DELIVERABLE 7.5

Tailored Ocean Literacy Programmes Focusing on Wave Energy

WP 7

D 7.5 Tailored Ocean Literacy Programmes Focusing on Wave Energy

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CITATION

CONTENTS

1 SAFE WAVE project synopsis

The European Atlantic Ocean offers a high potential for marine renewable energy (MRE), which is targeted to be at least 32% of the EU's gross final consumption by 2030 (European Commission, 2020, Fox *et al.*, 2017). The European Commission is supporting the development of the ocean energy sector through an array of activities and policies, including: the Green Deal, the Energy Union, the Strategic Energy Technology Plan (SET-Plan) and the Sustainable Blue Economy Strategy. As part of the Green Deal, the Commission adopted the EU Offshore Renewable Energy Strategy (European Commission, 2020), which estimates to have an installed capacity of at least 60 GW of offshore wind and at least 1 GW of ocean energy by 2030, reaching 300 GW and 40 GW of installed capacity, respectively, moving the EU towards climate neutrality by 2050.

Another important policy initiative is the REPowerEU plan (European Commission, 2022) which the European Commission launched in response to Russia's invasion of Ukraine. REPowerEU plan aims to reduce the European dependence amongst Member States on Russian energy sources, substituting fossil fuels by accelerating Europe's clean energy transition to a more resilient energy system and a true Energy Union. In this context, higher renewable energy targets and additional investment, as well as introducing mechanisms to shorten and simplify the consenting processes (*i.e.,* 'go-to' areas or suitable areas designated by a Member State for renewable energy production) will enable the EU to fully meet the REPowerEU objectives.

The nascent status of the Marine Renewable Energy (MRE) sector, and Wave Energy (WE) in particular, yields many unknowns about its potential environmental pressures and impacts. Wave Energy Converters' (WECs) operations in the marine environment are still perceived by regulators and stakeholders as risky activities, particularly for some groups of species and habitats.

The complexity of MRE licensing processes is also regarded as one of the main barriers to the sector's development. The lack of clarity of procedures (arising from the lack of specific laws for these types of projects), the varied number of authorities to be consulted, and the early stage of Marine Spatial Planning (MSP) implementation are a few examples of the issues frequently identified as contributing to delays in obtaining project permits.

Finally, there is also a need to provide more information on the sector not only to regulators, developers, and other stakeholders, including the general public. Information should be provided focusing on the ocean energy sector's technical aspects, effects on the marine environment, the part it plays in local and regional socio-economic development, as well as its impacts on a global scale as a sector producing clean energy and thus having a role in contributing towards the decarbonisation of human activities. Only with an informed society will it be possible to carry out fruitful public debates on MRE implementation at the local level.

These non-technological barriers that could hinder the future development of WE in the EU were initially addressed by the WESE project[1]. The current project builds on the results of WESE and aims to move forward through the following specific objectives:

1. Development of an **Environmental Research Demonstration Strategy** based on the collection, processing, modelling, analysis and sharing of environmental data collected from WE sites in different European countries where WECs are currently operating (Mutriku power plant and BIMEP in Spain, Aguçadoura in Portugal and SEMREV in France); the SafeWAVE project aims to enhance the understanding of the negative, positive and negligible effects of WE projects. The SafeWAVE project will continue previous work, carried out under the WESE project, to increase the knowledge on priority research areas, extending the analysis to other types of sites, technologies, and countries. This will increase information robustness so as to better inform decision-makers and managers on real environmental risks, broaden the engagement with relevant stakeholders, related sectors and the public at large, and reduce environmental uncertainties in consenting of WE deployments across Europe.

2. Development of a **Consenting and Planning Strategy** through providing guidance to ocean energy developers and to public authorities tasked with consenting and licensing of WE projects in France and Ireland. This strategy will build on country-specific licensing guidance and on the application of the MSP decision support tool developed for Spain and Portugal in the framework of the WESE project. The results

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[1] WESE: Wave Energy in Southern Europe (2018-21). Project co-funded by the European Maritime and Fisheries Fund (EMFF) of the European Union.

of the SafeWAVE project will offer guidance to ocean energy developers and public authorities for most of the EU countries in the Atlantic Arch.

3. Development of a **Public Education and Engagement Strategy** to work collaboratively with coastal communities in France, Ireland, Portugal, and Spain to co-develop and demonstrate a framework for education and public engagement (EPE) concerning MRE, enhancing ocean literacy and improving the quality of public debates.

2 List of acronyms

BiMEP	Biscay Marine Energy Platform
CORE	Community ocean renewable energy
DOA	Description of activities
ECN	École Centrale de Nantes
EPE	Education and public engagement
ERI	Environmental Research Institute
MRE	Marine renewable energy
MSP	Marine spatial planning
SDGs	Sustainable development goals
UCC	University College Cork
WE	Wave energy
WEC	Wave energy converter
WP	Work package

3 Executive summary

SafeWAVE Deliverable 7.5, 'Tailored Ocean Literacy Programmes Focusing on Wave Energy', uses the framework developed in Deliverable 7.4 to organise an approach for creating education and public engagement (EPE) programmes that are tailored to the specific circumstances in each of the communities of the project's four member countries – France, Ireland, Portugal, and Spain. These programmes will aim to: (i) raise awareness of wave energy, energy transition and climate action through outreach, education, and training initiatives and (ii) provide an inclusive mechanism for community and wider society stakeholders to input into the planning and realisation of ocean energy projects. Roughly one-quarter of the document (Sections 5, 6, and 7) presents a guide for the SafeWAVE Project's EPE facilitators to reference as they plan the programmes for their communities. Each of these sections details the planning steps to be considered for representative EPE activities in each of the framework tiers – consultation, collaboration, and co-creation. The EPE facilitators can refer to the planning stages of the activities in the framework tier most appropriate for the level of engagement they seek in each of their respective communities. These different plans for engagement are detailed in chapters 9 - 12 for each community of the SafeWAVE Project.

4 Introduction

4.1 Background to task

Past experience with marine renewable energy (MRE) has shown that public opposition may hinder the development of MRE projects, slowing down Europe's energy transition. As indicated in the proposal "SafeWAVE is very aware of the importance of good relationships with local communities and the need to develop good two-way communication with stakeholders to facilitate the successful scaling of ocean energy device deployments. SafeWAVE will work collaboratively with coastal communities in France, Ireland, Portugal, and Spain, to co-develop and demonstrate a framework for education and public engagement (EPE), specifically aimed at ocean literacy". With this objective in mind, this deliverable has been produced as an output of work package (WP) 7 which includes the following six tasks:

> T7.1. Understanding opposition to renewable energies.
>
> T7.2. Critical review of education and public engagement.
>
> T7.3. Identification & characterisation of societal stakeholders.
>
> T7.4. Constructing the EPE Framework.
>
> T7.5. Tailoring specific ocean literacy programmes.
>
> T7.6. Trialling and evaluation of the ocean literacy programmes.

4.2 Educational programmes in the context of public engagement

Insights from D7.4

An educational programme in the public sphere is much different from that of one in a school setting because the way people learn in the one setting is different from how they learn in the other. In the public sphere, the programme participants will have a much more diverse set of backgrounds, ages, abilities, experiences, and areas of knowledge. In the arena of scientific learning, the school students all have taken the required prerequisite courses and the lessons the teacher presents build upon this base. There is a focus on the acquisition of data and techniques and so the programmes focus on presenting this data and the various techniques in a way that promotes the

students' accumulation and retention of discrete data. The public pedagogy literature almost universally regards this approach to education as inappropriate for education activities in the public sphere (Petts & Brooks, 2006).

The reason why this approach is not accepted by public pedagogy scholars is that it rests on a fundamental misunderstanding of how most people acquire and utilise knowledge. To the extent that a person's knowledge is related to accepting a proposed science-based intervention; the process is much *"more closely tied to individuals' culture, beliefs, values, and attitudes, rather than scientific understanding"* (Nadkarni *et al.,* 2019, p. 305). It is, in fact, a different mode of understanding (Irwin, 1995), as if the scientist and the layperson are not even really speaking the same language (Lévy-Leblond, 1992).

The move from traditional deficit model instruction to a more engaged and dialogue-centred approach is assuredly unfamiliar territory for most practitioners tasked with educating the public about science and technology orientated topics (Flower, 2008). However, there does seem to be a transition underway where those responsible for EPE programs are starting to realise that the issue is not one of a knowledge deficit as much as it is an issue in the lack of trust people have in government regulators and/or renewable energy companies to have their best interests at heart (Rowe *et al.,* 2005; Walls *et al.,* 2004).

The disdain for the traditional style of classroom teaching expressed by public pedagogy scholars does not mean that there is no place at all for this "knowledge deficit" form of instruction, just that its place in the public sphere should be limited to the provision of information to spur dialogue, not replace it. In the programmes for the SafeWAVE project, there will indeed have to be such a component. Presenting ocean wave energy conversion as an aspect of ocean literacy will necessarily entail the provision of facts and data as well as a characterization of what it means to be ocean literate (Mokos *et al.*, 2020; Sturgis, 2014).

4.3   Introduction to tailoring specific programmes

Deliverable 7.4 described a useful framework for considering the different approaches to an education and public engagement (EPE) campaign. In this document, the focus is on identifying, adapting, and/or developing an array of different EPE activities that each reflect a different motivation depending upon where in the framework they are

meant to apply – consultation, collaboration, or co-creation. In the Description of Activities (DOA), the example EPE activities are grouped according to designations that roughly map onto the framework. *Awareness-raising* activities tend to adopt a one-way communication technique consistent with the consultation level of engagement. *Collaboration* activities, unsurprisingly, parallel the EPE activities associated with the two-way communication style advocated in the second tier of the framework that shares that name. The third category of EPE activities listed in the DOA centre around the *training* aspect of the programme and, as such, mirror the co-creation tier of the framework in that citizens participating in these type activities are preparing to take the lead in a programme that they helped create with the facilitators. Consequently, one may look at these different tiers as stages in a holistic EPE programme, one that progresses from a general lack of awareness about the problem and/or solutions to a state of learning about the relevant issues, sharing perspectives, and ends up with citizens learning tools that help them tackle the problem. The end result is that citizens can take ownership of their own community-based solution.

It is important to state from the outset that education and public engagement is a process, not a product. As such, the tailored programmes discussed here will focus on how one should go about conducting an EPE programme using any one of the activities discussed. The programme is not intended as a blueprint, rather, it is envisaged a guideline of what should be considered when employing any of the techniques described below. Specifically, we will examine each proposed activity type and discuss what should be included in each stage of the activity – the strategic, requirements, design, and planning stages. In this examination we follow the insights of Elizabeth Ellsworth who understands learning as an experience, not as the mere acquisition of facts. Her emphasis is on *"knowledge in the making."* It is relational, relational to the world and the other people in it (Ellsworth, 2005). It is dynamic, not static. Learning in an EPE programme is, as Dewey[2] (1916) claims, a process of discovering and constructing knowledge together – the participants and the facilitators

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[2] John Dewey (1859 – 1952) was an American philosopher and educator who, with William James and Charles Sanders Peirce, established the movement known as Pragmatism. He was also the leader of the progressive education movement in the US, a movement that really began in Europe but not under that name (Cremin, 1960).

(Hopkins, 2018). The specifics of what is learned cannot be dictated beforehand, they arise out of the process, the two-way communication, the relationship. The ocean literacy programmes of the SafeWAVE project will engage local citizens in a dialogue about their relationship to the ocean and its influence upon their lives consistent with the UN's framework for action for ocean literacy (Santoro *et al.,* 2017) and introduce participants to the science and technologies of ocean wave energy conversion as an expression of that literacy (Samad *et al.,* 2022). This process is fleshed out a bit more in the objectives section below.

4.4   Objective

The objective of this deliverable is to present for the potential EPE initiator a typology of different EPE activities that may meet the needs of programme administrators at every stage of the engagement process – consultation, collaboration, and co-creation – <u>and</u> to indicate the various considerations they will have to balance in planning for the use of the given activity. With this information at hand, a facilitator can plan their EPE programme for what level of engagement is appropriate for their goals according to the framework, D7.4. Utilising this typology, chapters 9-12 present the different plans created for each of the communities in the SafeWAVE project.

As detailed in the project Description of Activities (DOA), the tailored EPE programmes are envisaged as having two primary aims:

1. Raise awareness of WE (wave energy), energy transition and climate action through outreach, education, and training initiatives and

2. Provide an inclusive mechanism for community and wider society stakeholders to input into the planning and realisation of ocean energy.

The description then moves on to list various activities which will fulfil these aims. In an intuitive understanding of what was expanded upon in D7.4, these activities are grouped according to categories that are easily mapped onto our framework, though with different designations. These activities are examples of the most often used approaches. There are many more types of activities than these fifteen. Table 1 below, adapted from Rowe and Frewer (2005), lists over 100 different public engagement activities and includes sources for each should the reader like to learn more.

Table 1. Public engagement activities adapted from Rowe & Frewer (2005, p. 257)[3]

Methods for public engagement		
Act Create Experience (ACE)	Enspirited Envisioning	Opinion Polls
Action Planning	"Finding Home" (Visualizing our future by making maps)	Participatory Theatre
Appraisal (Community, Public), e.g., village/parish/environmental "	Co-option (Citizen Representatives on Policy making Bodies)	Planning Balance Sheet
Monitoring," e.g., citizen monitors)	Deliberative Opinion Poll	Planning Cell
Arbitration (Mediation)	Design-In	Planning For Real
Broad-Based Organizing	Drop-In Centre	Policy Capturing
Cable Television (Not Interactive)	Neighbourhood Office	Policy Delphi
Cable Television (Interactive)	Fishbowl Planning	Participatory Appraisal
Charette	Focus Group	Participatory Strategic Planning
Choice Methods	From Vision to Action	Priority Search
Citizens' Advisory Committee	Future Search	Priority Setting Committee
Citizen Advocacy	Game Simulation	Public Hearing
Citizen Employment	Guided Visualization	Public Information Programs
Citizen Honoraria	Hotline	Publicity (leaflets, newsletters, exhibitions)
Citizens' Jury	Human Scale Development Initiative	Question and Answer Session
Citizens' Panel (Research)	Initiatives (Citizen Initiated Petition)	Random Selected Participation Groups
Citizens' Panel (Standing) e.g., Health Panel	Imagine!	Real Time Strategic Change
Citizen Review Board	Interactive website	(The) Recall
Citizen Training	"Issues, Aims, Expectations, Challenges & Dialogues in a Day"	Referendum (generic; compulsory response)
Community Dinners	Learning Service Team	Referendum–Petition
Community Forum - of: Place (e.g., Neighbourhood); Issues; Service Users; Shared Interest	Local Sustainability Model	Referendum–Preferences (Preferendum)
Community Indicators	Maps/Mapping (Village, Parish)	Roundtable
Community Plans/Needs Analysis	Media-Based Issue	Social Audit
Community Site	Balloting	Study Circles
Management Plans	Meeting–Community Sponsored	Surveys
Community Strategic Planning	Meeting–Neighbourhood (location-based)	TalkWorks

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[3] See the source cited for references for each of these EPE activity types.

Methods for public engagement		
Community Technical Assistance	Meeting–Public (Open Informational, generic)	Task Force
Complaints/Suggestion Schemes	Meeting–Town (New England Model)	Team Syntegrity
Computer-Based (IT) Techniques	Meeting–Town (Electronic)	Tele-Polling
Conference (generic term, often with qualifier e.g., "planning," "deliberative," "visualization")	Negotiated Rulemaking	Tele-Voting
Consensus Building	Neighbourhood Planning Council	Time Dollars
Consensus Conference	Ombudsman	User Management of Services
Consultation Document	Open Door Policy	Value Analysis
Consultative Panel	Open House	Visioning Exercises/Conferences
Coordinator or Coordinator-Catalyst	Open Space	Workshops (generic, may include Action Planning; Design; Information Exchange)
One-Stop/ First-Stop Shop)	Opinion Metres	Whole System Development

The awareness-raising activities correspond to the Consultation tier of our framework. This awareness-raising is to take place through activities like establishing a virtual presence for the project (creating a website, blog, or social media account), capturing media coverage, conducting information campaigns, delivering school programmes, and carrying out demonstration activities. All these undertakings utilise the one-way communication style depicted in the Consultation tier of the framework. Though consultation represents the least active form of engagement in the framework, there is still participation taking place. It is a top-down process that is most often a vehicle for information distribution (Chilvers et al., 2005), but can also include contributions from the public related to their provision of what would be required for them to offer their support for the project or intervention (Haggett, 2011). Though this level of engagement is the minimal that should be considered to count as public participation, it is by far the most prevalent (Braun & Könninger, 2018; Devine-Wright, 2011).

The second category of activities listed in the DOA map onto the second tier of our framework, Collaboration. Though in practice there is often overlap between the use of these two terms – consultation and collaboration – consultation, in this context, refers to activities that embody a one-way communication approach from facilitators to the public whereas collaboration embodies a two-way communication approach, or, if there is only one-way communication, the direction of that information flow is from the citizens to the initiators of the EPE programme. So, collaboration can involve

both – one-way communication from the citizenry or a two-way approach that involves some sort of dialogue. Consultation only involves one-way communication from the initiators of the EPE programme. This collaboration tier includes one-way communication activities from the population to organisers with activities like polls, surveys, and questionnaires; and it includes two-way communication activities like focus groups, water user forums, collaboration clinics, and community dialogue sessions like town meetings. In the collaboration tier, the public's values, concerns, and knowledge are incorporated into the first stages of a consensus-building, decision-making process (Harris, 2002) that is brought to fruition in some new ways of engaging the public that truly try to foster a co-creative process for technology innovation and policy formation (Solman *et al.,* 2021). This is co-creative education and public engagement.

The third category of activities listed in the DOA centre around the provision of education and training. The education here is two-way and the training is what prepares the public to take a leadership role in confronting the issue and producing solutions for it. These activities map onto the Co-Creative tier of our framework. Co-creative engagement specifically seeks change, a change brought about by a partnership between government/ academic/ corporate representatives and the public. The public has greater influence over the direction of the intervention through their representatives in the decision-making process who voice their interests (Mackenzie & Warren, 2012). Formation of this engagement type "constructively advances an argument that has been building in the participation literature amongst practitioners for some time about the need for governing institutions to more carefully listen to and be responsive to public voices rather than ritualistically carrying out invited public engagement processes as an end in themselves" (Pallett *et al.,* 2019, p. 609).

Activities here include tasks like the creation of web-learning sites, community-based learning and training initiatives, citizen science activities, summer school programmes, and the provision of training material that will be available for future interested parties either through the web-learning sites or some other third-party delivery. The education and training here are meant to empower the community to take the lead in determining their own energy future. As such, it is interactive and motivated by the prospect of creating change. As this stage reaches maturity, the organisation which initiated the EPE program will drop back and take on an advisory role, if even that. The community,

through the organisation it creates, will be in charge. As the community exercises its new-found capabilities, it may well be the initiator in future engagement activities in partnership with other communities or with other government and education bodies. If so, it could use this framework and planning document to guide its endeavours. The process continues. Learning is not static. We each learn from each other and help each other create the world within which we want to live. Table 2 summarises the distribution of different activities under each of the framework tiers.

Table 2. Framework Tiers with Corresponding Activity Types

Consultation	Collaboration	Co-Creation
• Establish a virtual presence. • Capture media coverage • Conduct information campaigns. • Deliver school programmes. • Carry out demonstration activities.	• Create and distribute polls, surveys, and/or questionnaires. • Establish a focus group. • Facilitate water-user forums. • Hold town meetings or other similar community dialogue sessions. • Conduct collaboration clinics.	• Design web-learning site • Undertake specific community education/ training. • Encourage citizen science activities. • Develop a summer school programme. • Training material provision for web-learning or dissemination.

4.5   Methodology

The objective of this deliverable is to create a typology of various engagement methods appropriate to each category of the framework and to inform the reader of different rationales that should be considered in the formation of an EPE plan based upon any of these methods. The methodology chosen as fitting for this process is similar to the one used in the previous deliverable – an integrative literature review. As stated in that document, an integrated literature review "*is a form of research that reviews, critiques, and synthesises representative literature on a topic in an integrated way such that new frameworks and perspectives on a topic are generated*" (Torraco, 2005, p. 356). The difference between how this methodology is used in D7.4 and this deliverable, 7.5, is that not only are peer-reviewed articles in academic journals considered, but the grey literature of not-for-profit organisations, industry groups, and government bodies is also considered. Though not (necessarily) as academically rigorous as journal articles, this body of literature is of high quality and offers insights into how education and public engagement activities are conducted in the real world of contentious participants, time constraints, and financial limitations. These considerations are important as this document is meant to help plan actual EPE activities and there is no

way better to learn how to accomplish this task than to seek the advice and wisdom of the actual practitioners who have done it before. They have gathered their best practices from years of work in the field in their publications and it would be foolish to ignore their insights just because their findings were not published in peer-reviewed journals.

4.6   Structure

Faulkner and Bynner developed a handbook on the EPE process (2020) and in it they describe the four stages any EPE programme creator should consider in the planning of any EPE activity. These stages are the strategic stage, the requirements stage, the design stage, and the planning stage (Table 3). Their description of the importance of these stages makes them a good lens for viewing how any particular EPE activity should be developed. In the strategic stage, one maps out the strategic considerations for using a given activity in an EPE process. Next, the EPE initiator needs to figure out what will be required to make the activity a success. Third is to establish what objectives the intervention will meet and how the participant will progress through various objectives. And last, and only after the first three have been met, does the facilitator create a detailed plan of how to execute the activity.

Table 3.   Stages in Designing & Planning the Engagement Process (Faulkner & Bynner 2020)

Strategy Stage	Requirements Stage	Design Stage	Planning Stage
The Focus.	Appropriate Goals.	Determine the progression of mini objectives.	Draw-up a timeline.
Initiators.	Time and Place.		Choose Techniques.
Potential Participants.	Recruitment.		Decide upon the practical details.
	Facilitation Challenges.		Draft and refine the process plan.

The following sections will examine each of the activities listed in Table 2 and breakdown the considerations that should go into their planning according to the depicted above.   Sections 5–7 correspond to the three tiers of the framework developed in D7.4, *viz.*, Consultation, Collaboration, and Co-creation. Each section will have subsections that correspond to each of the five activities listed in Table 2 as appropriate for that tier of the framework. Under each subsection, the proposed activity will be examined from each stage of the EPE process to help the potential planner determine how they should proceed. Using all this information as a guide, chapters 9

- 12 will describe the specific plans for EPE that each of the SafeWAVE partners will roll out in their respective communities in fulfilment of the requirements for Deliverable 7.6.

5 Consultation Activities

Though consultation represents the least active form of engagement in our typology, there is still participation taking place. It is a top-down process that is most often a vehicle for information distribution (Chilvers *et al.,* 2005), but can also include contributions from the public related to their provision of what would be required for them to offer their support for the project or intervention (Haggett, 2011). Generally speaking, in this type of engagement the public has one of two expected roles – accept the project, if that is what is proposed, or change their behaviour, if that is the requirement of the intervention (Owens & Driffill, 2008).

The consultation tier does not necessarily have to have these negative connotations. Not every intervention or every project has to be brought up before every citizen and debated endlessly and there are some issues about which the public is uninformed and which they need to know about (*e.g.,* vaccination roll-out). In many instances, a top-down, one-way communication is all that is required even considering the qualifications of equity and justice (Reed *et al.,* 2018). Consultation may just be the first stage in a more in-depth EPE programme. In fact, that is the motivation envisioned here in this document. The public is generally unaware of wave energy converters (Chozas *et al.,* 2010) and so activities which seek to inform them of this innovative energy technology can be meaningfully conveyed in a consultative public engagement campaign.

5.1 Establishing a virtual presence

In the 21st Century, it is almost a requirement of any EPE campaign that it has a virtual presence of some sort (Heierbacher, 2010). At a minimum, it should have at least a website (Chun *et al.,* 2010). Here the EPE initiator can post all sorts of information for a visitor to the site. These postings could include documents related to the programme, videos, links to other resources, a calendar of events, newsletters, webinars, and even a forum where participants could exchange ideas (de Lima *et al.,* 2019). A virtual presence can be used under any tier of the framework. Under the consultation tier it is just a source of information. Under the collaboration tier, the EPE facilitator will probably want to have visitors complete a quick registration (just a name and email address is sufficient) and then they may join a forum where they can provide ideas,

enter into conversations, and receive feedback from the facilitator (Holliman *et al.,* 2009). And lastly, the website could function in the third tier as a place where citizen training can take place and where citizen scientists could discuss their work. At this stage, the website administrator credentials should be switched over to whichever person(s) in the community group who are chosen to have managing it as their responsibility. This management responsibility should also include directing traffic to it from social media sites like Facebook or Twitter (Agostino & Arnaboldi, 2016). The strategy stage turns to what considerations should go into planning this form of engagement in its minimal form.

Strategy Stage. In strategizing for the use of a website, EPE programme administrators should consider what their focus should be, what community groups they may want to work with, and for whom this form of engagement might be best suited (Rheingold Howard, 2008).

SafeWAVE has a focus on ocean literacy and wave energy development so the website should offer resources under each topic. Those leading the engagement process may wish to use the website already created by the programme, but a more effective campaign would be to create one for the individual community and just have the project website as a link. Three of the SafeWAVE communities already have detailed and informative websites onto which could be added specific EPE initiative information. These communities are Mutriku and Armintza in Spain (https://www.bimep.com/en/), Nantes and Le Croisic in France (https://sem-rev.ec-nantes.fr/), and Aguçadoura in Portugal (https://www.wavec.org/en/test-sites/agucadora-test-sites). In Ireland, where there is not a pre-existing web site in place, the web presences of participating organisations (*e.g.,* MaREI centre at UCC https://www.marei.ie, ERI at UCC https://www.ucc.ie/en/eri/), or related projects (*e.g.,* WindValue https://windvalue.ie) could be leveraged for this communication. Emailing lists and social media accounts of relevant local groups can also be usefully employed to disseminate information.

Requirements Stage. Here EPE administrators need to think about what their goals for the website are, how they will recruit people to register, and what possible barriers exist to information communication with this medium (Wenzel, 2019). At this initial stage, the goal might be as simple as tracking visitors to the site and figuring out how they learned about it. An incentive to register can be offered in the form of participants receiving a newsletter or being notified of new events or activities. The barriers are a

little more difficult to overcome as they mainly fall under the problem of reaching people who do not often use the internet (Wenzel, 2019). This may happen with marginalised populations within the community, older citizens, and those whose work does not involve much work on the computer.

Design Stage. This stage includes not only how the programme manager wants to design the website, but also determining what goals will be accomplished with the site and how the design elements fit into that (Garett, *et al.*, 2017). There are hosting sites which can offer a free blogging and site-building platform (*e.g.,* WordPress) as well as ones that will do it for a monthly charge that might be able to offer site-building skills that the EPE programme administrators lack. At the costliest end of the spectrum, but also the most powerful, are dedicated web hosting services which can act as something like an IT department for the online presence (Whitfield, 2022).

Planning Stage. In the planning stage the programme leaders should draw up a timeline for when they want to go live with the site. They also need to settle all the practical details of the launch and finalise what they wish the sites capability to be (Coleman & Gøtze, 2001).

5.2   Capture media coverage

Media coverage is a great way to get people to notice a new public engagement campaign or to even just get a new idea out there for people to start thinking about. Aside from social media outlets discussed above, there is television, radio, and local magazines and newspapers. Increasingly, also new media such as podcasts have a role in this space. However, it is not quite as easy as just designing a pitch and sending it out. If media coverage is to be the sole instrument of engagement, it is highly beneficial to already have an established programme or operation in place that people can visit or find out more about. While this may be a possibility for the many of the sites which have operations already in place, for others it may be possible to work with local media to publicise the programme and thereby gauge public receptiveness of such an idea. Regardless, it is not as easy as just pitching the idea and so following these steps suggested by Faulkner and Bynner (2020) will be helpful. Like everything important, solid planning will pay the best dividends.

Strategy Stage. The focus of a successful media campaign should revolve around a good story (Wenzel, 2019). Something localised has the best chance of attracting the

attention of listeners, viewers, and readers. It also has the best chance of attracting the attention of journalists who want a good story to tell their audience in whichever media platform they work. In this stage, the programme initiator should also consider who the audience is for this campaign and which media outlets tend to serve that audience the best. Is there a fisher's publication popular in the area? Is there a local newspaper or zine? Is there a publication which appeals to surfers? Which radio station has greatest appeal among your target audience? Local physical and virtual bulletin boards are another source that should not be overlooked. It is also useful to know if the media outlet provides free advertising for public service adds and for non-profit organisations.

Requirements Stage. The single most important requirement for a successful and wide-reaching media campaign is to have a good relationship with the journalists (Ginosar & Reich, 2022). Like with EPE in general, it is all about building these respectful and trusting relationships. Seeking (free) coverage is a favour and it is always easier to ask a friend for a favour than it is a stranger. It is important to engage with them ahead of time. Follow them on twitter, repost stories on the programme's Facebook page, and, if they are local, try to meet them in person and attend local events they may be covering. After a few months of this rapport-building, their decision to cover an EPE event will be much easier and much more likely positive. It is better to have quality relationships with a few journalists than it is to send out a dozen pitches to strangers (Firmstone & Coleman, 2015).

Design Stage. For this stage it is necessary to set some goals. Possibly schedule the completion of media kits to have ready for the right time. Set a target of one or two media placements based on the relationships that have been formed. Schedule the next round of media outreach and contemplate if different resources should be used to attract a different audience (Ginosar & Reich, 2022). Keep the objectives clear and reasonable. For example: one goal could be to just increase awareness of the programme by reaching out to popular publications or media outlets in the area; a second objective could be to reach out to niche publications (e.g., zines) or outlets (e.g., a college radio station) that could deliver a more targeted message (Dunbar-Hester, 2014).

Planning Stage. In this stage, the programme administrator should establish a timeline for the various different media coverage campaigns that needs facilitating. Also, which

types of messages work best with which types of audiences and which types of media coverage reach which different type of audience will be decided (Lindström, 2014). All the practical details need to be decided in this stage as well. Things like budgeting for the media campaign or determining how many different type messages for different audiences will be needed. Try to build in some flexibility here as more opportunities to capture media attention relevant to different audiences may arise as more is learned about the community.

5.3   Conduct information campaigns

Many information campaigns will incorporate media coverage, and those willing to conduct such a campaign can reference some of the information contained in Section 5.2, but not every aspect of an information campaign is necessarily communicated through the media (Corner & Clarke, 2017). To draw a distinction between this kind of EPE activity and the previous, here will be examined non-media information campaigns. Examples of these type activities are things like displays in public spaces, flyers, and old-fashioned door-to-door canvassing or in-person petition signing recruitment activities (Rowe & Frewer, 2005)

Strategy Stage. Just as in a media campaign, in a non-media information campaign the initiator needs to be keenly aware of her target audience (Wibeck, 2014). A poster, or series of posters, displayed in a maritime museum should probably convey more technical or detailed information than, say, a poster displayed in a grade school cafeteria. For example, if they are both trying to improve the ocean literacy of their viewers vis-à-vis describing fish in the local waters, the museum display might address how the breeding ground of these fish may be affected by ocean energy development and the cafeteria display may just offer some top-level information about the fish species that students may find on their lunch menu. The first example may contain detailed graphs and statistical information whereas the latter should have colourful pictures and a few descriptors in large, bold print.

Requirements Stage. Appropriate goals for this activity could include determining how many new website memberships were derived from this avenue of communication (could be on a follow-up questionnaire sent to registered website participants). It would also be good to know just how many posters were displayed, or how many flyers were handed out, or how long it took for a petition signer to sign the letter in support of

whatever action was being proposed. The reader may be surprised to learn how effective direct information dissemination activities like this can be (Lindström, 2014). It is also a lot less expensive and time consuming than paying for advertisement or developing relationships with journalists. Other requirements that have to be met include negotiating how long a display can remain standing in a given locale, figuring out whether "no-soliciting" laws apply to the programme, determining if it is more effective to address people on the street with a petition or at their front door (Hackett et al., 2017) and finding locations that will help the programme recruit members from historically disadvantaged segments of society.

Design Stage. The design stage refers here to more than just the particular design of the physical articles distributed or posted, though it does include that, but also to where will the activities take place, how long should volunteers be out on the streets, which neighbourhoods may be most receptive to the message, which businesses will allow posters or flyers, *etc*. An information campaign may be general (Save the Whales) or specific (sign up for the workshop to be held at *SomeVenue* on the dd-mm-yy from hh:mm to hh:mm). The latter is easier to draw quantifiable information from, but the former also has its purposes (Nisbet & Kotcher, 2009).

Planning Stage. In this stage of the EPE process, the organisers need to set specific dates for their campaign and determine by what metrics it will be considered a success or not. They will also need to determine what data they can gather and how to analyse it (Purkus *et al.,* 2015). It is also important to determine if any of the volunteers need further training in canvassing techniques and to determine if they will need any support during the actual activities and how they will receive that support – *e.g.,* have a rolling support person who attends to the needs of each canvasser – (Cotterill *et al.,* 2009)

5.4   Deliver school programmes

School programmes offer a way to deliver more detailed information, and more of it, to a larger audience at one sitting of about an hour's length. These courses can be delivered informally by just contacting a local science teacher, building a rapport, and offering to teach one, or a few, classes on the subject to his or her students. It can also be done more formally by going through the local school board of education. There are several lessons plans available on the web for free and from reputable sources and these can be tailored to allow the instructor to discuss wave energy and wave

energy converters with the students, though these topics may be better suited for students in the higher years of secondary school. Table 4 below offers a sampling of such websites. In planning these school programmes, it is still useful to apply the structure used for the previous activities.

Table 4. Examples of websites for Ocean Literacy Programmes

Sponsoring Organization	Website addresses
Ocean Wise – A global environmental charity addressing climate change, pollution, and overfishing	https://ocean.org/learn-explore/education/ocean-literacy/
The Irish Ocean Literacy Network – creating an ocean literate society in Ireland	https://irishoceanliteracy.ie/bring-the-ocean-into-your-classroom-and-connect-to-europe-and-beyond/
Reeducamar – The Spanish Ocean Literacy Network providing an inventory of ocean literacy resources to support educators and the public	https://www.miteco.gob.es/es/ceneam/recursos/mini-portales-tematicos/reeducamar/reeducamar-recursos.html
EuroGOOS – ain international non-profit association committed to European-scale operational oceanography, with a dedicated ocean literacy working group	https://eurogoos.eu/ocean-literacy/
The Marine Institute of Ireland – An Irish government agency researching marine technology development and innovation	https://www.marine.ie/Home/site-area/areas-activity/education-outreach/explorers/explorers
UNESCO – An ocean literacy toolkit. UNESCO is heading-up the Decade of the Ocean for Sustainable Development. This link is just one of many resources available from this extensive project.	https://unesdoc.unesco.org/ark/48223/pf0000260721
Another UNESCO source – *Ocean Literacy with All (OLWA)*	https://www.oceandecade.org/actions/ocean-literacy-with-all-olwa-the-change-we-need-for-the-ocean-we-want/

Strategy Stage. It is important to involve the teacher of the class at the earliest stage if considering this option. They can fit the presentation(s) into their schedule at the best time for the students and make sure the material is appropriate for the members of the class. As stated above, if wave energy is discussed, it will probably be in the most general of terms until the final year or two of secondary school. In working with the class's teacher, the EPE facilitator will also learn what he or she hopes the students can learn from the special session and whether they will be tested on the material. This last point will have a large impact on what material is presented and how (Frederiksen, 1984).

Requirements Stage. In working with the teacher, the EPE facilitator will be able to determine what are the appropriate goals for the students. These goals should be presented to the students at the beginning of the session to help them be aware of what they may be evaluated on and help them with their note taking (Frederiksen, 1984). The EPE instructor will need to have some flexibility regarding the material as they may not be able to conduct their lessons in front of the age group and/or gender with whom they feel most comfortable (Smith & Renzulli, 1984), hopefully there are more people involved with the EPE programme so that different facilitators can teach different sessions. The facilitator will also have to plan differently depending upon whether the class is advanced, standard, foundational, or mixed (Aftab, 2016).

Design Stage. In this stage, the facilitator needs to address the order of the presentation material, making sure that the lesson has a clear beginning, middle, and end and that each is geared toward leaving the student not only with a nugget of knowledge, but also an impression of how important the ocean is to them and how their activities affect the ocean (Santoro et al., 2017). This stage also asks the facilitator to make sure each step in the lesson works toward a defined end and that there are no unnecessary steps in the plan or steps left out that should be included.

Planning Stage. The lesson plan should be crafted with the class teacher, but if he or she is too busy, or has great trust in the facilitator, at the least it will be subject to the teacher's approval. This is also the stage where all the particulars are worked out, for example, the day, time, and venue (the classroom or maybe the library with more than one class in attendance). The martials needed and the clarification of any special requirements for students of special needs also needs to be set during this stage (Aftab, 2016). The timeline also should be worked out here, the time limits for each mini-

objective, and the time for open discussion and questions. Do not worry if the plan needs to undergo several revisions.

5.5   Carry out demonstration activities

Demonstration activities are a great way to involve the students and the process for planning for them is much the same as is covered in Section 5.4 above. If the facilitator is conducting one or more in-class sessions and wants activities to accommodate the lesson, or wants to plan a field trip to the ocean and carry out some activities there, a good resource is the *Teachers Pay Teachers* website. These activity guides do cost a little, but there are over 7,800 to choose from which deal only with ocean literacy (5 million resources all together) and they can be found to address range of age ranges, as well as for higher education students and adult education participants. These are lessons prepared by teachers, for teachers, and it is teachers who receive the dividends. They can be accessed at https://bit.ly/40dyHEu. The activities for the planning stages considered here are for wave energy demonstration activities as they apply to three of the four communities in the SafeWAVE project that have working devices in their waters.

Strategy Stage. The focus of the strategy here is mainly on ocean wave energy devices (wave energy converters, WECs) as this is a key focus of the SafeWAVE project overall. Of course, there are other ways to explore ocean literacy through demonstration activities like beach sweeps (picking-up litter), turtle hatchling watches[4], fish counts, shore-life inventories, erosion control activities, *etc*. (Santoro *et al.,* 2017), but seeing how the WECs work seems most appropriate in the current context.

Requirements Stage. Ideally, the test sites will have the option for people to tour the sites, but that is only obviously the case with the Mutriku site. The others appear to be offshore or open sea devices which will require boat trips (Mora-Figueroa *et al.,* 2011). Demonstrations of these other may have to be through video record and/or just inspecting the onshore power delivery mechanisms, if that is even permitted. There are

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[4] If sea turtles hatch during a new moon or if it is particularly overcast at night, volunteers could go out at night with flashlights to lead them toward the ocean (J.R. Smith *et al.,* 2021).

YouTube videos of WECs which can be shown as the least arduous option (e.g., see https://bit.ly/3mCe9Ic).

Design Stage. In designing a demonstration of wave energy, it is important to keep in mind what the participants should get out of the activity. An in-person visit to a site will help convey the scale of these devices and the conditions within which they have to operate, but if the goal is just to educate on the mechanics of the operation, a portable device and tank or even videos might be enough to fulfil the objectives.

Planning Stage. The plans to fulfil the objectives of the design of a demonstration will involve many more people than just the EPE facilitator. There is the boat captain's schedule and fee to consider, insurance waivers to gather, participants' accessibility concerns to address, general safety guidelines to compose, transportation to and from the onshore landing to arrange, and possibly even snacks or meals to provide depending upon the length of time for the visit. Logistical concerns like these will play a large role in the collaboration activities this report considers next.

6 Collaboration Activities

The second type of engagement, collaboration, represents an increase in the level of public participation. The emphasis shifts from a unidirectional information flow from organisers to participants, as typified in consultation, to a collaborative process where the public's values, concerns, and knowledge are incorporated into a consensus-building, decision-making process (Harris, 2002). A more minimal view of collaboration still relies on a one-way flow of information, but the direction is from the public to the organisers. Even in its minimal form, however, the point is still to incorporate the publics' views into the decision-making process. The first set of activities discussed below typify this type of collaboration and the remaining four revolve around the idea of dialogue and an exchange of ideas. This type of engagement exemplifies the public pedagogical theme of deliberative democracy. In a deliberative democratic process, the central mechanism for making decisions is reasoned debate and not just voting (Chambers, 2003).

6.1 Create and distribute polls, surveys, and/or questionnaires[5]

The first thing an organisation must do if it is wanting to conduct any sort of public engagement activity is getting to know the community they wish to engage (Coleman & Gøtze, 2001). They should research local history, study local maps, examine census results for the community, and speak with local political and cultural leaders (Hendriks & Lees-Marshment, 2019). Next, they should distribute or make available some sort of tool to get a sense of people's current attitudes and preferences. Polls are one way to do this. These are usually simple, short, and limited in what they can reveal because the pollster will generally only spend a brief time with each respondent (Fernandez *et al.,* 2016). Surveys provide more information for the researcher and can more readily use a response scale (e.g., worst, bad, neutral, acceptable, excellent), but do require

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[5] Terms such as polls, surveys and questionnaires are often used interchangeably. In this document we use the terms to indicate different forms of survey data collection involving brief data collection to e.g., ascertain views and attitudes (polls); more detailed data collection capturing more nuanced information (surveys); and more qualitative data collective involving free form answers allowing the respondent to 'give voice' to their opinions (questionnaires).

more effort from the respondent. Keep in mind that more than 15-20 minutes of answering questions would be considered excessive by most (Revilla & Ochoa, 2017). Questionnaires allow the respondent to compose their own answer and are therefore better at capturing nuances, but these are considered more arduous than multiple choice questions and probably should be limited to just a couple of prompts (Slattery *et al.,* 2011). Though each tool taken separately may require slightly different planning considerations, they are similar enough in most aspects that the example here will be of a tool that has components of each. The model proposed is a document (here forward referred to as a survey tool) that can be distributed to potential respondents as either a hard copy or an online form that utilises all three approaches – polling questions to start, survey questions in the bulk, and ending with one or two open-ended questionnaire prompts.

Strategy Stage. Though in many ways a survey tool is the thing used to help craft a strategy for a public engagement campaign (Nicholson-Cole, 2009), the use of it cannot be haphazard and unplanned if the researcher is to gain any information of worth from its use. In a sense, one must have a strategy to strategize. The first step is to determine what the focus of the questions should be. For example, in the case of an area where there is no active wave energy installation of any type – test, demonstration, production, or commercial – one focal point would be to determine if people have even heard of producing energy from waves. Then the researchers would be interested if people would want to learn more about it and to also try and gauge what they consider the preconditions for establishing the acceptability of any level of wave energy development in the waters off their shore (Although, most communities in the SafeWAVE project all have some form of wave energy and there has already been some level of community engagement (Dunphy *et al.,* 2021)). If the EPE facilitators there were to use a survey tool, they would likely have a different focus, like, for example, is there public interest in having a more prominent role in the resource's development? This mention of the public brings up another aspect of the strategy stage – who are the potential participants for this survey?

It has long been acknowledged in the field of public participation that there are many and varied publics. The public is not a homogenous, monolithic body (Cotton & Devine-Wright, 2012; Michael, 2009). A small community is a public. Within that community there is also the business community, or the community of faith, there is

the public school system community of teachers, staff, and students. Within and between each of these, among others, there are other publics which can be categorised along classifications of race, gender, ethnicity, class, or sexual orientation/identification that have been unjustly excluded from public participation in the past (and also the present) (Dunphy *et al.,* 2017). If the researcher wishes to know "what the community thinks," then the survey will need to be distributed to every public in the community and hope to acquire a statistically significant return from each (Devaney, 2001). However, if her focus is just upon exploring the possible multiplier effects of wave energy development on the community's business sector (increased eco-tourism, lower energy costs, increased sales to facility workers, *etc.*) (Moreno & López, 2008), then the survey will only be directed towards the local Chamber of Commerce.

Requirements Stage. It is important to think about the goal of the survey tool before the process of crafting questions is considered. Knowing the goal will help the researcher design the questions (next stage in planning). A goal is a broad statement regarding the purpose of the survey and what is hoped to be achieved with it (de Leeuw *et al.,* 2008). A goal could be as simple as *to understand what the people of Mutriku and Armintza think about the possible expansion of operations at the BiMEP site*. The questions in the survey will then be constructed with that goal in mind. The next requirement is to settle on a time and place of the survey. Are online surveys sufficient or would some of the members of the public be left out if that was the sole method? Should the researchers set up a kiosk at a local community event and have volunteers fill out hard copy forms there? Should copies be mailed out? Should the researchers canvass door-to-door? If so, which neighbourhoods should be canvassed? Once these questions about goals, target publics, timeframe and facilitation issues are answered, the researcher can turn to the design of the survey.

Design Stage. This is the stage where the researcher chooses specific objectives that will help her progress toward her goal. There is a common rule of thumb for the design of objectives that the survey questions are meant to satisfy. It is called the SMART rule – the objectives need to be *specific, measurable, achievable, relevant,* and *time-bound*

(O'Neill & Conzemius, 2006). Using the goal structured above for BiMEP,[6] the survey tool may have many objectives. Maybe one objective could be to determine what percent of the population is aware of the operations at BiMEP. That objective is specific. It is measurable if a statistically significant number of surveys are returned (364 responses for a population of 6,595 will produce results that have a 5% margin of error at a 95% confidence level – (Taherdoost, 2018), although other rules may apply). Its achievability is dependent on the ability of the research team to distribute 1,820 surveys estimating a 20% response rate (*ibid*.). It is certainly relevant in determining acceptability of expansion whether people even know of the plant's existence. It is time-bound in that the results are for a given population at a given time. The art and science of designing specific questions is part of this stage, but beyond the scope of this present document. A good source to learn more about how to do that is the *International Handbook of Survey Methodology* (de Leeuw *et al.*, 2008). If the researcher is unfamiliar with survey design, either that source or something similar should be consulted prior to crafting questions as there is more to it than one might at first think.

Planning Stage. In this stage, the researcher should distribute the survey to at least five colleagues to make sure that it sufficiently meets the research criteria and to determine whether certain questions need re-wording, if there are other relevant questions that should be asked, and if there are any superfluous or (mis)leading questions (Girling *et al.,* 2017). In addition, a few other representatives of the community to which the survey is directed, will test it with similar objectives (i.e., whether there is need for rewording or clarifying content. Decisions about how to distribute the survey and whether any kind of incentive can be offered also should be answered at this time (Laurie, 2007). Once the revisions are made and distribution routes set, the tool is ready to go.

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[6] Note: This is a hypothetical policy initiative. BiMEP is not planning on expanding their test site anytime soon.

6.2   Establish a focus group

Surveys are great tools for getting at what people may think or feel about a certain topic (albeit at a somewhat superficial level), but some things may be too new or novel for most people to have formed an opinion about them. This is where a focus group can be useful. These small, safe settings allow people to explore different perspectives on an issue and do a better job of revealing detailed information and providing thoughtful insight (Gibbs, 1997).

Strategy Stage. There is a trade-off, however, for participants to feel comfortable and for the researcher to explore some issues in depth, these groups work best if the participants are of a relatively homogenous group and if the questions are few in number (Morgan, 1996). As regards the participants, this should be a group of at least six people and no more than ten (Masadeh, 2012). This will allow for some diversity of opinion while also allowing for each person ample time and space to express themselves. The homogeneity of the group is important because it allows the researcher to focus on how a planned programme, policy, or project will affect a specific demographic or subset of the population. It also allows for the participants to feel a comfort level in the shared experiences of their fellow participants (Freeman, 2006). If, for example, a site was thinking of incorporating onshore or nearshore wave energy devices, in addition to their off shore deployments then the researcher might want to get in-depth reactions from shore fishers. The researcher may want to compare these responses to those of, say, surfers. Pleasure boaters and jet skiers may make up the participants of yet a third focus group, scuba divers a fourth. In this sense it may be inaccurate to describe this activity as establishing a focus group. If the researcher is seeking a broader understanding of the issue, he may need to establish a few focus groups, each targeting a different subset of the public at large. It will usually take more than one focus group for the results to be valid, most often three or four. The researcher will know how many focus groups create a valid pool of information when he or she starts to get the same answers to the questions and nothing new is learned. This would be the saturation point (Masadeh, 2012). Conversely, if the researcher is solely exploring the effects of an intervention on a single, underrepresented group, then a single focus group might work, especially if it meets more than once (a time series study) or before and after the planned intervention (pre-post study) (Getrich *et al.*, 2013).

Requirements Stage. The goal of the focus group facilitator is to generate as many different ideas as possible from as many of the participants as possible in the time allotted, usually 90 minutes and no longer than two hours (Morgan, 1996). The focus group is not a debate club or a group therapy session. It is centred around a small selection of open-ended questions (8-10) meant to stimulate discussion and encourage the sharing of perspectives (Masadeh, 2012). The time and place should be convenient as possible. There should be ample parking and consider ensuring that it is near a bus stop. The room should provide privacy and there should be enough space for twelve people – 10 participants, the moderator, and an assistant who takes notes and manages the recording devices. Recruitment of the participants can be by nomination from key community collaborators, selection by lot if the subgroup is large, or, depending upon the topic, maybe the group already exists like with people of the same job title or role in the community. A financial incentive works effectively to ensure participation and reenforces the fact that the organising institution values the time of its participants (Krueger & Casey, 2015).

Design Stage. The progression of the mini objectives here revolve around the questions the facilitator puts before the group for discussion. These questions should be concise and, of course, relevant to the topic. Ideally, each one will be focused on a single aspect of subject under discussion. Generally speaking, these questions follow a three-stage process. First the facilitator may ask one or two "engagement" questions. These are meant to introduce the topic and help make everyone feel comfortable in the setting. The bulk of the questions are exploratory questions that really get to the meat of what is under discussion. At the end, the facilitator should ask one question, an exit question, which is designed to elicit from the participants anything they think should have been covered that was not (Krueger, 1997). A good resource that the moderator may wish to check out from their local library on this function of the focus group is Richard Krueger's *Developing Questions for Focus Groups* (1997).

Planning Stage. This is the stage where all the practical details are worked out. The moderator and the assistant need to draw-up a timeline, secure the location and transportation for any of their participants should they need it. The selected group should be telephoned, or confirmation letters should be sent by traditional post and/or electronic mail. The event does not really need to be catered, but refreshments should be offered. The questions should be circulated within a small group of learned

colleagues for their review and refinement and later for another small group representing the group to which the survey is addressed.

6.3   Hold town meetings or other similar community dialogue sessions[7]

Some cinematic renditions[8] of a public meeting (or 'town hall' meeting) with standing-room-only crowd in an uproar, abandoning their chairs, yelling at cowering and confused officials ducking projectiles, hard and soft, flying from behind the sea of waving arms and stomping feet sets the scene in many a mind of how contentious these events can become. Before we allow a fear of this sort of out-of-control meeting take too strong of a hold in our mind, let us not forget that this type of public meeting is the classic conception of democracy in action. Though movies may try to cast the mass of people as "stupid" and "sheepish", it is only really through this public setting that most people have felt their voice was heard, only here that that they have felt the ability to speak truth to power (Toliver *et al.,* 2019). The trick is in how to keep such meetings from being either a turbulent and ultimately ineffective instrument of public engagement or a mere rubber stamp to the plans of powerful elites. Well, the trick lies in good planning and better communication.

Strategy Stage. The reason for the meeting should be published well in advance (at least two weeks) and it should be stated clearly. For instance, instead of saying that the reason for the meeting is to discuss wave energy, say that the meeting is to discuss possible expansion of a particular testing facility. With the meeting announcement, the agenda should be published as well as any supporting documentation participants may wish to read ahead of the meeting (Leslie, 2013). Publishing all this in the newspaper is probably not possible, but it should be made available through a website, the address of which should be published along with the announcement. A public meeting is an open call for any who wish to participate. It is not limited to a certain

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[7] The planning stages of facilitating water user forums is very similar to the stages of establishing focus groups described in 6.2 if they are conducted in person with no more than ten participants in each forum. If these are on-line forums, the planning stages will be discussed under the designing a web-learning site in section 7.1.

[8] Perhaps more common in North American movies

group of people (Lukensmeyer & Brigham, 2002). That being said, there are subsets of the population who do not generally show up to these events and every effort should be made to reach out to them as well (Toliver *et al.,* 2019). Consider avenues of advertisement that would target these audiences.

Requirements Stage. A typical goal for this type of meeting is just to hear what people have to say, to listen to their input and show that they have been heard in the follow-up documentation of the meeting – published minutes and memos to the programme initiators as well as return emails to those who have asked for them (Leslie, 2013). This setting is probably not the best for reasoned consideration of specific actions, such activity is probably more productive in settings with fewer people and with time to allow for informed and deliberative discussion, but opportunity should be given to those at the meeting to join these other planning sessions (Toliver *et al.,* 2019). The public meeting could, however, dictate the general direction of these other, smaller and more deliberative sessions and require they report on their activities to the larger body of interested townspeople. Facilitation challenges do stand as a predominant concern with these types of engagement activities.

No doubt it is challenging for the facilitator to avoid that a public meeting gets away from them and ends up as some version of what was described at the beginning of this section. Though there is skill to conducting these types of meetings, especially if the topic is contentious, there are a few tips that can help even the novice stay on top of things. Before the facilitator can manage a heated public meeting, personal emotions will need to be managed, as it is important to remain neutral and move through issues without becoming emotionally involved, at least not perceptibly so. Something that may help the facilitator keep calm is to begin with discussing the agenda and setting out the ground rules. Ask for consent on these ground rules so that there is a certain amount of buy-in from the participants about how the meeting is supposed to flow. Do not get into the blame game. If someone is moving toward blaming someone else for what they perceive to be the problem, try to re-direct the conversation back to how they feel about the situation and seek confirmation from others that they may feel something like that as well so that the speaker feels her concerns have been heard and that they are valid. It is ok if there are awkward silences. People need time to reflect on difficult questions and the open-ended questions the facilitator asks should encourage contemplation. If participants ask questions that are difficult to answer in

the setting or need a more technical response, be sure the facilitation assistant gets their contact information and responds within 48 hours. Note that in public meetings participants usually state their name and neighbourhood (or affiliation) before addressing the room. These meetings should be recorded (if consent is given by participants) so that follow-up should not be too difficult. Lastly, do not close the meeting in an atmosphere of conflict. Acknowledge the difficulty of talking about the issue and thank everyone for being respectful of others during the process.[9]

Design Stage. In some ways, public meetings are more difficult at this stage of planning because much of the content of these events will come from the people gathered. However, the facilitator can have a well-prepared presentation and have thought of multiple questions that might be put to her (Krueger, 1997). It is not necessary, or even recommended that all these anticipated questions be answered in the presentation. Since the point of the town meeting is to allow a safe space for the people of the community to express their concerns, it is probably best not to pre-empt the vocalisations of those concerns. If the crowd is unusually shy, the facilitator can definitely pose these questions to the audience or maybe even have a colleague in the crowd raise the concern.

Planning Stage. This stage is when all the final details are put in place. The time and place of the meeting should have already been set and so here it might just be a matter of making sure everyone knows about it. Consider including in the advertisements that on-site childcare will be provided (if possible) as well as public transportation options to and from the meeting (Labosier, 2020). The timeline of the meeting needs to include not only the specific allowances for citizens to address the meeting (not only in general as a block of time, but also for individual comments) but is should also be planned to end at such a time that it is convenient for people to catch a bus back to their home

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[9] The observations in this paragraph are based upon the authors' experiences, but a handy and short treatment of the topic is The Lukaszewski Group's *Surviving contentious meetings: Seven key steps* (Lukaszewski, 2016). A treatment of how the issue relates to renewable energy development (wind) is Andrea Bues' *Planning, protest, and contentious politics: The governance of wind energy in Brandenburg and Ontario* (2018).

neighbourhood (Labosier, 2020). It is not a bad idea to practice how one might handle possible scenarios with colleagues in a dry run of the meeting (Leslie, 2013).

6.4   Conduct a collaboration clinic

A collaboration clinic, or workshop, bridges the gap between activities meant to gather input from the public to activities that prepare the public to take a leadership role in instituting the change sought. Behind town meetings, this may be the second most prominent form of public engagement that exists in the minds of most people (Girling *et al.,* 2017). The reason for this level of familiarity is that they are common instruments of local planning boards (Laurian, 2007), but there is a wide range in the intensity and depth of these engagement activities. They may range from a simple exercise to involve citizens in hypothetical city planning ideas lasting about two hours or so, as depicted by the schedule shown as Table 5, to involved sessions lasting days, a whole week, or even occupying multiple sessions held over many weeks or months (Wells *et al.,* 2021). For the purpose of exploring the planning stages of such an event, the hypothetical proposed here is of a day-long stakeholder engagement session around the possible levels of public participation in long-term wave energy development.

Table 5.   Hypothetical walkable city planning workshop. Adopted from Girling *et al.* (2017, p. 269).

Workshop Agenda	Time Allowed (minutes)
1. Arrival, role assigned.	10
2. Entry survey.	10
3. Introductory lecture.	5
4. Instruction on design task and tools.	2
5. Work on design task.	20
6. Targets provided by researchers.	3
7. Continue to work on design task.	25
8. Break.	20
9. Post-task questionnaire.	15
10. Focus group discussion.	30
TOTAL	140

Strategy Stage. A planning workshop or clinic should not be the first step in an engagement process. Generally, this step is only taken after some preliminary research, like a survey to gauge interest, and maybe an information campaign (Nicholson-Cole, 2009). In the example proposed here, the assumption is that there has already been a survey that revealed public interest in learning about wave energy

and a town meeting where it was decided to form an exploratory body to investigate the possibilities. The people chosen to make up this initial body were selected based upon their expertise and the potential that the resource development may potentially affect them directly. In this situation, then, the potential participants could be representatives from water user groups like surfers, fishers, marine biologists, and tourism organisation representatives. In addition, the group may contain representatives of environmental groups, local business associations, planning department officials, transmission system operators, local government officials, university researchers, wave energy developers, local teachers, and cultural leaders, to name a few. The focus of the session would be to develop capacity among this stakeholder group to reach out to the community and evaluate (promote?) the acceptability of wave energy development and determine a game plan for making it happen. In this sense, some of the participants could also be initiators.

Requirements Stage. To determine the best date for this collaboration clinic it is best to poll all the participants as to what would work best for them, or, better yet, what days will definitely not work for them. The session will probably be on a weekday as many of the participants can include it as part of their work schedule. Some will have to take it off work, but many workplaces will grant time off for public service activities of which this is certainly one. As to the time of year, November or December will work best for many of the water user groups (less fishing at least (Tradex_Foods, 2018)) and summertime sessions should probably be avoided as coastal towns tend to be busy during that time of year. The goals for this session should be discussed and agreed upon with the members beforehand, but they would likely include learning about the technical requirements for profitable energy extraction from ocean waves, grid requirements, environmental concerns, legal issues, etc. Perhaps the primary goal will be to learn areas that the group needs to investigate, the best methods for doing so, and setting a time to meet again to review what was learned during the interim. The main facilitation challenge will be to not let the session be dominated by experts and to encourage information sharing on a broad range of issues (Lukaszewski, 2016).

Design Stage. If the goal of this workshop is as is depicted here – determining the acceptability of wave energy development in the waters off the shores of a given community – then, if it is to be done thoroughly, it will likely require a few of these types of sessions (Lowitzsch et al., 2020). The first session would likely be introductory

and revolve around determining the group's vision for the task before them. A customary mini objective would then be to possibly set up individual task forces that would each work on one aspect of the group's vision before the next meeting. So, if the group's vision entailed objectives that covered areas such as technology assessment, resource characterisation, environmental impacts, economic considerations, grid connection particulars, and marine spatial planning (MSP), then each task force could develop mini objectives regarding their specific duty and a date and time could be determined to reconvene (Chozas *et al.,* 2010). At such time, the group could determine if they are ready to plan a plenary meeting with the town members or if more preliminary work is required.

Planning Stage. This stage is really just that first meeting where the vision statement emerges, and individual task forces set out how to accomplish their respective work. Having all the key stakeholders involved in planning the flow and intensity of the work before them is a fundamental aspect of the engagement process (Kearnes & Chilvers, 2009).

7 Co-Creation Activities

Co-creative engagement specifically seeks change, a change brought about by a partnership between government/academic/corporate representatives and the public. The process is still deliberative, but the public has greater influence over the direction of the intervention through the representatives of the organisations in the decision-making process who voice their interests (Mackenzie & Warren, 2012). Formation of this engagement type *"constructively advances an argument that has been building in the participation literature amongst practitioners for some time about the need for governing institutions to more carefully listen to and be responsive to public voices rather than ritualistically carrying out invited public engagement processes as an end in themselves"* (Pallett *et al.,* 2019, p. 609).

Engels, Wentland, and Pfotenhauer state *"test beds and living labs represent an experimental, co-creative approach to innovation policy that aims to test, demonstrate, and advance new sociotechnical arrangements and associated modes of governance in a model environment under real-world conditions"* (2019, p. 103826). The activities described in this section of the report can be considered test beds and living labs in that they aim to train members of the public to take on the leadership roles of the proposed policy or project and then for the initiating institution to step back and let the community take the reins. This stage represents the height of public participation in the EPE programme. There is another stage of participation that is even more vigorous than this, citizen led engagement activities (Arnstein, 1969), but since it does not really involve the initiating organisation(s) – the intended audience of this report – it is not included in this typology.

7.1 Design a web-learning site

The web-learning site is just like the regular website that was discussed in Section 5, only this time it has greater functionality. There can be tabs for community discussions and e-learning tools like documents, videos, and problem sets (Bittle *et al.,* 2009). It can be a great resource for public engagement in that people are able to come to it on their own time. This facet is often referred to as its asynchronicity, as in it enables asynchronous forums and/or asynchronous collaboration (de Lima *et al.,* 2019). This feature provides a great advantage when engaging with people with busy schedules,

whether that relates to work, child rearing, shift employment, and/or other obligations. For it to be effective, however, it will require constant maintenance, updates, and return comments from a dedicated faction of the initiation team. The online forum is an example of this need. If people take the time to read and respond to comments or other prompts, they should expect a response, preferably within 24 hours when they again log-in. If they do not get a response, they are unlikely to continue the conversation and the website will have lost its value as an engagement tool (Coleman & Gøtze, 2001). The role of managing the site should be turned over to a project stakeholder when that citizen group is up and running on its own.

Strategy Stage. The focus of the website should be to encourage people to get involved with the project or policy discussion and to provide them the tools to do so. It is important to remember that the website is not the sum of the EPE programme. It is a tool that allows communication between events and provides information so that visitors can get more out of the events when they are able to attend (Bachen *et al.,* 2008). The potential participants are all those with a computer or phone that has internet access. The site should be designed so that people can register as official users and certain functions should only be permissible to those who have registered. This move will hopefully keep the number of trolls to a minimum. However, the "About" and "Contact" tabs should be available to anyone who visits.

Requirements Stage. As mentioned above, the goal of the website is to inform, excite, and empower citizens to take an active role in the renewable energy development of their community, focussing on wave energy within the context of a thoroughgoing ocean literacy approach. Whoever is assigned to manage the website should also be responsible for helping to direct online traffic to its pages. This task can be accomplished through maintaining an involved presence on other social media websites like Facebook and Twitter. The website should also be included on any advertisement material used by the group. The asynchronous nature of online discussions can make them difficult to facilitate, but on the positive side it can offer the possibility of more well-thought-out responses and comments from both the facilitator and the participants (de Lima *et al.,* 2019).

Design Stage. The design of a fully functional web-learning site will be more involved than that which is offered by most free services (Garett, *et al.* 2017). That being said, it does not have to be really expensive and there are probably people in the community

who could help get it up and running. Another possibility, depending on the ties stakeholders or steering committee members have to the Town, is to recruit members of the local government's internet technology team. The website also does not have to be all ready at one time. It can start off as the basic information portal discussed in Section 5 and grow as the public engagement programme grows.

Planning Stage. The planning of the website and its design are similar. The person, or people, who will be managing it need to have as much involvement with the design as possible and interested community members should be involved if possible as they will eventually take over the management (Firmstone & Coleman, 2015). At least a rudimentary site should be up and running at the beginning of the EPE process, even if it is leveraging the initiating organisation's established site.

7.2 Encourage citizen science activities through a summer school programme[10]

Though this heading unites two different topics listed in the DOA, the combination is not haphazard as the SafeWAVE programme's objective is the improvement of ocean literacy with a focus on wave energy – both potential topics of citizen science initiatives <u>and</u> summer school courses. In discussing the planning of these activities, the approach used here will be to envision the provision of a summer school programme that aims to encourage the pursuit of citizen science investigations into an arena of ocean literacy that focuses on wave energy. For two approaches to public engagement that appear to have so much in common – citizen energy communities and citizen science – it is surprising that their union is not really seen in the literature (Wuebben *et al.,* 2020). Examining the potential synergies could make for an interesting and influential piece of research for a science-based institution that already has a foothold in a community with its ongoing energy project. A summer programme directed at primary school students would probably focus on ocean literacy and encourage the

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[10] The planning steps for undertaking specific community education/training initiatives will be similar to conducting information campaigns (albeit with a focus on training) and developing school programmes already discussed in Section 5. Providing training material for the web-learning site or for third party dissemination (the last EPE activity listed in the DOA) was discussed in Section 7.1 and will be discussed again here under this present heading.

scientific investigation of the students' coastal environment through various hands-on and *in situ* lesson plans and activities (Santoro *et al.*, 2017). The description of the planning steps here will be of a programme for upcoming 5th and 6th year secondary school students, university students, and any curious adults who wish to participate (although the target participants could be others).

Strategy Stage. The focus of the programme will be on training participants to approach the intricacies of renewable power supply and community power demand utilising logic and the scientific method (Cohen & Nagel, 1934).[11] There are number of both hard and soft science research topics on which members of the class could focus. Students could survey energy use patterns in their community, or they could track sea conditions and estimate hourly power production potential using a number of quantitative methods. Some members of the class may wish to focus on economic impacts of wave energy development while others may wish to quantify the carbon abatement possibilities. Some members may wish to tackle more ethereal topics like community self-image linkages to forward-thinking energy solutions or images of the community practicing good stewardship of their natural resources. There is a wealth of possible research and investigation avenues (Irwin, 1995). The initiators will likely either be university personnel or local secondary school teachers and the potential participants will be upper-level secondary students and university students who either just have an interest or/and wish to have a certification of class participation to add to their college applications/CVs. There may also be adults in the community with the time and interest who just want to learn whether wave energy development is a good idea for their community before they rush to judgement one way or another.

Requirements Stage. A common summer vacation for secondary students is around 10-12 weeks. That is also as long as the average college semester. However, unless these courses are designed to garner college credit, they will likely be less intense and should probably only last 6-8 weeks, meeting once a week, or possibly be structured in a day-camp style and last no more than two 5-day weeks (Cheeseman & Wright, 2019). In either manifestation, they will require a commitment from the students, require much planning, and involve a fair amount of cost in money and time from the

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[11] A classic text: *An Introduction to Logic and Scientific Method.*

facilitating organisation. That being said, the rewards for both the community and the participants from a well organised programme such as this could be future altering. Think of what effect a small cadre of dedicated individuals with knowledge, experience, and passion billowing their sails might accomplish.

The place of these classes will probably vary depending upon the topic, but a good base of operations could be the local community building or maybe a conference room at the local library, museum, or nature park building. There will be many goals, or mini objectives, for these courses, but the overriding goal is to spur interest in the participants' interconnectedness with the ocean and for them to learn how this interconnectedness may transfer into sustainable development options for their community (Santoro *et al.,* 2017). Recruitment will be primarily through contacts at local schools, but there could also be outreach conducted at local third-level institutions (for both teachers and students) and through local papers and volunteer organisations. As the demand on the participants' time will be not inconsiderable, attention should be given to the benefits of the course and to communicating how much fun can be had and the friendships that could be formed (Cheeseman & Wright, 2019). Facilitating these classes could be a challenge with participants from so many different backgrounds and age groups, so one idea would be to have several different working groups each working on different projects of their own interests (Patanakul & Milosevic, 2009).

Design Stage. Three people to a working group is probably a good place to start. This will helpfully not overburden the facilitator yet offer a wide enough variety in the topics pursued to make for an interesting final product (Patanakul & Milosevic, 2009), but it all really depends upon how many people sign-up. The course could be designed to begin with the provision of information and research techniques applicable to every student's desired learning goal, then split off into working groups for much of the rest of the courses (still meeting once a week together to instil that sense of unified purpose and provide relevant general information and instruction), and then have all the groups ready to present their results to the community at large at an end-of-session festive event.

Planning Stage. Planning for something this involved will probably take at least 9-12 months. The facilitating organisation will have to work with local educators to find methods of encouraging students to participate and to learn from them what they

would hope to get out of such a project. Local volunteer organisations will also have to be contacted and involved to recruit both participants and maybe guest speakers as well. All the details of securing facilities and field-trip destinations will have to be sorted well in advance. Securing funding will also be an issue. Does one seek grants? Should a tuition of sorts be charged? If so, how much and are there avenues to provide tuition resources for disadvantaged students. All reasonable efforts should be made to allow students to attend at no charge. Otherwise, recruitment will be more difficult and the intended positive impacts for the community will likely be lessened. A small charge might be required if for no reason other than to impart the worth of the course to students. Studies have shown that when people pay for something, even a small amount, they tend to utilise it more than if it was offered for free (Clark *et al.,* 2016).

8 Transitioning to community-led action

The highest level of civic participation is when the community is leading the engagement (Arnstein, 1969) and the EPE initiating organisation steps back to an advisory or support role, if even that. The EPE activities described in this document can be seen as steps on the way to that goal. That is not to say that individually any one activity is "better" than another. Different activities are appropriate for a given community at different times depending upon the capacity of the community to embrace the change they wish to see. In the case of the SafeWAVE exploration of wave energy acceptability and its place within the context of ocean literacy, the height of acceptance may very well be the community taking a leading role in the deployment of wave energy devices (WECs) in their coastal waters. This represents a progression in the understanding of ocean literacy away from the mere acquisition of knowledge to embracing a more activist role that seeks to achieve a deeper understanding of the link between ocean literacy and human behaviours that can mitigate climate change related impacts (McKinley & Burdon, 2020). As Lowitzsch, *et al.,* observe, community *"(co)ownership in renewable energy (RE) [is an] essential cornerstone […] to the overall success of the Energy Transition"* (2020, p. 109489). WECs may fulfil this need for coastal communities to help accelerate the transition. They have the potential to fill this specific niche. Though their levelised cost of energy is still higher than that of wind turbines, even at €0.29/kWh[12] (Chang *et al.,* 2018) the lower capital costs of the devices (Bosserelle & Reddy, 2016) still make them a potentially attractive investment for a community that just might need to power 2,000 homes or so, not the 20,000 or so powered by the world's larger wind turbines (Khanna, 2021).

Getting to the point where a community may wish to take on the role developing its wave resources will take a good bit of engagement from organisations that can help the citizens navigate the complicated processes of forming the legal entities needed to enter the electricity market. However, the *Clean Energy for all Europeans Package of the European Union* does include provisions for renewable energy communities (Roberts, 2020) and if the WECs of SafeWAVE's corporate partners have reached the

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[12] Conversion from the paper's estimate of $.30/kWh to euros (2018 value)

stage of commercial viability, then the ground might be ready to build the future sustainable energy society, or should we say the seabed might be ready?

This technical report described the planning process for several different EPE activities that the SafeWAVE partner organisations might want to utilise in planning their own community outreach and training activities. These plans are contained in chapters 9-12 of this document.

9   Ireland's EPE Plan

Ireland has some of the best wave energy characteristics of anywhere in the world and there is easily enough of this resource to meet 75% of Ireland's electricity needs (SEAI and the Marine Institute of Ireland, 2022). That being said, there are no wave energy farms as of yet in Irish waters, but there are two testing areas being developed, one off the coast of County Clare (Simply Blue Energy, 2023) and another off the coast of County Mayo (Sustainable Energy Authority of Ireland, 2023). The Saoirse site being developed by Simply Blue and will hold 15–16 CorPower WECs making for a 5 MW array (2023) whereas the SEAI site in Belmullet is not yet ready for developers, but the onshore substation is scheduled to be completed this year (2023). As both these sites have already conducted public engagement activities, the Irish EPE plan will seek to raise awareness of the potential for wave energy in two different areas, County Donegal and County Kerry.

The County Donegal EPE activity will take place as part of a broader initiative to introduce marine renewable energy technologies to the people of Malin Head where UCC has just begun another effort to address floating wind energy and is in the process of learning how rural communities assess the risk involved in community renewable energy projects. The County Kerry EPE activity seeks to raise awareness of wave energy technologies among a group of likely stakeholders in any future development – The Kerry Sustainable Energy Co-op.

9.1   Strategy Stage

The *focus* of both events, the community meeting in Malin Head and the stakeholder meeting in Tralee, is to begin the process of getting the community comfortable with the idea of promoting wave energy development in their area as an expression of a proactive approach to ocean literacy. In this approach, based on UNESCO's Ocean Literacy Principle #6 that humans and the ocean are inexorably linked, citizens take the lead in helping to improve the health of the ocean by reducing the amount of carbon it has to absorb and in turn the ocean helps them by providing the energy to heat and light their homes. This is a new way of looking at ocean literacy in that it is activist-orientated and not just informational.

UCC is the primary *initiator* of this programme, but it will be joined along the way by interested community members in Malin Head and Kerry Co-op participants of which there are hundreds (KSEC, 2023). The *potential participants* from each group will have slightly different motivations. The Kerry Sustainable Energy Co-operative (KSEC) has a history of developing different renewable energy projects so they will probably be focused on how to derive economic benefit from promoting wave energy, whereas the citizens in Malin Head are more likely just curious and may be interested in learning whether it is possible for them to have any role and what that role might be.

9.2   Requirements Stage

The *goals* for each group meeting are also different and reflect the different levels of familiarity they have with renewable energy technologies. Members of the research team will make a short presentation to the board members at one of their meetings and elicit their help in distributing an information video and survey to their members at large. The video is an introduction to the SafeWAVE EPE plan for Ireland and the survey gathers input on what the respondents think on a number of topics from climate change to energy use to public participation events. The 20-minute information video is intended to be a conversational exposition on the relationship between investigating the potential of wave energy for the economic future of sea-side communities and the environmental health-future of the oceans. Its purpose is to help coastal residents begin thinking more about their relationship to the ocean and what that could mean for their community's role in wave energy development. This idea is presented within the context of UNESCO's ocean literacy programme, principle #6. The backdrop for the video is an action shot of the Atlantic Ocean off the west coast of Cork in Ireland that runs uninterrupted throughout the speaker's monologue. The continual crashing of the waves are meant to keep the viewer's attention and convey a sense of the ocean's power.

The script for the video and a copy of the survey will be made available on the SafeWAVE website under a new tab, *Public Engagement*, where other members of the consortium can post their public engagement material or adapt these two for their own purposes.

Figure 1. Screen grab from video produced for the Irish EPE programme.

The *time and place* for each engagement event will necessarily be different. The Malin Head event will be held in mid-June at the community centre there. It will be part of an all-day (6-hour, lunch and snacks provided) event on marine renewable energy. The presentation will be composed of an information session on the role of wave energy for the ocean literate person followed by a dialogue session where community members can sound-out their views of wave energy, ocean literacy, and climate change in a respectful and supportive environment. Engagement with Kerry community will take place mostly on-line aside from the meeting with the KSEC board, which will be in-person in the latter part of June. The presentation here will be different and focus on the synergies between the organisations stated objectives (below) (KSEC, 2023) and the SafeWAVE project (especially objective #4):

1. Local production of clean energy
2. Local retailing of clean energy
3. Developing local business based on clean energy utilising both local and national expertise
4. Developing Kerry as a prime location for the testing of new sustainable energy prototypes
5. Increase awareness in citizens and communities about the need for and benefits of renewable energy

6. To engage with other co-operatives to improve regulative and legislative barriers to developing local energy co-ops.

Recruitment for the Kerry project will be mainly through email to members, using local gatekeepers. For Malin Head, we are fortunate to have a member of the research team who has a strong network in the area from when he lived there in the recent past. He was really active in that tight-knit community for 12 years.

9.3   Design Stage

The *mini objectives* of the dialogue session in Malin Head is really just to get people talking and thinking about wave energy in the context of ocean literacy. We will have a couple of slides that we will put up that include some possible talking points, but mainly it is to see what is on the mind of these citizens in the far north of Ireland. Though we will ask them to visit the website to view the video and take the survey, historically this has not proved all that productive. The survey and video are meant to go together and will be most informative for participants who are not involved with the in-person session, *i.e.* the general members of the Kerry Sustainable Energy Co-op. The survey seeks some general demographic information and then moves on to query specific attitudes regarding energy and climate change, public forums, renewable energy, and their perpectives on energy citizenship. Though at 65 questions, the survey may seem long, it only takes 6 – 8 minutes to complete because the questions are short and they all pull from the same Likert scale of responses.

9.4   Planning Stage

The *techniques and timeline* of the plan are pretty well established. What remains are some of the *practical details*. For the KSEC Board of Trustees, it is a matter of getting on the agenda for either their May or June meeting and designing an email message that will really grab people's attention. For the Malin Head event, it is a matter of getting the word out and deciding a few last things about the venue. We will advertise the event in the local paper (*Inishowen Independent*) and maybe get a radio spot on *Highland Radio* (based in Letterkenny, boasts the greatest penetration into the Donegal market of any radio station). The community centre is available for our time preference and has a restaurant that can cater the event. There is also a daycare there which may improve attendance of any stay-at-home moms or dads.

9.5 Content curation

As has been discussed throughout this document, education in a public engagement setting is relational, it is about building trust with the community, engaging in two-way communication, listening and not preaching. Though all of that is true, there are still specific bodies of information that we would like to communicate and on which we would like to receive feedback. Below are six different learning areas we explore in this programme. Not each one will be addressed at each stage in the EPE plan, however, through the course of the entire programme we hope to engage citizens around each one of these learning opportunities. In the subsections below, we offer links to different online documents and resources from which we and our SafeWAVE partners will draw as we compile presentation material for our audiences. Each partner will no doubt wish to use more regionally relevant material in their presentations, however, there are also many resources here which are general enough that they could be used in all manner of contexts.

Table 6. Six EPE Learning Areas

1. Seven principles of ocean literacy

2. Drilling down on principle #6 – humans and the ocean are inextricably linked

3. Climate change and the ocean

4. Ocean wave basics

5. Wave energy converter (WEC) technologies

6. Community ocean renewable energy

9.5.1 Seven principles of ocean literacy

The United Nations has declared this decade, 2021 – 2030, The Decade of Ocean Science for Sustainable Development. Within this larger framework, UNESCO is spearheading efforts to spread ocean literacy and has developed material around each of seven different principles of ocean literacy.

Table 7. Seven Principles of Ocean Literacy

Principle #1	The Earth has one big ocean with many features.
Principle #2	The ocean and life in the ocean shape the features of Earth.

Principle #3	The ocean is a major influence on weather and climate.
Principle #4	The ocean made the Earth habitable.
Principle #5	The ocean supports a great diversity of life and ecosystems.
Principle #6	The ocean and humans are inextricably linked.
Principle #7	The ocean is largely unexplored.

The following are examples of the many resources available online from which we will draw for presentations on these principles.

The Ocean Literacy Network: This site has a wealth of information on ocean literacy (OL). Under the "getting involved" tab there is even a PowerPoint presentation all about these seven principles, but it is more suited for middle school students. A more detailed depiction of the seven principles can be found from the Georgia Association of Marine Education linked below. The Ocean Literacy Network information can be found here: https://bit.ly/3Yn2cUA.
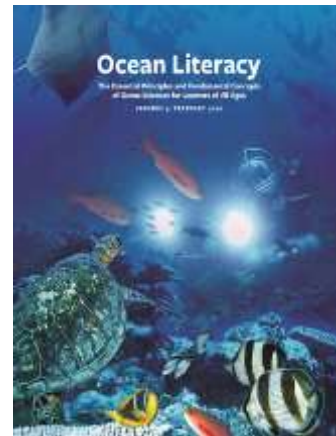

Figure 2: Ocean Literacy Guide

The Marine Institute of Ireland has various planning guides for school-aged children around ocean literacy as well as other resources, including posters, that we will use. These lesson plans and activities can be found here: https://bit.ly/3Fosw87

The Georgia Association of Marine Education has a website that has presentations on each of the OL principles along with activity suggestions. It can be reached at https://bit.ly/3KyWoBv.

The Intergovernmental Oceanographic Committee (IOC), affiliated with UNESCO, is working on the Implementation Plan and on the Ocean Decade website there are a number of publications which we will consult when putting together presentation materials. There are documents related to how OL fits into the Decade of the Ocean. There are documents on engaging stakeholders and how to empower communities around OL.

IOC: https://bit.ly/3YkAMPd

Implementation Plan: https://bit.ly/3FrmuDW

The Ocean Decade: https://bit.ly/3mzXzbO

The National Oceanic and Atmospheric Administration (NOAA, USA) has a number of different lesson plans that can be downloaded. The (US) National Marine Educators Association (NMEA) has also listed 90+ lesson plans around ocean literacy. We will consult these when crafting our presentation.

NOAA lesson plans: https://bit.ly/3v5lGQt

A Spreadsheet of NMEA lesson plans and links to related material can be found at https://bit.ly/3FPAnNJ

9.5.2 Drilling down on principle #6

After having introduced the idea of ocean literacy and impressed upon the participants the importance the world's marine educators place on the initiative and all the resources that are available, we will then draw down on principle #6 because that is the most relevant for the SafeWAVE project. This principle states that the ocean and humans are inextricably linked. This perspective coincides with the emphasis that the Marine Institute (Ireland) places on this principle. They state on their website: "*Ocean Literacy is having 'an understanding of the ocean's influence on us and our influence on the ocean'. An ocean-literate person: understands the importance of the ocean to humankind; can communicate about the ocean in a meaningful way; and is able to make informed and responsible decisions regarding the ocean and its resources*" (Marine Institute, 2022, n.p.).

To draw out how people are connected to the ocean we will elicit stories from them about their time in and around the ocean. We will split off into manageable sized groups (4-6) and will go around the table asking for stories from their lives. We believe this method will be more effective than just discussing various connections between the ocean and humans. It is also a little more nuanced than just asking them to tell us their connections. The point here is to allow people to see how they are connected and have them make those connections themselves through the lenses of their own life experiences. Researchers can later examine these narratives and try and find the various themes. Below is a prompt that will be displayed on the presentation screen while people talk in their groups.

In this session of the workshop, we really want to get a sense from you of what it is like to live and work near the sea or even on it. Your life is rich with stories that at least touch upon some aspect of what it is like to live, work, and play in and around the ocean. Will you pick one of these stories and share it with us? It doesn't have to be anything fantastical, dramatic, or adventurous; just choose a regular old story that kind of embodies or exhibits in some way the emotional connection you have with this place where you live. Details really make a story like this, so try to include as many as you can remember.

Textbox 1: Presentation prompt for group sea story telling time.

From a personal discussion about our participants' sea stories, we will move to a presentation on the effects humanity as a whole is having on the ocean and how that will turn around and effect humanity in return.

9.5.3 Climate change and the ocean

We will use the NOAA website for lesson plans on a wide variety of climate change effects on the ocean. These lesson plans range in time from 30 minutes to 90 minutes. They contain handouts and downloads, materials needed and set-up, procedures for conducting the lesson, maps, videos, etc…. For Ireland, The Marine Institute also has a host of learning modules. We will use these to help tailor or presentation. In one of the activities, participants can take a virtual tour to visit the effects of climate change on the Irish coast and its ecosystems. These lesson plans and materials are available through the Marine Institute's Open Access Repository.

NOAA lessons on climate change and the ocean: https://bit.ly/3FOZHTS

Ireland's Marine Institute Open Access Repository: https://bit.ly/3Ppwxht

Figure 3: Marine Institute poster (Ireland) on climate change and the ocean

9.5.4 Ocean wave basics

We think it is important for our programme participants to understand some basic ocean wave physics so that they can get a sense of the factors that come into play when trying to create a device that converts the motion of waves into electrical current. In teaching about ocean waves there are many resources which the facilitator may utilize. We think the best approach would probably be to pick up a book of physical oceanography and create the learning content from that. There are, however, plenty of places on the web that could help the facilitator get an outline of how to approach this subject. There is a lot to know about waves and they are really complicated, but for the purposes of this project we suggest not getting bogged down with too much information.

The University of Hawaii, Manoa, has a good site that reviews ocean wave basics. If the facilitator would like to get an idea of the types of information contained in learning material about waves, there is a presentation available on slideshare.net delivered by Professor Balasubramanian from India. This is a good resource with a lot of detail and only about waves, but it is over 80 slides and might be too much for many audiences. However, some information will be drawn from this resource (cited of course) and incorporated with other information. There are also a number of lesson-plans available for a small charge on teacherspayteachers.com, that cover plans for every grade in school. University of Hawaii on waves: https://bit.ly/3Foh4t9
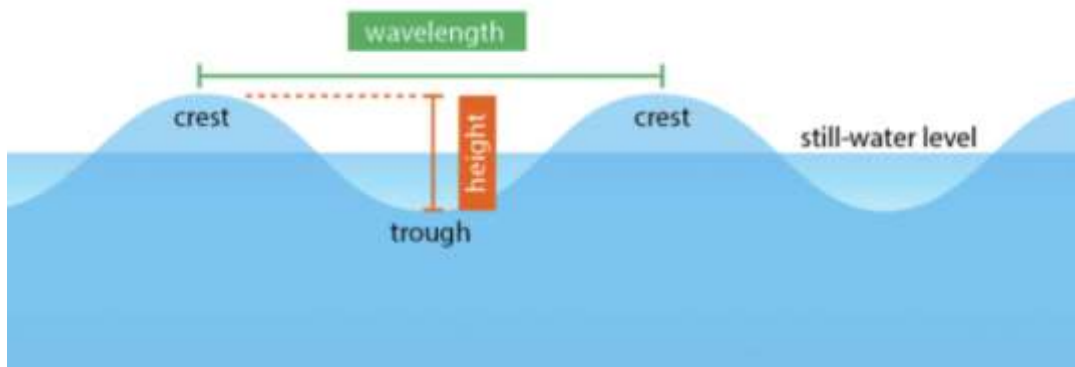

Figure 4: Profile of a standing water wave manoa.hawaii.edu

Lecture on waves from an oceanographer: https://bit.ly/3Pl0XkV

Primary and secondary teacher lesson plans on ocean waves: https://bit.ly/3FpdM9g

9.5.5 Wave energy converter technologies

This is one of the more exciting parts of the programme in that it will represent a new area of learning for many of the participants involved. Though many of the participants have a good working knowledge of climate change and the continuing degradation of the ocean environment, they may not have been exposed to wave energy as a possible solution on how to improve humankind's sustainable relationship with the ocean. There are eight different types of wave energy converters in use today (Table 8).

Since it is difficult to visualize what is happening with these WECs just from the brief description above, we will use YouTube videos to help convey how they work.

Table 8. Wave energy conversion technologies (Drew *et al.,* 2009)

Technology	Description
Attenuator	A hinged device that floats on the ocean surface and uses the motion between its floating bodies to drive a hydraulic system that powers a turbine (*e.g.,* Pelamis).
Point absorber	These are small in relation to wavelength and heave up and down with the motion of the wave e.g., Ocean Power's Powerbuoy.
Oscillating wave surge converter	Generally, there is a hinged deflector that moves back and forth and exploits the horizontal movement of the wave *e.g.,* Aquamarine Power Oyster.
Oscillating water column	The rising and falling water in the shaft of the device forces air through a turbine that can take advantage of the air's motion whether coming or going *e.g.,* The Limpet
Overtopping, terminator device	This device catches sea water as it overtops a container wall then the water exits through a turbine on its way back out to the sea *e.g.,* Wave Dragon.
Submerged pressure differential	This is a submerged point absorber which uses the pressure differential between wave troughs and cresta to create electrical power.
Bulge wave	This is a water filled tube moored to the ocean floor. A passing wave creates pressure variation that results in a bulge that grows as it moves through the tube. This accumulated energy drives a low-head turbine at the end of the tube before the bulge is deposited back in the ocean.
Rotating mass	It uses two forms of rotation with a unbalanced weight in the centre that accentuates the heaving and swaying. The movement is attached to an electric generator inside the device's hull.

Wave Power Could be Energy's Next Big Leap: An 11-minute video from Bloomberg Quicktakes that gives an overall picture of the industry https://bit.ly/3MJBulY .

How Waves Could Power a Clean Energy Future: This is a 14-minute video from CNBC, a US business news channel. Though half the video is about US efforts to harness wave energy, there are other projects discussed from Europe as well. This video does not cover every type of device, but it is relatively recent (September 2022) https://bit.ly/409lf3a.

Why Wave Power isn't Everywhere (yet): This video from Deutsche Welle (DW – a German news broadcaster) offers a brief history of wave power and discusses why it has not really taken off yet. This video could also be used in the previous learning area

as it discusses how waves are formed and why some areas have better waves then others https://bit.ly/3KCM2QX.

There is a 31-slide PowerPoint presentation available from Seminarlinks that we will either use in whole or from which we may take information for our own presentation (Figure 5). It covers all the basics, is well documented, and the presentation is clear, concise, and informative. It can be downloaded from https://bit.ly/3Ymld9V.
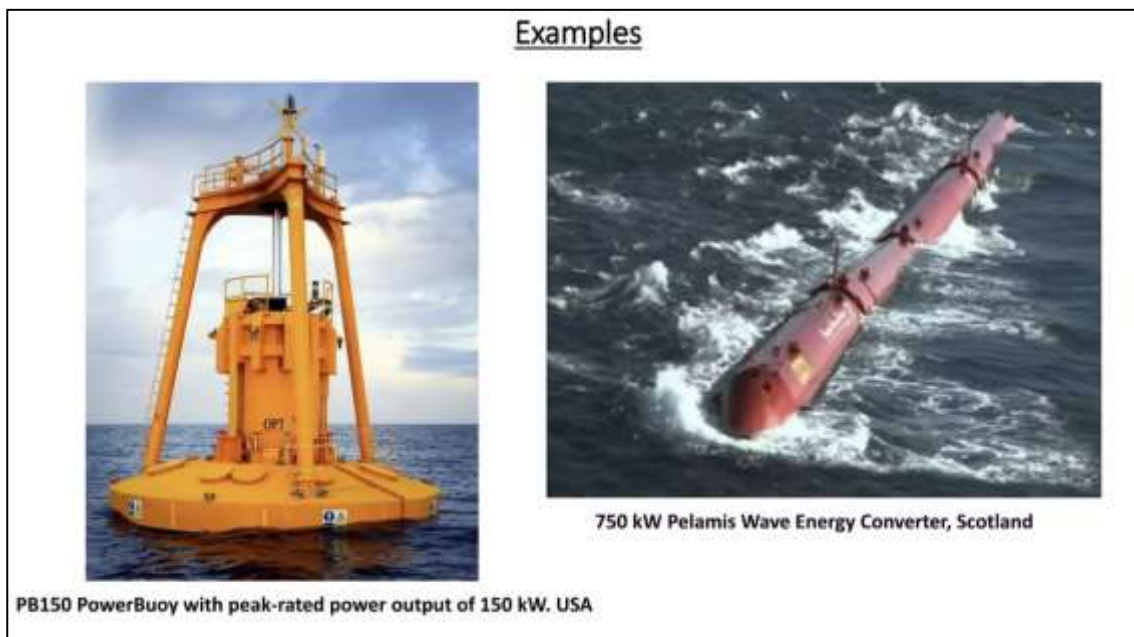

Figure 5: Seminarlinks PPT slide screen capture.

9.5.6 Community ocean renewable energy (CORE)

This learning area will only occur near the final stages of our initial EPE programme and only if the community has established a separate committee to investigate the potential of welcoming wave energy to their community. The group will become a member of REScoop which is an organization of European citizen energy cooperatives. This organization offers various services and tools for fledgling community energy organizations. Examples include community coaching, organizational development, advocacy, and financing. Though there is this wealth of information and support from REScoop, there are no community wave energy projects so this will be new territory for both the SafeWAVE partners and the community as well as for REScoop itself (Figure 6).

REScoop website: https://www.rescoop.eu/the-rescoop-model

Figure 6: Screenshot from REScoop website.

EU laws and regulations regarding community energy organizations (Schockaert, 2020): Schockaert, H. (2020). *D4.1 Legal Report on European Environment and Regulatory Issues*. Community Energy for Energy Solidarity -- EU Horizon 2020 Grant No. 101026972 https://bit.ly/43AbT4U. The EU community energy toolbox offers a wide variety of resources (>100 documents) for communities undertaking local renewable energy projects. There are technical reports, scientific studies, masterclasses, financing aides and grant data, and other practical information https://bit.ly/417XKdz. One document in the above resource speaks to Ireland directly and which we will use in workshops on this topic is the Sustainable Energy Authority of Ireland's Handbook for Sustainable Energy Communities (SEAI, 2022) available here: https://bit.ly/3uKv9fw. This is an interesting article on community financing of renewable energy projects: Pons-Seres de Brauwer, C., & Cohen, J. J. (2020). *Analysing the potential of citizen-financed community renewable energy to drive Europe's low-carbon energy transition*. *Renewable and Sustainable Energy Reviews*, *133*, 12 https://bit.ly/3mu3gYX.

10 France's EPE Plan[13]

Centrale Nantes (ECN) operates the SEM-REV test site, which is the first grid connected multi- technology test site in France. The site was created in 2007 and is fully permitted for floating wind and wave energy demonstration. As the development of Marine Renewable Energy is relatively slow in France, the demonstrators deployed on site in 2018 (floating wind turbine "FOATGEN", still on site) and 2019 (the hybrid wave and solar energy device "WAVEGEM", removed in 2021) were, and still are, unique opportunities to communicate broadly on MRE systems. The present proposal for a French EPE plan is built around the concept of a localised plan focused on the test site area and activities. The main objective is to identify the catalyser effect of a test site for a broader EPE plan. Therefore, a first shortlist of EPE activities is presented and discussed below.

10.1 Test site communities

Test sites are pioneers. They are built to host technologies at low maturity levels, technologies which are expected to be further developed and commercialised at larger scales. Consequently, their local communities are also experimenting with marine renewable energies first, making them pioneers as well. The development of a specific program targeting this community will both highlight the social effects of test sites and offer these communities an opportunity to further engage in the development of Marine Energies.

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[13] The description of the French EPE plan follows a slightly different format from the others because ECN, the facilitator of the plan, has been continually active in EPE activities. As such, this chapter describes what they have been doing in this space for the last few years and adds their plans for the near future. These new plans, as the reader will see, are ambitious. They have already received funding for this endeavor beyond the SafeWAVE structure and the completion of the project is well under way. When complete, there will be a physical structure with year-round exhibits and programmes dedicated to ocean literacy and marine renewable energy development – including wave energy.

In the case of the SEM-REV test site, the target community for the EPE plan is made of the different local communities living, visiting, and working in the area around SEM-REV (see Figure 1 below). For instance:

- inhabitants of the peninsula within sight on the test site (see orange frame below, the SEMREV site further south is now "hidden" behind the floating offshore wind farm).

- water users (from traffic monitoring) identified with the port they depart from (La Turballe, Le Croisic, or Pornichet).

- owners of holiday homes, with a seasonal and regular/repeated presence.

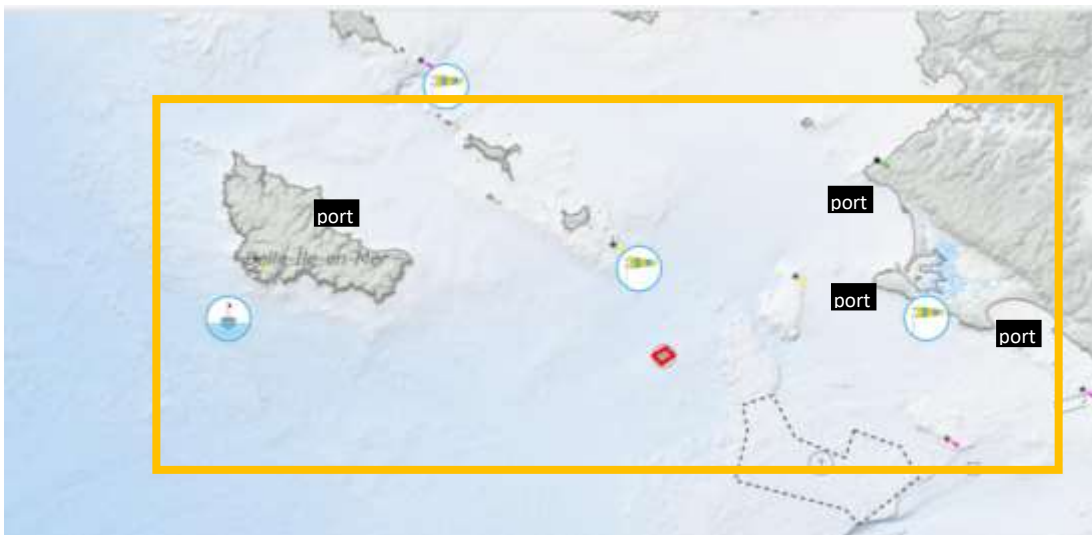- visitors / tourists with a seasonal and "one off" presence.

Figure 7. Community around SEM-REV test site. Red shape = test site, yellow shape = community area.

As a test site operator, ECN is willing to engage in a plan which highlights the need for a broader deployment of MRE, consistent with an action-orientated interpretation of ocean literacy principle #6. This principle states that humans and the ocean are inextricably linked. An action-orientated interpretation of this principle is that people can have a positive effect on the ocean. In the process of detailing a specific implementation plan, SEMREV is willing to request support from additional initiators such as:

- Project and technology developers. Their own objective is to facilitate acceptance for their future commercial projects. They would contribute to the EPE program by providing technical material and feedbacks from field operations which are usually not accessible by the community.

- For the energy syndicates and clusters. They have a history of feedback from past public consultations and could consider this EPE program and its trials as tools in a field of experimentation. Their objective would be to learn the specifics of community acceptability of wave energy and thereby improve their existing tools. They can also bring material and content on energy related topics, including the national and European policies and goals in term of MRE deployments.

- Local promoting agencies (for tourism or industry). Their main role is to promote activities (including MRE deployment) on the territory and to attract visitors and inhabitants. They could act as a coordinator of parts of the program.

- The city councils also play a key initiator role for such a local EPE plan. They coordinate activities in schools for instance and are interested in making their cities more attractive.

10.2 Short term EPE trial actions

Centrale Nantes (ECN) is a school of engineering and so education is part of its core mandate. Even if research on Marine Renewable systems, and above all the activities related to sea trials, are not necessarily carried out in close collaboration with engineering students, the dissemination is part of Centrale Nantes's driving motives. Indeed, Centrale Nantes has a long-standing habit of opening its doors to the public, starting with the main campus in Nantes. Going one step further, Centrale Nantes has organised three public site visits in the past three years (would have been more but for COVID).

- 29th of June 2019, in the frame of a national-regional event "la Mer XXL", which was a first of its kind exhibition on and around the sea, an event was organised in Nantes.

- 25th of June 2022 another event was organised in the frame of a national initiative led by the French Energy syndicate (SER), as depicted in Figure 8. SEM-REV site visit organised in the frame of a national event ("Mer XXL national

exhibition" top, JPO organised by the French Energy syndicate, bottom). Here is a specific news item that is published on the website: https://bit.ly/40hmC1i

The tour programme and logistics are managed by Centrale Nantes's communication department and the SEM-REV operational team. For public visits, Centrale Nantes rents tourism boats which can host up to 200 people. Centrale Nantes decided to limit the visits to 150 attendees to allow more space and give more room for small group discussions.

Figure 8. SEM-REV site visit organised in the frame of a national event ("Mer XXL national exhibition" top, JPO organised by the French Energy syndicate, bottom).

Figure 9. June 2022 public visit.

Figure 10. June 2022 public visit, when reaching the test site vicinity.

Additional site visits have been organised for specific communities in the past few years. The targeted audiences were:

- Marine renewables conference attendees. When conferences or exhibitions are organised in the region, a SEM-REV site visit is often part of the technical visits. The chosen boats and tour organisation is often similar to the public visit (approximately 100-150 attendees for each visit)

- Decision makers, local authorities (such as the local city council). Smaller naval means are often selected for these visits (15-30 attendees) because they facilitate small group discussions.

- Academic groups. Research clusters or consortiums have been brought to the test site during the steering committee meetings when organised by Centrale Nantes

- Scholars. Up to now, the scholars were not the main target for these visits. However, international student groups benefited from a dedicated visit (for example, PhD candidates from the FLOAWER EU project: https://www.floawer-h2020.eu/)

The positive feedback from the participants (public or private) confirms the importance of demonstration activities within the EPE process). Nevertheless, Centrale Nantes is willing to develop the concept of "engaging site visits", turning the demonstration activities into co-creation activities.

The feedback from the public and private site visits are encouraging and would suggest maintaining or increasing previous efforts. Nevertheless, the well proven site visit organisation should be exploited further. Centrale Nantes could envisage more engaging site visits. The detailed planning and design of the French EPE programme are not part of the present deliverable, but each stage is briefly described below.

Table 9. French EPE plan description

Stages	Description
Strategy	• Build on Centrale Nantes's past experience with test site visits in order to create a dedicated and more engaging programme. • The primary objective is to educate, and make sure that the visitors return home with a basic knowledge.
Requirements	• Joining a broader and, if possible, national event is not mandatory to gather visitors but it will increase visibility. • The visits should be during the month of June, as the weather is often well adapted, and it remains just before the main summer holiday period (July- August) • The main challenge is to organise a workshop accessible for a broad audience. • The second challenge is to provide valuable knowledge on MRE systems within an ocean literacy context.
Design	• Prepare dedicated tools in order to engage further with the attendees (participatory science, debrief questionnaire, a challenge with a prize…). • Determine if a full day is enough (workshop in the morning, visit in the afternoon)
Planning	• Up to now, Centrale Nantes managed to organise the visit free of charge for the participants. It is envisaged that we will carry on with this model, but it will depend on the impact of the cost of the workshop sessions.

10.3 Long term plan: exposition centre (curated content)

Contrasting with the low risk, well proven and short-term activity described in the previous section, Centrale Nantes has envisaged a longer-term plan.

The Penn-Avel Park, in Le Croisic, has been one of the key elements that have made up SEM-REV since the site was created for sea trials in 2007. The team's offices, in one of the park's Villas, is the central point, in complementarity with the Centrale Nantes campus. Research activities are carried out at sea on the site of trials. This park

is also a place of relaxation for the inhabitants of Le Croisic and seasonal tourists. The development of the SEM-REV site with the installation at sea of 2 prototypes, FLOATGEN since 2018 and WAVEGEM since 2019, consolidates the local establishment of its research activities in Le Croisic. It is time today to take a step further and develop a place of research into sustainable economic development and energy citizenship in this territory.

Figure 11. Schematic view of the programme structure, on the peninsula of Le Croisic.

This project will ultimately lead to a structure made up of 3 spaces in constant exchange with each other within the park and the surroundings of Le Croisic peninsula. The different spaces are depicted in Figure 12 and described below:

• **A business incubator**: Companies in the MRE field aiming to demonstrate a prototype or develop activities on the offshore site of the SEM-REV would come to carry out part of their research activities locally. This local presence will facilitate the collaboration with the SEM-REV engineering team and enable the contribution of these industrial actors in the EPE programme.

• **An exhibition space/interpretation centre**: The exhibition will focus on the challenges of the Marine Renewable Energies sector:

   o Presentation of the offshore wind farm on the Banc de Guérande and the SEM-REV experimentation site. This task will be completed through immersive virtual

viewing technologies made possible with 3-dimensional simulators and data visualization sites.

o Research and development in the field of MRE with explanations of the different MRE technologies (wave, wind, and tidal energies) but also all life cycle phases (logistics at sea, environmental monitoring, *etc.*) and the various tools (numerical simulation, weather station, real-time data, *etc.*)

o Uses of MREs in the sharing of spaces and preservation of biodiversity in the context of ocean literacy.

o Completed by an event space, training facilities, and a temporary exhibition.

- **A global tourist route**: The exhibition can be completed with outdoor material, with full scale equipment and information panels along the coastal path. The outdoor equipment and the exhibition centre will be integrated into the existing tourist offer of the territory (see Figure 12).

The programme design is already engaged, the following table summarises the main elements of this programme design.

Table 10. SEM-REV EPE Plan for a Centre on Ocean Literacy and Marine Renewable Energy

Stages	Description
Strategy	The development of SEM-REV activities within the Penn Avel Park will respond to 3 major challenges: • Raise awareness about ocean literacy and Marine Renewable Energies by being a place of exchange and sharing of scientific and technical knowledge. • Enhance the natural, cultural and scientific heritage while preserving the environment. • Boost the territory by welcoming innovative ideas and technologies. Centrale Nantes is the project manager, and can count on the support from various actors (wind project developers, electricity operator, city council…)
Requirements	A first feasibility study, combined with a detailed analysis of the context and requirements was subcontracted in 2022. This was a first step towards the specifications of the three spaces mentioned above before launching the public consultation for procurement.
Design	Designed for a wide audience, it will be a place to discover and raise awareness of the challenges in this sector. There will be many interactive tools and informative displays.
Planning	The business model of the programme is still being developed (entrance fees, visit fees…). The programme will be operational in 2023.

The plan is ambitious and will result in a structure made of various tools applicable at all stages of public engagement (consultation, collaboration, and co-creation). Centrale Nantes received funding to develop the exhibition centre and initiated the preliminary studies. This new structure is set to open in autumn 2025.
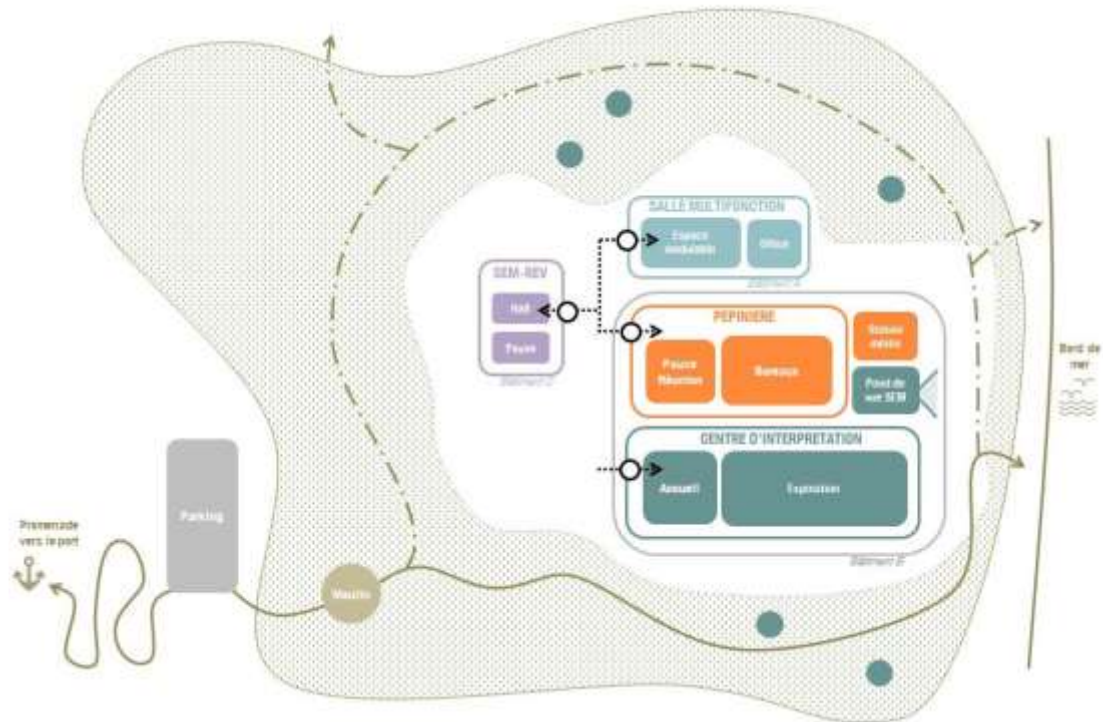

Figure 12. Schematic view of the 3 main spaces in Pen Avel Park.

10.4 Content Curation

The learning materials on display at the exhibition centre relevant to the SafeWAVE project will cover at least 4 general topics – climate and energy, climate change and the ocean, ocean wave basics, and wave energy converter technologies. Below is a list of different sources from which we will draw information in creating the EPE materials for these topics.

10.4.1 Climate and energy

For the 30th anniversary of Le Mar – an exhibition of marine renewable energy technologies held in Nantes – we put together a series of 24 infographics depicting

the work ECN is involved in which tell the full story from climate change to wave energy (and other MRE technologies). The exhibition hall will have these infographics displayed in various places throughout the building. Below is an example of the one on wave energy devices which depicts the detail contained in these posters.

https://www.youtube.com/watch?v=AMF7YDvhTws

ECN also put together an hour-long environmental education video discussing climate change, its cause, and its possible mitigation through the deployment of renewable energy technologies (currently at 12,000 views). This may play on a loop on one of the Centre's monitors or, at the very least, information on how to access it will be provided on our brochures.

10.4.2 Climate change and the ocean

As other of our partners have realized, the 2019 IPCC report on the oceans is an invaluable tool to communicate UNESCO's 6th principle of ocean literacy – humans and the ocean are inextricably linked. We will develop display material from this document and may also print out the French government's press release of its publication for distribution to interested visitors because it does an excellent job of summing up the main conclusions (PNUE, 2019). Our exhibition hall will also benefit from ECN joining UNESCO's Decade of Ocean Science for Sustainable Development and their ongoing ocean literacy efforts as evidence by this poignant image of coral life under a 1.1°C rise (current state), a 1.5°C rise (our quickly vanishing target) and a 2°C rise (United Nations, 2023).

(IPCC, 2019)
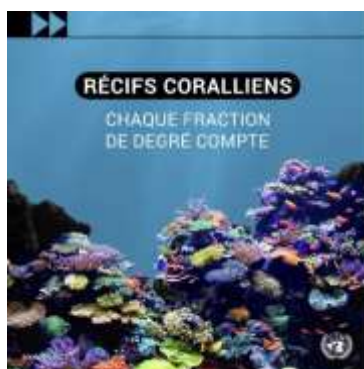
10.4.3 Ocean wave basics

(AFP, 2016)

AFP, the French Press Agency put out a short video explaining ocean wave basics that is well done and easy to follow. It also has the advantage of being short so we might be able to use it on a monitor near the reception desk. It will be easily digestible for people waiting in line or who just stop by unsure if they want to go deeper into the exhibition hall. A longer video addressing both ocean wave basics and marine renewable energy generation is this episode from a somewhat old television show. Though some of the technology is outdated, wave energy physics are the same and It has the added benefit of being filmed in our own ECN wave tank.

It's not rocket science - ENERGIES OF THE SEA: from the oceans to the current! (c. 2014)

10.4.4 Ocean wave energy converters

Under this topic we have a multitude of possible display material owing to our long life as a wave energy testing facility. We will conduct tours out to our current installations, but we will also have some information displayed inside the exhibit hall. For instance, just last year there was a new type of wave energy converter installed off the coast of Brittany. This unique shutter device claims to convert 60% of a wave's energy to usable electrical power. Next year (2024) this device will be replaced by a full-scale one made out of concrete and have a nameplate capacity in the megawatts.

For the more technically astute visitors to the centre, we have the good fortune of being able to draw insights from one of our colleagues. Aurélien Babarit wrote the book (2018) on wave energy resource and technologies, or well, at least a book. The book relays state-of-the-art knowledge on wave energy and, unusual in this field, it also offers ways to position wave energy on the electricity market. Though material from this work would be inappropriate for the uninitiated, for the right visitor, it offers insights that otherwise, would unlikely get elsewhere.

11 Portugal's EPE Plan

11.1 Introduction

WavEC Offshore Renewables is an organization with extensive experience in public engagement activities, particularly in the installation of marine energy technologies. The goal of this engagement in Portugal is to ensure that the community near the proposed site of the HIWAVE-5 technology installation understands the project and its potential impact on the area. These two aims will be communicated within the context that wave energy development serves as a concrete and visible example of UNESCO's Ocean Literacy Principle #6 – *that humans and the ocean are inextricably interconnected*. The plan presented here follows the four-stage structure used throughout this document.

Figure 13: HiWave-5 deployment (CorPower, 2022)

11.2 Strategic Stage

The *focus* of this engagement initiative is to ensure that the community is well-informed about the project and the potential impact it may have on the area. To achieve this, WavEC Offshore Renewables will work closely with key stakeholders, such as the City Hall and Maritime Authority, who are familiar with the community and can help facilitate open and effective communication.

In order to ensure a positive outcome from this interaction with the community, it is imperative that all relevant *stakeholders* are thoroughly identified and involved. This includes not only community leaders, but also important contacts such as the head of fishing associations and any other organizations that may have a vested interest in the proposed installation of the HIWAVE-5 technology. Through this comprehensive approach, WavEC Offshore Renewables aims to build strong relationships with the local community and foster a deep understanding of the project and its potential effects on the region. In addition to meeting with direct stakeholders, we will hold a public event in the town of Póvoa de Varzim that will be open to the general public.

11.3 Requirements Stage

The goals of the stakeholder meeting and the meeting with the general public are slightly different. The first step, the stakeholder engagement, has already taken place. This engagement involved the organization of separate meetings with the City Hall, Maritime Authority, and the main Fishermen associations. During these meetings, WavEC was able to address the specific concerns and questions of each group. This was followed by an open session that brought together all relevant stakeholders, where they could learn more about the project and ask questions.

The City Hall and Maritime Authority were specifically invited to participate in open sessions about the technology, where they were given the opportunity to voice their opinions and perspectives. During these sessions, Corpower Ocean, the technology developer, explained the project in detail, while WavEC held a presentation about environmental monitoring, ensuring that all participants had a comprehensive understanding of the project and its potential impact.

The Maritime Authority has a proactive approach towards promoting the safe and responsible use of marine resources and they believe that initiatives like open sessions play a crucial role in achieving this goal. They aim to prevent any potential accidents that may arise due to lack of awareness or non-compliance with established regulations. On the other hand, the City Hall has shown great enthusiasm in supporting projects related to marine renewable energy, as they recognize the significant economic benefits it can bring to the region. The City Hall sees itself as a key player in communicating the importance of the project to the public and in arranging venues and dissemination centers for meetings and events. Furthermore,

they are eager to offer their facilities as a location for open sessions, where members of the community can come together to learn about the technology and ask questions.

To promote the wave energy HIWAVE-5 project and engage with the general public, a new half-day open session is planned to take place in May 2023, complete with a food and drinks reception for networking. This open session will provide attendees with the opportunity to learn about the progress made in the installation process and to ask questions.

The event will take place in Póvoa de Varzim, at the Diana Bar, a former restaurant that has been converted into a local library that is well-visited, particularly in the summer. With its prime location in the same region as the wave energy converter, the library sees a significant amount of visitors, particularly during the bustling summer months.

The first open session of the project was attended by approximately 35 individuals. However, it is projected that the participation will increase in the next session once the device has been successfully installed in the water. The installation process has been scheduled for the month of February in 2023. According to the estimations, the venue has the capacity to comfortably accommodate a larger crowd of up to 80 people, which is why it is expected to see a higher turnout for the subsequent session.

11.4 Design Stage

The purpose of this open forum is to keep the community informed on the advancements made during the installation phase of the innovative HIWAVE-5 project. The session provides a platform for stakeholders and the general public (who could be considered stakeholders as well) to ask questions and clear any doubts they may have, with the ultimate goal of avoiding any potential opposition to the testing of the project.

It is essential to foster a positive and productive dialogue between all parties involved and to emphasize that the project will not result in any negative impact on the use of the sea by any party. By openly communicating the progress and ensuring that everyone is well-informed, we can create an implicit assurance to all that the project is being implemented in a responsible and safe manner. Specific learning objectives are covered in section 11.6.

11.5 Planning Stage

WavEC Offshore Renewables is committed to public engagement and has plans to continue these efforts beyond the timeframe of the SafeWAVE project.

An exhibition centre is set to be established with the purpose of presenting information about the HIWAVE-5 project to all stakeholders. The centre will feature a range of media to disseminate information, including videos, project brochures, interactive displays, and posters. To gather feedback and gauge the public's understanding of the project, attendees will be given access to a tablet where they can answer questions and provide their insights into the potential environmental impacts and other questions related to the HIWAVE-5 project. This will enable the organisers to determine what information stakeholders and the general public are already aware of and where further education may be necessary.

11.6 Content curation

A state-of-the-art camera will be strategically placed in proximity to the device to continuously capture real-time footage and data, which will be made readily accessible to all attendees. The Diana Bar, which serves as the main hub for the exhibition centre, will have staff members on hand at all times to assist visitors in finding their way to the centre and inform them of the survey that can be completed using the tablet. The duration of the exhibition at the Diana Bar is yet to be determined.

In order to cater to a wide range of attendees, the educational materials provided at the exhibition centre will be tailored to meet the needs and interests of each individual. For instance, dedicated materials will be created specifically for younger visitors, while journalists will receive press releases containing all the necessary information they require. This approach will ensure that the information presented is both engaging and accessible to all attendees, regardless of their background or level of knowledge.

The exhibition centre has been designed to educate and captivate attendees through the use of a wide range of informative materials. These materials will include a TV screen displaying videos, project brochures, a tablet for completing questionnaires, eye-catching posters, drawings that children can colour, and an interactive module that explores the wave energy device and the production of renewable energy. All of
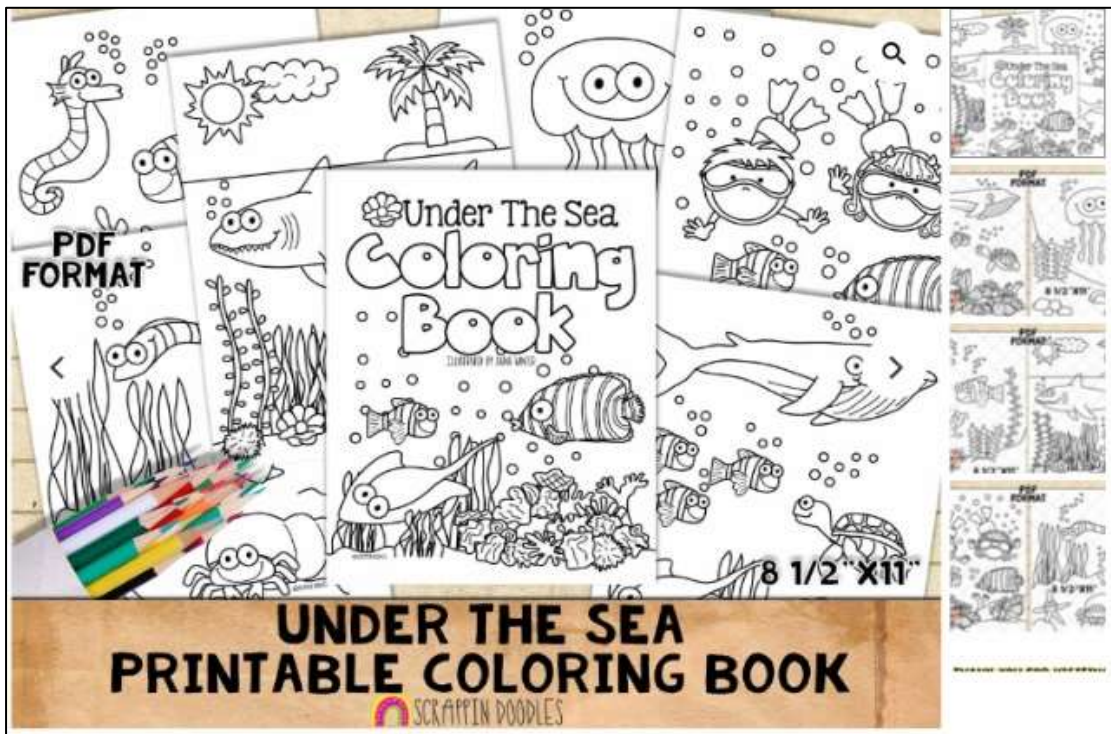
these materials are currently in the process of being produced and are expected to be completed and ready for use by May, 2023.

In the course of preparing our EPE materials, we will make use of our store of in-house resources as well as many that are available through open-source sites on the web. So that the reader may have an idea of what this indicative content may look like, we include a few examples below.

As Aventuras da Poli & Orci": defesa de um

As has been noted elsewhere in this document, this decade, 2021 – 2030, has been designated by the UN as *The Decade of Ocean Science for Sustainable Development*. This movement is linked hand-in-hand to UNESCO's ocean literacy program and there are hundreds, if not thousands, of resources available for those who take part in the programme, which we will do. To the left is an example.

Downloadable PDF colouring pages (Scrapppindoodles, 2022)
https://www.scrappindoodles.ca/products/under-the-sea-coloring-book-ocean-coloring-pages-pdf

"The Adventures of Poli & Orci" is a multi-layered children's story that uses graphics and an instructional narrative to convey elements of ocean literacy in an informal method suited to 21st-century kids aged 6-10. This would be a good resource if we were conducting a session with children alone. If we want to give something to children of parents who visit for the tour, or if we have a child care service while the parents are involved in a dialogue session or on a tour, we might use colouring pages (like that available from Scrappin Doodles, 2022)

Video of the side event on Ocean Literacy Dialogues hosted by Ciência Víva at the United Nations Ocean Conference in Lisbon, Portugal on 29/06/2022

https://www.youtube.com/watch?v=FBHVB4LwoME

In addition to the live feed video of the test site which will be streaming on one of our monitors in the exhibition hall, we may also have other monitors with other content (content we will also make available on our website). For example, at last year's United Nations Ocean Conference in Lisbon, there was a side event focusing on ocean literacy dialogues and we could run that video on a 2-hr loop. It is easy enough to pick up on any of the numerous discussions covered over the span of the event and it does not require the listener to commit to the whole two hours. Of course, the second focus of the SafeWAVE project is how this broadened conception of ocean literacy creates a space for discussing how the citizenry can learn more about wave energy and even provide avenues for them to contribute to its development. To this end, we

will be conducting tours to the site and making presentations specifically about wave energy and how the devices work to convert the motion of ocean waves into electrical power we can use.

Poster advertising a public information event (WavEc)

A slide from one of our typical presentations (WavEc)

There are also a number of videos on YouTube which showcase different wave energy technologies in action which we may run of other monitors in the exhibition facility. Here is a screen shot of one from last year depicting an earlier version of the HIWAVE-5 that does a good job of showing how the device actually works.
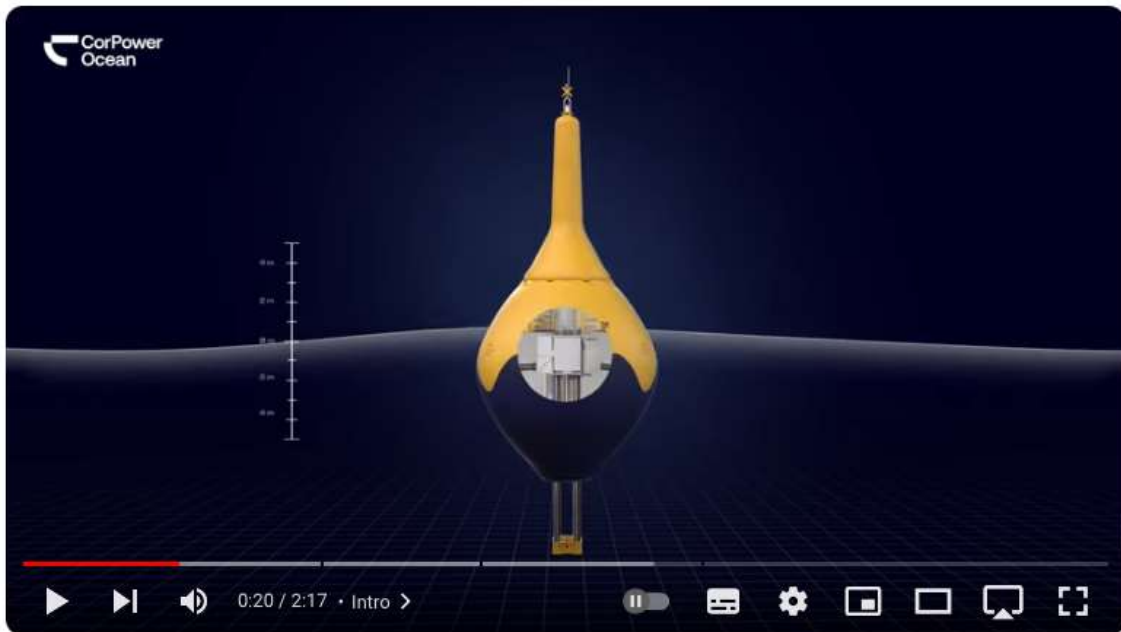
CorPower's C4 Technology in action (CorPower, 2022)

https://www.youtube.com/watch?v=9qu2Olw4-p8&t=20s

Figure 14: Future HiWave-5 array (CorPower, 2022)

12 Spain's EPE Plan

The Basque Country is and has historically been one of the most industrialised regions in Spain. It has numerous SMEs dedicated to the design and manufacture of metallic, mechanical, and electric-electronic equipment for aeronautics, telecommunications, energy, machine tools, and automobiles, among others (Euskadi, 2023). The Basque Country has the highest per capita expenditure in R&D activities in Spain (INE, 2023). Despite being a traditionally industrial region, its tourism industry has also been steadily growing in recent years (Euskadi, 2023).

The Basque Country has a population of around 2.2 million people and a population density of 307 people/km². Official languages are Spanish and Basque, with 53% of the population being bilingual in one way or another, although only 17.5% of the population report Basque as their first language (Departamento de Cultura Y Politica Linguistica, 2019). The Basque Government, through its Energy Agency, EVE, has promoted renewable energy projects and in particular marine energy since the early 2000s. The current Basque Energy Strategy specifically sets a target of 60 MW installed capacity of marine energy by 2030.

The Biscay Marine Energy Platform, BiMEP, a public company owned with a 25% ownership stake by the Spanish Energy Agency (IDAE) and a 75% stake by the Basque Energy Agency (EVE), currently manages two sites, Armintza and Mutriku. These two test sites are a result of the Basque Country's long-term commitment to marine renewable energy.

The wave power plant in Mutriku was a pioneer in its field. Commissioned in 2011, it is the longest-lived wave power plant in the world and has produced over 3 GWh to date. The opportunity to build the plant arose when the town of Mutriku decided to build a new breakwater to protect its harbour. It has 16 ocean wave converter chambers and an installed capacity of 296 kW. The municipality of Mutriku is situated on the west coast of Gipuzkoa Province in the Autonomous Community of Basque Country, northern Spain. It has a population of 5,314 inhabitants according to the 2018 census, 98% of which are Basque speakers (INE, 2023).

The economy in Mutriku is largely dependent on the sea, with the natural harbour catering mainly to inshore fishing and ancillary activities. The canning industry has

historically been the main focus of economic activity, though in recent years this has given way to various metal transformation workshops that connect with the principal industry of the region. Tourism has contributed to Mutriku's economy for some years now. The old quarter has been classified as a cultural heritage site since 1995. Since 2010, Mutriku has been part of the Geopark of the Basque Coast, along with Deba and Zumaia, which were incorporated into UNESCO World Geoparks network in 2015.

Figure 15: Mutriku Wave Energy Plant (Verdict Media Limited, 2023).

Armintza, located in the municipality of Lemoiz, hosts the BiMEP test site, an open-sea, full-scale test site for wave energy converters, floating wind energy prototypes and auxiliary equipment. BiMEP occupies an area of 5.2 km² of open sea which is marked as excluded for navigation and maritime traffic. It is situated at a minimum distance of 1.7km from the shore where the water depth ranges from 50 – 90m and access to the test area is fast and easy from the nearby harbour (Figure 16).

The municipality of Lemoiz is located on the coast of the province of Bizkaia, in the Basque Country, North of Spain. Lemoiz has just over 1,200 inhabitants and 97% of its population speaks Basque. There are three main neighbourhoods, Lemoiz - Andraka, Urizar and Armintza. Armintza, located in a natural cove, is often frequented by scuba divers and fishing enthusiasts, and is the host to many leisure boats. The

service sector accounts for 84.1% of the Lemoiz municipality's economic activity, whereas Armintza's economy is mostly linked to the sea. Fishing has been its main engine directly or indirectly for years and the village has grown popular as a tourist destination. During the 1970s and 1980s it was the chosen site for the Lemoiz Nuclear Power Plant. However, the project was halted in 1983 and while it was nearly completed, construction remains unfinished due to the 1984 all-Spain moratorium on new nuclear power plants. Currently, there are plans for establishing aquaculture facilities in this location.

Figure 16: BiMEP's open ocean test site, Armintza.

Both towns, Mutriku and Armintza, have hosted wave energy projects for many years and there have been many public outreach activities during that time. Therefore, they are considered to be aware of wave energy and other forms of marine renewable energy. These populations were recruited to participate in the process of developing these marine energy projects from the very beginning. Thus, it has been decided that rather than focusing on the communities of these two locations, the Education and Public Engagement Plan (EPE) should target a community with the Basque public in general to raise awareness of marine renewable energy and ocean literacy among the broader population.

In the effort to bring the topic of wave energy to different sectors of society, the Spanish EPE initiative aims at giving the society the opportunity to participate in different actions: i) guided visit to Mutriku Wave Energy Plant, ii) involve people on a survey tool, iii) and engage students/civil society through a wave energy card game.

12.1 Strategy

The *focus* of the guided tour around the Mutriku wave energy facilities will be to raise awareness on the potential of the ocean to provide energy, and more specifically, wave energy. This activity takes an opportunistic approach in the sense that guided visits are already offered to the society through the Tourism Office in Mutriku. Nevertheless, this opportunity has allowed us to adapt the content of the explanations we normally provide to emphasize the six key learning areas identified earlier in section 9.5 (i.e., ocean literacy principles, Principle 6 – humans and the ocean are intrinsically interlinked, climate change and the ocean, ocean wave basics, wave energy converter technologies and community ocean renewable energy). This holistic approach can contribute to a better understanding of the topic and, hopefully, generate some meaningful engagement. The number of visitors is limited to 25 people per visit. There are two tours per month, one in the Spanish language and another in Basque. Depending on the start and end of the implementation of the project, the number of engaged people will vary between a minimum of 50 participants and a maximum of 200 participants. It needs to be considered that visitors are not randomly selected; in fact, they are people with a personal interest since they signed up for the tour. Therefore, it should be considered that they already have some sensibility about the topic of marine renewables and possibly some specific knowledge as well.

Whenever possible, a survey will be carried out as means to assess both the general knowledge of society on the topic (six main themes) and the effectiveness of guided tours at raising awareness and broadening ocean literacy. In that sense, the implementation of two questionnaires is needed, one pre- and one post- visit. The initiators are personnel from a dedicated tourism agency (Begi-bistan: https://www.begi-bistan.com/), with high expert knowledge on the area of societal engagement. The maximum number of participants on the above-mentioned tours is 200. However, and considering previous experiences, the tours are not always completely full, and it cannot be expected that all the people will return completed

surveys. Thus, it is expected that we will receive a maximum number of 100 surveys. Although this may be limited in size, it is a first step towards assessing the effectiveness of wave energy engagement through guided tours.

Finally, a wave energy card game has been developed as an alternative way to engage with people. This kind of resource allows reaching high numbers of people and has little requirements. This game aim at presenting the process of a wave energy development: authorisation, development, and energy production. During this process the players will be exposed to different situations, and thus, able to reflect on several topics. It is expected that this process will allow exchanging ideas and fruitful discussions.

12.2 Requirements Stage

The objective of this activities is to raise awareness on the potential of the ocean to generate energy, and more specifically, wave energy, while increasing ocean/energy literacy among the society at large. The guided tours are already ongoing, but the tours, with adapted content, will start in March 2023[14]. The tours carried out between March and June are expected to be the ones to be considered within the scope of the implementation of this EPE. The tours are organized by the Tourism Office, and they are already advertised on the following website https://geoparkea.eus/es/visitas-guiadas/planta-olas-mutriku for bookings. As indicated in the strategy stage, there are two tours a month, always on the same day, and always on the weekend. The cost is 2 euros per person for a guided tour that lasts one hour, the age limit is at 8 years old, the communication language is Spanish and Basque (carried out at independent times), and a maximum of 25 people is allowed in each tour. The facilitator is an experienced engineer working in BiMEP who has already carried out this type of tour in the past and who has a capacity to communicate both in Spanish and Basque. During the tour, the facilities are visited, and the guide provides information on climate change and the ocean, ocean wave basics, and wave energy converter technologies. For the purpose of this EPE, additional information will be communicated on the ocean

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[14] Due to delays in finalising the document, these activities have already been carried out. Yet, we have maintained the original design.

literacy principles, especially on principle 6, and the effect of this type of project for the community. As indicated above, the maximum number of participants, if every visit offering is full capacity, is 200 participants. These tours are open to any person above 8[15] years old and are not limited to local people. If prior to the events the groups are not full, we, and our colleagues, will actively promote the tours across our network of friends, to increase the chances of more people participating.

On the other hand, the goal of the surveys is to learn about the knowledge base of society on wave energy and associated topics (i.e., ocean literacy principles, climate change, convertors, etc.), and their capacity to learn through a guided tour. A tangential but expected result is that the event could potentially improve the perception of wave energy developments. These events will be carried out during the last year of SafeWAVE project (2023) and, due to the time needed to submit the Deliverable 7.6. related to the implementation of the EPE, the surveys will be carried out between March and June 2023. Both, pre- and post-surveys will be carried out *in situ*. Printed version will be used for this task. The questionnaire will be developed both in Spanish and Basque, so as to address visitors´ needs. The tours are not limited to local people, but since the tours are carried out only in these two languages, we expect that if visitors from other countries attend the tours, they will have sufficient Basque and/or Spanish language skills to complete the survey.[16]

Ideally, the card game would be use with those on participating in the guided tour as means to complement it. Nevertheless, since these visits fit within another programme, it is considered best to separate it from those other actions. The goal of the card game is to promote ocean literacy on this topic with different sectors of society. With this purpose, the idea is that once the game is developed (with the required testing), the game will be used in different contexts (e.g., different countries, students, professionals in the field, standard citizen). The innovative character of this type of action, requires from applying it first to see what works best and obtain feedback on the level of engagement that it generates and capacity to increase ocean literacy. This will allow better defining the requirements in the future.

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[15] Surveys/questionnaires will only be distributed to people 18 years of age or more.

[16] Our Irish partner is also working on a survey tool and an introductory video for the website which they also plan to be available in different languages.

12.3 Design Stage

The visits will be structured in the following parts. The times are representative as the starting time varies between tours:

- 12:00 – meeting at the "old swimming pool" of the port of Mutriku
- 12:05-12:15 – walk to the facilities while the guide gets a feeling of the group (short survey – see next action) and talks about the ocean literacy principles and especially, principle 6.
- 12:15-12:50 – visit to the facilities which is accompanied by information about climate change, the ocean and wave energy and wave energy convertors.
- 12:50-13:00 – facilitator will focus on the environmental, social and economic impact of this installation.
- 13.00 – survey completion (see next action)

Both at the end of the tour and during the tour, the participants will have the opportunity to interact with the guide and ask questions at any time. The guide will be responsible for providing similar content in all the tours, but it is expected that some deviations may occur as the interest of the different groups will very likely vary.

The survey should take no longer than 5-10 minutes to be completed. The questionnaire will be designed both in Spanish and Basque. However, it will contain three sets of questions. A first set will allow the self-characterisation of the person. The second set will aim at characterizing the knowledge of the people on the key topic (for the pre- visit) or the learning experience on those same topics (post- visit). The final set of questions will allow identifying the most rewarding part of the visit and suggestions for improving the learning experience. The main concern is that, initially, participating in the survey itself does not provide any input to the participant, as opposed to the visit to the facilities. Thus, it will be important to reinforce the importance of understanding the effect of these types of actions (guided tours to wave energy facilities as means to gain better understanding and perception on these projects), as it can be a learning experience for future developments.

On the other hand, the card game is designed for being played in groups of four. Thus, it is considered that with one "moderator", a maximum of three or four groups

can play the game at the same time. The game session is structured into three parts. During the first part, at the introduction, a short video (available on a QR code on the box of the card game, will be presented as means to introduce the wave energy topic and support the moderator on this process. This video will be presented and after that the "moderator" will present the instructions of the game. Secondly, the different groups will play the game. Since the objective is to achieve certain energy production, this may require playing more than one round. During this game, players will go through three steps: obtain authorisation for the installation of a wave energy park, make the development and produce energy. Players will undergo different situations, which will serve for the third part of the game, the closure. During the closure, players will discuss the situations they have lived during the game (i.e., difficulties, obstacles and opportunities, etc.). The "moderator" will use these personal experiences as means to compare with reality of this processes. The players will verbally assess the contribution of the game to engaging and learning.

12.4 Planning stage

The plan is to start working with these visits in March 2023 through June 2023, so outputs obtained can feed into Deliverable 7.6. These visits do not work in isolation. The idea is to be accompanied by a short questionnaire survey that is implemented before and after the visit. This pre-post assessment will allow us to understand the effectiveness of the visit at reaching the objectives. All the details on the questionnaire surveys are provided in the following action.

The timing of the questionnaire surveys needs to be aligned with the guided tours around the Mutriku facilities. Therefore, these surveys are planned around the specific dates for which guided visits are planned, between March and June 2023. The specific timing of the survey will be before the start of the tour and just after finishing the tour. Although we will provide printed copies of the questionnaire, a QR code will be provided to those that prefer completing the questionnaire online. Although the questionnaires will be distributed face-to-face among all participants, the completion of the questionnaire itself will be carried out independently by the participants. Ideally, we would like to carry out the "pre-survey" while signing up for the guided tour. However, there may be difficulties in this approach as it means that people will be

dedicating extra time to register which may ultimately deter them from participating. Thus, careful consideration may be given to this point.

Finally, since the card game will work independently, it is expected to implement the game in different *fora* (e.g., with master students from different disciplines, which could allow understanding how different backgrounds allows for different engagement types).

12.5 Content curation

As mentioned above, curating the content for our EPE programme will be the least taxing part of this endeavour. BiMEP has been in operation for over a decade and has conducted numerous public engagement events dating from before the facility at Mutriku was even constructed. See Deliverables 7.2 and 7.3 for a brief history of our work in this area. Indeed, it may be more difficult to limit the information to what is digestible by the casual visitor than it will be to find information to communicate. To help us with this task, we have chosen to organize our presentation material, all of which we have in-house, according to the learning areas set out in Section 8.5 above. In fact, we are currently working on an infographic that will be displayed alongside our long-standing exhibit at the Maritime Museum. In Deliverable 7.6 we will provide the finalized pre- and post- survey question, the results obtained, as well as the card game content and experiences.

Though we will develop this content in-house, there are a number of external sources we will consult as we create the tour guide script and the questionnaire. We include a few examples here below of the indicative content from which we will draw.
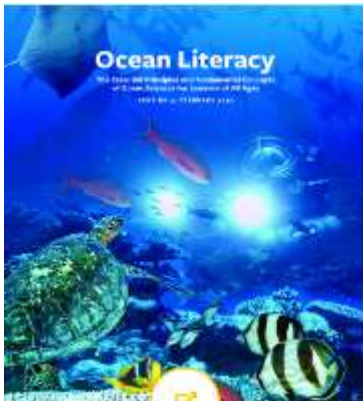
Alfabetización oceánica: los principios esenciales y los conceptos fundamentales de las ciencias oceánicas para estudiantes de todas las edades (2020)

As has been mentioned, UNESCO's ocean literacy program is vast, detailed, and catered to learners of all ages. They have a wealth of material and it is all available in Spanish as well as a host of other languages. We intend to join "The Decade of the Ocean" and share some of our programmes and activities through the Ocean Literacy Portal on UNESCO website. As with the Irish plan we will focus on the sixth principle of ocean literacy, which states that 'humans and the ocean are inextricably linked'. It is through the lens of this principle that ocean renewable energy development, and specifically wave energy, can best be viewed.

The 2019 report by the IPCC – Special Report on the Ocean and Cryosphere in a Changing Climate – represents a significant development in our understanding of how climate change is affecting the oceans and, therefore, human populations. There are two chapters especially relevant to the ocean literacy aspect of SafeWAVE: Chapter 4 – Sea Level Rise and Implications for Low Lying Islands, Coasts, and Communities; and Chapter 5 – Changing Ocean, Marine Ecosystems, and Dependent Communities. We will incorporate this information into our EPE materials.

Following the rather bleak material on the ocean's degrading health, we will offer part of the solution through our presentation of the potential for wave energy development to help reduce the amount of carbon the ocean has to absorb and supply seaside communities with renewable energy in return. To present this idea, we will first need to discuss some ocean energy wave basics.

This video by BiMEP project manager Dr. Jon Lekube is one resource that we could use to explain wave power harnessing. It is a superb presentation of the oscillating water column device used at the Mutriku wave energy plant.

Wave Power Plant in the Bay of Biscay - Pioneer Jon Lekube

https://www.youtube.com/watch?v=yoFd5nPS6-Q

What we have presented here are examples of the indicative content from which we will draw as we produce the specific presentations, questionnaires, and infographics that will be described and evaluated in D7.6.

13 Conclusion

SafeWAVE Deliverable 7.5, *Tailored Ocean Literacy Programmes Focusing on Wave Energy*, used the framework developed in Deliverable 7.4 to organise an approach for creating education and public engagement (EPE) programmes that are tailored to the specific circumstances in each of the communities of the project's four member countries – France, Ireland, Portugal, and Spain. These programmes aim to: (i) raise awareness of wave energy, energy transition and climate action through outreach, education, and training initiatives and (ii) provide an inclusive mechanism for community and wider society stakeholders to input into the planning and realisation of ocean energy projects. After the introductory material, the document's sections 5, 6, and 7 detail the planning steps to be considered for the representative EPE activities (listed in the project's Description of Activities) in each of the framework tiers – consultation, collaboration, and co-creation.

The second half of the document details the tailored EPE plans of each country that were produced by the partners using the four-stage EPE planning guide and example activities described in the document's first half. Each country's plan seeks to broaden the community's understanding of ocean literacy to include a proactive approach that actualizes their interconnectedness with the ocean in line with UNESCO's Ocean Literacy Principle Number 6 – humans and the ocean are inexorably linked. In the SafeWAVE programme, this linkage is expressed through the community's consideration of wave energy technology which, if manifested, could improve the health of the ocean by reducing the amount of carbon it absorbs that acidifies its waters and kills its coral reefs. In turn, the energy transmitted by the ocean's waves could help provide sustainable electrical power to these seaside communities.

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Appendix 1: an OL – MRE EPE planning guide

A Guide for Wave Energy Education within a Context of Public Engagement for Ocean Literacy

The outline below is meant to serve as a guide for any wave energy company or promoting organization that wishes to conduct a public engagement campaign. It is a three-step programme (information campaign, site visit, and public dialogue session) and can be most aptly used if there are wave energy converters in the water or if there soon will be. It is not a blueprint because every project is different as is every community. Rather, it breaks up the planning process into stages and asks the planner to consider certain questions under each stage.

> ❑ **Strategic Stage:** To map the strategic considerations for your engagement process
> ❑ **Requirements Stage:** To identify what requirements your EPE plan needs to meet
> ❑ **Design Stage:** This is where you create a process design – A progression of steps with mini-objectives – capable of meeting the requirements
> ❑ **Planning Stage:** To elaborate a detailed plan for how each step will happen

Information/Advertisement Campaign

Strategy Stage:

1. Focus:
   a. Give your campaign a name
   b. What are the local radio stations where you can run an ad, preferably a public service ad?
   c. What are the local newspapers?
   d. Where can you put up a poster or distribute flyers?
   e. What is your organization's website and can you include a tab for the EPE event, calendar, newsletter story, etc.

2. Initiators:
   a. Who is on your core team?
   b. Include a local contact on this team – preferably a local government official or someone from the planning department. Other community leaders are an option too, like maybe the parish priest or a local schoolteacher, etc. If your organization does not already have much community presence, it is essential to fill this position.
   c. Are the facilitators of the programme comfortable engaging with an audience some of whom might be a bit antagonistic or show-hogs? If so, consider some online public engagement training. There are a number of online courses available, but most of them require a fee. YouTube can be a surprisingly informative source, but there are also plenty of books on the subject.

3. Potential participants:
   a. Your advertising campaign should reach as many local residents as possible.
   b. What is the town's population?
   c. Should you expand to a regional campaign – only if you do not think you will garner enough participants from the town/local area to fill 20 – 30 seats in your dialogue session.
   d. Are there any population groups who might not have been exposed to your advertising campaign and how can you reach them?

e. If you want to include participants younger than 18 in the dialogue session or site tour, there may be additional paperwork in addition to the general consent forms. Don't, however, discount the contributions from younger people just because of this. They are, after all, the future and your dialogue session will probably include some visioning exercises.

Requirements Stage:

1. Appropriate Goals:
   a. What would define a successful advertising campaign in your community?
   b. Can you track hits to your website and what percentage increase constitutes successfully directing people there?
   c. How many public service ads can you run?
   d. How many flyers do you think should be distributed?

2. Time and Place
   a. The advertisement campaign should continue for a month before the event. Much more than that people will forget about it. Much less than, say, two or three weeks and people may not be able to shift their plans to attend. Considerations to the timing of the event will be covered under the site visit section next.
   b. Focus above covers considerations of place

3. Recruitment
   a. Can you include a registration form on your website?
   b. You may not be able to take everyone who registers for the tour/dialogue session, so for planning purposes decide whether you want the participants to be representative of the community in their demographics OR do you want to focus on groups that have the most to gain or loose by wave energy development. They will not necessarily be the same. In response to this prompt then list the criteria which you will use to select participants. Be as specific as possible.

4. Facilitation challenges

a. How will you reach people who normally do not participate in community events like this (e.g. speak at a fishermen's guild meeting, print materials in all languages appropriate for your area, get a note put into church bulletins, etc.)?

b. Where do people who do not have the internet at home go to use it. Are there internet cafés for example or can you post something at the local library? Please provide names here to make the plans tailored?

Design Stage

1. What are the progression of mini objectives?
   a. Do you need to upgrade the website to handle registrations? / community boards? / comments? / videos? / etc.
   b. How do you pick places for poster displays – high traffic, close to dock, public buildings, etc…what is the priority – be specific
   c. Same for flyers
   d. How many newspaper ads to run and where if at all
   e. Get contact information for local reporters and reach out

Planning Stage

1. Timeline dependent upon site visit and/or workshop
2. Techniques – are there any creative ways to advertise not covered yet, for example, is there a local festival where we could have a presence or an information booth at a farmer's market day? Could you make a presentation at a local environmental organization meeting or a chamber of commerce meeting? Provide organization names, be specific. When and where do they meet. Who is the president/chair, how do you contact them? Include their website. Etc.
3. Practical details – well here discuss more about how you determine these. Do you have any budget for advertising? What can you do with the funds you do have. How can you maximize the potential of your network.

Site Visit

Strategy Stage

1. The focus:
   a. What parts of the site are you going to show the participants?
   b. What about these aspects are relevant to them?

2. Initiators
   a. Are the people leading the site visit the same as the ones leading the dialogue session?
   b. If different, what are their duties at the site, what is their role?

3. Potential participants –
   a. addressed above, but will there be a potential difference in people attending the tour and attending the dialogue session. These should be linked so you can cover questions raised during the tour at the workshop, but not necessarily.
   b. If taking a boat out to the site, are there people who will not want to get on a boat, can you accommodate people who may have mobility challenges?
   c. Can people sign up for one activity and not the other?
   d. If travel is provided by a third party, who are they, what is the name? Will people have to sign a waiver?
   e. If you have a lot of people sign up for the event, could you break it up into two groups and do the workshop on a different day?

Requirements Stage

1. Appropriate Goals
   a. What do you want the participants to know after the tour that they did not know before?
   b. What makes your site unique? What is special about it?

2. Time and Place
   a. How long will the tour last?
   b. How long to get to the site from the meeting place (if they are different)
   c. Will you do the tour first then the dialogue session, or the other way around?

d. Will they both be on the same day as a linked event or are you thinking about doing a few tours and then everyone meet the next weekend (for example) for the dialogue session.

e. Is there a better time of year to tour the facility? Though winter has better waves, generally speaking, will it be too uncomfortable for visitors?

f. Is it safer to do the tour in spring or summer?

g. Think about ways to monitor the reception of your site visit so that you can determine if there are presentation techniques or aspects of the tour that get more attention or spark more questions. How will you make the most of these opportunities?

3. Facilitation challenges
   a. How will you ensure participant safety?
   b. How many people can you accommodate on a tour?
   c. Is there a high noise level that may inhibit conversation?

Design Stage

1. List what you want to show the group in what order you want to show/discuss it. example
   a. Begin tour at observation point
   b. OR begin at doc parking lot
   c. Tour control room and point out a,b,c,d, etc.
   d. Show how the power take off works
   e. Show how wave motion is converted to electrical energy
   f. Etc…

Planning Stage

1. Timeline
   a. Tour starts at _____ and ends at _____
   b. Before or after dialogue session?
   c. Same day or different day?
   d. Weekday or weekend?

2. Techniques
   a. Are there any virtual aspects to the tour?
   b. Should the participants view any videos first or after?
   c. How many guides?
   d. Any hands-on components?

3. Practical details
   a. Do tour participants have to wear any special clothing?
   b. Will there be any costs to them?
   c. Is transportation provided from the dialogue session to the tour spot or vice versa?
   d. How long of a break between the two parts?
   e. Is this a good time to break for lunch?

Community Dialogue Session

Strategy Stage

1. The Focus
   a. What do you want to communicate to this group of citizens and what do you want to learn from them? Be as specific as you can here.
   b. For example, in a given programme, we might want to learn from the community whether they would be interested in hosting a test site and in forming a committee to explore the possibilities of this and further wave energy development. Other examples might be to get their impressions about further development of the site, or expansion, or new devices, or commercialization, citizen science initiatives, etc….
   c. Are you going to cover a few topics – then what are they?
   d. Is your session going to be directed toward a single goal – e.g. visioning exercises to help plan for the community's role in future wave energy development?
   e. Is your focus the production of a document – e.g. a statement from the community about what they expect from energy developers and what they can offer these developers (tax breaks, trained work force, streamlined permitting, etc.).

2. Initiators
   a. This should be the core group from your organization plus one or two community leaders plus (maybe) an industry rep and maybe a regulatory person, depending on the nature of your dialogue session.
   b. You might want to bring in an expert if you wish to discuss topics upon which you might not have specific knowledge. E.g., an environmental scientist to talk about the impact of WECs or what impacts they could offset. Maybe an economist or financier to talk about those topics. Etc. Who else do you think you might want to bring in to the discussion as leader on a particular topic. You do not have to have the specific person right now, but their field of expertise would be good to include in the plan.

3. Potential participants
   a. Already addressed, but who is going to take place in this dialogue session?
   b. Everyone who shows an interest?
   c. What if that is too many, it could be hard to manage a group of more than 30. If you have that many interested participants consider separate sessions or maybe even two or three simultaneous sessions with rotating facilitators.
   d. Other option – maybe your dialogue session is more of a focus group (or more than one focus group). If so, what will be the defining characteristics (underemployed fishermen and women? Budding energy engineers? People over 50/ under 32? Etc…)

Requirements Stage

1. Appropriate Goals
   a. Set in accordance with the focus of the session
   b. Concrete and achievable
   c. Measurable
   d. Consider having some goals set by the participants at the beginning with a question as to what they hope to get of the session and then be

prepared to address those ideas as you go over your planned topics and activities.

2. Time and Place
   a. How long is the session? Is it a half day combined with the tour? Is it a whole day?
   b. Is it more like a workshop retreat lasting a weekend?
   c. Where will you have it? Be specific please. Your place of business, a hotel conference room, community centre, town hall, public park, etc?
   d. Will it be before or after the tour?

3. Recruitment
   a. Can you register people through the website, or will they have to email a form into you?
   b. Are you able to offer any compensation to participants for their time (other than, of course, knowledge which we all know is priceless), even if it is only a free meal?
   c. Will you recruit through social media?
   d. Will you enlist the help of other community organizations to spread the word and seek volunteers? If so, which ones?

4. Facilitation challenges
   a. Will the location of the meeting be able to accommodate people with mobility impairments?
   b. What is the audio visual set up like?
   c. Will there be enough space for the breakout sessions, i.e., can it accommodate 5 or six tables with 5 or six people each?
   d. Will there be any language barriers and can you have bilingual facilitators to circulate during sessions?
   e. Do you need a person who can sign?

Design Stage.

1. Generally, you will want to break up these community dialogue sessions into discrete sections of no more than 1.5 hours each.

2. List 4 topics/activities that you would like to discuss/engage with the participants. Try to keep them specific and not too general, but broad enough that everyone can have something to say. E.g. Are there downsides to wind energy that are not exhibited by wave energy? Vice versa? What role would you like to see your community play in wave energy development or should we leave all that up to the energy companies? …

3. Have a separate goal for each breakout session and for the plenary sessions that follow. Allow breaks in between.

Planning Stage.

1. Timeline
   a. Write out a proposed agenda for the meeting with time allowances for each activity.
   b. Schedule a break every 1.5 hours where some kind of snack and beverage are provided.
   c. Probably should plan for a lunch if you are doing an all-day workshop (four sessions with 2 hrs of whole-group discussions dispersed).

2. Techniques
   a. It is a good idea to use a different activity/instructional technique for each session. That will help prevent people from getting bored.
   b. Examples use a breakout session to form some homogenous groups and treat each as a focus group.
   c. Sharing narratives is also a useful technique that helps to create understanding between different groups
   d. Maybe task each group with working on a different aspect of the problem and then put them together in the plenary session
   e. Maybe create a game where each group has to balance the grid with a certain set of energy generation figures in given times

f. The world is your oyster here, just think of four techniques that you might use to go along with the four topics you provided above (note, you are not wedded to these ideas at this stage, but just think of combinations that could work).

3. Practical details
    a. Will you have to rent the venue?
    b. Can you afford to have the event catered? Or will lunch be something like pizza or subs?
    c. Do you have to provide transportation for anyone?
    d. Could you provide a day-care service for the day so parents with young children could attend?
    e. What materials will you need? Paper, markers, dry erase board *etc*.

Appendix 2: A cradle-to-grave EPE plan using Dingle, Ireland, as an example

What follows is a thought experiment describing what a full education and public engagement campaign might look like using Dingle, Ireland, as the host community. It uses the objectives and timeline of the SafeWAVE project as a springboard, but it is not the Irish EPE plan. This plan is extensive. It is designed to take a community from relative ignorance about wave energy converters and their place in a proactive understanding of ocean literacy to a place where the community is actively engaged and leading the efforts to prepare a host of devices for market readiness. This plan is a hypothetical, an ideal. It is meant to provide an example of what can be accomplished with an EPE approach that draws from each of the three types of engagement activities – Consultation, Collaboration, and Co-creation. To enact this plan would be far beyond the resources available in the SafeWAVE project, but it can serve as what may be achievable in a 3-year funding project dedicated exclusively to education and public engagement on ocean literacy and wave energy development.

1. An introduction to Dingle

Dingle is the only community out of the four that does not currently have any wave energy converters in its waters (Dunphy *et al.*, 2021). The Dingle Peninsula was, however, the focus of a three-year long EPE programme conducted by members of The Dingle Creativity and Innovation Hub, ESB Networks, MaREI Centre (UCC), and North East West Kerry Development. The programme was called Dingle Peninsula 2030 and its goal was to create a more sustainable future for the peninsula (MaREI, 2020). Though energy was one of the areas addressed by the programme, the specific manifestation of that initiative was a feasibility study of using biogas to meet the needs of the peninsula. Though biogas may be an option for the energy mix, it will unlikely meet all the energy needs of the area. According to *Ireland's National Energy and Climate Plan 2021-2030*, in the rosiest scenario (WAM – with additional measures) biogas will meet about 9% of renewable transportation needs, 2.4% of renewable electricity, and 4.5% of renewable heat generation in 2030 (Department of Communications Climate Action & Environment, 2020, pp. 41–43). The waters just off of Dingle, however, have the best near-shore wave energy potential of anywhere in Ireland (Belmullet is a close second) (SEAI and the Marine Institute of Ireland, 2022)

and the west coast of Ireland as a whole has some of the best wave energy generating characteristics of anywhere in the world (Penalba *et al.,* 2018). Just on the basis of competitive advantage alone, exploring the potential for wave energy here could lead to a sustainable energy future for the area with a healthy economic boost for the community as well. And, as noted in Section 8, wave energy could find its niche in the national and international power generation mix through fulfilling the energy and sustainable development needs of small coastal communities not only here but the world over. Ireland's EPE initiative within the SafeWAVE project then is to make the first step in bringing community ocean renewable energy (CORE) to Dingle. It is the intention of this effort to involve the community from the very beginnings and to do that we need to learn as much as we can about the capacity of the population to broaden its ocean literacy perspective to include this new and innovative sustainable energy technology. To that end, the EPE programme begins with an information campaign to get the word out about the wave energy potential off the shores of the community. It will then progress to the next tier of community engagement by circulating a survey among the population to gauge interest and potential participation. If the results of the survey are promising, the EPE programme moves on to conducting at least one community dialogue session to both provide more in-depth information and to hear from community members narratives about their life near the ocean and what possible visions they have of incorporating wave energy into the image they have of their town. At the end of the dialogue session(s), the community votes on whether to establish a marine renewable energy exploratory committee (the CORE committee – community ocean renewable energy) and continue working with the university. Further EPE activity will involve training sessions and capacity building for this committee to help them realize the potential of wave energy generation for the peninsula. Each of these four stages are described below.

2. Information campaign – Consultation, unidirectional from initiators

The EPE programme in Ireland begins with an information campaign to inform the citizens that the university (UCC) is interested in exploring the concept of ocean literacy with them and discovering if and how renewable ocean energy development fits into that concept. This campaign consists of posters, flyers, radio advertisements, local news coverage, and information booths at public events and periodically in public

spaces. Planning for the information campaign follows the four-stage process described in Section 4.6.

Strategy Stage. The *focus* of the information campaign is two-fold. First, it is intended to provide information about wave energy and its place in an overall deeper understanding of our interconnectedness to the ocean. In this latter respect, the campaign utilizes material from UNESCO's Ocean Decade project and the seven principles of ocean literacy it promotes (Santoro et al., 2017). The most relevant principle in this context is number six which directly relates to this aspect of the effect humans have on the ocean and the benefits the ocean provides to humans. The second focus of the campaign is to encourage people to register at the website and take the survey. More on this aspect in Section 9.2. The *initiators* of the information campaign come from the founding members of the programme which are composed of representatives from UCC, Dingle Peninsula 2030, the Dingle Hub, MaREI, Transition Kerry, the Kerry County Council, the Dingle Business Chamber, Dingle Tourist Office, the Dingle Harbour Board, the North East and West Kerry Development Board, and the Dingle Sustainable Energy Community. These organizations play some role in the EPE programme as a whole, but they each might not be involved in every aspect. The *participants* of the information campaign are the entire population of the peninsula, about 10,000 people. The goal of the information campaign is to reach everyone who could be a potential stakeholder in the community's effort to explore the possibilities of ocean energy development.

Requirements Stage. The *goal* for this part of the EPE programme is broad information dissemination. Ideally, every person in Dingle will be in a position to have seen or heard about the programme. The secondary goal is to accumulate at least a statistically significant response on the survey which is discussed below. There are multiple *places and times* at which the information dissemination occurs. This phase of the SafeWAVE project begins in September, 2022, and it will take a minimum of three months to prepare the print material, create and test the survey, upgrade the website, and establish contacts with the relevant organizations. This preparation time takes the programme initiators to December 2022. Owing to the holiday season, it will be best to begin the information campaign at the beginning of 2023. The UCC team estimates it will take four to six months before enough surveys are returned to gauge the community's interest in pursuing the possibilities of ocean renewable energy

generation. During that time, direct mailers are sent out to all the households on the Dingle Peninsula, posters are displayed in acceptable public spaces and in stores where permitted. Radio advertisements run from April to June, and information booths will be staffed at each of the eleven festivals that take place on the peninsula from March through June (Dingle-Peninsula, 2022). The only *recruitment* involved in the information dissemination will be of people to take the survey and of volunteers who would like to spread the message. As far as the *facilitation challenges*, these will mainly be financial as flyers, direct mailers, posters, brochures, banners, radio spots, and newspaper advertisements all cost money.

Design Stage. The mini-goals of the information campaign are all related to numbers. How many flyers were mailed and what percentage of the population does that cover? How many people might see a given poster dependent upon the foot traffic in a certain area? How many radio spots were secured? How many brochures were handed out at the festivals? All this information is tracked and recorded. One of the questions on the survey will cover trying to find out which of these advertisement approaches worked best by asking how the respondent heard about the survey and whether they heard about it from more than one source.

Planning Stage. The *timeline* for the planning stage is from September to December of 2022 when funding *resources* are secured, partners are brought up to speed, the website is upgraded, and the survey tested. The *timeline* for the information campaign itself is from January 2023 to the end of June 2023. After that time, the results of the survey are analysed and the nature of the in-person engagement activities are determined.

3. Survey tool – Collaboration, unidirectional from the community

Ireland's EPE initiative within the SafeWAVE project is to make the first step in opening the possibility of community ocean renewable energy (CORE) for the Dingle Peninsula. It is the intention of this effort to involve the community from the very beginnings and to do that we need to learn as much as we can about the capacity of the population to broaden its ocean literacy perspective to include this new and innovative sustainable energy technology. To that end, we will use the distribution of a survey tool to serve as this first foray into this much broader campaign.

Strategy Stage. *The focus* of the survey tool will be to learn about the Dingle people's interest in and willingness to learn about a view of ocean literacy that embraces human interconnectedness with the marine world and manifests this symbiosis through developing climate change mitigation efforts like the development of the ocean's renewable energy potential (McKinley & Burdon, 2020). The *initiators* are UCC researchers, other project partners, Dingle Peninsula 2030, and the Dingle Creativity and Innovation Hub. The *potential participants* are a statistically significant sample of the population of the Dingle peninsula. That would be about 370 responses at a 95% confidence level and a 5% margin of error (Taherdoost, 2018) for an entire population of 10,000 (DPTA, 2022).[17] It may be more meaningful at this early stage, however, to just concentrate on the population of people who would consider themselves potential stakeholders in any wave energy development scheme. Determining this number and how to reach them will take further investigation and a good working relationship with town leaders – cultural, political, and educational.

Requirements Stage. The *appropriate goal* is as stated above, to learn about the capacity of the population to broaden its conception of ocean literacy to encompass the role of taking climate change mitigating actions that will benefit the ocean's environmental health such as lowering carbon emissions through renewable energy development, specifically wave energy. The *time*frame of the survey distribution, return, analysis, and reporting is in the third year of the SafeWAVE project, starting in January 2023 with a final report submitted by the end of September 2023. The *place* of the survey taking will be primarily online, but there are many avenues by which this place and activity will be advertised to *recruit* participants – public service announcements, flyers, posters, interactive displays, school and workplace announcements, word-of-mouth, and possibly, depending on rates, through direct bulk mailing. The main *facilitation challenges* is reaching people who do not use the internet and communicating with native Irish speakers. To address the first challenge, we canvas in areas with low internet connectivity and maybe at workplaces where we are permitted. To cross the language barrier, we have an Irish language version of the survey online

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[17] The difference is only 46 less surveys (Taherdoost, 2018) if we just concentrate on the Town of Dingle which has a population of 2,050 (DPTA, 2022). If we use a return rate of 33%, then we would need to distribute at least 1,121 surveys (Lindemann, 2022).

and will work with our bilingual collaborating partners in the town to reach out to populations who either do not speak English or who would appreciate being addressed in their preferred language.

Design Stage. According to the article by Braun, *et al, The online survey as a qualitative research tool* (2021), online surveys that provide enough data for informative analysis yet take less than 10 minutes to complete average around 20 questions – 4 topic questions and about 16 life experience questions. Though the particulars of the survey questions have yet to be designed as their formation will depend upon input from our community liaisons, we are tentatively working with the survey tool (the tool will be discussed in further detail in Deliverable 7.6). The topic questions will cover basic self-identifying traits like do they consider themselves an environmentalist or not, do they believe in human-caused climate change or not, etc. The life experience questions will try to get at their feelings about their connection to the ocean, their propensity for community involvement, their experience/knowledge of sustainable energy solutions, their trust level of government and/or corporate entities to take their concerns seriously, *etc.*

Planning Stage. The *timeline* is to start working with our community partners in September of this year (2022) after the close of their busy holiday season. During October and November, we *chose the survey techniques, decide upon some practical details* like advertising approaches, and *draft and refine the process plan*. These tasks cannot be completed without involving our community partners with their knowledge and expertise. The survey will be made available on the Dingle Peninsula 2030 website starting at the beginning of February and remain active through June. During the summer of 2023, UCC researchers will analyse the results, produce the report (Deliverable 7.6), and, depending upon the results, look for other organisations who may wish to take up the mantel of working with the Dingle community to help secure their sustainable energy future. The report will be circulated internally and with our SafeWAVE partners in July and August 2023 with final submission occurring on the 30th of September. Community dialogue session – Collaboration, bi-directional communication

At the end of the survey there will be a question asking the respondent if they would be interested in attending a eight-hour, weekday community dialogue session about the topics covered in the survey. Depending upon how many respond positively, there

will either be one or two of these sessions held in the fall of 2023. These sessions, or workshops, will be composed of three distinct sections each covering one major topic – ocean literacy, wave energy, and community participation in the energy system. These will be deliberatively democratic dialogues between participants and organizers fostering two-way, convergent and divergent communication techniques.

Strategy Stage. The *focus* of the dialogue session is to have an in-depth discussion on wave energy in an ocean literacy context by eliciting narratives from the community that may play either for or against pursuing greater exploration of the wave energy potential for the Dingle peninsula. The *initiators* will be drawn from the cast of organizations described in the strategy stage of 9.1. The *participants* will be chosen from those who emailed back the registration forms sent to survey respondents who indicated a willingness to be involved. These registration forms ask for certain demographic information – age, race, ethnicity, gender, marital status, income, education, employment, etc – so that organizers can be sure to assemble a representative body of the population. The table seating arrangement for the break-out sessions are assigned so that there is a good mix here as well.

Requirements Stage. There are individual goals for each breakout session, but the final *goal* of this EPE activity is to determine if the community should form a CORE (community ocean renewable energy) exploratory committee and elect members. Ideally, there would be two of these workshops with a different body of participants in each. If each workshop had 20-25 members, each breakout session could be composed of 4 to 5 groups of 5 with facilitators circulating. If each table chose one person to join the CORE committee, that would mean that this exploratory body would have 8 – 10 members along with two from the organizing institutions. Twelve CORE participants is a good working maximum, but the committee could be equally effective with six who had the time to dedicate to the cause.

The *timeframe* for the initial workshops will be in the late fall of 2023 in a *place* that can easily accommodate 25 to 30 people working around 5 to 6 tables with a presentation area as well. A town hall or community building would be best, but church basements or other public meeting spaces are also possible. Private meeting spaces, like that which are provided by hotels, are also a possibility if there are funds for renting such a venue. *Recruitment* was mentioned in the strategy stage. There will likely be a fair number of *facilitation challenges* that organizers will have to prepare to meet. The

most important thing is to ensure that the meeting creates a safe place for people to express themselves and have meaningful discussions with others. Luckily, wave energy is a new enough topic to not have garnered widespread vocal opposition yet (Chozas *et al.,* 2010), but there will still be disagreements, and, in fact, these should be encouraged and discussed in a thorough and rational way. The whole point of the dialogue is to explore issues and reach some sort of mutual understanding (Heierbacher, 2010). The organizers just need to remember to keep the discussion respectful and involve as many as possible so that no one is left out.

Design Stage. The community dialogue session is divided into 4 distinct parts and will follow the schedule below (Table A).

Table A: Workshop schedule example

	Activity
9:00	Greeting, introduction and ice-breaker
9:30	Plenary session on ocean literacy
10:00	Breakout session
10:30	Reconvene and share
11:00	comfort break/ coffee/ snacks
11:15	Plenary session on wave energy
11:45	Breakout session
12:15	Reconvene and share
12:45	Lunch and socialization
14:00	Plenary session on energy citizenship
14:30	Breakout session
15:00	Reconvene and share
15:30	Comfort break/ coffee/ snacks
15:45	Plenary session discussing a CORE committee with votes on forming one and, if agreed, electing members
16:45	Parting words / CORE committee gathers to schedule first meeting
17:00	Close

Each plenary session has specific objectives to convey, each breakout session entails an activity with a tangible objective that can be shared, and each sharing session

involves an exchange of ideas between groups and possibly includes a group product prepared from the sharing. The specific objectives and activities are determined by the collaborative facilitating body mentioned in Section 9.1. This body is responsible for the planning of the event and its details are determined by them well in advance as an example of early community involvement in the planning process (Wolsink, 2014).

Planning Stage. As mentioned, the specific planning of the event is determined by the organizing institutions' representatives. The communication style of the plenary sessions is dialogically divergent while the breakout sessions are deliberatively convergent (Faulkner & Bynner, 2020). The timelines need to be strictly followed, but in the event that a problematic issue arises, some flexibility is built into the schedule to allow facilitators the opportunity to explore the issue and reach a suitable conclusion, even if that conclusion is tabling the discussion till the next meeting. Planners need to be aware of such a possibility and prioritize objectives accordingly (Adams, 2004).

4. CORE Committee training sessions – Co-creative analysis and planning

The creation of the CORE Committee represents the height of the organizing institutions' public engagement activities. Once this group is up and running, the organizing institutions will take on nothing more than an advisory role and the community itself will be in charge of its sustainable energy future. Achieving that end, however, takes a good deal of time and commitment from the organizing institutions. In order for this group to stand on its own it will have to be technically proficient in a number of areas relating to ocean energy development. The members will have to be able to knowledgeably compare different wave energy converter technologies and determine which ones might work best for the sea states most often found off the coast of the Dingle peninsula. They will have to grasp the details of engineering and power system economics, regulatory hurdles, policy formation and implication, risk analysis, future proofing, negotiation techniques, environmental monitoring and analysis, public financing, and communication skills amongst others. Not only will the training have to cover these areas, but it will have to prepare the committee in techniques to learn these and other areas of knowledge/skill deficiency that are sure to arise. One of the most important skills the organizers can impart to their community partners is learning how to learn (R. M. Smith, 1982) because they will be spending a lot of their time doing just that.

Strategy Stage. The *focus* of these training sessions is to create a self-sufficient analysis, planning, and management committee. The *initiators* are members of the UCC team along with community, corporate, and government partners. The *potential participants* are selected from the community dialogue sessions described above with the caveat that persons with technical expertise may have to be recruited separately.

Requirements Stage. There are many goals set throughout the process of these training sessions, but the most *appropriate initial goal* is to decide whether the community should pursue the creation of a site for testing the commercial viability of WECs or whether to go ahead and pursue the development of a community owned production facility. The committee may investigate the possibility of making Dingle the go-to testing area of wave energy devices with the claim that if they can make it here, they can make it anywhere – the Dingle peninsula has some of the best, but most harsh, sea states of anywhere in the world for near shore wave energy development (ESBI Environmental Services, 2005). On the other hand, Dingle may want to reap the advantages of owning the first commercial scale wave energy facility in Ireland and gaining first mover advantages. The *timeframe* of these meetings should probably be weekly since there is so much to cover and that regularity will help to maintain the momentum. As to *place*, the Dingle Hub has a conference room that might be a perfect fit. *Recruitment* was addressed above, and the *facilitation challenges* mainly revolve around the complexity and volume of information and skills that have to be learned.

Design Stage. Though the specific design of any training session will be unique to the topics covered, a general schema might run thus:

1. Exchange reasoned arguments.
2. Re-examine preferences.
3. Map options.
4. Determine evaluative criteria.
5. Shortlist options.
6. Evaluate alternatives.
7. Seek agreement or consensus.
8. Draw-up an action plan.

Planning stage. Each meeting will have to be planned at the previous one. That is, roles will be assigned, and tasks allocated to all those involved. In a way, everyone will have homework to complete before the next session and then bring their discoveries to the committee for discussion and evaluation.

5. Ireland EPE Plan Conclusion

The Irish EPE plan is an ambitious proposal to bring the community of Dingle from a position where they have little information about wave power and its connection to ocean literacy endeavours to a position where the residents of the community are taking the lead in actively seeking ways to incorporate this novel renewable energy technology into the everyday life of their town and surrounding areas. The plan covers all three stages, or types, of engagement as expressed in the framework (D7.4).

The plan begins with an information campaign to get the word out and get people used to thinking about wave energy. This consultative type of engagement gives way to collaborative efforts as encapsulated in the survey (one-way communication from the community) and the community dialogue session (two-way communication between initiators and participants and participants with each other). If the community decides to move further along this path of development, they will set out on a path of discovery and learning through the community training sessions that will prepare them to take ownership of their approach to creating a sustainable energy future.