessment of all pipeline/cable routes and to include full assessment of all landfall areas, including looking at the foreshore and terrestrial areas immediate to the proposed works.

5. Results from all other investigations (grab samples, coring, etc.) or surveys (ROV, etc) shall be made available to the archaeologist, engaged to undertake the assessment, for their consideration and subsequent inclusion in the final assessment report.
6. Having completed the assessment, the report shall be included as part of the SEA. The report shall put forward definitive recommendations to mitigate against impacts on identified or potential archaeological remains. Such an assessment will need to consider not just known sites but also areas of archaeological potential.
7. Where archaeological material/features are shown to be present, preservation *in situ*/avoidance or further archaeological mitigation (e.g. excavation and/or monitoring) may be required.

Kindly forward any further information to the following address as soon as it issues:


The Manager,
Development Applications Unit,
Department of Environment, Heritage and Local Government,
Newtown Road,
Wexford

Alternatively, documentation associated with the above can be referred electronically to the DAU at the following address:

manager.dau@environ.ie

In addition, please acknowledge receipt of these observations by return.

Is mise le meas,



David Tuohy,
Development Applications Unit
Tel: (053) 911 7380
E-mail: david.tuohy@environ.ie



Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government



26th April 2011

Richard Bingham
RPS Consulting Engineers
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
Northern Ireland

Our ref: G2011/135
Your Ref: Ltr 110331
Re: Carnegie Wave Power Ltd. - CETO

A Chara,

I refer to your notification in relation to the above proposed wave energy development. Further to a letter as forwarded today, 26th April, please find, outlined below, the nature conservation observations of the Department of Environment and Local Government.

The applicant should note the following legal requirements in relation to nature conservation adjacent to the proposed development:

1. EU Habitats Directive- Article 6(3) assessment

The proposed activity would occur adjacent to the following Natura 2000 sites:

- Carrowmore Point to Spanish Point and Islands candidate Special Area of Conservation (Site code: IE001021). This site is designated inter alia for the marine Annex I habitats: Reefs
- Mid-Clare Coast Special Protected Area (4182). This site was given protection under the European Communities (Conservation of Wild Birds) (Amendment) (S.I. No. 349/1994).

Details of the boundaries and qualifying interests of Natura sites are available on <http://www.npws.ie>

Article 6(3) of Council Directive 92/43/EC (the Habitats Directive) states that "Any plan or project not directly connected with or necessary to the management of the [Natura] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives". This is transposed into national legislation by Regulation 31 of the European Communities (Natural Habitats) Regulations 1997. The proposed development would require such an assessment as the works would occur within or adjacent to designated Natura sites.

Guidance on this process can be found within "Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC" published by the European Commission in 2001. A recent

document entitled "Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities" published by the Department of the Environment, Heritage & Local Government is available to download on <http://www.npws.ie/en/WildlifePlanningtheLaw/AppropriateAssessment/>. The inclusion of this document as an Appendix to the Environmental Impact Statement is acceptable once it is appropriately recorded.

2. EU Habitats Directive- Article 12

It must be noted that all cetaceans are listed under Annex IV (including those in Annex II) of Council Directive 92/43/EEC (the Habitats Directive). Accordingly, under Article 12 of that Directive, it is an offence to deliberately capture, disturb or kill a cetacean or take actions that result in deterioration or destruction of their breeding sites or resting places. This has been transposed into Irish Law by Regulation 23 of European Communities (Natural Habitats) Regulations (SI 94/1997). Introduction of certain sound sources into the marine environment, as may result from construction (e.g. pile driving, dredging or blasting) over the foreshore, have the potential to cause injury and possibly mortality in these species.

3. Wildlife Act 1976 and amendments

All marine mammals are protected wild animals under the Fifth Schedule, which includes all cetacean and seal species, of the Wildlife Act (39 of 1976) and Amendments. Under Section 23 (as amended in 2000), it is an offence to kill, injure or wilfully interfere with or destroy the breeding place or resting place of any protected wild animal.

In order to fulfil the Article 6 legal requirements the following information should be supplied within the application:

Full description of proposed operation/activity

- A full description of the proposed construction and operational methodology including the likely time-scale of works.
- Are there similar operations/activities already in the locality? If existing operations/activities occur adjacently then a justification for additional facilities should be included. Would the proposed works act in conjunction with any existing developments?
- The facilities or licensing to be put in place to cope with both biological and industrial waste (e.g. construction materials, dredge spoil etc.) generated during construction of the proposed facility should be detailed.
- Detailed contingency plans sufficient to address potential negative interactions with the marine environment e.g. oil spills.

Baseline description of relevant environment

- If subtidal structures are to be built then a description of the hydrodynamic environment in which the activity will take place including the tidal and current flow regime. This model must have sufficient resolution to assess the potential changes relative to the direct scale of the development and designated Natura sites.
- Consideration should be given to whether the likely construction/operation would result in disturbance or loss to Annex I habitats (Reefs). Any loss or interruption of normal processes must be quantified relative to the entire designated area.

In relation to the obligations as arise from the provisions of the Wildlife Act and Article 12 of the Habitats Directive the following information must be provided. The applicant must collect sufficient details in relation to sound (above and below water) associated with the construction, operation and decommissioning of the proposed development. Underwater sound characteristics at source (i.e., sound pressure levels, sound exposure levels, frequency, bandwidth, duration of exposures) and information concerning propagation in air/water for relevant activities during the construction, operational and decommissioning phases should be included. Clear information concerning vessel routes and intensification of vessel activities during construction, operation and decommissioning should also be provided.

1. Marine Mammal Baseline Description

- 1.1. A baseline description of the distribution of Cetacea (i.e. whales, dolphins and porpoises) within the zone of impact (direct and indirect) must be provided. A number of cetacean species (e.g. Bottlenose dolphin, Harbour porpoise, Short-beaked common dolphin) have previously been recorded in the area. However, insufficient information is available to ascertain species (including small cetacean and baleen whale) occurrence and distribution within the zone of impact (direct and indirect).
- 1.2. A baseline description of the distribution of seals within the zone of impact (direct and indirect) must be provided.
- 1.3. The Department recommends that monthly visual surveys of cetacean and seal occurrence in the waters within the zone of impact (direct and indirect) be undertaken only in very good weather conditions (i.e., no precipitation, Beaufort Force/Sea State 3 or less) in conjunction with passive acoustic monitoring for small cetaceans using appropriate technology (e.g., C-PODs). Visual surveys should be undertaken on a monthly basis over a 12 month period and the acoustic survey should be deployed continuously over the 12 month period.

2. Assessment of Likely Significance to marine mammals

- 2.1. A description of the likely disturbance/interference arising from the proposed construction/operation/decommissioning of the development on the habitats of protected marine mammal species should be provided. An assessment of the likely significance of any such disturbance/interference should also be undertaken giving due consideration to likely intensity and duration.
- 2.2. A description by a marine mammal ecologist of the likely disturbance/interference arising from the proposed construction/operation/decommissioning of the development on all cetaceans and seals. An assessment of the likely significance of any such disturbance/interference should also be undertaken. Such an assessment should consider inter alia
 - the risk of collision;
 - the risk of entanglement;
 - direct disturbance/interference or injury due to sound, device operation and intensified motorised vessel/plant/construction activities;
 - potential disruption of a critical period in the life cycle of the species;
 - impacts due to habitat loss, displacement, or localised disruption of normal ecological activity.

3. Mitigation and Monitoring for marine mammals

- 3.1. Proposed mitigation and monitoring should be clearly described.

Kindly forward any further information received, or in the event of a decision being made a copy of same should be forwarded to the following address as soon as it issues:

The Manager,
Development Applications Unit,
Department of Environment, Heritage and Local Government,
Newtown Road,

Wexford

Alternatively, documentation associated with the above can be referred electronically to the DAU at the following address:

manager.dau@environ.ie

In addition, please acknowledge receipt of these observations by return.

Is mise le meas,

A handwritten signature in black ink, appearing to read "David Tuohy", is written over a horizontal line.

David Tuohy,
Development Applications Unit
Tel: (053) 911 7380
E-mail: david.tuohy@environ.ie

APPENDIX B

Environmental Scoping Matrix



Environmental Topic		Potential Impacts			
		Construction Phase		Operational Phase	
		Degree of Potential Impact	Description	Degree of Potential Impact	Description
Flora and Fauna					
Flora – Terrestrial and Marine	-	Loss of habitats within working areas associated with the CETO array, pipelines, electrical lines and the AGI. Potential for marine habitat loss due to sedimentation from construction activities outside the CETO footprint and working areas.	0 / -	Re-establishment of habitats and flora colonies within the area following construction, however still some small areas of permanent loss under footprints.	
Fauna – Birds	-	Disturbance to feeding and roosting birds due to construction activities and increased marine traffic.	0	Unlikely to be any significant disturbance to birds during operation, due to sub-sea nature of the array and the internal housing and insulation of terrestrial equipment.	
Fauna – Marine Mammals	-	Potential for disturbance to marine mammals during construction. Timing of construction important to minimise effects on marine mammals, e.g. by taking account of migratory, breeding cycles, diurnal activities etc.	0 / -	Operation of the CETO array should pose no significant risk to marine mammals from obstruction or movement, as long as the devices are well made to provide slow, smooth motions. There is however the potential risk of leakage of lubricants and water based hydraulic fluids.	
Fauna – Benthic and Littoral	-	Potential loss of benthic habitats from working areas during construction activities.	0 / -	Re-establishment of habitats and flora colonies within the area following construction.	
Fisheries					
Trawling	-	Exclusion of trawling fishing boats from the construction area.	0 / -	Exclusion of trawling fishing from the area of the CETO array. Potential loss of small area of fishing grounds.	

Line Fishing	-	Likely exclusion of line fishing boats from the construction area.	+ / -	Potential for area to still be used for line fishing activities. However if this is not viable there is the potential loss of a small area of potting grounds.
Potting	-	Likely exclusion of potting activities from the construction area.	+ / -	Potential for area to still be used for potting activities. However if this is not viable there is the potential loss of a small area of potting grounds.
Landscape and Visual				
Landscape and Visual	0 / -	Low level of potential negative impact on the landscape and visual impacts, due to small amount of above ground and above sea construction activities.	0 / -	Low level of potential negative impact on landscape and visual impacts from operation activities as mostly beneath the water, with marker buoys the only visible sea level indication of array. Sensitive development of terrestrial AGI should be able to mitigate for potential negative impacts.
Cultural Heritage				
Terrestrial Archaeology	+ / -	Potential for discovery of and disturbance of previously unrecorded archaeological artefacts. Can be mitigated for by supervised topsoil stripping.	0	No impacts anticipated
Marine Archaeology	+ / -	Potential for discovery of and disturbance of previously unrecorded archaeological artefacts, including shipwrecks. Mitigation can include pre-construction surveys and archaeological monitoring.	0	No impacts anticipated
Material Assets				
Traffic	0 / -	Potential for temporary traffic disturbances due to construction.	0	No impacts anticipated
Water / Drainage	0	No impacts anticipated	0	No impacts anticipated.
Energy / Power	0	No impacts anticipated.	+	New electrical infrastructure to be provided as part of the development. New renewable energy source to be

					provided for Ireland.
Human-Beings					
Socio-Economic	+ / -	Creation of employment from construction activities, however there is the potential for negative impacts on tourism in the area during construction if the local beaches are affected. Good site management practices should be able to mitigate for these impacts. Construction activities have the potential to attract tourist, local and passer by interest.	+	Economic benefits on both a local and regional scale. Benefits all of Ireland in helping to achieve renewable energy targets.	
Coastal Processes					
Coastal Processes	0 / -	Potential for sediment plumes to be created during construction which will affect water quality and sediment transport.	0 / -	Potential for CETO array to affect wave and tidal energy in the coastal region, which may influence sediment transport and hence beach recharge at the busy tourist areas of Lahinch, Spanish Point and Doonbeg.	
Air / Noise / Vibration					
Air	0 / -	Potential emissions to air from site plant and increased marine and road construction traffic.	+ / 0	Renewable energies can replace the need for fossil fuel burning.	
Noise	-	Potential of noise disturbance during construction through plant activity, and marine and road traffic. There is likely to be low background noise levels in the vicinity. Noise levels should however not exceed threshold limits if good site practice is maintained.	0 / -	Potential for noise from CETO movement and hydraulics to affect the behaviour of sensitive species within the area, such as marine mammals.	
Vibration	-	Potential for vibration from construction activities, e.g. drilling and blasting, to impact on sensitive species in the area, such as marine mammals.	0 / -	Potential for vibration from CETO movement to affect the behaviour of sensitive species within the area, such as marine mammals.	

Geology and Hydrogeology			
Geology	0	No impacts anticipated as identified sensitive geological areas are not within the potential construction area.	0
Hydrogeology	0	No impacts anticipated, as there are no groundwater resources in the area.	0
Health and Safety			
Health and Safety	0 / -	Standard risks associated with marine and terrestrial construction. Good planning, good site management and good working practices can mitigate for most of these risks.	0 / -
Navigation	0 / -	Temporary exclusion of boating from the marine construction areas. However the area is unlikely to be heavily trafficked.	0 / -
		Establishment of good operational management plans, including emergency response procedures and good training of site staff can mitigate for most of the health and safety risks that are likely to be encountered.	
		Potential permanent exclusion of boating from the area of the CETO array. However the area is unlikely to be heavily trafficked.	

Key

- 0 Potentially no impacts
- + Potential positive impacts
- Potential negative impacts

THIS AGREEMENT is made the day of 20112012

BETWEEN

THE STATE OF WESTERN AUSTRALIA represented by the Director General of the Department of Environment and Conservation, and who for the purpose of administration of this Agreement is represented by the Climate Change Unit of the Department of Environment and Conservation at The Atrium, 168 St. George's Terrace, Perth ("**State**")

AND

CARNEGIE WAVE ENERGY LIMITED of Level 1, 16 Ord Street, West Perth in the State of Western Australia, Australia (ABN 69 009 237 736) ("**Recipient**").

RECITAL(S)

- A. on 13 November 2009 the State and the Recipient entered into an agreement ("**Principal Agreement**") wherein the State provided a grant of financial assistance for the development of a small scale wave energy demonstration project (the "**Proposal**").
- B. Schedule 2 to the Principal Agreement provided a series of performance milestones which the recipient was required to meet in order to receive successive instalments of the grant monies.
- C. The Parties have agreed to amend the performance milestones set out in Schedule 2 to the Principal Agreement.
- D. Schedule 2 of this Variation Agreement shows the performance milestones as amended by this Variation Agreement.

THE PARTIES agree as follows:

1 DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Agreement unless the context otherwise requires:

Variation Agreement means this agreement.

Authorised Officer means a person appointed by the Recipient to act as its authorised officer under this Variation Agreement whose details appear in Schedule 3.

Business Day means any day except a Saturday, Sunday or a public holiday in Perth, Western Australia.

Confidential Information means information in respect of or provided by the State that:

- (a) is by its nature confidential; or
- (b) is specified by the State to be confidential; or
- (c) the Recipient knows or ought to know is confidential.

Department means the Department of Environment and Conservation or such other body or instrumentality which is charged with the administration of this Variation Agreement from time to time on behalf of the State.

Grant means the grant of ~~\$10,446,14342,538,955~~ provided, or where the context requires, to be provided by the State to the Recipient under the Principal Agreement and includes where the context requires any Instalment.

Instalment means any part payment of the Grant if specified in Schedule 2.

Minister means the Minister responsible for the Department from time to time.

Party means each of the State or the Recipient as the context requires and **Parties** means both of them.

Principal Agreement means the Financial Assistance Agreement entered into between the State and the Recipient on 13 November 2009, a copy of which is included in Schedule 1 to this Variation Agreement.

Recipient means Carnegie Wave Energy Limited of Level 1, 16 Ord Street, West Perth in the State of Western Australia, Australia (ABN 69 009 237 736).

State means the State of Western Australia.

Term has the same meaning as in the Principal Agreement.

1.2 Interpretation

In this Variation Agreement, unless the context otherwise requires:

- (a) the singular includes the plural and vice versa;
- (b) a reference to any thing is a reference to the whole or any part of it and a reference to a group of things or persons is a reference to any one or more of them;
- (c) a reference to a gender includes other genders;
- (d) a reference to a person includes a public body, a company and an incorporated or unincorporated association or body of persons;
- (e) a reference to a person includes a reference to the person's executors, administrators, successors, substitutes (including, but not limited to, a person taking by novation) and permitted assigns;
- (f) if the Recipient consists of a partnership or joint venture, then:
 - (i) an obligation imposed on the Recipient under this Variation Agreement binds each person who comprises the Recipient jointly and severally;
 - (ii) each person who comprises the Recipient is deemed to agree to do all things necessary to enable the obligations imposed on the Recipient under this Variation Agreement to be undertaken;
 - (iii) the act of one person who comprises the Recipient binds the other persons who comprise the Recipient; and
 - (iv) an Event of Default by one person who comprises the Recipient constitutes an Event of Default by the Recipient;
- (g) an agreement, representation or warranty on the part of, or in favour of, 2 or more persons binds, or is for the benefit of, them jointly and severally;
- (h) a reference to this Variation Agreement or another instrument includes all variations and replacements of either of them despite any change of, or any change in the identity of, the State or the Recipient;
- (i) a reference to a clause, schedule, attachment or appendix is a reference to a clause in, or a schedule, attachment or appendix to, this Variation Agreement;
- (j) all the provisions in any schedule, attachment or appendix to this Variation Agreement are incorporated in, and form part of, this Variation Agreement and bind the State and the Recipient;

- (k) headings are included for convenience and do not affect the interpretation of this Variation Agreement;
- (l) a reference to a statute, ordinance, code or other law includes regulations and other instruments under it and consolidations, amendments, re-enactments or replacements of any of them;
- (m) no rule of interpretation is to be applied to disadvantage the State or the Recipient on the basis that it was responsible for preparing this Variation Agreement;
- (n) if a word or phrase is defined, other grammatical forms of that word or phrase have a corresponding meaning;
- (o) if the word "including" or "includes" is used, the words "without limitation" are taken to immediately follow;
- (p) a reference to writing includes all means of representing or reproducing words in visible form including by electronic means such as facsimile transmission;
- (q) a reference to a liability includes all obligations to pay money and all other losses, costs and expenses of any kind;
- (r) a reference to a month is to a calendar month and a reference to a year is to a calendar year;
- (s) if a period of time is specified and dates from a given day or the day of an act or event, it is to be calculated inclusive of that day;
- (t) if a date stipulated for payment or for doing an act is not a Business Day, the payment must be made, or the act must be done, on the next Business Day; and
- (u) a reference to a monetary amount means that amount in Australian currency.

2 VARIATION OF PRINCIPAL AGREEMENT

2.1 Deletion and Replacement of Schedule 2 to the Principal Agreement

The State and the Recipient agree that the contents of Schedule 2 to the Principal Agreement are deleted and replaced with the contents of Schedule 2 to this Variation Agreement.

2.2 Acknowledgement of Variation

The State and the Recipient agree and acknowledge that this Variation Agreement constitutes a valid and enforceable variation of the Principal Agreement for the purposes of clause 22 of the Principal Agreement.

For the avoidance of doubt, the State and the Recipient agree to and are bound by Schedule 2 to this Variation Agreement as if the contents of Schedule 2 to this Variation Agreement were the contents of Schedule 2 to the Principal Agreement.

2.3 Limitation on Variation

The State and the Recipient agree that, except for the variation to the Principal Agreement effected in subclauses 2.1 and 2.2, nothing in this Variation Agreement limits, alters, derogates from, or otherwise affects the obligations of either party under the Principal Agreement and that the parties continue to be bound by the Principal Agreement as varied by subclauses 2.1 and 2.2 of this Variation Agreement.

3 CERTIFICATION

The Recipient must ensure that anything required to be certified under this Variation Agreement is certified by an Authorised Officer of the Recipient as being true and complete at a date no earlier than the date of this Variation Agreement.

4 REPRESENTATIONS AND WARRANTIES

4.1 Representations and Warranties

The Recipient represents and warrants that:

- (a) it is duly authorised and has the power to enter into and observe its obligations under this Variation Agreement;
- (b) its obligations under this Variation Agreement are valid and binding and are enforceable against it in accordance with their terms;
- (c) all authorisations, registrations, consents, approvals, licences and permits which are or will be required in connection with the performance by the Recipient of its obligations under this Variation Agreement have been or will be obtained or effected and are or will be and will remain in force and effect for as long as necessary;
- (d) there is no litigation, arbitration or administrative proceedings currently taking place, pending or threatened against the Recipient which could have a materially adverse effect on the Recipient's ability to perform under this Variation Agreement;
- (e) to the best of the Recipient's knowledge, information and belief, the Recipient is not in default or breach, as the case may be, under a law, regulation, official directive, instrument, undertaking or obligation materially affecting it;

- (f) this Variation Agreement and performance under it does not violate its constituent documents, any law, regulation or government order or decree or any consent, registration, approval, licence or permit or any agreement, order or award binding on the Recipient;
- (g) it is unaware of any act, matter, thing or circumstance by reason of which it would be unable to perform any obligation under this Variation Agreement;
- (h) all information provided by or on behalf of the Recipient to the State relating to the Recipient's affairs and this Variation Agreement are true, accurate and complete in all material respects and, without limiting this clause, all financial information provided by or on behalf of the Recipient to the State is, in all material respects, a true, fair and accurate statement of its financial position as at the date of preparation of the information; and
- (i) it has, after diligent inquiry and investigation, fully disclosed to the State all information which could reasonably be regarded as material to the State's decision to enter into this Variation Agreement.

4.2 Made Continuously

The representations and warranties made by the Recipient under clause 4.1 are taken to be made continuously throughout the Term.

5 FURTHER ASSURANCES

The State and the Recipient must do everything reasonably necessary, including signing further documents, to give full effect to this Variation Agreement.

6 COSTS

- (a) The State and the Recipient must pay their own legal and other costs in connection with the preparation and signing of this Variation Agreement.
- (b) The Recipient must pay all stamp duty on this Variation Agreement.

7 GOVERNING LAW

This Variation Agreement is governed by the laws of the State of Western Australia. The State and the Recipient irrevocably submit to the exclusive jurisdiction of the courts of Western Australia.

SCHEDULE 1 (COPY OF PRINCIPAL AGREEMENT TO BE INSERTED)

SCHEDULE 2 (June 2012 variation)

Completed and paid milestones

LEED Milestone	Description	Milestone achievement date	LEED Funding (Ex GST)
1	CETO Commercial Unit Design	Dec 2009	\$660,556
2a	Deployment of CETO foundation	Apr 2010	\$590,589
2b	Manufacture, delivery, testing and deployment of CETO unit	Apr 2011	\$637,711
3a	Completion of initial Site Assessment and Conceptual Design	Apr 2010	\$180,259
3b	Completion of detailed Site Assessment and Preliminary Design	Apr 2011	\$619,741
4a	Basis of Design	Dec 2011	\$144,993
Total			\$2,833,849

Schedule 2 continues on next page.



Remaining changed milestones

Previous LEED milestone	Previous LEED milestone description	Previous LEED milestone achievement date	Previous LEED contribution \$	New Milestone	New milestone description	New milestone achievement date	New LEED contribution \$
New	n/a	n/a	0	P1	Finalise Basis of Design, Risk Management and Community Consultation	Jul-12	0
4b	Detailed Design: Final Design	Jun-12	821,629				
5	Approvals	Jun-12	421,528	P2	Detailed Design and Approvals	Dec-12	669,700
6	Order Long Lead Items	Jun-12	732,117	P3	Order Long Lead Items (CETO units, Foundation & Pipeline Materials)	Jan-13	985,000
7c	Equipment Delivery : Foundations	Jul-12	308,500				
8c	Construction : Foundations	Dec-12	1,366,432	P4	Manufacture, Construction, Deployment of Foundation System	Apr-13	1,027,063
7e	Equipment Delivery : Onshore Facility	Sep-12	634,750				
8e	Construction : Onshore Facility	Oct-12	646,905	P5	Manufacture, Construction, Deployment of Power Generation System and Connection	Jun-13	1,050,000
7d	Equipment Delivery : Pipeline and Hydraulic Equipment	Aug-12	889,912				
8d	Construction : Pipeline and Hydraulic Equipment	Dec-12	1,618,912	P6	Manufacture, Construction, Deployment of Pipeline	Sep-13	1,950,000
7a	Equipment Delivery : CETO Units, Stage 1	Aug-12	474,816				
8a	Construction : CETO Units, Stage 1	Dec-12	167,685	P7	Manufacture, Construction, Deployment of CETO units	Oct-13	895,000
7b	Equipment Delivery : CETO Units, Stage 2	Apr-14	712,223	Removed	n/a		
8b	Construction : CETO Units, Stage 2	Jun-14	251,460	Removed	n/a		
9a	Commissioning: Stage 1	Jan-13	206,837	P8	Commissioning	Nov-13	395,000
9b	Commissioning: Stage 2	Jun-14	310,255	Removed	n/a		
10a	Practical Completion: Stage 1	Jan-13	56,458	P9	Practical Completion	Nov-13	76,031
10b	Practical Completion: Stage 2	Jun-14	84,687	Removed	n/a		
New	n/a	n/a	0	P10	Operation of plant for 12 months and Final Report	Oct-14	564,500
Total Future LEED Contribution			9,705,106				7,612,294
Total LEED Contribution			12,538,955				10,446,143
LEED Contribution Reduction							2,092,812

SCHEDULE 3

Authorised Officer of Recipient

Name: Michael Ottaviano, Managing Director
Address: Level 1/16 Ord Street West Perth, 6005
Tel: (08) 9486 4466
Email: mottaviano@carnegiewave.com

State Representative

Name: Assistant Director, Strategic Policy
and Programs Division
Address: Department of Environment and Conservation
168 St Georges Terrace, PERTH WA 6000
Tel: (08) 6467 5000
Email: leed@dec.wa.gov.au

Note: The parties must advise each other of any changes to these contact details from time to time.

Executed by the Parties as an agreement.

**Signed by Director General of the Department of Environment and Conservation for
and on behalf of the State of Western Australia**

(Signature of authorised person)

(Print name of authorised person)

In the presence of

(Signature of witness)

(Print name of witness)

**Signed for Carnegie Wave Energy
Limited by an authorised officer in the
presence of**

Signature of officer

Signature of witness

Name of officer (print)

Name of witness (print)

Office held

20112012

STATE OF WESTERN AUSTRALIA represented by DIRECTOR GENERAL OF THE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

AND

CARNEGIE WAVE ENERGY LTD

VARIATION AGREEMENT

To vary the FINANCIAL ASSISTANCE AGREEMENT entered into between the State of
Western Australia and Carnegie Wave Energy Ltd on 13 November 2009
