

INTER-AMERICAN DEVELOPMENT BANK

CHILE

**SUPPORT TO MARINE ENERGY PILOT PROJECTS IN SOUTHERN CHILE
(CH-G1002 / CH-T1139)**

Category B Project

**Environmental and Social Management Report
(ESMR)**

July 2013

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ABBREVIATIONS

CAPEX	Capital Expenditure
CORFO	Corporación de Fomento de la Producción
POD	Proposal for Operation Development
GoC	Government of Chile
IDB	Inter-American Development Bank
IG	Investment Grant
ESMR	Environmental and Social Management Report
ESS	Environmental and Social Strategy
MINENER	Ministry of Energy
NMES	National Marine Energy Strategy
PSPC	Private Sector Project Companies
SSF	Safeguard and Screening Form for Screening and Classification of Projects

**SUPPORT TO MARINE ENERGY PILOT PROJECTS IN SOUTHERN CHILE
(CH-G1002 / CH-G1003)
Environmental and Social Management Report (ESMR)**

I. INTRODUCTION

A. Summary Table

Country	CHILE
Sector	Energy
Project Name	Support to Marine Energy Pilot Projects in Southern Chile
Borrower and / or Sponsor	Government of Chile (GoC)
Project Team	Christoph Tagwerker (INE/CCS) Project Team Leader; Emiliano Detta (INE/CCS); Angelo Angel (INE/CCS); John McGlynn (INE/ENE); Paola Robles (CSC/CCH); Steven Collins (VPS/ESG); Hilary Hoagland-Grey (VPS/ESG); Ernesto Corzo (LEG/SGO); Francisco Lois (FMP/CCH); Raul Lozano (FMP/CPR); Roberto Monteverde (CSC/CCH) Team Members.
Executing Agency and / or Company	IDB
Transaction Type	Investment Grant
Total Project Cost (in US\$)	29,750,000
IDB A-Loan (if applicable)	2,950,000 (MSC and SCI Funds)
B-Loan/Co-lenders	13,400,000 (GoC MINENE); 13,400,000 (PSPC)
Environmental Category	B

B. Background

- 1.1 Chile has one of the largest endowments of marine energy in the world. This resource could represent a significant and world-class opportunity for the development of low carbon power. The government of Chile (GoC), through the Corporación de Fomento de la Producción (CORFO) and the Ministry of Energy (MINENE) has several activities being implemented or planned that are intended to promote conditions for local and foreign companies, research entities and universities to work jointly in order to create knowledge and experience in marine energy technology, help further develop the technology and adapt it to local conditions and bring down costs. This will in turn diversify the energy matrix and increase the competitiveness of the sustainable energy sector in the country. Examples of key activities within this program are shown in Table 1.

- 1.2 The IDB has been asked to provide both technical and financial support for Chile's current program, (the Project) to promote marine energy, in particular financial support for the two pilot projects.

Table 1. GoC activities to foster marine energy development		
Activity	Responsible	Original Timeline
1. Green Paper Marine Energy	MINENE	April 2013
2. Bidding documents for a Marine Energy Center of Excellence	InnovaChile	Bidding July 2013
3. National Marine Energy Strategy	MINENE	November 2013
4. Roadmap Marine Energy including public consultation of green paper	Aquatera	September 2013
5. Study on modification and/or possible revision of marine regulatory framework	MINENE	May 2013
6. Development of environmental guidelines for project developers	MINENE	Bidding October 2013
7. Marine Energy Explorer (Explorador marino)	Universidad de Chile	Bidding Q2 2013
8. GIS referenced use of coastal zones and marine energy potential study	MINENE	Bidding July 2013
9. Study about existing supply chain infrastructure	MINENE	Finished by end of 2013
10. Marine energy pilot projects	MINENE/CORFO	Bidding Q4 2013

II. PROJECT DESCRIPTION

A. Project Components

- 2.1 Project includes knowledge development as well as the design and implementation of two pilot projects, a tidal energy device and a wave energy device. Details of the components are contained within the POD. The components include:

- A tidal current (aka hydrokinetic) energy device pilot project with a target rated capacity of at least 1 MW; an incentive for larger generation capacity will be provided in the evaluation criteria
- A small wave energy pilot project ; no minimum capacity is required though an incentive for larger generation capacity will be provided in the evaluation criteria
- Knowledge development: technical consultant support throughout the process of selecting (including bid review), designing, implementing and supervising the pilot projects

In addition, IDB has been providing input and support to the GoC in other activities included in their program to foster marine energy development.

- 2.2 The IDB has been asked to co-finance the two pilot projects and other activities within the knowledge development, with counterpart financing from the government and private sector

companies supporting those activities and providing financing to the wave energy pilot project and the center of expertise. The breakdown of the components and their respective financing is as follows:

Table 2 Project Funding

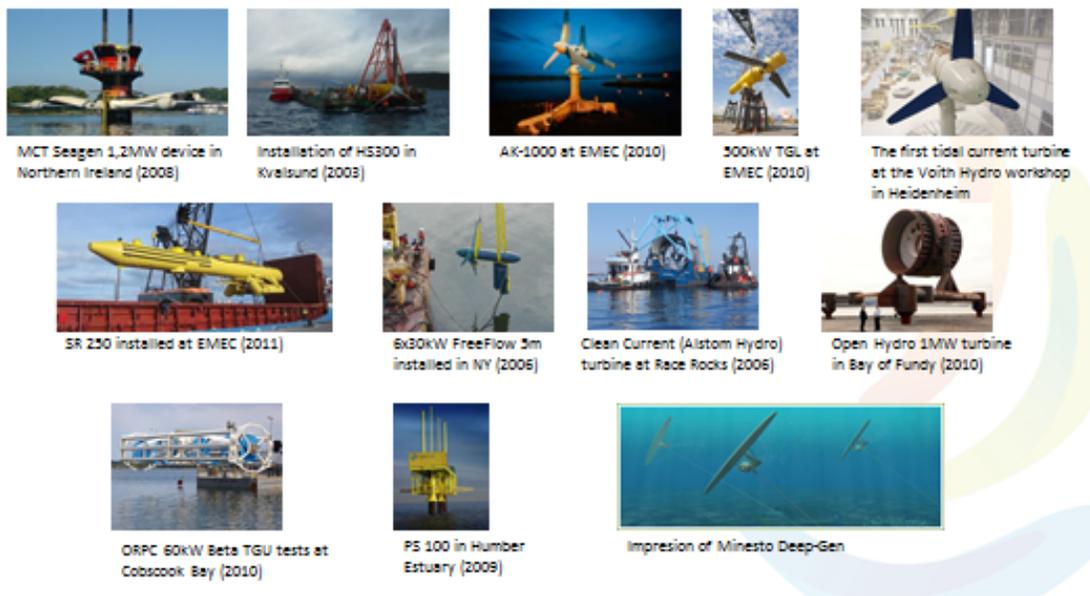
Components	IDB	Govt of Chile	Private Sector Companies	Total
Component 1: Investment Grant (Pilot Projects)				
Tidal current energy pilot project	1,800,000	10,000,000	13,000,000	21,800,000
Wave energy pilot project	600,000	3,400,000	3,400,000	7,400,000
Component 2: Knowledge development				
Consulting firm for technical evaluation of proposals received	40,000			40,000
Construction supervision and commissioning consultant	200,000			200,000
Consultant for knowledge database and info portal	40,000			40,000
Purchase of internet domain for knowledge database and info portal	10,000			10,000
Consulting firm for marine energy resource assessment in the Chacao Channel	80,000			80,000
Individual consultant for development of ESMS	80,000			80,000
Project management	60,000			60,000
Miscellaneous	25,000			25,000
Consultant Travel	15,000			15,000
TOTAL	2,950,000	13,400,000	13,400,000	29,750,000

- 2.3 One of the first activities under the Project is the issuing of requests for proposals from expert companies. IDB is currently working with the GoC on preparing the bidding documents. These companies will have six months to prepare technical proposals that will include the design of the technology to be utilized in the pilot projects.
- 2.4 While the final technology for the tidal current pilot project has not been selected, the anticipated plan will be to install a 1 MW turbine (or something similar). Most probably it will involve the installation of a single underwater horizontal rotor turbine (similar to a wind

turbine) or a small array of devices. These devices generally move at low speeds. Examples of leading technologies are shown in Figure 1 below.

- 2.5 The wave energy pilot project will be designed by the company that wins the bidding process and may be designed as a single unit or an array consisting of several smaller units operating together.

Figure 1: Leading Tidal Current technologies



B. Project Schedule and Workforce

- 2.6 The Project schedule and workforce have not been assessed and will be including in the selected proposal. In addition, a number of initiatives to support the Project have already been implemented or are by the Government of Chile. These include the Green Paper Marine Energy, a national Marine Energy Strategy, and the development of environmental guidelines for project developers. Various studies are being developed on: marine regulatory framework, a Roadmap for Marine Energy including public consultation of green paper. The Roadmap will be similar in scope to a strategic impact assessment.

C. Environmental and Social Setting

- 2.7 The Project locations are not currently known and will be developed during the tender process; therefore, the precise environmental and social characteristics of the Project's location cannot be described. During the development of the Project, the IDB will require that a detailed baseline and assessment be conducted once the site selection is final. It is known that the pilot facilities for the tidal energy project will almost certainly be located in southern Chile and the preferred alternative will be within the Chacao Channel, or Chacao

Straight, a five kilometer wide and 100 meter deep channel separating Chiloe Island, Chile's largest island, from the mainland of southern Chile.

- 2.8 Chiloe Island contains a large protected area, the Chiloe National Park, and the offshore habitat is home to many sensitive marine mammals including sea lions and sea otters and its forests contain the Patagonian woodpecker and the pudu, the world's smaller deer species, listed as Vulnerable on the IUCN Red List. Several species of sea birds rely on both the forest and marine environments in the area for survival. Blue whales (*Balaenoptera musculus*) are also known to congregate in the deeper waters surrounding the channel.
- 2.9 The Chacao Channel is known to be a tourist location and has a large number of ocean-going ferries transporting tourists from mainland Chile to Chiloe Island. There are also a large number of fishing vessels which work the channel and some aquaculture operations, oyster farms and salmon farms in particular, are located within the channel. Support vessels for divers harvesting sea urchins and shellfish are also common in the channel.
- 2.10 Most of southern Chile, including Chiloe Island and the area surrounding the Chacao Channel is remote and rural. There are many Indigenous communities in the area of southern Chile including Mapuche, Cunco, Chonos and Huilliches peoples. The primary economic activities of the region include fishing, agriculture, livestock (sheep and cattle), and aquaculture in recent years.

III. COMPLIANCE STATUS AND PROJECT STANDARDS

A. Appraisal Process and Local Requirements

- 3.1 The marine renewable energy sector is relatively new worldwide and has never been implemented in Chile; the two proposed pilot facilities will be the first of their kind to be installed in Chile. As such, the Chilean Government does not have any specific regulations, standards or requirements relating to the marine energy sector. Currently, no regulations or procedures are available to guide the process involving the Environmental Assessment requirements, permitting guidelines and concessionary processes. The GoC is, however currently preparing a Road Map for Marine Renewable, akin to an SEA, which will help guide the selection of the winning bidders and help identify the most appropriate physical locations to deploy the devices with minimal environmental and social impact.
- 3.2 It is anticipated that the IDB will be able to assist the Chilean Government in the process of establishing standards, regulations and procedures that are consistent with good international practice, which will help guide future Environmental Assessment requirements, permitting guidelines and concessionary processes within the marine energy sector in Chile. Nonetheless, the IDB will require that the pilot projects all have environmental and social assessments completed that are consistent with the policies and procedures of the IDB.

B. IDB Safeguard Policies

- 3.3 The Project is still in the early stages of development and a condition of the IDB financing will be compliance with IDB environmental and social safeguard policies and the ESMP will outline how compliance will be achieved. A summary of the Project's consistency with the policies and directives is described in Table 3.

Table 3: Consistency with IDB Policies and Directives

Policy / Directive	Applicable Aspect	Compliance Rationale
OP-703 Environmental and Safeguards Compliance		
B.1 Bank Policies	Compliance with applicable IDB policies	The required project EA and ESMS will ensure compliance with Bank policies
B.2 Country laws	Compliance with country laws and regulations	Since existing Chilean laws do not define marine renewable energy regulations; the Project will be required to comply with international good practice in the industry.
B.3 Screening and Classification	Application of appropriate classification	The Project has been screened and is classified as a Category B project.
B.4 Other Risk Factors	National capacity and regulatory framework	Project includes several components for institutional capacity strengthening
B.5 EA Requirements	Application of adequate assessment process	An Environmental Assessment will be conducted.
B.6 Consultations	Project will undergo appropriate public consultation	The Government of Chile is preparing a series of ten consultations regarding the development of the marine energy sector in the country. In addition, at least one consultation will occur involving each pilot facility to be implemented.
B.7 Supervision and Compliance	Project supervision and reporting	The Project's ESMS will detail internal supervision and monitoring requirements. The Bank will also provide supervision throughout the Project lifecycle.
B.8 Transboundary Impacts	N/A	Potential locations are focused in the south of the country far from any international borders.
B.9 Natural Habitats and Cultural Sites	Conversion of natural habitat	The pilot facilities may be located in natural habitat; their small size will minimize potential impact. Facilities will not be allowed to be located in Critical Natural Habitat.
B.10 Hazardous Materials	Waste management	The ESMS will describe waste management procedures in line with the Bank's policies.
B.11 Pollution Prevention	Pollution control and CO ₂ emissions	The ESMS will describe pollution prevention procedures in line with the Bank's policies. The pilot facilities will reduce the Chile's greenhouse gas footprint.
B.12 Projects Under Construction	N/A	The project is not under construction.
B.13 Non-Investment and Flexible Lending Instruments	N/A	N/A
B.14 Multiple Phase Loans	N/A	N/A

Policy / Directive	Applicable Aspect	Compliance Rationale
B.15 Co-Financing Operations	Potential presence of other lenders	Other lenders may be involved in the Project. The Bank will cooperate with any other potential lenders to ensure IDB policies are met.
B.16 In-Country Systems	N/A	N/A
B.17 Procurement	Tender Process	The Bank has been and will continue to be involved in the tender processes to identify a private sector company to design, construct and operate the pilot facilities.
OP-710 Involuntary Resettlement	N/A	The Bank will provide a set of exclusionary clauses to prevent the Project resulting in any involuntary resettlement.
OP-765 Indigenous Peoples	N/A	The Bank will provide a set of exclusionary clauses to prevent the Project resulting in any significant impacts to indigenous peoples and indigenous communities.
OP-704 Disaster Risk Management Policy	Earthquake zone, potential impact from climate change	The Project will be located in an earthquake zone and may be affected by climate change issues such as sea level rise. Project design will take these potential affects into account.
OP-270 Gender Equality	N/A	The Project will not have any adverse effects on women. The Project will look to integrate women into the workforce where possible.
OP-102 Access to Information Policy	Project information disclosure	Relevant project information will be made available to the public on the Bank's website.

C. Project Requirements and Standards

- 3.4 Neither the IDB, nor the Government of Chile, have sector specific standards for the marine renewable energy sector. The Bank's standard policies and procedures will apply to this Project. Additionally, the Project aims to establish Chilean standards relating to marine energy development and will look to existing standards established in other parts of the world where marine energy development is more advanced, including the United States, Great Britain, and Portugal, for example.

IV. KEY ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS

A. Summary of Key Impacts and Risks

- 4.1 Currently, since the final design of the devices and the precise locations where the devices will be deployed have not been fully assessed and finalized, exact impacts are not known. Based on the nature of the Project (relatively small size of the devices, general location of deployment, and specification of exclusionary zones) it is anticipated that the Project will have only minor to moderate potential environmental and social impacts. The types of impacts expected are discussed below.

- 4.2 The Bank will provide a set of exclusion criteria to be included in the tender documents in order to minimize the potential impacts by avoiding the placement of devices in environmental or socially sensitive areas. In addition, the projects will be required to assess the potential impacts and risks for each of the projects and prepare appropriate mitigation and management measures, which will be in accordance with IDB standards.

B. Environmental Impacts and Risks

- 4.3 Potential environmental impacts and risks that may be associated with the project include: disturbance to the sea floor during the construction (anchoring and cables) process; disturbance to benthic organisms during construction, noise impacts to aquatic fauna during construction and operations; impact risk to sea mammals and other fauna during operation; creating a foraging diversion for aerial foraging and diving sea birds and; impacts to natural habitat including tidal flow regimes.

C. Social Impacts and Risks

- 4.4 Potential social impacts and risks that may be associated with the project include: impacts to commercial fishing and aquaculture activities (various types of fishing operations are conducted in the area); impacts to shipping and transport; impacts to recreational activities such as fishing and diving; and potential visual impacts. Due to the relatively small size of the devices to be deployed and their offshore locations, it is not anticipated that any involuntary resettlement will occur in relation to the Project. It is also anticipated that Indigenous peoples will not be negatively or disproportionately affected by the Project; however, there are many indigenous communities in southern Chile and this situation will require careful analysis as the Project develops.

D. Cumulative Impacts

- 4.5 This project consists of two pilot projects which will be the first of their kind in the marine energy sector in the country. Future development of the offshore energy sector would depend on many factors, including the success of these pilot studies. Future development of offshore energy is, however, one of the long-term objectives the program, and as such would over time encourage development that could in the long-term lead to cumulative impacts. Of particular importance could be impacts related to conflicts over the use of the coast and near-shore water such as for recreation, fishing, or for conservation and protection of the marine environment. For that reason, the environmental and social studies that will be carried out as part of the program, specifically the SEA, will be required to include an assessment of potential cumulative impacts in the event the country moves forward with development of the industry. The management system that the Bank is requiring (see Section V, below) will also include provisions to assess and manage these impacts.

E. Positive Impacts

- 4.6 The Project will have a number of positive impacts including, but not limited to: reducing the country's reliance on fossil fuels; developing and promoting an untapped source of green energy in Chile; providing currently non-existent opportunities in education and the

study of marine renewable energy; employment opportunities in rural areas of southern Chile and; providing electricity to rural areas of southern Chile and perhaps beyond.

V. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING

A. Description of Management Systems and Plans

- 5.1 The Project is in the early planning stages and; therefore, does not have an Environmental and Social Management System (ESMS) developed. Currently, the Project is conceptual; the government program will promote two pilot facilities for tidal and wave energy; however, the exact prototype or device has not been selected, nor have locations to deploy the devices been selected. These selections will be made during the six-month tender process to select the private sector enterprises which will design, deploy, and operate the facilities. The GoC is also currently preparing a Road Map for Marine Renewable, akin to an SEA, which will help guide the selection of the winning bidders and help identify the most appropriate physical locations to deploy the devices with minimal environmental and social impact.
- 5.2 Following the selection of the private sector enterprises, an Environmental Assessment will be prepared for each facility to be deployed. The EAs will be reviewed by Bank staff from the Environmental Safeguards Unit to ensure the EAs comply with Bank requirements.
- 5.3 In conjunction with the results of the EA, an ESMS will be prepared outlining how the private sector enterprise will effectively manage the Project's specific environmental and social impacts and risks. Bank staff from the Environmental Safeguards Unit will participate in the preparation of the ESMS to ensure it meets the Banks requirements. Review of the ESMS will include an assessment of the enterprise's capacity to successfully implement the ESMS.

B. Monitoring and Supervision

- 5.4 The Bank will require that monitoring be conducted of the activities of the Project, in particular those related to the construction and operation of the pilot projects. At this time it is understood that the IDB will hire a specialist firm to conduct all monitoring activities, and this role will include environmental and social aspects. The ESMS will outline the requirements and the procedures for conducting the monitoring, including reporting to the Bank. The frequency of monitoring and reporting will be based on the outcome of the environmental assessments, but will most likely be at least semi-annual during construction, and annual during the early stages of operation. In addition, the Bank will conduct supervision of the Project at key stages of the Project during both construction and operation.

C. Indicators

- 5.5 Indicators related to the performance of the environmental and social mitigation and management measures will be determined following the completion of the environmental

and social assessment. Based on the nature of the Project, however, these indicators are likely to include parameters related to marine impacts, health and safety (especially during construction), and training.

VI. REQUIREMENTS TO BE INCLUDED IN THE LEGAL AGREEMENTS

6.1 Based on the environmental and social due diligence conclusions of this early stage Project, the conditions described below are required to be fulfilled for the Project prior to loan approval/financial close and throughout the life of the loan, in form and substance satisfactory to IDB.

A. Throughout the Life of the Loan

6.2 The IDB will require within its legal agreements that the Project and each Project party and other Project/Environmental parties, including construction companies and operators, and any contractors and sub-contractors will, at all times during the life of the Legal Agreement, comply with the following requirements:

- a) All applicable environmental, social, health and safety, and labor regulatory requirements of Chile.
- b) All requirements associated with any environmental, social, health and safety, and labor related permits, authorizations, or licenses that apply to the Project, the Borrower or any party responsible for executing the Project or its mitigation measures.
- c) All environmental, social, health and safety, and labor requirements of the Project contracts and any subsequent modifications.
- d) All aspects and components of all of the Project's environmental, health and safety, social and labor documents.
- e) All relevant IDB policies such as the Environment and Safeguards Compliance Policy (OP-703), the Disaster Risk Management Policy (OP-704) and the Disclosure of Information Policy (OP-102), the Involuntary Resettlement policy (OP-710), the Operational Policy on Indigenous Peoples (OP-765) and the Gender and Equity in Development Policy (OP-270) and their respective guidelines.
- f) Comply with all the requirements indicated in the Environmental, Health and Safety Action Plan.

B. Prior to Construction

6.3 The Project will develop and implement a project specific ESMS to assess, mitigate the negative impacts associated with the Project. The ESMS will include a defined monitoring and supervision regime. All project contractors will also be required to comply with the actions described in the ESMS.

- 6.4 The Project will appoint a Marine Energy Specialist (new hire or designate existing employee) for the duration of the construction and commissioning period to prevent and manage potential impacts and supervise and monitor mitigation measures.
- 6.5 The Project will conduct community engagement activities with local authorities and community groups to identify and implement potential social programs. The Project will look specifically to support social programs directed at benefitting women, children, and indigenous groups.
- 6.6 The Project will develop and submit to the Bank an Emergency Response Plan / Contingency Plan.
- 6.7 The Project shall demonstrate to the Bank that all pending land/marine territory use permits have been obtained. Copies of relevant permits, contracts, and agreements shall be submitted to the Bank.
- 6.8 The Project shall develop and implement a grievance mechanism that corresponds to best industry practices (IFC Good Practice Note, Addressing Grievances From Project-affected Communities, dated September 2009) for the public, including those affected by the transmission lines.
- 6.9 The Project shall incorporate into all contractors' contracts clear regulations and penalties for non-compliance with policies, plans and programs (including mitigation measures) adopted by the Project. This will include clear procedures and timing for reporting environmental, health and safety related incidents/accidents and a specific monitoring program to assess causes of incidents/accidents and track performance of the corrective measures. The GoC shall provide evidence of supervision and oversight of the contractors.
- 6.10 The Project shall present a report detailing the clearance of any potential cultural sites from potential deployment location and present final archaeological clearance from the appropriate governmental department to IDB. The report shall also detail the establishment of a Chance Find Procedure to be implemented throughout the construction period.

C. Special Exclusionary Conditions

- 6.11 Due to the early planning phase of the Project, neither the technology to be deployed nor the potential deployment locations are known. As such, a set of exclusionary criteria will be established and enforced through the ESMP in order to ensure the deployment of the marine energy devices do not have significant environmental and social risks and impacts, including but not limited to:
 - a) avoid deployment of devices in protected or sensitive areas including National Parks and marine refuges
 - b) avoid deployment of devices in special fishing areas
 - c) avoid deployment of devices in shipping lanes
 - d) avoid deployment of devices in sea mammal rooking, breeding, or feeding areas
 - e) avoid deployment of barrage type devices
 - f) avoid deployment of devices which would result in physical resettlement of local individuals

- g) avoid deployment of devices which would result in significant impacts to indigenous peoples and communities