Invitation to Quote

SELKIE Project

http://selkie-project.eu/

Important Note
Completed quotes must be received no later than:

30-04-20

CONTENTS

This project has received funding from the European Union's European Regional Development Fund through the Ireland Wales Cooperation programme.

1 SELKIE Introduction

The waves and tides around Ireland and Wales could provide significant low carbon energy. Local companies that build devices to harness this natural resource are already creating jobs and exporting around the world. However, a barrier to development is lack of funding for R&D and pilot demonstration at sea. Another barrier is a lack of common procedures and components (seabed anchors for example), with many technology companies repeating activity in slightly different ways.

Therefore, the aims of the project are:
1. Establish a cross-border network of Ocean Energy SMEs and supply chain companies;
2. Conduct industry-academic collaborative R&D projects;
3. Transfer R&D knowledge to wave and tidal industry/SME stakeholders, thereby advancing the technology sector as whole;
4. Assist Irish and Welsh SMEs to progress along the path to commercialisation.

Selkie will achieve these aims by developing shared multi-use engineering tools, templates, standards and models, which can be used across the sector in both Wales and Ireland.

Selkie will test and validate the technology tools on two pilot demo technologies: one wave and one tidal technology (chosen via open tender). The pilot testing will advance the knowledge for Wales and Ireland SMEs in general, using a structured development path for testing and improvement of ocean energy devices in terms of their reliability, survivability, operability, stability and commercial viability.

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https://irelandwales.eu/

2 Objectives of the Selkie project

Objective 1 - The operation will demonstrate the benefit of cross-border collaboration and show that it is essential to the development of the Marine Renewable Energy (MRE) industry.

Objective 2 - Selkie will design and create a range of the most common services required by the MRE sector responding to the programme regional needs e.g. developing models, testing models, sensors, monitoring of installation and operations etc. for use by MRE industry sector. These services will be demonstrated in the form of R&D projects that are mutually beneficial to Ireland and Wales as well as demonstrated in the form of two ocean energy Pilot projects,

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assisting the partner beneficiaries and case studies involved to progress along TRL path to commercialisation.

Objective 3 – Selkie will solve one of the critical barriers facing MRE: lack of confidence in data and results. Following data acquisition, Selkie will subcontract most of the data handing to expert third party experts in the field for data validation.

Selkie will develop shared multi-use technology tools, templates, standards and models, in key-shared technology areas through applied research work streams that can be used across the sectors and partner beneficiaries in both Wales and Ireland. These templates and models will be made open access post-project. The key technology tools are described below:

1. **Techno-economic models**. These tools will link the Ireland/Wales Geographical Information Systems (GIS) to a techno-economic model. This will enable the assessment of MRE sites in relation to resource, optimum technology, cable routes, logistics, grid connection etc. This will be led by UCC who have experience in both GIS and techno-economic development along with their use for cost optimisation.

2. **Foundations and Mooring Design.** There are no specific design codes for MRE and methodologies taken from the Oil & Gas Industry are generally used. However, these are not suited to MRE and do not provide optimum designs. In Selkie, foundation and mooring work will be led by the beneficiary GDG Ltd who have already taken innovative approaches to developing design methods for the MRE industry.

3. **Physical and Numerical Array Modelling**. These are methods normally used by the MRE industry to advance technology designs as accurate modelling can considerably de-risk an open sea deployment as well as reduce costs. Selkie focuses on research in wave and tidal energy modelling and array interaction and correlation using a modified BEM-CFD Computational Fluid Dynamics Technique. Led by SU:

4. **Sensor Optimisation and Data Analysis**. Evaluation and monitoring of pilot designs through sophisticated sensors are critical for understanding and learning purposes, as well as guiding new improved designs. Sensor design and demonstration in the pilot projects form an important part of Selkie. This will be led by SU.

5. **Operations and Maintenance (O&M) and logistics models**. It has been demonstrated within the offshore wind industry that significant cost savings can be achieved from efficient and optimised installation and O&M strategies. The Selkie project will develop a suite of bespoke models for the MRE sector to optimise logistics and O&M processes, building upon the knowledge developed within the offshore wind industry but incorporating solutions for the additional challenges that are specific to MRE. This will be led by UCC.

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3 Job description - WAVE Tender

Selkie will tender for the services of a Wave energy developer company.

There are nine Workpackages in the project and the successful company may be required to contribute input to any of the nine work packages. The requirement is to validate these five tools as described in section 2 for wave energy devices.

4 General Requirements

a) Confirmation of previous experience of deployment of technology at sea and possession of meaningful data from this deployment.
b) Confirmation of active development of an array deployment site including evidence of ownership of the site and investment in site development and consenting
c) Confirmation of economic activity that brings a benefit to the Ireland/Wales programme area. This can be technology development, demonstration, project development, location of company staff or any combination of the above.

4.1 Workpackage 4 GIS Techno – economic model and pilot applications

a) Be available for consultation for designing of the tool - This task will develop a GIS linked tool that will contain site relevant data for both Ireland and Wales such that strategic decisions can be made on optimum sites for specifically defined technologies
b) Ideal applicant will have local resource data and bathometry available for the model.
c) Applicant will be required to test and validate the model. Applicant should be able to supply their devices cost and power matrix to enable the techno economic analysis of their device to be completed. This task will involve interaction with pilot project managers, to decide on scope of case study and agree on data requirements. Once the modelling is completed the output may dictate aspects

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of the pilot projects and feedback after deployment may be used to tune the model for future applications

4.1.1 Workpackage 5 Foundation and mooring model and pilot application

a) Be available for consultation for designing of the tool - an open access methodology/tool that is specifically suited to the wave and tidal industry.
b) Ideal applicant will have local resource data and bathometry available for the model.
c) Ideal applicant will be able to participate in a real test of their moorings in a sea environment by May 2021.
d) In the case of a floating system where a mooring system is required, tank testing and numerical modelling will be carried out in WP 6. The tank testing will involve design and build of physical scaled models of anchors and moorings. Test of the designs in the Lir ocean tank and Deep ocean tank. This work will facilitate the verification of the foundation/mooring design which will be used for the pilot project which in turn will validate the process and allow a more general rollout of the methodology

4.1.2 Workpackage 6 Physical and Numerical modelling and pilot applications

a) Be available for consultation for designing of the wave array configuration.
b) Much of the work to date regarding modelling has been in relation to single device technologies with very little attention given to array design layout, optimization to maximize power output and understand interactions. Such an approach will involve different levels of modelling such that to quantitatively determine device interactions, wake effects, environmental impacts etc. This will lead to the development of modelling scenarios where the modelling approach will be applied and from it will come recommendations on the suitability of the approach as well recommendations on wave energy array layouts. Examples of possible modelling scenarios are outlined below

- Further development of wave array interaction tools and development of model set up data sets. This will aid the micrositing and layout of projects.
- Develop improved virtual models of the pilot technologies, to cross validate against physical testing and to inform scale up.
- Linking of potential flow models to mild slope equation models to examine array impacts and possible benefits in relation to surfing, aquaculture, fishing, coastal erosion etc.

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The selected pilot case studies will require both numerical and physical modelling in order to validate the de-risking of the technologies in relation to the application of project methods prior to field deployments. This work will supply further verification of the approaches developed and/or validation of certain subsystems such as power take offs or mooring systems. The pilot deployments will subsequently supply real data in terms of the accuracy of the methods developed.

4.1.3 Workpackage 7 Sensor Optimization, Data analysis and Pilot applications

The ideal Wave Energy company candidate will have a device in a real sea environment by May 2021 and be willing to cooperate in the deployment of sensors on or near their device.
The successful candidate will also be asked to contribute with the following;

a) Develop, test and validate a sensor system, to provide a sensor strategy for the wave technology – we are looking at a data logger for this section.
b) Participate in the procurement of and modify sensors prior to installation of the devices.
c) Participate in the installation of sensors
d) Participate in the monitoring of the sensors to ensure they are providing accurate data.
e) On completion of the pilot, participate in an overall assessment, with input from other stakeholders, to determine the overall feasibility of the methods and sensors developed and its general application to the wider industry

4.1.4 Work Package 8 Installation, Operations, Maintenance & Logistics models and pilot applications

a) Be available for consultation for designing of the tool – O&M expert software being developed by UCC and a separate service tender.
b) Ideal applicant will have local infrastructure data and costs for installation and maintenance.
c) Applicant will be required to test and validate the model. The tools will first be applied to plan and optimize the installation and O&M strategies and subsequently real data can be input that will help refine and improve the model. The models will then be used to consider how installation and O&M strategies would change for different scales of array development for these technologies.

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5 Data Access

As a pilot company within the SELKIE project, the consortium requires access to your data to validate the models developed within the project. These models will be published by the consortium, and the publication will include example validation taken from your data sets. For each data item supplied by you, please indicate (in the table below) the current situation regarding your data already published and the terms on which you are willing to share data with us.

5.1 Selkie require all bidders to provide information on the extent to which they are willing to share the data they currently have access to for each of the categories described in the table (COLUMN A)

5.2. Selkie also requires all bidders to provide information on the extent to which they are willing to share the data that will arise from this contract, should they be successful, for each of the categories described in the table (COLUMN B)

5.3. The companies that are willing to provide wider access to a larger range of more relevant data will score higher than those that provide limited access and / or limited data sets.

Please use the reference keys below to categorise the data you hold.

0. The data does not exist, or we are unwilling to provide access.
1. Data can be provided to the consortium under confidentiality conditions but cannot be published or distributed further.
2. Summary data can be published in normalised form in papers and reports, and is subject to our review of the draft document.
3. Processed data can be published (including values and units) in papers and reports, and is subject to our review of the draft document.
4. Raw data can be published and uploaded to data repositories under open access conditions. Processed data can be published (including values and units) in papers and reports.

a. If you are willing to share with us data that you hold, but do not have IP rights to (a third party has shared it with you under licence) then indicate this with the appropriate number (1-4) above followed by a secondary “a” and provide details of the data owner.

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5.4. Please complete the table as per the above instructions –please note the data item requirements are examples and you will be required to provide details on as many relevant examples as per the list in each section as possible.

6 Data Table

Data Item Requirement Examples	COLUMN A Previously published data access category (0-4)	COLUMN B Proposed data - as a result of this contract access category (0-4)	Comments/ further details
GIS Techno-economic model - *The GIS-TE tool will contain site relevant data for both Ireland and Wales in order to facilitate the strategic decision-making on optimum sites for specifically defined technologies. Functionality will include GIS layers (constraints and restrictions, proximity to infrastructure, environmental and technical data, etc.), Outputs – LCOE/NPV, Decision facility – location rank*			
Power Curve, CapEx, OpEx, WACC, Project discount rate, Expected life of the system, Decommissioning cost and Desired site characteristics for deployment (proximity to grid, seabed character, desired depth, etc.)			
Foundation and Mooring model - *An improved software tool for the design of mooring systems for wave and tidal technology*			

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Details of Geophysical Surveys, Details of ROV Surveys, Details of Intrusive Geotechnical Surveys (boreholes, grabs, VCs, sampling, lab testing, CPTs, etc.), Continuous Current Profile data, Wave Data, Wave, Current misalignment data			
Numerical Modelling - Numerically model wave energy array configurations to determine issues and constraints in relation to layout optimisation.			
1. Geometry CAD model (for example .stl, or .igs file) 2. Schematic diagram showing dimensions. Mass and Moment of Inertia properties.			
3. Input parameters of the mooring scope: Stiffness (N or N/m), Maximum Tension (N), Mass/length (kg/m), Line diameter (m), Connection points coordinates (x,y,z), Upstretched length (m).			
4. Power take off (PTO) information: PTO damping , PTO stiffness,			
5. Wave Data (set of Hs and Tp for the given wave spectra)			
Sensor optimization & Data analysis. ***Selkie will design a new or modify existing sensors such that they specifically meet the requirements of the wave and tidal industries. The experience of the project partners will facilitate the development of additional or better functionality through modification and testing in relation to minimising power requirements, enhancing survivability and minimising sensor failure in order to reduce deployment risk. In this section we will focus on wave buoy data loggers***			
Details of existing device data logging specification. Pressure Sensors Torque Sensors			

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Sensing principles, sensing precision and load measurement range Sensor life under different environments Dimension of overall structure Mechanism of over-loading protection			
Installation, Operations, Maintenance and Logistic models - *In order to reduce the LCoE for marine renewables it is important to optimise operations in all parts of the life cycle*.			
<u>Site data</u> For wave energy converter you will need c. 10 years of site data with c. an hourly resolution of the significant wave height Hm0 and peak wave period Tp to make a site scatter diagram.			
<u>Installation logistics</u> 1. Device description including rating, overall size, weight and materials, list of components, electrical infrastructure, moorings and anchors etc. 2. Array details including spacing etc. 3. Proposed installation strategy of each element i.e. device, moorings and anchors, electrical infrastructure and substation. This includes per element: a. Expected installation duration; b. Required vessels, equipment and technicians per operation;			

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c. Weather restrictions per operation e.g. maximum significant wave height or current speed etc. d. Costs including CAPEX costs for devices and balance of plant as well as the associated cost of vessels, equipment, technicians etc. required for installation.			
<u>O&M logistics</u> 1. Power production: device power matrix 2. Description of required preventive planned maintenance (PM) including which components included in PM and per component: a. Frequency of PM; b. Description of operation required; c. Estimated duration; d. Required vessels, equipment and technicians per operation; e. Weather restrictions per operation e.g. maximum significant wave height or current speed etc.			
3. Description of required corrected maintenance (CM) including: a. List of components to be considered for CM. b. Different CM categories e.g. minor			

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or major maintenance or replacement etc. c. Estimated failure rate per component and maintenance category. d. Description of operation required for each CM; e. Estimated duration; f. Required vessels, equipment and technicians per operation; g. Weather restrictions per operation e.g. maximum significant wave height or current speed etc.			
Costs for vessels, technicians, equipment and consumables as well as replacement parts related to PM and CM.			

7 Previous experience

Please provide at least two references as detailed in the table below

Please provide a record of a project/purchase involving a similar service carried out within the last five years.	Details as below	HD	3
Organisation Name, Address & Postcode:	[Insert Response]		
Project/Purchase Date(s):	[Insert Response]		
Project/Purchase Value and Quantity:	[Insert Response]		
Details of Service Supplied:	[Insert Response]		
Please provide a record of a project/purchase involving a similar service carried out within the last five years.	Details as below	HD	3
Organisation Name, Address & Postcode:	[Insert Response]		

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Project/Purchase Date(s):	[Insert Response]
Project/Purchase Value and Quantity:	[Insert Response]
Details of Service Supplied:	[Insert Response]

8 PRICE

The indicative budget for this service including insurances and all associated costs is €24,999 (inc VAT). This is not a definitive maximum or minimum and may be subject to slight change to meet system specifications.

1. The budget is €19,250 (ex VAT), including all expenses.

2. Confirmation of acceptance of the University's Terms and Conditions as provided.

3. Please note payment shall only be made upon satisfactory completion of each stage as agreed with the Principal Investigator.

4. Duration of the contract will be from commencement of the signing of the contract until the end of the SELKIE project, due to finish 31/12/2022 (36 months or less duration, depending on date of signing contract). SELKIE is a 3.5-year project commencing 01/05/2019

4.1 Successful candidate will also have access to the Selkie Network –over 150 SMEs from Ireland and Wales
4.2 Access to all the Selkie tools
4.3 Access to expert business diagnostic consultations
4.4 Researchers and academic expertise available for separate product development and testing.
4.5 The tenderers IP will be protected at all stages.

9 AWARD CRITERIA

Quotes will be evaluated on the basis of the most economically advantageous submission using the following award criteria;

a) Demonstrated understanding of the requirements as set out in the specification (scored out of 20)
b) Range and depth of previous relevant experience (scored out of 25)
c) Range and depth of data access (scored out of 25)

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d) Quality of the quote proposal and methodology (scored out of 25)
e) Cost (scored out of 30)

Quotes must obtain an aggregate score of at least 50 under criteria (a), (b) and (c) in order to be selected for contract award.

10 QUOTE PROCEDURE

The deadline for receipt of quotes is **12pm on 30th April 2020**. Quotes received after this date will not be considered.
Quotes should be submitted by e-mail to TJ Horgan at; **tj.horgan@ucc.ie**
Please complete the data access table from section 6, the previous experience table from section 7 and any further supporting information to demonstrate your understanding of the requirement along with your quoted total price

11 University College Cork Policies

The Contractor must comply with the following University policies:

Procurement, contract and purchasing policies;

https://www.ucc.ie/en/procurement/procurementpoliciesandprocedures/

12 Disclaimer

12.1 Although every care has been taken in preparing this Invitation to Quote and equal care will be taken in conducting the process which arises out of this Invitation to Quote, no representation, warranty or undertaking, express or implied, in respect of any error or mis-statement by or on behalf of MAREI, ERI, UCC or any of its officers, employees, servants, advisers, consultants, contractors or agents is or will be made or given to any Quoter to this Invitation to Quote or to any other party, and no responsibility or liability will be accepted by MAREI ERI, UCC or any of its officers, employees, servants, advisers, consultants, contractors or agents for the accuracy or completeness of this Invitation to Quote.

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12.2 Any and all liability and/or loss of any nature whatsoever and howsoever arising (including liability and/or loss in any way resulting from the process and competition which arises out of this Invitation to Quote) is hereby expressly disclaimed by MAREI ERI, UCC and its officers, employees, servants, advisers, consultants, contractors and agents to the fullest extent permitted by law.

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