Interreg
Italy - Croatia
COASTENERGY

EUROPEAN UNION

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area’s coasts

- 3.1. Preparatory activities –

Contents

Project Acronym	COASTENERGY
Project ID Number	10045844
Project Title	Blue Energy in ports and coastal urban areas
Priority Axis	1
Specific objective	1.1
Work Package Number	3
Work Package Title	Analysis of the potential of integrated Blue Energy production in the Programme area's coasts
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Partner in Charge	SDEWES
Partners involved	IRENA, DURA, UniCam, UniUd, CMU, Chieti-Pescara, Ploče
Status	
Distribution	Project partnership

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Activity	3.1 Preparatory activities
Deliverable detail	D3.1.1 Methodology for the background analysis
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Authors	
Revision	

Overview of the WP3 activities:

Starting from past and current studies on Blue Energy and their results, drawing on existing platforms and databases, the WP3 aims at setting up the background for further activities. This includes a review of the state-of-the-art of knowledge, legal context and problems that could hinder the development of Blue Energy systems. Results of these activities will be used for the implementation of pilot activities foreseen in WP4.

The outputs of WP3 mainly refer to the Programme output indicator 1.1O1 – Number of enterprises receiving non-financial support and consists in a shared knowledge framework on the coastal Blue Energy systems and their development potential in the Programme area. Outputs will be covering all legal/regulatory, environmental, socio-economic, financial and operational aspects, as well as other factors that can influence the development of Blue Energy systems in the Programme area's coasts that can influence on and orient the selection of specific technologies.

WP3 activities include the following activities:

3.1. Preparatory activities, where partners identify and share the methodology for the background analyses

3.2. Regulatory framework and background analysis, including a critical review of relevant regulations and legal barriers to the development of blue energy systems in Italian and Croatian ports and coastal urban areas, as well as a survey of existing data repositories and experiences on blue energy production in other port areas and seafronts with special attention to energy production devices that can be integrated in coastal infrastructure

3.3. Stakeholders mapping, where partners identify the key actors in the Programme area and beyond that are (or can be) involved in Blue Energy projects

3.4. Energy potential analysis aimed at assessing the overall feasibility of pilot areas for the realization of Blue Energy systems.

Work package leader for the WP3 is responsible to make a draft of methodology for the background analysis, on which all partners need to give comments, propose changes and, finally, agree on. This is the main task of activity 3.1. Upon the agreement, developed methodology will be used by all partners for background analysis review, which tasks are encompassed in other activities of the WP3.

3.1. Preparatory activities

3.1.1. Methodology for the background analyses

Methodology for the background analyses is the first activity of the WP3, which need to be carried out by all partners, who will jointly set the methodology.

The deliverable will be a document, which will be validated and approved by all partners, describing the methodologies that will be applied during the WP for the analysis of the current situation. Even more, such a document will also pave the way for the implementation of the following WPs. The document will include forms/templates and instructions to be used by partners for the co-creation of knowledge by collecting data and information on regulations, case studies and pilot areas.

By the project proposal, this methodology paper needs to include the following parts:

- 3.1.1. the main requirements for the review of the regulatory framework
- 3.1.2. the methodology for the identification and selection of the stakeholders to be involved in the project activities
- 3.1.3. the methodology to be applied for the blue energy potential analyses, including the ways to incorporate environmental and socio-economic concerns
- 3.1.4. the requirements and points of attention for the case studies review
- 3.1.5. the main requirements and characteristics of the geodatabase to be implemented by the project.

For a better understanding, in the following chapters, the methodology will be described by WP3 activities.

3.2. Regulatory framework and background analysis

3.2.1. The main requirements for the review of the regulatory framework

One of the major parts of the background analysis is a review of the regulatory framework that has a direct or indirect influence on the development of Blue Energy in the project area countries.

It should consist of a critical review of relevant regulations and barriers for the development of blue energy systems in ports and coastal urban areas in Italy and Croatia.

There are three parts that this review needs to encompass:

- International legislation review
- National legislation review
- Local/regional legislation review

International legislation in this area mainly focuses on territorial rights, obligations, safety issues on the sea and environmental impact.

National legislation needs to transfer the legislative determinants from international legislation and need to be in line with them, but also at the same time encompasses the bigger scope of regulations like building and energy-related legislation as well as legislation on the use of resources and tariff systems. Also, it can prescribe the rules for the use of sea water and maritime area.[1]

Local regulations build upon national legislation and play the most important role, especially in the contest of the future case study locations and encompass the requirements/permissions/prohibitions related to specific conditions and (micro) location. The jurisdiction of local and regional governments includes spatial planning (directing the spatial development; prescribing detailed criteria and conditions that determine the purpose of the each area and the spatial arrangement of buildings in space in relation to the preservation and use of nature and natural and cultural values and goods of local importance, protection of the

[1] The competence of local and / or national governments in individual segments may differ depending on country

environment and protection from natural and other accidents; planning interventions in the area of the county and local importance) and use of local natural resources (such as groundwater).[1]

As the national legislation needs to be in line with the international legislation and guidelines, national and local legislation review are the most important output of this subtask. Because of this, and differences between Italian and Croatian national and local regulations, the review process should be conducted by all partners grouped per country, which will result in two separate country reports. For each country there will be one coordinating partner in charge for preparing comprehensive document on national and local legislation, while WP leader is responsible, to combine these two reports, and make one final regulation report. All project partners will give their feedback on final report.

During the review process, scope of the project has to be taken into account as it puts emphasis on the systems that are integrated in coastal infrastructure and built environment (ports, hotels & tourist accommodation structures, seafront promenades, marinas, etc.), i.e. systems integrated in the coastal waters and terrestrial areas (on the coast). This reduces the required scope of the review process as some regulations do not need to be consulted during the process of planning and implementation of such projects, or only some part of specific regulation needs to be consulted.

The legislation review process should encompass the list of acts which could have an influence on the development of Blue Energy systems on each level (relevant EU directives, national legislation, and local (regional) legislation, but also national and local plans and strategies), description of each act and its instruments.

Based on legislation review, partners should provide a critical review for each piece of legislation, concerning the opportunities provided by the legal instrument but also its drawbacks, i.e. barriers that it introduces that could hinder the development of Blue Energy systems.

Relevant data can be collected through the legislation review, literature review, review of results of past and current EU projects tackling Blue Energy in the Mediterranean such as ENERCOAST, BLUENE - BLUe Energy for the Mediterranean, BlueNET, BLUEMED, MAESTRALE, iBLUE and PELAGOS (reports like Interreg project MAESTRALE Deliverable D.3.1.1 Blue Energy regulations

[1] The competence of local and / or national governments in individual segments may differ depending on country

and funding framework). Also, from previous EU projects on RES and port areas, such as Interreg IV A “Patch – Port Adapting To Change” and Interreg IV B North Sea Region Programme “BEPPo – Blue Energy Production in Ports” and Horizon2020 project MUSES - The Multi-Use in European Seas (that ended in October 2018). Also, in a case study review of a project MAESTRALE (Deliverable D.3.2.1 Updated International Catalogue of Blue energy Best Practices and Case Studies), a legislative and administrative background for each technology is given, which can be also used for data collection.

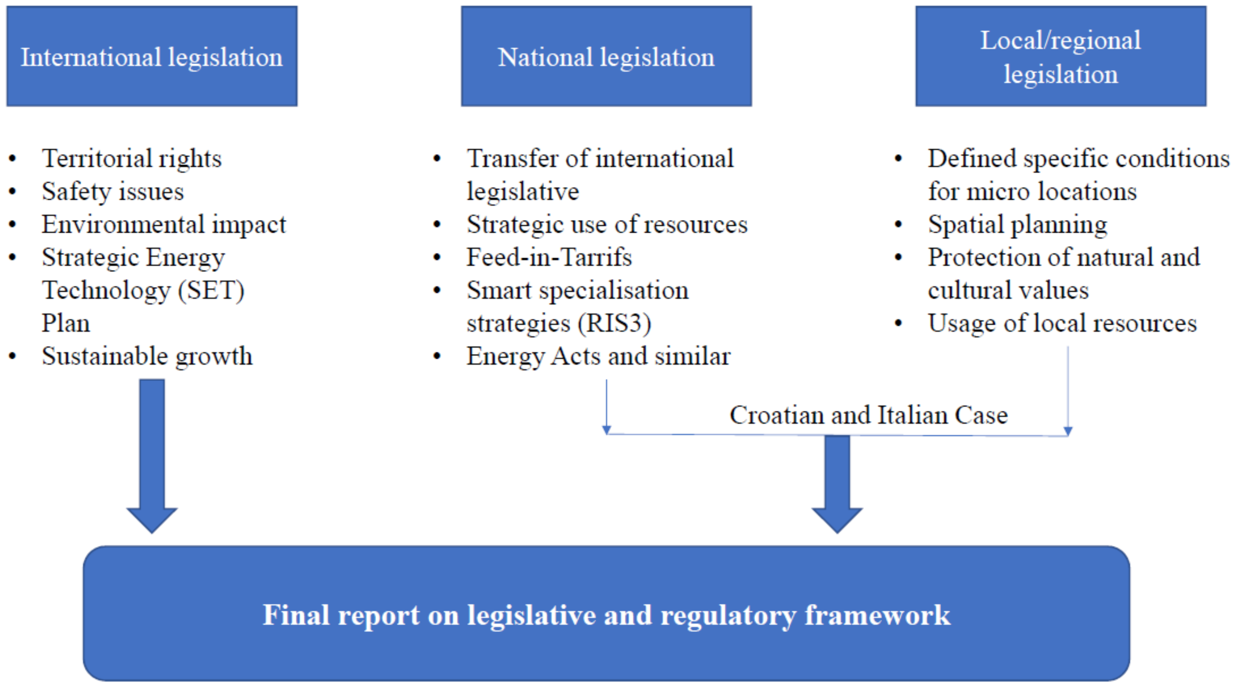

Figure 1. Legal and regulatory framework analysis

Template for a review of the regulatory framework is given in the file supplied with this methodology (Review of the regulatory framework template), where also an example is given.

3.2.2. Funding opportunities

During this review process, funding opportunities for the implementation of systems for harvesting Blue Energy should be identified, as well. This analysis should be carried out on both levels, the EU and national level. In this part, sources of possible funding opportunities need to be listed as well as the other information that could be helpful for policy makers (like, what is funded and in what extent…).

This overview should be also included in the same form as regulatory framework review, as it is described in the supplied template (Review of the funding opportunities template).

3.2.3. Review of case studies and list of references

The project is focused on exploiting the potential of blue energy in ports and coastal urban areas in the Adriatic Sea. Previous projects showed that blue energy potential for this area is mainly related to wave and thermal energy, therefore, aim of this project is to carry out potential and feasibility analysis related to these technologies. Depending on the selected pilot location and type of technology, each partner should prepare 3-5 case studies reviews, backed up by the list of references which are related to this topic. In addition, case studies should also refer to unconventional deployment of such technologies. In example, usage of heat pumps for pool heating, or aquaculture etc.

Template for case study review is given with this methodology (Case study review template).

3.3. Stakeholders mapping

3.3.1. The methodology for the identification and selection of the stakeholders to be involved in the project activities

As competencies are spread across different sectors, geographical borders and value chains, it calls for collaboration between different actors across different sectors. This encompasses public authorities (local, regional and national), regulation bodies, business support organizations, maritime institutions, technology and research/development centres, supportive organizations such as universities, regional and local development agencies, energy agencies, technology transfer offices, chambers of commerce, associations of chambers, enterprises and SMEs, NGOs, associations, innovation agencies, business incubators, cluster management bodies and networks, other knowledge and skill providers, financial actors, etc.

Because of this, in this sub-task, stakeholders which have an influence or interest in Blue Energy systems need to be identified. Identified stakeholders will be, as a part of WP4, included in the establishment of clusters and their work. Clusters foster links among different stakeholders, which cooperate in the developing sector-specific knowledge infrastructure which can be used on specific projects. Once established, clusters will select pilot areas and suitable technologies.

In the process of identification of stakeholders, all levels of Quadruple helix must be represented (i.e. policy makers, research institutions, entrepreneurs and citizens). During the process of selection of key actors, the emphasis should be put on stakeholders that could benefit from this project and its results, which is why they will be interested in participating in the project activities and giving their inputs.

Partners should provide their opinion for each stakeholder if it is more suitable to be included in the operation of the cross-border hub or the local hubs, or both, to enable creation of two separate lists of stakeholders in order not to generate cross-posting during the organisation of meetings.

This activity is also locally based, as local partners have better overview and knowledge on which stakeholders there are in their area (country, region, city), which stakeholders have interest in Blue Energy, and which will be willing to cooperate. Also, local partners can easier contact local stakeholders.

Each identified stakeholder, who expressed interest in the project activities, should be consulted through questionnaires/interviews aimed at collecting information on the state-of-the-art of knowledge on the project. To make this process straightforward and to collect uniform data, typical questionnaires need to be defined which will be used in this process.

Template for a data gathering during the process of identification and selection of the stakeholders is given in the file supplied with this methodology (Identification of stakeholders – stakeholders data template).

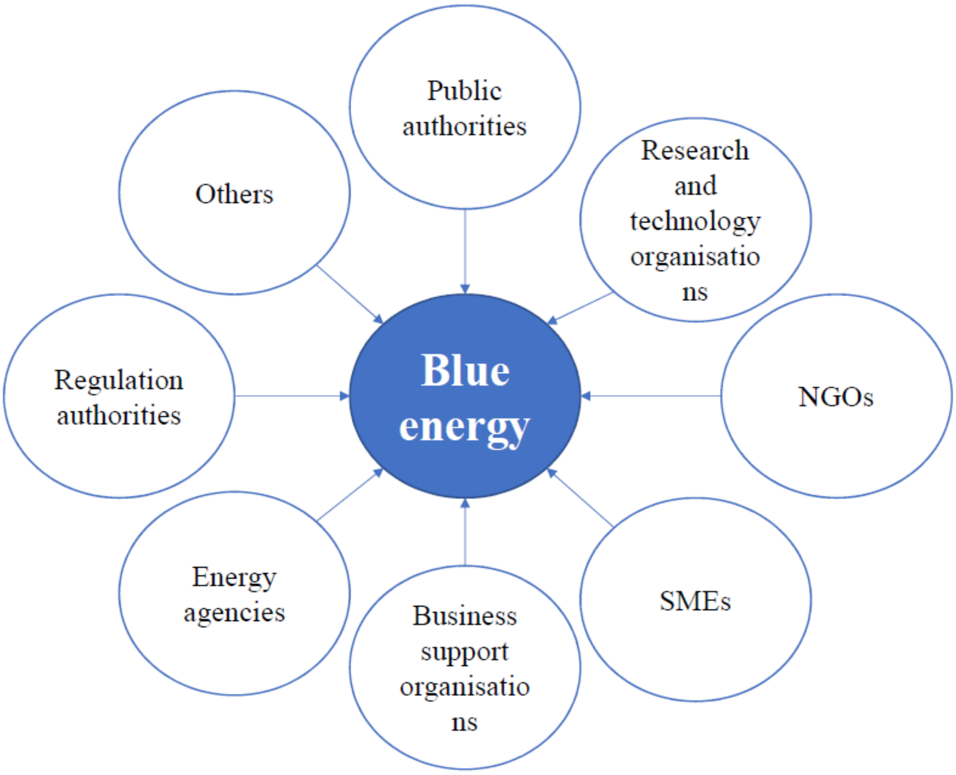

Figure 2. Stakeholders with the related interest to Blue Energy

3.4. Blue Energy potential analysis

3.4.1. Energy potential analysis

Blue Energy, which is harvested from the sea or ocean, can be divided into four types according to the origin of the extracted power:

- sea surface waves
- tidal/sea currents
- thermal gradients
- salinity gradients

Sea surface wave energy is a form of marine hydrokinetic energy that can be extracted from the relative motion of ocean/sea waves. Sea surface waves are generated under the influence of wind, through complicated interaction processes between air and sea. When compared with offshore wind energy, sea wave energy is more spatially concentrated and persistent form of energy. On the other hand, as wave predictability is based on wind predictability, waves present a large variability in several time scales. Therefore, their predictions are less accurate.

Thermal energy and thermal gradient energy represent another type of Blue Energy which can be harvested. Ocean thermal energy conversion (OTEC) is a technology that indirectly harnesses solar energy through the use of the differences in temperature between ocean surface and subsurface. The OTEC for power generation requires a temperature gradient which is greater than 20 °C. This temperature gradient is meaningful at depths of around 1 km and greater. Also, thermal energy (capacity) of the sea and underground coastal waters can be used directly, like through the use of heat pumps (although they are not strictly related to the exploitation of Blue Energy). Since most of the solar heat energy which reaches the Earth, gets absorbed into the ocean and sea water has a more or less constant temperature over the year, this makes sea water excellent heat source.

To conduct blue energy potential analyses, identification of wave energy potential, and thermal energy need to be assessed. In addition, as it has an influence on the majority of Blue Energy potentials, bathymetry data should be also gathered.

On a larger scale, potentials can be assessed through the use of online databases such as ENEA web GIS on wave energy (utmea.enea.it/energiadalmare), the MEDAS database of oceanographic data, created by the Institute of Oceanography & Fisheries of Split (HR), the MONGOOS (Mediterranean Operational Network for the Global Ocean Observing System) data centre, encompassing monitoring platforms that collect data on sea temperature, salinity, waves and currents (http://www.mongoos.eu/data-center), Asterion database as an online calculation of the tides for the entire Mediterranean and Western Europe (free to use with mandatory user registration http://www.asterion.info/Home)) and the EMODnet portal for Bathymetry developed in the framework of the European Marine Observation and Data Network as initiated by the European Commission (http://www.emodnetbathymetry.eu/home).

On a smaller scale, local level and site-specific data, it could be only taken from local institutions, previous researches, pilot projects and other initiatives carried out in the Mediterranean. Also, results and publications of, previously mentioned, past and current EU projects tackling Blue Energy in the Mediterranean could be used as a source of relevant data.

Partners will during this process, track the sources of information on existing databases and other relevant data sources regarding sea energy potential (e.g. wave height, frequency and period, sea temperatures, sea depths, etc.) and produce a list of references for data collection with a description of data that can be found in each data source and its form.

The survey will be carried out separately by all partners and the WP leader will ensure the harmonization of contents. Template is given within this methodology.

3.4.2. Mapping the blue energy potential for the case study locations

For each location, different data on blue energy potentials can be available. To successfully identify and collect the relevant data, various sources of information should be consulted, as illustrated in Figure 1.

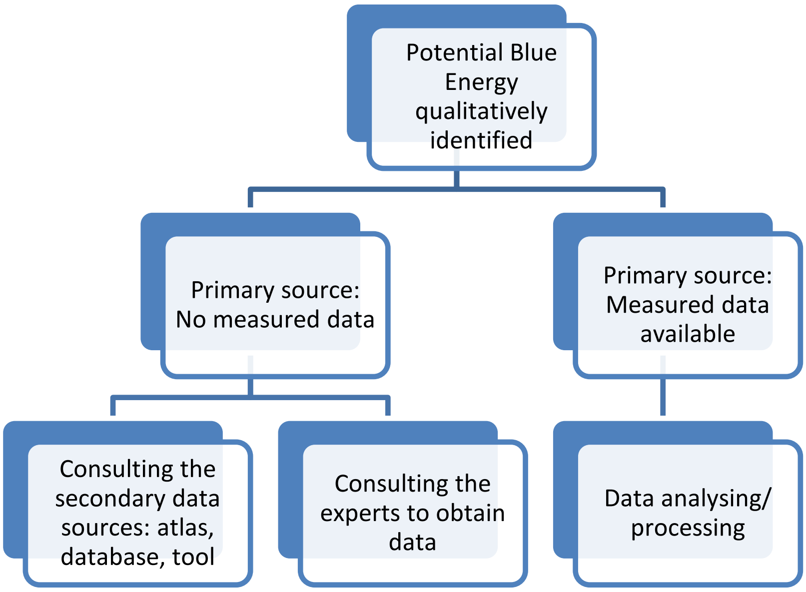

Figure 3. Identification of Blue Energy potentials

The most straightforward situation, when the access to the locally measured data is available, still requires some data preparation. Data can most often be acquired in the form of time series of values, on hourly level or on averaged level for some time period. The data preparation requirements are connected to the technology and type of analyses that will be conducted.

If there are no direct measurements of relevant values for Blue Energy potential at the location, then the mapping can still be performed using the secondary sources of data. Various atlases, national sources of data and data interpolated by the use of some tools. These data sources are considered to be secondary sources of data.

Key data that needs to be gathered to map the RES potential:

- Wave energy
- Sea as the heat source

Format type for each dataset:

- Significant wave height (m),
- Wave energy flux (kW/m)

- Wave frequency (Hz)
- Wave period (s)
- Sea water temperature (K) and depth (m)

The measurement data should be collected over a period of at least 1 to 3 years to ensure that seasonal fluctuations are taken into account by the comparison with long-term data.

Template for a gathering of data sources on blue energy potentials is given in the file supplied with this methodology (Blue energy potential – data sources template).

3.4.3. Technology overview

To get a complete picture, an overview of technologies which are used to harness previously mentioned types of Blue Energy need to be made. In this process, focus need to be put on applicability of these technologies in target area/infrastructure, i.e. on energy production devices that can be integrated into coastal infrastructure, coastal tourist accommodation structures, marinas, etc. (e.g. port breakwaters for wave energy conversion).

Relevant data can be collected through literature review, scientific papers (such as Soukissian TH, Denaxa D, Karathanasi F, Prospathopoulos A, Sarantakos K, Iona A, et al. Marine renewable energy in the Mediterranean Sea: Status and perspectives. Energies 2017;10. doi:10.3390/en10101512.), review of results of past and current EU projects and from data on case studies (like Interreg project MAESTRALE Deliverable D.3.2.1 Updated International Catalogue of Blue energy Best Practices and Case Studies). Project is focused to investigate potential of the following technologies and energy sources:

Wave energy:

- Wave attenuators
- Point absorbers
- Oscillating wave surge converters
- Oscillating water column
- Overtopping devices …

Thermal energy:

- Ocean Thermal Energy Conversion
- Heat exchangers with heat pumps …

The survey will be carried out separately by all partners and the WP leader will ensure the harmonization of contents.

Template for a technology overview is given in the file supplied with this methodology (Blue energy technology overview template).

3.4.4. Environmental and socio-economic concerns

Even though Blue Energy is a renewable energy source, the impact of technologies for their harvesting on the environment need to be assessed. In this stage, the easiest way to assess possible impacts is to make an overview of possible impact per technologies that could be implemented in the area encompassed by project scope.

Also, the socio-economic impact should be assessed. Socio-economic impact also encompasses impacts on other activities which are of importance for target area (in this case, these activities are tourism, fisheries, aquaculture, fish farming, marine transport, etc.), visual disturbance, competence for space with other activities/technologies, social acceptance, etc. Also, there are positive influences like employment.

The survey will be carried out separately by all partners and the WP leader will ensure the harmonization of contents.

Reporting will be done per analysed technology, as a part of Blue energy technology overview, in a previously mentioned template (Blue energy technology overview template).

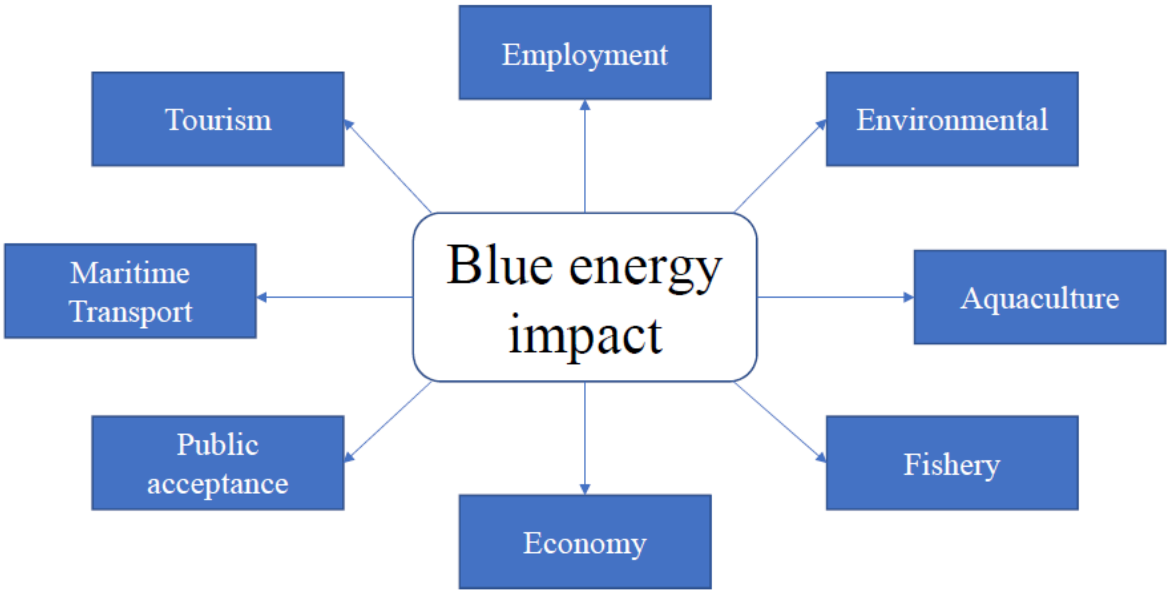

Figure 4- Socio-economic impact of Blue Energy sources and technologies

3.5. Methodology for other activities

3.5.1. The requirements and points of attention for the case studies review

One of the main sources of information on Blue Energy technologies and possibilities of their integration in existing, already installed systems, and previously designed case studies. As these projects already passed all stages of implementation, collected knowledge can be used for potential technology transfer.

This review process builds upon previously gathered data and knowledge and is the next step in the technology review process where all gathered data will be related to a number of specific locations and technologies used in existing project/facility.

It needs to encompass international experiences in the implementation of Blue Energy technologies. In this review, the scope of the project has to be also taken into account, which means that emphasis should be put on the technologies that can be integrated into coastal infrastructure and pre-built environment (i.e. in the coastal waters and terrestrial areas).

Review needs to include data on location, considered and implemented technologies, technical characteristics, year of commissioning, current operation status, involved actors and also financial data (like investment cost, operating costs, payback period, etc.), including sources of financing. Next to this raw data, emphasis should be put on encountered obstacles (technical, financial, administrative, …), the success of the implementation of the respective technologies as well as technical information on its operation and background information. Also, the review should include all previously identified problems that could hinder the development of Blue Energy system.

Relevant data can be collected through literature review and a review of results of past and current EU projects tackling Blue Energy (like Interreg project MAESTRALE Deliverable D.3.2.1 Updated International Catalogue of Blue energy Best Practices and Case Studies).

Template for a case studies review is given in the file supplied with this methodology (Case study review template).

3.5.2. The main requirements and characteristics of the geodatabase to be implemented by the project

The geodatabase is the main output of this WP and it presents spatially distributed data of previously gathered data. Final geodatabase should be open platform that would collect, integrate and display on maps all existing information useful to assess the potential for the production of energy from waves and sea thermal gradients in the Programme area (wave height, frequency and period, sea temperatures, etc.), as well as the localization of operating plants, case studies and stakeholders maps, as well as enable easy access to more detailed information on the selected item. Also, it should include other relevant information such as marine protected areas, bathymetry, administrative marine boundaries, and any other spatial information that can hinder or foster the development of blue energy.

During the implementation of geodatabase, the possibility to download relevant fact sheets as pdf files, connected to some of the records (the case studies for example) should be explored and implemented if possible.

Also, possibility of continuation of work on some of existing, previously developed, web GIS platforms on Blue Energy could be explored, which would be expanded with new data and information, instead of starting completely new database.

3.6. Annexes

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area's coasts

- Review of the regulatory framework template –

1. International legislation:

(example is in red)

<table>
<tr><th>Name of international legislation</th><th colspan="2">Description of international legislation</th><th>Notes</th></tr>
<tr><td>Number</td><td>Type of legislation</td><td>Year</td><td rowspan="6">(Optional)</td></tr>
<tr><td rowspan="4">Name</td><td colspan="2">Link</td></tr>
<tr><td colspan="2">Description (min 500 characters)</td></tr>
<tr><td colspan="2">Barriers (min 100 characters)</td></tr>
<tr><td colspan="2">Opportunities (min 100 characters)</td></tr>
<tr><td>1</td><td>Directive</td><td>2014</td></tr>
<tr><td rowspan="3">Directive 2014/89/EU on Maritime Spatial Planning</td><td colspan="2">https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX:32014L0089</td><td rowspan="3"></td></tr>
<tr><td colspan="2">• Establishing of the legal framework for maritime spatial planning for the purpose of promoting sustainable development of maritime economic systems, sustainable development of maritime areas and sustainable use of maritime resources
• Encompasses the space inside the borders of marine waters, but not the space that encompasses district, municipal and city spatial and town – planning schemes.
• According to Article 8, among the activities that may be encompassed by spatial plans of maritime area are: installations and infrastructures for the exploration, exploitation and extraction of oil, of gas and other energy resources, maritime transport routes and traffic flows, military training area, nature conservation sites, raw material extraction areas, scientific research, laying of cables and oil pipelines, tourism and underwater cultural heritage.</td></tr>
<tr><td colspan="2">There could be problems with previously defined distribution of use and activities in marine waters, as well as competition with other activities in that area.</td></tr>
</table>

	Easier implementation of Blue Energy technologies if that kind of activity is previously identified for implementation in that area		
2	Directive	Year	(Optional)
Directive 2	Link		
	Description (min 500 characters)		

2. National legislation:

(Name of a country):

Name of national legislation	Description of national legislation			Notes
Number	Country	Type of legislation	Year	(Reference, other optional data)
Name	Link			
	Description (min 500 characters)			
	Barriers (min 100 characters)			
	Opportunities (min 100 characters)			
1	Croatia	Law	2012	Croatian Parliament. 2012. Energy Law. Official Gazette 120/2012 HRVATSKI SABOR. 2012. Zakon o energiji, NN 120/2012.
Energy Law	https://narodne-novine.nn.hr/clanci/sluzbeni/2012_10_120_2583.html			
	• This Act regulates measures for the safe and reliable supply of thermal energy, heating systems for use of thermal energy for heating and cooling, the requirements for receiving a concession for distribution of thermal energy or concessions for construction of a distribution network, the rules and measures for safe and reliable production, distribution and supply of thermal energy in heating systems and measures to attain energy efficiency in heating systems.			

	• To relationships in the heating sector which are not regulated by the provisions of this Act, the provisions of the Acts shall apply that regulate the energy sector, regulations of energy industry activities. the provisions of laws which regulate the area of energy efficiency, and the provisions of the laws regulating the area of the concession. • The provisions of the Act on General Administrative Procedure shall apply to proceedings prescribed by this Act as appropriate. Applicable to all sources of energy, including renewables in general.			
	It is heavily dependent on by-law acts and regulations which enactment could delay implementation of projects			
	Defines a minimal share of renewable energy and a possibility of stimulation of investments in renewable energy sources and Blue Energy is renewable energy source.			
2	Country	Type of legislation	Year	(Reference and local name of the legislation, other optional data)
Law 2	Link			
	Description (min 500 characters)			

3. Local legislation and plans:

(Name of a country, county):

Name of local legislation	Description of local legislation				Notes
Number	Region	Coutry	Type	Year	(Reference, other optional data)
Name	Link				
	Description (minimum 100 characters)				
	Barriers (minimum 50 characters)				
	Opportunities (minimum 50 characters)				

<table>
<tr><td>1</td><td>Croatia</td><td>Istria, County</td><td>Decree</td><td>2002</td><td rowspan="5">County of Istria, 2002. Urbanistic Plant of the County of Istria. Official Gazzette of the Istrian County Nr. 2/2002</td></tr>
<tr><td rowspan="4">Urbanistic Plan of the County of Istria</td><td colspan="4">http://istria-istria.hr/index.php?id=4289</td></tr>
<tr><td colspan="4">Spatial/urbanistic plan of the County of Istria. Regulates building and construction in the County.</td></tr>
<tr><td colspan="4">Defines the ways of use of land under the jurisdiction of the County which can be in collision with some projects.</td></tr>
<tr><td colspan="4">If project is implemented in the Urbanistic Plan, it can speed up its implementation.</td></tr>
<tr><td>2</td><td>Region</td><td>Coutry</td><td>Tipe</td><td>Year</td><td rowspan="3"></td></tr>
<tr><td rowspan="2">Local 2</td><td colspan="4">Link</td></tr>
<tr><td colspan="4">Description</td></tr>
</table>

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area's coasts

- Review of the funding opportunities template –

1. EU/international level:

Name of source of funding	Description and scope of funding	Notes
Number	Does it have due date and when	(Optional)
Name	Link	
	Description (min 500 characters)	
	Barriers (min 100 characters)	
	Opportunities (min 100 characters)	
1	Does it have due date and when	(Optional)
Name 1	Link	
	Description (min 500 characters)	
	Barriers (min 100 characters)	
	Opportunities (min 100 characters)	
2	Does it have due date and when	(Optional)
Name 2	Link	
	Description (min 500 characters)	
	Barriers (min 100 characters)	
	Opportunities (min 100 characters)	

2. National level:

(Name of a country):

Name of source of funding	Description and scope of funding	Notes
Number	Does it have due date and when	(Optional)
Name	Link	
	Description (min 500 characters)	
	Barriers (min 100 characters)	
	Opportunities (min 100 characters)	
1	Does it have due date and when	(Optional)
Name 1	Link	
	Description (min 500 characters)	
	Barriers (min 100 characters)	
	Opportunities (min 100 characters)	
1	Does it have due date and when	(Optional)
Name 2	Link	
	Description (min 500 characters)	
	Barriers (min 100 characters)	
	Opportunities (min 100 characters)	

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area's coasts

- Identification of stakeholders –
stakeholders data template

Name of a stakeholder, country, county	
General stakeholder information list	
Name of stakeholder:	
Type of stakeholder:	
Sector/activity:	
Adress:	
City:	
Country:	
Contact person:	
Mail:	
Tel:	
Other contact:	
Stakeholder overview:	(Min 300 characters)
Relevance for COASTENERGY project and Clusters:	(Min 300 characters)
Interest in the project:	
Suitable for being a member of:	(cross-border hub, local hub or both)
Contacted by:	

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area’s coasts

- Blue energy technology overview template –

3. Technology name:

General information on the (name of the technology):	
Group:	**wave energy or thermal energy**
Name of the technology:	
Type of energy source:	(wave energy oscillations…)
Type of energy output:	
Installation:	(how is it installed, where (ports, breakwaters…) (minimum 200 characters)
Output power range:	
Cost range:	
Relevance for COASTENERGY:	(min 300 characters)
Environmental and landscape impacts:	(min 300 characters)
Socio-economic impacts:	(min 300 characters)
Applicability in the COASTENERGY area:	(min 300 characters)
Sources:	

Blue energy technology overview:

(overview and other information/figures) (minimum 1000 characters))

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area’s coasts

- Blue energy potential – data sources template –

Name of a source	
Tipe of Blue Energy covered:	**WAVE ENERGY OR THERMAL ENERGY**
Area covered:	
Type of source:	(map, table, meassured data, modelled data…)
Year:	
Datasets and format:	(wave energy (wave frequency, height…)
Overview of data source:	(min. 300 characters)
Relevance to COASTENERGY:	(min. 300 characters)
Availability:	(free, free for academic use, for a price…)
Origin and dana owner (project, research, company, …):	

Other informations about datasource

(optional)

WP3 - Analysis of the potential of integrated Blue Energy production in the Programme area’s coasts

- Case study review template –

1. Name of a Case Study:

General information on (Case study name):	
Group:	(wave energy, thermal energy…)
Name of project/plant	
Location	(coordinates, location, adress)
Year of commissioning	(year of commission and years of each stage of development if available)
Name of used technology	
Type of energy source	(wave energy oscilatons…)
Type of energy output	
Type of project	(What is the goal of a project: prototype construction, implementation of technology, potential assessment…)
Plant status	(is ti in planning stage, under realisation, operating…)
Involved actors	(all involved actors in a project)
Nominal power	
Size	
Annual productivity	
Implementation cost	(known costs of a project implementation, by stages if available)
Payback period	(calculated of forseable payback period)
Operating cost	(operating costs, fixed and variable, as available)
Sources of financing	(all known sources of financing)
Reason for interest for COASTENERGY	(min 400 characters)
Problems and obstacles	(min 300 characters)
Assessment tools and methods	(min 150 characters)
Environmental and landscape impacts	(min 300 characters)
Socio-economic impacts	(min 150 characters)
Success factors	(min 150 characters)
Transferability in the COASTENERGY area	(min 200 charecters)
Key words	
Web link	(web link of a project)

Year of data collection	
Sources	

Case study summary:

(min 1000 characters on the project summary and other informations)

(example is in red)

2. Magallanes Turbine:

General information on (Case study name):	
Group:	Tidal energy
Name of project/plant	Magallanes Turbine
Location	59.009N , -2.877E Atlantic Ocean Orkneys, Scotland
Year of commissioning	Under realisation 2016 – End of testing of the model (scaled 1:10 at the EMEC) 2017 – Construction of the full prototype in Vigo 2018 – Deployment full scale in Scotland
Name of used technology	Tidal energy platform by Magallanes Project (Magallanes Tubrine)
Type of energy source	Tidal stream energy
Type of energy output	Electricity
Type of project	Prototype
Plant status	Under realisation
Involved actors	Magallanes Renovables – Developer and designer Leask Marine – Marine Operations EMEC – Offerer of demonstration facilities IM Future - Maintenance, operation and management Sagres SL – Technical clothing for security corps and forces
Nominal power	2 MW (nominal power)
Size	0.270 km^2
Annual productivity	17520 MWh/year (prognosed by project)
Implementation cost	1.9 million € (construction and design of the prototype (Fast Track Project))
Payback period	Not applicable for this type of project The forseen payback period for any offshore project is around a decade
Operating cost	n/a
Sources of financing	European Union's Horizon 2020 research and innovation programme – Fast Track to Inovation Project (grant agreement N°730628) Regional Government of Galicia (Xunta de Galicia) under Galician R&D Plan

Reason for interest for COASTENERGY	Magallanes Turbine harvest energy from the flow of water resulting from tidal oscillations. Energy is harvested with the aid of water turbines. This project is a project which has a quite moderate power generation and a very low costs as it does not require huge constructions such ar breakwaters. Being a modular structure, it can be easily scaled according to different locations and situations. Iti s interesting becouse the fact that it is completely built onshore which recudec construction costs and its floating platform concept reduces its environmental impacts. Because of its characteristics, it can be easily integrated and used in various prebuilt coastal infrastructure and as well easily reallocated on the more optimum location in the case of future changes in infrastructure and its development.
Problems and obstacles	The main problem in these types of projects lies in the dificulty of maintenance due to submmerged structure and/or offshore instalation. However, the Magallanes project has reduced the maintenance costs by desigining boat-like deck which enables direct access to machinary avoiding the need of complex offshore structure to control and maintainance. Another possible problem is corrosion due to the saltwater and particles influence on the blades of turbines Also, there are a possible navigation problems that could appear as its a large size floating object that may cause obstruction in a shipping lines.
Assessment tools and methods	As this was a research project that was installed for a year, it was not necessary to conduct such studies. However, the potential impacts on the environment brought about by the device were considered and mitigated, as will be described in the following section.
Environmental and landscape impacts	The main environmental concern with tidal stream energy is associated with blade strike and entanglement of marine organisms as high speed water increases the risk of organisms being pushed near or through these devices. As with all offshore renewable energies, there is also a concern about how the creation of elector magnetic fields and acoustic outputs may affect marine organisms. Tidal energy removal can also cause environmental concerns such as degrading farfield water quality and disrupting sediment processes, however as this technology is a floating platform this affection on the environment would be less than anchored projects.
Socio-economic impacts	The technology would positive contribute to the decarbonisation goals of the country. Local economic regeneration would improve.

	Spanish economic opportunity where its technology could become worldwide known and expanded Construction and manufacturing jobs sustained by the project. Power over 1200 homes.
Success factors	The Megallanes Project goal is to develop the most efficient and at the same time profitable method to harves tidal energy. THis is achieved by: - A sturdy construction - Simple instalation - Capability of producing electricity in any area in the world - Easyest and low cost maintenance system
Transferability in the COASTENERGY area	Tidal movements generate currents which can surpass 9 m/s in intensity. IEA estimates thatat least 1.2 million MWh of energy could be obtained from tides per annum, meaning 7.5% of all the energy worldwide. In the Mediterranen Sea, tidal currents are not so intense due to now tidal ranges (between 0 and 1 meter). Becouse of it, these kind of technology could be used only on some locations where local conditions increase their intensity.
Key words	Tidal energy, floating platform, tidal energy harvesting platform, current hydro generators, orientated blades
Web link	http://www.magallanesrenovables.com/en/proyecto
Year of data collection	2017
Sources	http://www.magallanesrenovables.com/en/proyecto http://www.emec.org.uk/about-us/our-tidal-clients/magallanes/ http://www.emec.org.uk/press-release-magallanes-successfully-install-floating-tidal-turbine-at-emec-2/magallanes/ http://www.bbc.com/news/uk-scotland-scotland-business-30250329 http://www.offshorewind.biz/tag/magallanes/ http://tidalenergytoday.com/2014/11/28/magallanes-deploys-floating-tidal-turbine¬at-emec/ https://vimeo.com/216471855 Sleiti, A. K. (2017). Tidal power technology review with potential applications in Gulf Stream. Renewable and Sustainable Energy Reviews, 69, 435-441. MAESTRALE Deliverable D.3.1.1 Blue Energy regulations and funding framework

Case study summary:

This case study consists in the installation of the Magallanes Turbine prototype in the European Marine Energy Centre (EMEC, a test site in the Orkneys, Scotland, that provides to ocean energy developers the opportunity to test full scale grid connected prototype devices in unrivaled wave and tidal conditions).

The floating system developed by the Magallanes Project is based on building an artefact (a steel-built trimaran), which incorporates a submerged part where the hydrogenerators are fitted. This platform is anchored to the sea bottom by two mooring lines, to the bow and stern.

The Magallanes Project sets out to develop and construct, in Galicia, the technology required to win the race for harnessing power from tides, by generating patents, expert teams, the electrical components and shipbuilding industries for floating platforms.

Previous tests in the EMEC at a scale of 1:10 have proven the capabilities of the device to produce energy. On this sense, the full scale model will have a nominal power of 2 MW.

Fourty reasearchers from universities and technology centers have taken a pert in developingthe model.

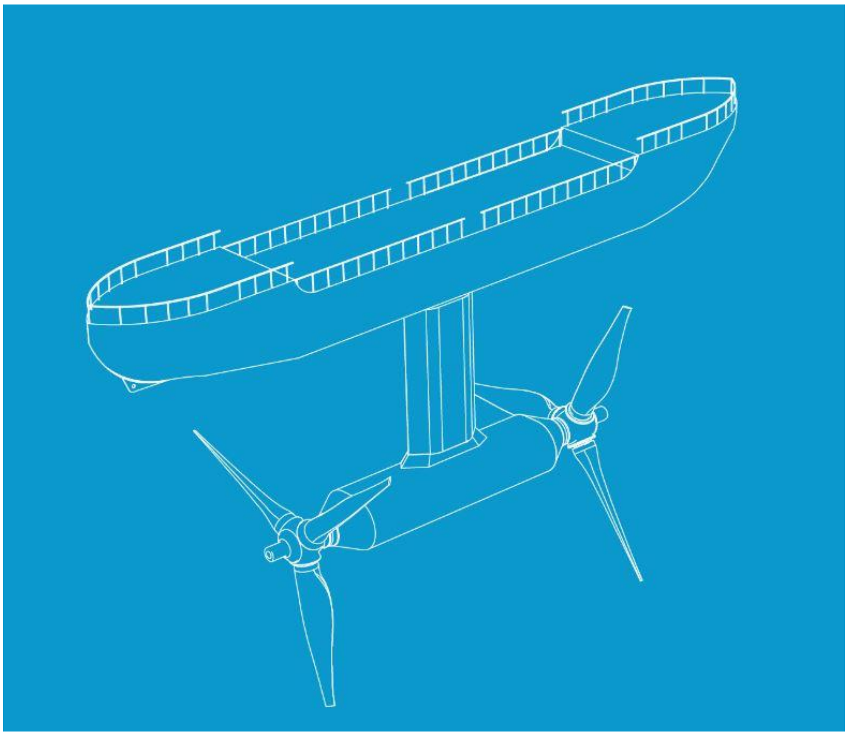

Figure 4. Magellanes floating tidal turbine

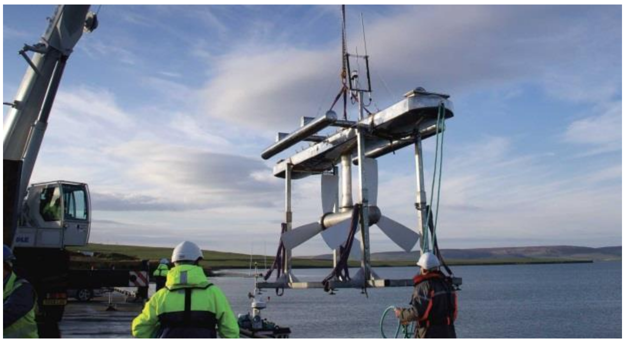

Figure 5. Magallanes Project turbine instalation

Figure 6. Installed and submerged tidal turbine

Technical overview

The floating system developed by the Magallanes Project is based on building an artefact (a steel-built trimaran), which incorporates a submerged part where the hydrogenerators are fitted. This platform is anchored to the sea bottom by two mooring lines, to the bow and stern. It harnesses the ocean currents to move the turbine and produce electricity.

Technical informations

- Weight: 350 mt
- Draft: 25 m
- Overall length: 45 m
- Breadth: 6 m
- Power rating: 2 MW
- oriented blades: 19 m diameter

Inovation aspects

Its considerable advantages are: low maintenance, because it has an accessible engine room, a lower installation cost, and a higher degree of efficiency. Since they are floating facilities, they are adaptable to all sea environments with a low environmental impact.

Background information

Based in Orkney, Scotland, the European Marine Energy Centre (EMEC) has supported the deployment of more wave and tidal energy devices than at any other single site in the world. EMEC provides a variety of test sites in real sea conditions. Its grid connected tidal test site is located at the Fall of Warness. off the island of Eday. in a narrow channel which concentrates the tide as it flows between the Atlantic Ocean and North Sea. This area has a very strong tidal current, which can travel up to 4 m/s (8 knots) in spring tides. Tidal energy developers currently testing at the site include Alstom (formerly Tidal Generation Ltd), ANDRITZ HYDRO Hammerfest, OpenHydro, Scotrenewables Tidal Power, and Voith.

Therefore, similar conditions are foreseen to guarantee the viability of this type of renewable energy.