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O T2.2

PoWER METHODOLOGY FOR BUILDING INNOVATION SUPPLY CHAINS

Document Control

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INTRODUCTION

The PoWER project – "Ports as driving Wheels of Entrepreneurial Realm" in full - supports the evolution of ports into Innovation Hubs, meant as systemic innovation processes aimed at creating new transmission belts between ports and their related territories and to exploit their untapped entrepreneurial and innovation potential. Innovation Hubs foster the collaboration among the key-actors of the Innovation Supply Chain, with special reference to cognitive institutions (schools, Universities, research bodies), enterprises and public administrations, in order to turn the multi-layered challenges affecting ADRION ports into opportunities to integrate, cross-fertilize and exploit the power of territories.

From this perspective, PoWER tackles the main challenges that the ports of the Adriatic-Ionian area (ADRION) will face in the next years (such as energy, mobility & transport, digital transition, etc.) as flywheels to empower ports' transition towards Innovation Hubs. The activation of collaborative processes will underpin the creation of a holistic innovation environment capable of producing improved services and opportunities for the territories.
To this extent, core of PoWER is a Foresight and Co-design process as a support to the construction of mid-to-long-term Scenarios related to the evolution of PoWER ports and fostering, in so doing, the set-up of thematic Innovation Supply Chains.

In this overall framework, the **PoWER Methodology** is one of the main project outputs; it is aimed at fostering and facilitating **the replication of the PoWER innovation process** in other ports of the ADRION area, with the objective of promoting at local level the establishment of Innovation Supply Chains (ISC) connecting Schools, Universities, Research Centres, Enterprises and Public Administrations. ISC are cooperative innovation environments based on the triple Helix paradigm and devoted to the construction of the **future innovation scenarios** of port areas, progressively integrating their potential contributions into one innovation flow (held together by the scenario contents and frameworks).

To this extent, PoWER created a two-fold pathway, aimed at pursuing such innovation processes along two different but integrated level:

- **Strategic level:** it is pursued by the Innovation Supply Chains by co-developing a mid-to-long-term **local strategic outlooks**, in which all the most relevant innovation issues are discussed, ranked and integrated into a coherent framework for the evolution of the port into an Innovation Hub; such outlook needs to be periodically updated by the Innovation Supply Chains, also according to the results of the latter level of the innovation process;

- **Operational level:** it is pursued by the Innovation Supply Chains by co-developing short-term **local thematic scenarios**; each of them addresses one key-issue detected in the abovementioned outlooks and are devoted to the definition of an operational framework for the concrete implementation of innovation measures related to that specific key-topic.

The strategic direction has been enhanced by the co-creation, by the members of the PoWER consortium, of the **PoWER Strategy**, which is the Innovation Hubs Network's (IHN) shared document describing the evolution pathway of ADRION ports into Innovation Hubs, by jointly tackling the relevant key-topics identified in the local strategic outlooks developed by each participating port. The PoWER Strategy integrates the PoWER Methodology by providing all ADRION ports willing to join the Innovation Hubs Network with a wide, ready-to-use, shared and viable strategic framework for supporting the implementation of local thematic scenarios.

Local protocols have to be signed by stakeholders and institutional actors in order to make the establishment of a local Innovation Supply Chain official, which aims at pursuing the evolution of the port into an Innovation Hub according to the contents of the strategic outlook.

Local agreements, instead, shall be signed among stakeholders involved in the methodology implementation and willing to commit to the actual implementation of local shared thematic scenarios developed together (strategic level).

Within the PoWER project implementation, the set of coordinated and integrated actions composing the PoWER Methodology has been tested on the **Energy** topic, allowing to fully develop **local thematic scenarios** related to energy-related issues, as well as **local strategic outlooks** where further key-topics have been detected.

Following the lessons learnt and the tips collected during the testing phase, phases and steps of the Methodology have been fine-tuned, in order to enable its adoption and replication on all the future critical issues which will be addressed in the transition of ADRION ports into Innovation Hubs, in order to complete the IH program by developing the thematic scenarios still missing.

The PoWER Methodology described in the following pages can be thus seen an optimized version of the overall PoWER project approach, distilled with the specific purpose of fostering **cost-efficient and effective transferring and replication** activities able to capitalize and build on the work already developed during the PoWER project.[1]

THE METHODOLOGY ARCHITECTURE

As outlined in Figure 1, the PoWER Methodology consists of 3 main phases, involving different types of stakeholders (actors of the Innovation Supply Chain), which will be further illustrated in the following chapters:

1. Needs mapping;
2. Ideas and Solutions Scouting;
3. Scenarios Foresight.

The main output of the methodology consists in the establishment of a local Innovation Supply Chain in the targeted port, the set-up of which can be formalized according to the two abovementioned directions:

- **development of a Local Thematic Scenario,** and signature of the related agreement, regarding a specific strategic key-topic identified before the implementation of the methodology;
- **development of a Local Strategic Outlook,** and signature of the related protocol, aimed at integrating the addressed key-topic into a more comprehensive strategic framework for the evolution of the port into an Innovation Hub.

According to the level of maturity of a port's development strategy, the methodology can be either applied **only on thematic issues**, or be used also to **create, enrich or evolve the port's strategy**,

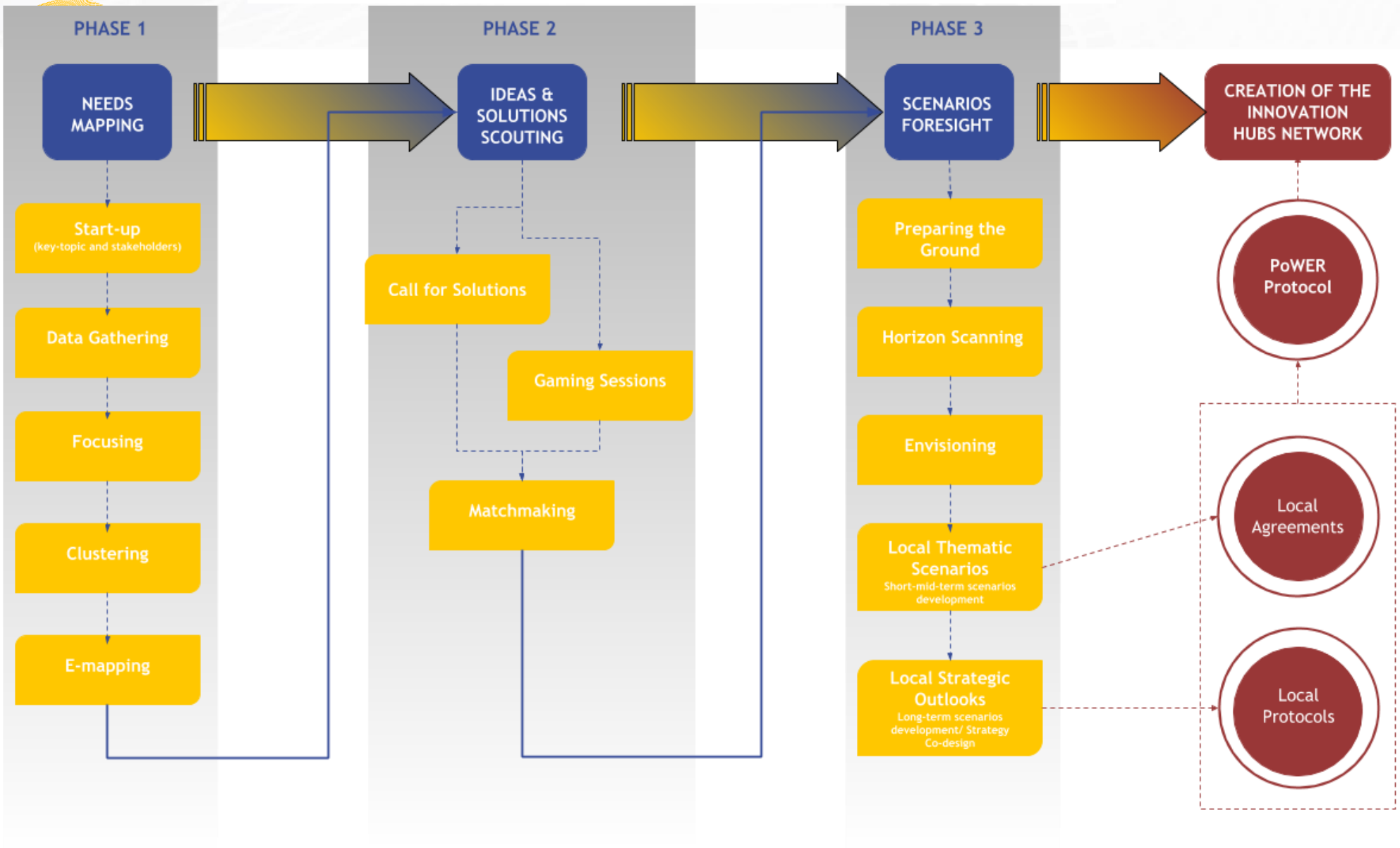
[1] For a comprehensive overivew of the overall approach followed by the PoWER project during its implementation, see also N. Koukovinos, F. Stergiopoulos, C. Ziogou, S. Voutekakis, I. Metaxa, M. Padula, F. Picenni, R. Malvezzi (2019): *The Evolution of Ports into Innovation Hubs: A Proposal for the Adriatic Ionian Area.* Chemical Engineering Transactions, v. 76, pp. 1165-1170.

with the aim of enhancing the innovation potentialities connected to the establishment of integrated Innovation Supply Chains at local level.

In the next chapters the Methodology will be described in detail, also with the support of:

- the **Annexes**, where some methodological passages have been reported, in order to facilitate the consultation and use of the overall PoWER Methodology.
- (Energy-oriented) **Examples**, documents useful to better understand the functioning of some tools which can't be directly adopted to tackle other issues/challenges because their contents depend on the information collected during the phase 1;
- **Templates**, that are tools that can be immediately and easily adapted to deal with other thematic issues/challenges, in addition to the Energy-related ones.

Figure 1 - The PoWER Methodology Scheme



1 NEEDS MAPPING

This first phase consists in gathering and analysing different ports' needs in relation to a specific challenge. This phase is connected to the early engagement of innovation actors, and for this reason, it is the most sensitive phase of the overall innovation process, since its success strongly relies on the effective interest that promoters are able to mobilize, from the beginning, in relation to specific challenges. Therefore, it is of crucial relevance that the Innovation Supply Chains actors agree to take part to the mapping activities, by sharing information needed for nurturing the successive phases.

The needs mapping phase and, in general, the whole methodology process, shall be therefore started-up by two preliminary steps:

- The ***matter of study shall be individuated***; this will be the so-called key-topic which will be investigated through the implementation of the Methodology (PoWER, for example, has chosen energy);
- ***Meetings with key-actors*** of the target area shall be organized to outline grounds and goals of data gathering and to plan a working time-table (planning);

The preparation phase will be followed by four steps:

1. ***Data gathering***: foreseeing the collection of quantitative, qualitative and behavioural data;
2. ***Focusing***: leading to the settlement of local thematic Needs according to the data gathered;
3. ***Clustering***: leading to the definition of a list of G-local needs, i.e. needs shared among all the ports participating in the Methodology implementation exercise
4. ***E-Mapping***: transferring the detected needs in a geo-referenced database open to the public.

1.1 DATA GATHERING

Data gathering shall be carried out in order to achieve a clear view of the initial situation of the port area with respect to the chosen challenge and to identify critical points, opportunities and, most of all, needs. Data shall be gathered through questionnaires, interviews, workshops and, if needed, on-the-spot checks in the case-study area. It is warmly suggested, whenever possible, to have surveys prepared and interviews/workshops carried out by local researchers/professionals and students.
Data shall be classified at different levels:

- ***quantitative***, including statistics and investigating critical points, e.g. how much, where and how energy is used within the area, leakages, etc.; available port authorities' databases can be used.
  Interviews using predefined questionnaire have to be carried out with local key people/ stakeholders.
  In the test performed during the PoWER project on the Energy topic, the aim of the quantitative analysis was to evaluate energy consumptions of the case studies and to investigate "critical points" on site. For this purpose, an ad-hoc structured questionnaire had to be developed (see Example 1 - Questionnaire for quantitative analysis). A set of 5 indicators was defined on annual basis, which is used to benchmark energy use and compare the performance of the case-study

areas among each other. Calculation of indicators was possible after collection of energy consumption data and analysis energy use;

- ***qualitative***, with the aim of identifying identify opportunities and needs of the port area by means of interviews and group discussions (in the form of focus groups, workshops or meetings with key stakeholders); more than one area being interested, the outputs must be streamlined in order to achieve coherence and comparability among the different areas under study. More specifically:
  - *Interview sessions* – after defining the contents of the thematic qualitative questionnaire (see Example 2 - Questionnaire for quantitative analysis, set up for the Energy topic), all promoters have to define a list of key persons to be interviewed.
  - *Group discussions* – events will be organised as group discussion with the aim to obtain more qualitative information about the port area. The group discussions shall be organised in a semi directed manner, meaning that a part of the event should be managed by a facilitator, while the other part should be organised as an open agenda event were participants nominate topics to discuss. The modality of the group discussion (e.g. world café, open space technology, fishbowl, round table etc.) is a free choice and can be joined to another project or activity, if synergies can be built.

- ***behavioural***, i.e. identifying stakeholders' behavioural patterns emerging from the quantitative and qualitative analysis and their grounds.
  Behavioural patterns are crucial to understand what people working in the port know (and don't know) on different challenge-related data, whether they are aware of the meaning of those data and how they act (behave) in relation to the present situation.
  According to conventional research, the link between measures and behaviour are crucial since evidence suggests that technical interventions have lower impact and higher costs if carried out in isolation, e.g. without any accompanying management programme designed to encourage related behaviour change.
  In this case as well, the data collection can be carried out in two ways:
  - *Interview sessions* – after defining the contents of the thematic behavioural questionnaire (see Example 3 - Questionnaire for behavioural analysis, set up for the Energy topic), all promoters have to define a list of people working in the port to be interviewed;
  - *Group discussions* – workshops and meetings involving people working in the port or people using services in the affected area.[2]

1.2 FOCUSING

PoWER process promoters shall to select and cluster the information collected during the data gathering in order to define the *local thematic Needs*.

First, emerged needs shall be described in detail in a dedicated fiche, structured by process promoters according to the topic investigated (see Example 4 - Local Need). Afterwards, the single needs shall be processed in order to re-order them in *local thematic Needs* according to a specific template developed (see Template 1 - Format to describe local thematic Needs). This activity does not foresee a structured feedback on collected data, but the construction of a Needs check

[2] In the PoWER Methodology testing and validation process, being „energy" the topic under study, the data gathering phase has included a smartness assessment of each involved port as well, i.e. an evaluation of their current performance with regard to their infrastructures and equipments, processes and expertises (operational, energy and ambient management) enabling the identification of the ports' strong and weak points.
Basing on the topic investigated, the process promoters can investigate specific data typologies/ add dedicated assessments in addition to those foreseen in the PoWER Methdology.

list, directly expressed by interviews or by inferable collected data themselves. As described in the next step, the collection of the local Needs is a fundamental intermediary step, necessary to define the final G-local thematic Needs list.

1.3 CLUSTERING

The clustering is necessary in order to transform the local thematic needs into thematic horizontal needs shared by multiple ports in the ADRION area. The local thematic needs emerged in each ADRION Port participating in the process, shall be compared, clustered and harmonized[3] to the extent possible in order to achieve a shared "g-local" list of needs (see Example 5 – G-local Needs list). This new list does not include geographical information on the ports where the related local needs were detected since, at this stage, the collected needs represent horizontally relevant thematic issues, which are peculiar to different port contexts thanks to the shared features of the ADRION port areas, not to their geographical location.
This approach underlines the Innovation Hubs Network's main objective: supporting the creation of international networks among key actors belonging to the local Innovation Supply Chain, in order to boost the internationalization of the best ideas/ products/ services, thus triggering the creation of an ADRION-level Innovation Supply Chain.

1.4 E-MAPPING

Each g-local need shall be transferred in a geo-referenced database which will be available online (see PoWER Platform's dedicated section) in order to allow interested stakeholders and, in general, the wider public to access them online.
The maps are composed of three main categories of data:

- ***general data***: general description of the port; see Table 1 - set of general data to describe ports as template to describe each new port joining IHN;
- ***specific thematic data***: a set of data has to be built for each thematic topic, see table 2 as example related to Energy topic;
- ***specific Needs***: see table 3, as template to describe each new set of thematic needs.

An ESRI Shapefile shall be created for each g-local need.[4] Once all the Shapefiles have been created, they will be converted (e. g. exploiting options offered by ogr2ogr https://gdal.org/programs/ogr2ogr.html, by the PoWER platform administrator, in GeoJSON format and integrated into a self-contained Web application developed by exploiting the Google Maps APIs which is open for consultation on the PoWER Platform.

[3] Local needs' clustering shall be carried out by a member of the Innovation Hubs Network (IHN), to be appointed at the beginning of the process, at the time when the topic/challenge to be addressed is chosen.

[4] A Shapefile is a geospatial vector data format for geographic information system (GIS) software, consisting of (at least) three files: .shp file, containing the geospatial data (i.e. features); .dbf file, containing data associated to features (i.e. attributes); .shx file, an index file used for optimize seeking operations on the geospatial data. Each one of these files is needed. Each Shapefile contains polygonal or point data (according to the nature of the need to be represented); is named as the need title and must be produced in EPSG:4326 geodetic coordinate system.

Table 1 - set of general data to describe ports

Data	Description
Port Name	
Port Type	
Indoor storage area	
Outdoor storage area	
Capacity	
Enterprises located	
Other activities located	

Table 2 - set of specific thematic data related to the Energy topic

Data	Description
Main energy oriented key-issues	
Behavioural aspects	
Opportunities and further development	
Smartness level: Operational management	
Smartness level: Energy management	
Smartness level: Ambient management	
Overall average smartness level of the Port	
Smartness level (narrative)	
Notes	

Table 3 - data necessary to describe thematic Needs

Data	Description
Need title	
Goal	
Interested applying Sector	
Need description	
Notes	

The results of the needs mapping phase are nurturing the following one, contributing to the creation and enhancement of new market opportunities.

2 IDEAS AND SOLUTIONS SCOUTING

The second phase aims at finding innovative solutions and ideas addressing the detected needs and at matching them in order to activate the first operational framework of the Innovation Supply Chain; it foresees three different and integrated activities: Call for Solutions (C4S), Gaming Sessions (GS) and Matchmaking (MM).

2.1 CALLS FOR SOLUTIONS

The ***Call for Solutions*** **(C4S)** targets entrepreneurs and researchers and aims at individuating new solutions/patents for answering to the thematic needs emerged during the first phase. The C4S shall be launched by all ADRION ports participating in the process (possibly simultaneously) and be open at least one month up to two months tops.
In any case, each time a new cluster of ports implements the Methodology to investigate a key-topic, they can agree on different timings for Call(s) opening and proposal submission, as long as the new procedure are clearly stated in the Call text they will publish.
Once all the call text has been prepared basing on the dedicated template (see Template 2 - Call for Solutions)[5], the process manager shall get in touch with the PoWER Platform administrator to get support for the C4S online launch.

Participants shall submit their proposals through the PoWER Platform dedicated submission form. The proposals submission form is also available in offline version (see Template 3 - C4S Solutions proposals submission form). C4S-related communication activities – both before and during the call opening – have to be very effective and widespread in order to create awareness and engage as many local stakeholders as possible. Indeed, it is warmly suggested that each entity participating in the process implementation:

- publish the call on its own website and social networks;
- publish the call in local, regional and national newspapers and magazines;
- organize public events to present the C4S;
- ask to stakeholders and local institutions to support the promotion of the C4S.

Once the Call is closed, the gathered solutions shall be assessed in a **two-steps evaluation** by technical juries (see Example 6 – Solutions Assessment Matrix):

1 LOCAL LEVEL
The local selection jury shall be composed of at least three members, relevant personalities from local businesses, research and cultural institutions and shall be appointed before the launch of the Call (see Template 2 – Call for Solutions); each involved port's local jury shall select up to10 solutions/patents among those submitted;

2 TRANSNATIONAL LEVEL
The transnational jury is composed of one representative from each local selection jury and the venue of their meeting has to be decided and made public before the opening of the C4S; the transnational jury shall select 10 to 20 solutions/patents among those which got through the first evaluation step.

[5] The C4S template shall be filled in according to cuntry-specific laws and rules; the template provided is in English; it is warmly recommended to have the call translated in each of the involved Countries' languages.

It is suggested to foresee an official awarding ceremony – either ad hoc or encompasses in a wider local/international public event – for the transnational-level winners and, possibly, a reward.

All winning solutions will feed the PoWER Platform Solutions database where the wider public will be able to read and excerpt of the proposed Solution and, if interested, get in touch with the author(s).

The gathered solutions shall be also used to organize Matchmaking events (Phase 2, step 3) and to fine-tune the Thematic Scenario (Phase 3) and. Indeed, Solutions authors, at the time of the proposal submission, shall be also involved in the third phase of the methodology by administering them a Horizon Questionnaire (see Example 7 - PoWER Horizon Questionnaire)[6].

2.2 GAMING SESSIONS

Gaming Sessions (GS) are conceived as a "fertilizer" of business culture in secondary schools and universities; it consists in a simulation game in which students take on the role of entrepreneurs and – with technical/ organisational support of business experts, e.g. local stakeholders engaged in the needs mapping phase - design a business idea aimed at addressing at least one of the g-local needs emerged from phase 1.
The GS methodology (see Annex 1 - Gaming Sessions Methodology) follows a specific activities flow:

- the facilitator presents the needs and the mapping method to the students to stimulate their business ideas, which are drafted in a dedicated template (content analysis);
- the facilitator illustrates the business ideas proposed by each student; the best ideas are selected by the students;
- students are clustered around the ones they find more appealing according to a “liking” approach, thus making teams playing the role of entrepreneurs;
- the facilitator and available entrepreneurs and consultants lead each team to develop its idea and draft a business plan through a dedicated template;
- students prepare a 10 min presentation of their idea for a public event organized by the schools; a local jury evaluates the business ideas and selects those to be sent to the transnational jury.

This gaming session path, indeed, foresees – just as the Call for Solutions’ – a two steps assessment by technical juries, thus adding an element of actual competition that shall stimulate student’s motivation. The final business ideas’ reports produced by students are assessed:

1 at local level, where 10 business ideas per port are selected;

2 at transnational level, where 10 to 20 business ideas among those which got through the first evaluation step will be selected. The transnational jury is composed of one representative per IHN member and the venue of the transnational jury meeting has to be decided at the beginning of the GS activity.

All winning solutions will feed the PoWER Platform Ideas Database where the wider public will be able to read and excerpt of the proposed Solution and, if interested, get in touch with the author(s).

[6] Optional activity, it does not block the proposal submission procedure.

In order to guarantee a homogeneous implementation of the GS Methodology in different schools and countries, specific tools for the idea description, business plan report, and ideas evaluation have been developed (see Template 4 "Gaming Sessions Tools").

GS students are asked to indirectly participate in the thematic scenarios co-creation process (phase 3) by filling-in the abovementioned Horizon Questionnaire (see Example 7 - PoWER Horizon Questionnaire).

GS engages high-school and university students to find new business ideas answering to the real needs. Besides contributing to the PoWER process implementation, gaming sessions are an innovative way to spread business culture in secondary schools and universities, facilitating connection between schools and professionals/ entrepreneurs, providing young people with knowledge, motivation and soft skills such as team-work, deadlines management, problem-solving capacities, etc.

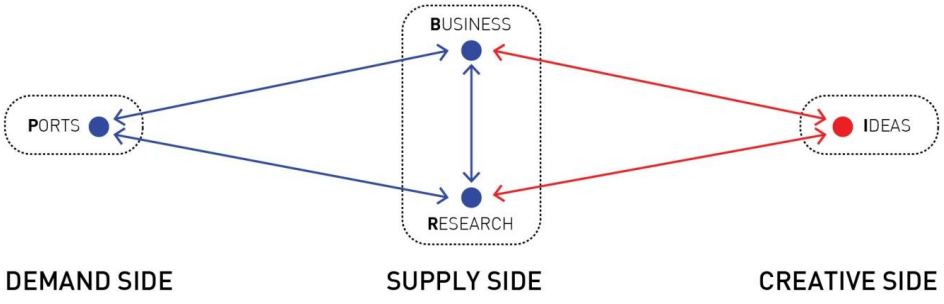
2.3 MATCHMAKING

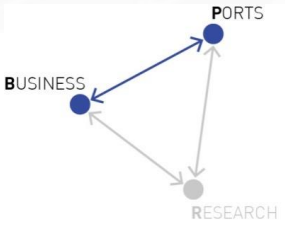
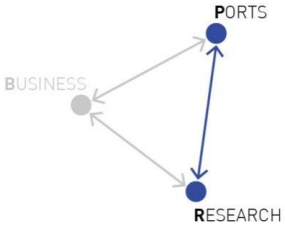
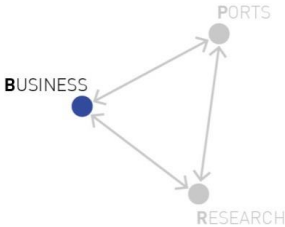
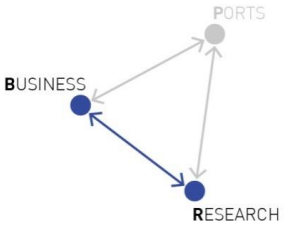
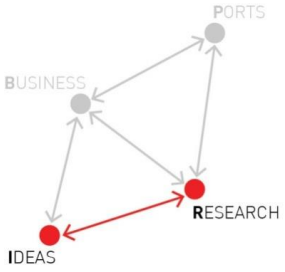
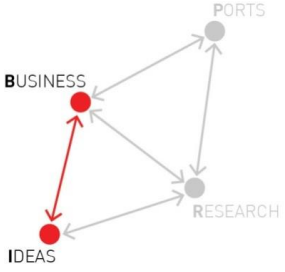
Matchmaking is the core activity for building thematic Innovation Supply Chains (ISCs) since it represents the chance for supply and demand to finally meet in person. Within the PoWER framework, the matchmaking is made of structured networking sessions organized during PoWER public events, following two main purposes: to consolidate and widen the thematic Innovation Supply Chain, and to fine-tune the local thematic Scenarios (by finding new ad-hoc solutions to solve local Needs).
Engaged ports' stakeholders shall be involved in (at least) two dedicated transnational events, structured in:

- an exhibition aimed at showcasing the PoWER methodology, port areas, their needs and the ideas and solutions found so to stimulate discussion and facilitate the dialogue among supply and demand sides of the Innovation Supply Chain; one possibility is to design and print dedicated posters, but the event coordinator is free to display the contents as considered most appropriate;
- a working seminar where stakeholders participate as speakers to stimulate discussion on the key-topic among all participants by offering a panel of multifaceted complementary perspectives;
- matchmaking sessions aimed at consolidating the innovation supply chains brought together by matching the demand (ports representatives) the supply (awarded solutions from business and researchers) and the creative side (awarded ideas from students).

In Figure 2, the possible combinations for the matchmaking are proposed.

Figure 2 - PoWER matchmaking concept



	**Business for Ports (B4P):** how business supports ports What happens: since the selected solutions are presented during the seminar and are shown in the exhibition, the Ports representatives are able to directly contact enterprises of their interest. Expected results (entrepreneurs' point of view): open new market and/or create opportunities for a wider roll-out of new solutions; find areas/buildings to be used as demonstrators (see below).
	**Research to Ports (R2P):** how research & ports can collaborate What happens: since the selected patents/products are presented during the seminar and are shown in the exhibition, the Ports representatives are able to directly contact enterprises of their interest. Expected result (researchers' point of view): find areas/buildings to be used as demonstrators (participation to calls for funds in order to demonstrate the validity of products/patents).
	**Business to Business (B2B):** how enterprises can collaborate What happens: the selected solutions are published in the PoWER platform and a dissemination campaign is carried out to ease the collaboration opportunities; the one-to-one meetings are addressed to the entrepreneurial realms of the IHN members, with a focus on the entrepreneurial ecosystems of the public event host country. Expected results (entrepreneurs' point of view): subscribe entrepreneurial agreements to develop common proposals to be presented to customers and/or to jointly develop new solutions.
	**Research to Business (R2B):** how research & enterprises can collaborate What happens: through platform, exhibition & working seminar, researchers know the enterprises profile and their entrepreneurial solutions; researchers can ask for one-to-one meetings with enterprises in order to propose some kind of collaborations. Expected results (entrepreneurs' point of view): create opportunities to improve the quality of a solution and/or to develop new products/services/systems
	**Ideas to Research (I2R):** how students & researchers can collaborate What happens: through platform, exhibition & working seminar, researchers know the students' ideas; researchers can then ask for one-to-one meetings with students in order to offer their help to develop the submitted ideas. Expected results (students' point of view): subscribe agreements among schools and research centres to jointly develop new solutions.
	**Ideas to Business (I2B):** how students & entrepreneurs can collaborate What happens: through platform, exhibition & working seminar, entrepreneurs know the students' ideas; entrepreneurs can then ask for one-to-one meetings with students in order to offer their help to develop the submitted ideas. Expected results (entrepreneurs' point of view): subscribe agreements among schools and enterprises to jointly develop and market new products.

Optional (but suggested) tools for optimizing the matchmaking sessions management are:

- matchmaking fiches, which shall be filled-in by participants before the event so to give time to the organizers to match participants with joint interests (see Template 7 "Matchmaking fiche");
- dedicated digital applications, s. a. B2MEET: https://www.b2meet.com/en/.

3 SCENARIOS FORESIGHT

Foresight is a trans-disciplinary activity belonging to the so-called Future Studies, i.e. studies based on the prediction and analysis of future horizons, able to examine the long-term impact of policies and technologies and to anticipate emerging social challenges (Di Pasquale et al., 2015). The scenarios foresight method adopted by PoWER as the third step of its methodology aims at preparing the ground for future actions to be taken in order to renovate the port areas according to their needs, thus turning them into Innovation Hubs.

The PoWER foresight method aims at accompanying local Innovation Supply Chains towards the co-design of short-term (thematic) and mid-to-long-term (strategic) innovation scenarios.[7] The following chapters will focus especially on the steps of Horizon Scanning, Envisioning and Scenarios Development, which embed the most relevant process segments in view of the replication activities of the PoWER project.

The method is compliant to (Van Woensel, 2015) and is therefore structured in five steps (Figure 3).

3.1 PREPARING THE GROUND

This foresight step aims at carrying out a benchmark analysis on the key-topic feeding the next phases of the foresight activity. It overlaps what the PoWER Methodology carries out in its 1st and 2nd phases - Needs Mapping and Ideas and Solutions Scouting.

A Benchmark Analysis shall be also carried out in relation to the key-topics of interest, aimed at producing a comparative model for the foresight process. As reference for this task, the Benchmark Analysis carried out by PoWER is proposed; it gathers well-accepted practices of EU ports in terms of innovative operations, energy management and environmental performance, which the IHN ports may use for assessing and evaluating their base performance, for generating innovative actions, and for setting the goals to be achieved in future to empower their evolution into Innovation Hubs.[8]

3.2 HORIZON SCANNING

A SWOT analysis of each port area involved in the study shall be performed and then cross-referenced with the horizon questionnaires gathered from C4S and GS participants – and, possibly, as many local stakeholders as possible – in order to deliver a preliminary analysis providing a description of a possibly undisturbed evolution of the port areas (10-20 years' time-span) according to current trends emerged.

When specifically declined in the PoWER Methodology, this foresight step is aimed at producing so called **Reference Foresight Frameworks.**

[7] See also Del T3.1.1 "WP4 Working Method"; N. Koukovinos, R. Malvezzi**,** I. Metaxa, M. Padula, F. Picenni, F. Stergiopoulos, S. Voutekakis, C. Ziogou (2019): *Towards a Foresight Methodology for Adriatic-Ionian Port Areas Focusing on the Energy Sector*. Chemical Engineering Transactions,v. 76, pp. 505-510.

[8] PoWER Project, DT3.4.1 - Benchmark Analysis

3.3 ENVISIONING

This step is aimed at developing preliminary visions on the potential scenarios on port's future and at assessing them through a ranking method. To this purpose, a panel of experts - PoWER foresight panel – shall be set-up in each port area implementing the Methodology in order to participate in off-fields discussions.

The panel shall be made of experts on topic-related technical issues – s. a. engineers and environmentalists as well as experts on social issues and humanitarian issues – coherently with the STEEP framework (social, technological, environmental, economic, political) (Szigeti H.,.2011). These experts may either come from entities/ stakeholders groups already involved in the Methodology or from externals strangers to the activities carried out in the two previous phases, or both typologies; If local experts won't be available for completing the Panels, also non-local experts could be engaged; in any case, objective is to cover all the types of expertise required for in the STEEP framework.
As for the PoWER panels working method, the Delphi method has been chosen as the most appropriate one, both because its' iterative dynamics fit the objective of the panels discussion and because it does not require panel members to meet physically, thus simplifying meetings logistics and increasing the range of engagement (regional or national level).

The Panel discussion is carried out in a two-to-three-rounds iterative process, which shall bring panellists to agree on one (or few) leading scenarios:

- round 1: a questionnaire is administered to the members of the panel (see Template 5 – Delphi Questionnaire Format). The compilation of the questionnaire can be made directly by the panellists, or, if present, indirectly by process facilitators, e.g. on basis of interviews or recorded material.
  In case the questionnaire compilation is made by a facilitator, filled-in questionnaires shall be validated by panel members.
  Finally, a report highlighting relevant similarities or differences among the expert viewpoints shall be prepared (either by the facilitator or by an appointed panel member).

- round 2: each member of the Delphi panel takes vision of the answers given by the other members (in anonymous form) as well as the related report.
  With that information in mind, each member is asked – if deemed appropriate – to modify, extend or deepen his previous answers, highlighting synergies or incompatibilities with the other expert viewpoints (also in this case, the compilation can be direct or indirect).
  At this point, either the facilitator or an appointed panel member, shall elaborate a new report highlighting the most relevant elements of convergence or divergence among the panel members' updated answers. The Facilitator/appointed members should also review the first and the second report in order to compare panellists' before- and after-answers and, finally, match, relate and possibly integrate the final answers (from round 2) with the thematic g-local Needs and the Ideas and Solutions selected in the previous phase in order to create a comprehensive picture to be shared with the members of Local Thematic Committees (see point 4).

The iterative approach shall continue alike, until a clear stabilization of the positions is reached (normally this happens in few rounds, such as 2 or 3). The final expected result is that all members of the panel finally agree on one single position or on a few; to this extent, Delphi method presents a high convergence ratio, and it is therefore most suitable for individuating few alternative and robust options out of a multiplicity of possibility and stimulus.

In the end, local facilitators/ appointed panel members prepare the Final Delphi Report, containing a short description of the process implemented and the final positions emerged in the different port areas.

3.4 SHORT-MID-TERM SCENARIOS DEVELOPMENT: LOCAL THEMATIC SCENARIOS

This step capitalizes all previous methodology activities in order to elaborate short-mid-term scenarios related to the expected evolution of involved port areas into Innovation Hubs. First, a Local Thematic Committee (LSC) shall be set-up in each port area involved.

Local Thematic Committees are flexible entities, to be built in a variable geometry fashion basing on the topic-related interests of the stakeholders involved. Generally speaking, the Committee is set-up by extending the Foresight Panel (see previous point) to the local stakeholders' community members willing to cooperate in the definition of a specific thematic scenario to be pursued, basing on the work done by the Foresight panel (see previous point). The following stakeholders' categories shall be represented in the Thematic Committees:

- subjects involved in the phase 1 of the PoWER Methodology (see §1);
- political and administrative representatives of the Municipalities and of the Port Authorities;
- Call for Solutions and Gaming Sessions winners (in the latter case, it's important to involve both students and teachers);
- academics and researchers working in field of the addressed topic;
- local multi-utilities (if needed);
- representatives of territorial institutions (Chambers, Foundations, etc.) interested in supporting thematic innovation processes, also by call for proposals or direct funding.

During their meetings, the Local Thematic Committees shall develop exploratory scenarios representing a number of possible futures of their port area as a predictive tool to support better risk management and decision making aimed at accomplish those possible future considered as positive.

It is warmly suggested to have co-design meetings moderated by a facilitator.
One possible tool to facilitate the Committee discussion are "playing cards" (see Template 6 - Cards layout for co-design sessions)

Different views emerging in the committee shall be discussed, elaborated, updated, extended as long as one (or few) shared comprehensive view(s) is agreed among all the members, thus gradually building the consensus of the members to sign the Local Agreement in which they state their commitment in the implementation of the agreed scenarios[9] in their port area.

Local agreements (see Template 9 – POWER Local Agreement) are not legally binding for their signatories. The proposed template shall be considered as a starting document which can be edited by The Local Thematic Committees' members according to their specific needs and availability at institutional level.

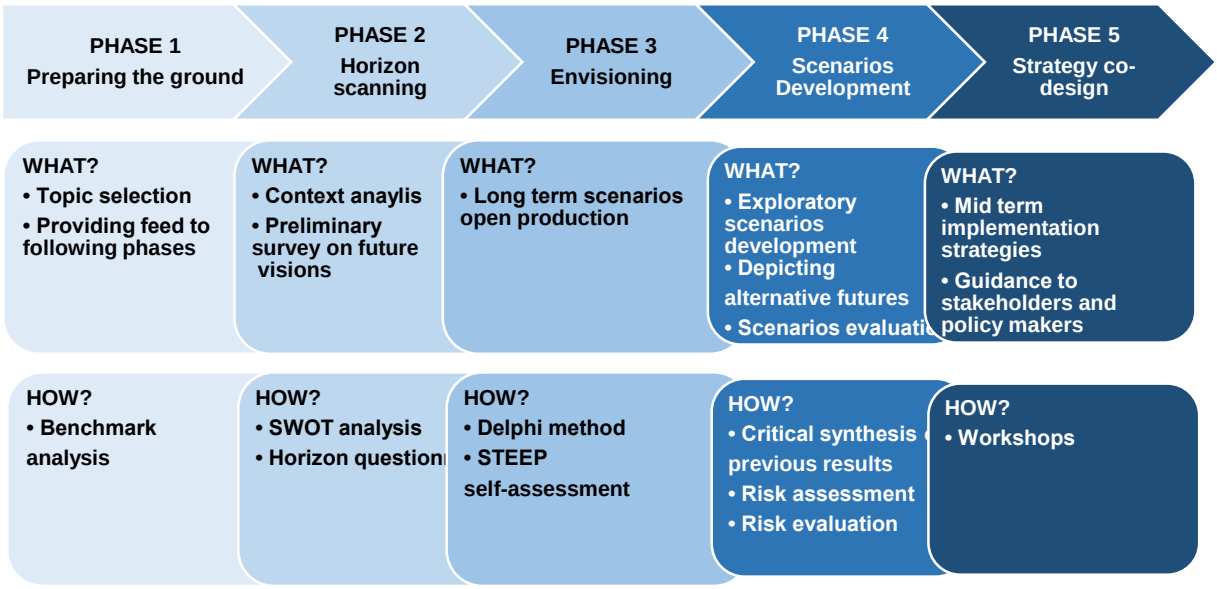
[9] Agreed short-mid-term scenarios shall be reported as an annex to the Local Agreement.

3.5 LONG-TERM SCENARIOS DEVELOPMENT: FROM LOCAL STRATEGIC OUTLOOKS TO A WIDER STRATEGY

The last phase of the PoWER foresight aims at producing a long-term scenario in which all the thematic visions (Local Strategic Outlooks) are addressed and that may contribute to the evolution of ports into Innovation Hubs. The strategic perspective of the long term scenario provides guidance to stakeholders and policy makers involved in the ports transition process. Strategy co-design is entrusted to Local Strategic Committees (LSCs)[10], which shall physical meet in co-design workshops, organized and facilitated by local coordinators of the Methodology implementation. A small editorial board shall be set-up by 2-3 appointed LSC members which shall take care of transforming the outputs of this phase's LSCs discussion into organic and homogeneous strategic documents.

This step of the foresight process is assumed as an incremental work, nurtured by the progressive creation of independent scenarios related to different thematic layers, each new one interacting with the previous ones; the output of the 5th phase will be a joint document - a long-term Strategy – that shall be signed by LSC members (and possibly other stakeholders) willing to engage in the actual implementation of the long-term scenarios developed and basing on which the innovation Hubs Network will be further enlarged.

Figure 3 - PoWER Scenarios Foresight Phase



[10] Local Strategic Committees shall encompass enterpreneurs, researchers, PA members, etc. Which have a direct interest in cooperating in the elaboration of stategic scenarios; for this reason, they will probably be a more extended version of the Local Thematic Committees.

CONCLUSIONS

The described Methodology, aimed at triggering the establishment of new Innovation Supply Chains at ADRION level, was especially focused on the development of Local Thematic Scenarios, since these allow a quick and effective stakeholders' engagement as start-up action for building a network of relations and interests, able to concretely and effectively foster achievable innovations on the short-mid-time range.

After gradually building the consensus of the Local Thematic Committee around a shared thematic scenario, its members shall sign a Local Agreement, in which they state their commitment to the actual implementation of the developed scenarios in their port area.[11] Local agreements (see Template 9 – POWER Local Agreement) are not legally binding for their signatories, and the proposed template shall be considered as a starting document to be edited by Local Thematic Committees members according to their specific needs and availabilities.

On this basis, the PoWER methodology also encompasses a more complex pathway, related to a strategic level and aimed at generating an open innovation environment in which multiple key-topics shall be addressed in an integrated approach as way for incubating the elaboration of topic-related thematic scenarios. Such strategic pathway shall enhance the connections among thematic layers and therefore, among stakeholders linked to each thematic layer, thus enabling the extension of the Innovation Supply Chain and the construction of a consistent framework for the operational decision making.

The operative and strategic levels can be readjusted according to the concrete necessities and specific situations of each port realm; this shall lead to the definition of different implementation frameworks, such as the following ones:

- PoWER ports which have already developed a local strategic outlook shall apply the PoWER methodology recursively in order to develop the local thematic scenarios for each new key-topic identified in their local strategic outlook (in this case, step 1 and 5 of the Foresight can be skipped).
- ADRION ports which have not developed a strategic outlook can adopt the PoWER Strategy as a starting point for detecting their key-topics on which to apply the PoWER Methodology; in this case, the PoWER strategic co-design approach (step 5 of the Foresight stage) may be applied in order to tailor the PoWER Strategy to the local context;
- Periodic updates of the local strategic outlook shall be performed on the basis of the development or the implementation of local thematic scenarios, so to include new evidences, added values or results coming from the operational level.

According to these situations, also the local protocols shall be signed by the new members willing to join the Innovation Supply Chain, if already established, or, in case the Innovation Supply Chain is newly established, a new protocol shall be created and signed by all the wannabe members.

[11] The agreed thematic scenario shall be reported as Annex to the Local Agreement.

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ANNEX 1: GAMING SESSIONS METHODOLOGY

STEP 1: CONTEXT ANALYSIS

In this phase, the project and the Gaming Session methodology will be presented to participants in order to stimulate students' business ideas. Students will be invited to think and propose business ideas.
At the end of this phase, students shall be informed about the project and present their business ideas in a specific form.

STEP 1: TIME PLANNING

- 1 or 2 meetings for each type of target
- Month 1

STEP 1: ACTIVITY

- Organize one or more introductory meetings with participants (it is possible to organize different meetings with different groups of participants); it is possible to organize brainstorming activities in order to stimulate business ideas
- Issue the specific form for business ideas to students, agreeing on a return date (indicatively 7-10 days)
- Students return the form filled in with their business ideas.

STEP 1: METHOD

After the project, the timeline and training presentation, the methodology foresees an introductory lesson about the economic framework specifically related to the topics of thematic NEEDS.
Furthermore, it's possible to organize a field visit for students to see the port area or a meeting with sectoral businesses.
Then, a brainstorming can be a way to share case studies within which students will be inspired to develop their business ideas. Participants will be invited to imagine a business idea. Consultants will support them in facing specific issues in order to focus and define their own entrepreneurial idea.

STEP 1: TOOLS

- Thematic Needs list
- Form "MY IDEA IS..." *(see Template "Gaming Sessions Tools")*

STEP 2: TEAMS

Aims of this phase are:
- Identify business ideas, selecting among submitted proposals
- Create student teams to work on the selected ideas.

Teams' definition is based on the "liking" of the idea individually proposed by other students who become "members" of the future enterprise. The whole project, especially the part self-managed by the teams, enhances the potential of group work, whose dynamics must be carefully supervised by coordinators.
The number of team members varies according to the students:
- High school students: teams of a minimum of 3 to a maximum of 4 students
- University students: teams of a minimum of 2 to a maximum of 4 students.

STEP 2: TIME PLANNING

- 1 meeting for each type of target or for every class
- Month 1 – Month 2

STEP 2: ACTIVITY

- Reading and selection of received business ideas

- Creation of teams
- Appointing by the team members of a team leader ("owner" or "legal representative" of the simulated company)

STEP 2: METHOD

The selection of business ideas takes place collectively. Trainers/consultants meet students divided in classes or homogeneous groups (i.e. all students belonging to the same upper high school class) and all together, they read the received business ideas.
It is recommended to write the ideas on a blackboard or a screen, to make them visible for everybody. The promoter of the idea can add details, explanations, etc. other students or trainers/consultants can ask questions, suggest changes or adjustments.
Once the ideas have been all illustrated, the group will start discussing, evaluating both their feasibility and their interest.
Being this the first phase in the technical validation of the business ideas, it is recommended that one or more entrepreneurs or companies representatives or technicians can guide the session of business idea evaluation.
The ideas to be developed are then selected; the number of ideas per class/group of students varies according to the number of students (team of 3-4 students for upper secondary schools, teams of 2-4 students per university).
Once the ideas are identified, students gather around them; each student chooses the team where to work. Within the team the group leader is then appointed (this person in the simulated company becomes "Owner" or "legal representative").
The students or the consultant/teacher fill in the “IDEAS & TEAMS” form.

STEP 2: TOOLS

- Form “IDEAS & TEAMS” *(see Template “Gaming Sessions Tools“)*

STEP 3: BUSINESS PLAN

Aim of this phase is the development of the business plan for each business idea. Through meetings with trainers, consultants and entrepreneurs and through teamwork, participants develop and deepen all aspects of the business plan related to their own business idea.
At the end of this work, they present a report describing their business idea.
The report must consist of maximum 15 pages written in the participants’ language, but an abstract in English is necessary.
Participants hand back the report by the deadline established by the organization.

STEP 3: TIME PLANNING

- About 4 meetings for each type of target or class group (approximately 12 hours)
- Month 3 – Month 8

STEP 3: ACTIVITY

- Meetings among trainers/consultants/entrepreneurs and students in order to explain to students the various chapters of the business plan
- Teams meetings for individual work
- Drafting by each team of the business plan report

STEP 3: METHOD

The GS provides an active teaching methodology and workshop; in fact, to carry out the activity and develop the business plan, students are supported by:

- The organization providing the training tools and coordinating the implementation of the activity in all participating schools
- Consultants, specialized in different topics, to whom each team can ask about specific problems
- School teachers, managing the project in the institutional context

- Companies and business associations with whom students (potential customers and suppliers) relate
- Banks: resources and financial players for each team
- Institutions and local, national and European public authorities

It is possible to organize for the students' groups some meetings with consultants, teachers, entrepreneurs, representatives of institutions supporting them in solving problems incurred during the business plan drafting.
Therefore, it is important to alternate frontal lessons (explanation) with an open methodology based on:

- Learning by doing: students acquire practical competencies while developing their business plan;
- Collaborative learning: students work in teams; each team meets, searches for information, contacts potential customers/suppliers, drafts its own business plan;
- Mentoring: consultants and "mentors" entrepreneurs support teams, helping them in the development of the business project, guiding all operational steps of business simulation;
- Flipped classroom: teachers, mentors and expert consultants will assist students in classroom in revising contents and solving practical problems in the business plan.

STEP 3: TOOLS

- Form "BUSINESS PLAN REPORT" *(see Template "Gaming Sessions Tools")*

STEP 4: COMMUNICATION

Aim of this phase is the preparation and presentation of the business idea by the teams.
Each team, after finalizing and submitting its own business plan report, prepares a 10 minutes' oral presentation of the business idea. The presentation can include video, slides, programmes, schemes, etc. Students are given full freedom of expression.
The Gaming Sessions Methodology foresees a common event for participating students to present their business ideas and related business plans. If both high school and university students take part in the GS, it is possible to organize two different final events.

STEP 4: TIME PLANNING

- 1 presentation meeting for each type of target
- Month 8 – Month 9

STEP 4: ACTIVITY

- Teams prepare their business plan presentations
- Teams present their business plan in a presentation event

STEP 4: METHOD

The GS does not provide a defined methodology for the presentation of business plans; teams are free to choose tools and methods of communication.

STEP 4: TOOLS

- Not provided.

STEP 5: EVALUATION

A selection board shall choose business ideas. The selection board will consist in minimum 3 members from local institutions, companies and cultural sector. The selection board is in charge of analysing and evaluating all received proposals in order to select a maximum of 5 proposals.

STEP 5: TIME PLANNING

- 1 meeting for jury
- Month 9

STEP 5: ACTIVITY

- Projects evaluation

STEP 5: METHOD

The local evaluation will take place in a selection board meeting, after the projects presentation event. Each member of the selection board evaluates reports, assigning a score for each item in the evaluation model. It is important that each member give his/her opinion about the selected projects. After a brief debate, board members will select the final winning project.

STEP 5: TOOLS

- Projects evaluation grid “GS EVALUATION FORM” *(see Template “Gaming Sessions Tools“)*

ANNEX 2: INSTRUCTIONS TO FACILITATE THEMATIC CO-DESIGN SESSIONS

In this Annex detailed instructions to facilitate processes in the Local Committees are provided.

Specific Objectives	Main objective of the Local Thematic Committee is the development of the thematic scenario, following which all subjects interested in implementation will be involved in the formalization of the local Agreement. Each co-design session has to answer to a specific objective. In the following lines, a peculiar key word for each meeting is defined: • **Appealing Event** • Kick-off Meeting: **starting point** • Co-design/1: scenario **main directions** • Co-design/2: scenario **trigger actions** • Co-design/3: **accountability** (scenario fine-tuning) • Co-design/4: **validation** of the thematic scenario • Agreement **signature** In order to guaranteeing the achievement of the expected results an important desk work has to be foreseen (research of answers in case of emerged doubts and scouting related to financing opportunities).
	Appealing Event Objective of the event: to attract relevant stakeholders not used or interested in participating in co-design processes because not able to understand the added value generated by their active engagement. After the meeting, some stakeholders could decide to take part to the Committee. Organizational issues: definition of a panel of realtors, able to present case studies, information, tools, relevant to make evident the importance of cooperation to develop scenarios and strategies. According to the main objective of the meeting, it is suggestable to organize a workshop accessible by invitation, in order to focus the event involving relevant actors.
	Kick-off Meeting: **starting point** Objective of the event: to build a common knowledge baseline and present how to manage the future meetings. Organizational issues: presentation of the results achieved during the implementation of phases 1 and 2. During the meeting the information collected through the Horizon Questionnaire and the Foresight Panel are provided. The second part of the session is devoted to the presentation of the set of playing cards: participants are invited to suggest additional cards.
	Co-design/1: scenario **main directions** Objective of the meeting: identifying the prior directions characterizing the thematic scenario. Organizational issues: sharing at the beginning of the meeting solutions/ideas identified by Call for Solutions e Gaming Sessions, in order to complete the information baseline; choosing the cards and clustering them to define the directions to be followed.

	Co-design/2: scenario **trigger actions** Objective of the meeting: to define the trigger actions. Organizational issues: within the main directions, choosing the cards having the higher possibility to become trigger actions (able to start up in the short period).
	Co-design/3: **accountability** Objective of the meeting: preparing the trigger actions and defining the responsibilities of engaged actors. Organizational issues: completing the selected cards following the trache, with the further aim to define the contents of the Local Agreement.
	Co-design/4: **validation** of the thematic scenario Objective of the meeting: finalizing and validating the contents of the thematic scenario and of its trigger actions; listing the signing actors. Organizational issues: preparing a paper overview of the scenario and a project fiche for each trigger action; organizing a brainstorming for focusing/validating the scenario, and foreseeing a work in groups to specify the contents of the trigger actions, (the final versions of Scenario and Agreement might be shared by online communication).
	Agreement **signature** Depending on the results produced by the co-design sessions, it will be possible to give visibility to the event: due to the operational relevance of the meeting, each Port/City can make the most suitable choice (a good press release could be enough).
Management	The prior tool used to manage the co-design sessions is the **set of playing cards** useful to facilitate the definition of the energy-oriented scenario. In the **front** of each card (see Template 6 "Cards layout for co-design sessions") the following items are provided: • The title of the possible solution to be adopted; • A brief description of the solution, in order to provide an incipit to the debate. The description has to be inspired by the outcomes generated by the Horizon Questionnaires and by the Foresight Panel; • Quantitative evaluation for a ranking list of the prior solutions. In the **back** of the card questions to be treated in case of the card will be considered as a priority are provided: • Who has to be involved in the action; • When it is possible to start the action (list the preconditions able to stop the realization and the timeline); • In which zone of the port area the action might be implemented (use maps); • What kind of financing could be foreseen for its implementation; • Prior synergies able to link the action to the other ones foreseen by the Scenario. In the following lines, in italics, some **title of the energy-oriented playing cards** are provided as examples: • One card for each solution emerged by **C4S and GS** • *Solar systems (storage)* • *Solar photovoltaic* • *Biomass energy (organic waste)* • *Geothermal energy* • *Optimization of the material used for the opaque part of the casing*

	• *Qualified choice of the material for the restoration of the transparent casing* • *Introduction of efficient generation systems (condensing boiler, biomass stoves, etc.)* • *Green roofs* • *Domotics* • *Awareness and outreach campaigns* • *Gaming for increasing awareness and stimulate virtuous behaviours* • *Training courses for Energy Managers* • *National incentives (if possible, within the description of the card, synthetically specify which ones, even writing their name or acronym only)* • *BEI Financial tools (i.e. ELENA)* • *Private funds* • ... • Other (It is possible to choose/add the desired cards, **but paying attention not to exceed the number of 40**) Considering the fact that the titles of the cards have to be defined in coherence with the results of the local foresight actions, each Pilot has to create its own **set of playing cards**. Nevertheless, despite the potential differences between the cards, the shared methodology in managing the meetings guarantees the comparison between partial and final results.
Setting	For the co-design process related to the local Thematic Committee the identification of a **fixed setting** is strongly suggested. It would be better if the chosen setting is located in/close to the Port area. To have a reference space helps the organization of the events and the loyalty of involved participants.
Time	It is strongly suggested to organize meetings with a **maximum duration of 3 hours**.

TEMPLATE 1: FORMAT TO DESCRIBE LOCAL NEEDS

NEED NUMBER: .....

NEED TITLE: .....

GOAL

With reference to the specific challenge tackled in the foresight and co-design process, please, select one or more objectives. The objectives represent a selection of the goals defined both in the EU Missions and in the Horizon Europe Clusters (programming period 2021 - 2027) (see Example "Local Need", which was built on the goals of the Strategy "Europe 2020", since the PoWER project referred to the 2014 - 2020 programming period).

The identification of the objective/s is meant to support the definition of possible project ideas and related network, also facilitating the identification of the most adequate financing line where submitting the possible proposal.

SECTOR OF APPLICATION CONCERNED

With reference to the specific challenge tackled in the foresight and co-design process, please, select the sector/s related to the thematic critical issues revealed during the implementation of the data gathering phase. This item/s remain/s partially open because of the item "Other" that has to be necessarily specified (see Example "Local Need"): this will permit to define if adding new applying sectors to the g-local version of the Needs List (see Example "G-local Needs List"). It is recommended to use the item "Other" just in case of real necessity, in order to make easier the Needs clustering, after the acquisition of the Local Needs Lists coming from the IHN members interested in the specific challenge. The applying Sector is another helpful item in the development of new project ideas and networks.

NEED DESCRIPTION

Concise description of the Local Need (max 1500 characters, spaces included).

TEMPLATE 2: CALL FOR SOLUTION (C4S)

ARTICLE 1 — INTRODUCTION

The Innovation Hub Network is the most important Output of the PoWER — *Ports as driving Wheels of Entrepreneurial Realm* European Project (Interreg ADRION, 2018-2020); its objective is to support ports in a path turning them into **Innovation Hubs** able to reinterpret and innovate their historic role of exchange places, to become connection points among the different Adriatic territorial contexts and to facilitate the enhancement of their entrepreneurial potential, which is currently unexpressed or not adequately valued. Through this evolution of the Adriatic ports into Innovation Hubs, the IHN aims to reverse the trend that sees them largely characterized by a structural weakness (in terms of representativeness, modernization, smartness, socio-economic positioning, regeneration processes and reconversion actions).
In order to reach this objective, IHN facilitates and encourages the collaboration among the innovation supply chain key-actors: **educational organizations** (secondary and vocational schools, university, research organizations), **companies and public authorities**, therefore, collaboration transforms complex problems affecting ports and the surrounding urban contexts in research and cooperation opportunities, creation of production chains and opening-up of markets.
In particular, IHN focuses on *(insert the topic tackled by the foresight and co-design process)*, being this challenge a strategic factor in several territorial/business development plan.

As described in the PoWER Methodology, the approach applied by the IHN, based on the Needs defined during the data gathering phase, brings to the birth of entrepreneurial ideas and proposals, to the creation of collaborative networks to design new products and services, to the opening of new markets based on cooperation between the most innovative forces of the different Countries involved in IHN. In particular, IHN foresees two actions strictly connected to this "Call for Solutions", that is, in chronological order:

- collection of **ideas and solutions** to solve the Needs (see Annex 1): this action is carried out, on one hand, through "Call for Solutions" in object; on the other hand, through the implementation of "Gaming sessions" involving students from secondary schools, vocational schools and universities from IHN participating Countries;
- a **co-design path** aimed at the definition, through the involvement of stakeholders and using the ideas/solutions collected during the scouting phase, of the optimal scenario to strive towards.

ARTICLE 2 — OBJECT OF THE CALL

This call for proposals is promoted by *(insert the entity's name)*; it is aimed at the selection of products and services connected to *(insert the topic)* which are appropriate for the issues described in Annex 1 and in the section "Needs" of the PoWER Platform *(insert link to the webpage where Needs are available)*
Submitted proposals can be elaborated at different levels:

- **ideas** to be developed and prototyped;
- **prototypes or patents** to be marketed;
- **products or services** already on the market.

In order to submit an application, candidates must complete a dedicated form on the website *(insert link)* and use the on-line forms listed in the section *(insert link)*.

C4S (Call for Solution) is not a commercial action. It aims at facilitating networking actions between demand and supply. Furthermore, the involvement in the network offers candidates the opportunity of promoting their own idea/prototype/product through the platform of the project. After the project end, the platform will also allow C4S participants to play an active role in the construction of future projects steaming from the results of the Project pilot actions.

ARTICLE 3 — APPLICANTS

Participation to the Call for Solutions is free of charge and is addressed to:

- **Independent professionals**
- **Researchers**
- **Small and medium enterprises**
- **Industries**

Participants must have their legal seat or their seat of operations in *(insert the country/countries)*.

ARTICLE 4 — PROPOSALS' SPECIFICATIONS AND OPERATIONAL FRAMEWORK

Proposals to be submitted to the Call for Solutions can be:

- **ideas** to be developed and prototyped;
- **prototypes or patents** to be marketed;
- **products or services** already on the market.

Creative freedom is given as long as proposals tackle the problems highlighted in the Needs list.

ARTICLE 5 — PARTICIPATION REQUIREMENTS

Participants to the Call for Solutions must fulfil the following criteria to be eligible *(please, adjust the following text in italics according to your national laws and local regulations)*:

5.1 INDEPENDENT PROFESSIONALS / SMES / INDUSTRIES

- They have their legal seat or their seat of operations in one of the IHN Countries *(insert countries)*;
- *they are not in a state of bankruptcy, subject to insolvency or winding up procedures, their assets are not administered by a liquidator or by a court (even voluntary), they are not in an arrangement with creditors or in any other analogous situation in accordance with current legislation;*
- *their legal representatives, administrators (with or without powers of representations) and shareholders do not have prohibition, forfeiture, suspension pursuant to art. 67 of Legislative Decree 159/2011 (Code of anti-mafia laws and prevention measures, as well as new provisions on anti-mafia documentation). The applicants subjected to the anti-mafia verification are those indicated in art. 84 of Legislative Decree 159/2011. Companies that do not meet the above requirements will be excluded from participation to the call for proposals.*

5.2 RESEARCHERS

- They operate in a research institution with a seat in one of the IHN Countries *(insert countries)*;
- they have not been convicted and have no criminal proceedings in progress.

At application stage, the applicants will declare to meet the participation requirements and to know, accept and consider binding all the rules of this call for proposals.

ARTICLE 6 — REGISTRATION AND PARTICIPATION RULES

The Call is available in the PoWER platform (hereafter "the platform"). In order to participate, the applicant must complete a proposal submission form made of two main sections:

- Participant identification and acceptance of call's rules/requests: regulation, self-certification, Privacy Policy, release of the use of (non-sensitive) materials made available;
- Proposal description (it will be also possible to attach, if necessary, further relevant material photos, videos, slide shows, etc. in order to provide a clearer view of the proposal).

ARTICLE 7 — DURATION AND TIMING

- Applicants have to submit their applications by *(insert the date)*
- Selections will take place before *(insert the date)*, a maximum of 5 proposals will be selected.

ARTICLE 8 — SELECTION JURY AND PROCEDURES

The local selection jury will be composed by at least 3 members, relevant personalities from local businesses, researchers and cultural institutions; selection jury members will be selected and appointed by *(insert the name of the call's promoter)*. The selection jury is responsible of the analysis and evaluation of all proposals submitted by participants, in compliance with Art.6 of the present document, with the aim of selecting up to a maximum of 5 proposals. The assessment of the juries is conclusive and incontrovertible.

ARTICLE 9 — SELECTION CRITERIA

The submitted proposals meeting the call requirements will be unquestionably evaluated by the Jury according to the criteria indicated below.
The evaluation will be drafted through a brief evaluation chart leading up to 100 points detailed as follows:

ITEM EVALUATED	**MAXIMUM SCORE**
Relevance to the energy challenges of ports emerged in the needs analysis	30
Replicability	20
Social impact	5
Cultural impact	5
Environmental impact	5
Economical sustainability	15
Timeframe for implementation	15
Clarity and synthesis of the proposal	5
Maximum score	**100**

ARTICLE 10 — REWARDING AND VISIBILITY

The reward is represented by *(insert rewards or change of visibility)*.

ARTICLE 11 — LIABILITY LIMITATIONS

The promoter assumes no responsibility for any difficulties in the submission process caused by technical failure.

ARTICLE 12 — GUARANTEES AND MANLEVE

The applicant guarantees that the proposal *(please, adjust the following text in italics according to your national laws and local regulations)*:

- *do not contain any material violating rights, positions or claims of third parties (with reference to the law on copyright and industrial property and other applicable laws or regulations);*

- *do not contain obscene, pornographic, illicit material, prohibited by law or contrary to what is indicated in this regulation;*
- *the contents are freely and legitimately usable in compliance with the provisions of this regulation because the user is the owner of the rights to use them, or in that it has acquired the availability from all the subjects entitled, having taken care of the full compliance and / or satisfaction of the rights - even of economic nature - due to the authors of the contents and / or works from which such contents are derived and / or extracted, or to other subjects entitled, such as, by way of example, the Siae, or due for the use of image and name rights provided for by law.*

Candidates participating to the Call for Solutions are aware that the responsibilities, even criminal, of the contents presented or attached for the purpose of participation, are charged to the candidate who has uploaded them.
The candidate undertakes to hold staff harmless from and against any claims, actions or requests including, but not limited to, legal and accounting expenses arising from the uploaded content or other materials provided to the project, or the violation by the candidates of these conditions. The Staff undertakes to promptly notify the candidate of any claim, action or legal proceeding.

ARTICLE 13 — EXCLUSION GROUNDS

(please, adjust the following text in italics according to your national laws and local regulations)

Applicants will be excluded from participating in this call for proposals if they will use fraudulent means or violate the normal course of the initiative or, merely as an example but not limited to, if they will hinder other applicants' registration procedures, manipulate the functioning of the Website or for other activities that otherwise violate this regulation.
The staff, or third parties appointed by the same, reserves the right to proceed, within the terms deemed most appropriate, and in compliance with applicable laws, to limit and inhibit any initiative aimed at circumventing the system designed. Any fraud or attempted fraud of this initiative will be prosecuted according to law and will immediately and irrevocably result in the exclusion of the applicant from participation.

ARTICLE 14 — MANAGEMENT OF INTELLECTUAL PROPERTY RIGHTS

(please, adjust the following text in italics according to your national laws and local regulations)

The promoter of the Call for Solutions does not acquire any property rights on the contents presented by the candidates. Contents remain property of the candidates.
The staff can publish, reproduce, represent download any content presented to the call for proposals, for the purposes of participation in the call or otherwise, but does not acquire any property right on the content itself. On the other hand, the candidate is informed that, given the intrinsic features of Internet, contents transmitted are not protected against the risks of further diffusion and/or use, of which the staff cannot be considered responsible.

ARTICLE 15 — PRIVACY AND CONFIDENTIALITY

(please, insert the privacy policy standard text according to your national laws and local regulations)

ARTICLE 16 — CONTENTS AND SIGNS

Candidates acknowledge that their distinctive logos or contents may be published on the PoWER platform and that they will retain all exclusive rights over them.

ARTICLE 17 — APPLICABLE LAW AND JURISDICTION

For disputes that may arise in the interpretation and execution of this Regulation, only *(insert your country)* law will be applicable. The competent court will be the Court of *(insert the country/city)*.

ANNEXES:

1. **Needs list** *(see example "Glocal Needs List")*
2. **The format to submit proposals** *(see template "C4S — Format to submit proposals")*

TEMPLATE 3: C4S SOLUTIONS PROPOSALS SUBMSSION FORM

PROPOSAL DESCRIPTION	
Title of the proposal:	
Typology: *(drop-down menu)*	*Idea / prototype / product*
Specific need to which the proposal gives an answer *(drop-down menu)*	*Needs list*
Abstract of the proposal in local language	*(max 1500 characters, spaces included)*
Abstract of the proposal in English	*(max 1500 characters, spaces included)*
Attachments	*up to a maximum of 3 files*
What is the social impact the proposal can achieve?	*(max 500 characters, spaces included)*
What is the cultural impact the proposal can achieve?	*(max 500 characters, spaces included)*
What is the environmental impact the proposal can achieve?	*(max 500 characters, spaces included)*
What is the necessary timing for the proposed idea to become fully operational?	*(max 500 characters, spaces included)*
In case of an idea to be patented, indicate **which economic resources are necessary** for the realization of the prototype and with what financial arrangements it is intended to cover them (if any)	*(max 1000 characters, spaces included)*
In case of a patent to be marketed, report **which economic resources are necessary** both for the industrialization of the product / service (and with which financial arrangements it is intended to cover them, if any) and for the implementation of the product /service.	*(max 1000 characters, spaces included)*
a product/service already on the market report the **costs for the purchase and the implementation.**	*(max 1000 characters, spaces included)*

TEMPLATE 4: GAMING SESSIONS TOOLS

*These tools have to be used by following the Gaming Sessions Methodology described in **Annex 1**.*

"MY IDEA IS...." (see GS Methodology's step 1)

TITLE OF THE BUSINESS IDEA	
THEMATIC AREA connection with needs	
OBJECTIVES AND DESCRIPTION	
STUDENT'S NAME SCHOOL	
E-MAIL	

IDEAS & TEAMS (see GS Methodology's step 2)

TITLE OF THE BUSINESS IDEA	
THEMATIC AREA connection with needs	
OBJECTIVES AND DESCRIPTION	
TEAM school students' names **Team leader**	
E-MAIL	

BUSINESS PLAN REPORT (see GS Methodology's step 3)

COPERTINA

Insert: Title of the project, students' names, grade, school, City, Country

SUMMARY

Project abstract: 1 page with students' photo and names and project description (max. 10 lines in English)

BUSINESS PLAN (max 15 pages)

Description of the idea

Invent the name and logo of your company.
Describe your business idea: What is it? How was it born? Who are your customers? How do you connect with the topics of your area?

Description of the product/service

What are the characteristics of your product/service? What are the innovative elements? You can illustrate your product/service even with a diagram or a drawing.

Market research
Do a research (for example on the web) to check if you have competitors and the differences with your product / service.
Submit questionnaires to your potential customers to verify their interest for the product / service

Production
Describe how you produce the product or provide the service. Search for your suppliers, define the price

Company aspects
Write the role of the team members in the enterprise (manager, administration, customer management, supplier management, production, logistic, etc.)
Choose the type of company, choose a location

Market strategies
Describe how you will advertise your product / service
Make a marketing plan (to whom / how do you sell the product? in which areas?); report how many products / services you will sell (in a month, a year, etc)

Budget
With the help of an expert, make a simple first-year economic forecast, only by analyzing the possible costs and revenues. Indicate the amount you'd need to start the business

Considerations and acknowledgments
Considerations about the performed activity, lesson learned

EVALUATION FORM (see GS Methodology's step 5)

NAME OF THE PROJECT		
COUNTRY		
		Score
1	**Completeness of the project**	_____/10
2	**Consistency of the idea** – realistic and achievable enterprise idea (not fantasy!)	_____/10
3	**Originality feasibility of product in marketplace** – explanation of product/service – market research, positioning among competitors	_____/10
4	**Business development** – production process / service supply, organizational structure, management of human resources	_____/10
5	**Market strategy** – market strategy, advertising, targeted promotion, targeted positioning in the market	_____/10
6	**Management of financial resources** – economic report, financial statement, financial requirements, etc.	_____/10
7	**Connection with Needs** – How the project is related with the needs	_____/10

8	**Innovation** – improved product (differentiation of the idea compared to an existing product) – innovation (the idea has innovation, creativity) – transferability (the idea can be licensed to other companies to increase production or to the use of technology / product in sectors other than for which it was invented)	_____/10
9	**Other Attributes** – use of new technologies – it takes into accounts sustainable development (such as environment, social or community's themes, etc.) – etc.	_____/10
10	**Project presentation** Quality of presentation, written and oral skills	_____/10
	TOTAL	**_____/100**

TEMPLATE 5: DELPHI QUESTIONNAIRE FORMAT

0. General data *(to be filled-in by the facilitator)*
PORT/CITY:_____
DELPHI round: ☐1 // ☐2 // ☐Last

1. Panel Member	
Social Expertise	☐
Technological Expertise	☐
Economical Expertise	☐
Environmental Expertise	☐
Political Expertise	☐

2. Envisioning		
TIME HORIZON / **QUESTIONS**	**5-10 YEARS**	**20-25 YEARS**
	short/medium-term	Long-term
	(Please, refer mostly to energy-related issues)	***(Please, refer to all relevant strategic themes)***
1. Which will be the **main breakthroughs** in port areas that Innovation Hubs should work for (technological, economic, institutional, social, organizational, etc) and which are going to be their **expected benefits?**	*max 2.000 characters spaces included*	*max 2.000 characters spaces included*
2. Which will be the **main forces** (human, financial, entrepreneurial, scientific, behavioral, etc.) driving the breakthroughs described?	*max 1.500 characters spaces included*	*max 1.500 characters spaces included*
3. Which will be **main obstacles** to the achievement of such breakthroughs?	*max 1.500 characters spaces included*	*max 1.500 characters spaces included*
4. Which **concrete actions** may you suggest to overcome obstacles and	*max 1.500 characters spaces included*	*max 1.500 characters spaces included*

support achievements?		
5. How the vision of **Ports as Innovation Hub** could be strengthened, improved, extended?	*max 1.500 characters spaces included*	*max 1.500 characters spaces included*

3. Review *(to be filled-in by the facilitator)*	
SHORT-MID TERM	**LONG TERM**
max 1.500 characters spaces included	*max 1.500 characters spaces included*

TEMPLATE 6: CARDS LAYOUT FOR CO-DESIGN SESSIONS

FRONT: *solution title*

Please describe the solution [max 1.500 characters spaces included]

DEGREE OF PRIORITY:.....

Number between 0 (no priority) and 10 (high priority)

Insert the Partner Logo

BACK: outline to define the solution implementation

- Who should be involved in the steps needed to implement the solution?
- Where (in which areas/buildings) the solution can be applied?
- When (in which month) could the solution implementation start?
- Which funding opportunities could be activated?
- Which are if any, the main synergies with other scenario's solutions?

cut along the border and fold the sheet along the dotted line

TEMPLATE 7: MATCHMAKING FICHE

REGISTRATION	
Company Name	
Vat no.	
Address	
Country	
Phone	
E-mail	
Reference person	

QUESTIONS	
What kind of activity does your company carry out?	*max 500 characters spaces included*
In what supply chain mainly deals your company?	*max 500 characters spaces included*
In which matchmaking-meetings are you interested: *(drop-down menu)*	☐ Business for Ports (B4P) ☐ Research to Ports (R2P) ☐ Business to Business (B2B) ☐ Research to Business (R2B) ☐ Ideas to Research (I2R) ☐ Ideas to Business (I2B)
Describe what would you like to get from the matchmaking meetings	*max 500 characters spaces included*

TEMPLATE 8: THEMATIC SCENARIO'S STRUCTURE

Executive Summary

Please provide a brief summary of the contents and key findings.
Please use max 2.000 characters (spaces included)

Introduction *(standard text which should be the same in each single scenario)*

The PoWER Scenarios constitute **short and mid-term visions** produced during the foresight and co-design activities *(see PoWER Methodology Phases 2 and 3)*. Features:

- they are co-developed by **Local Thematic Committees,** which consist in an enlargement of the Delphi Panels to local stakeholders willing to cooperate in the definition of specific scenarios to be pursued, basing on the alternative options;
- they focus on a time horizon spanning **from 5 to 10 years;**
- they should describe **specific actions**, including solutions and ideas adopted, as well as their economic viability;

Scenarios will be the basis for the sign of **agreements** among stakeholders.

Vision and Objectives

Please indicate the shared vision agreed among the participants of the Local Thematic Committee. Pay special attention in describing the general objectives of the vision.

Fields of action

*Please specify the main fields of actions / general axes that can be tackled within the given time frame of the scenario (5-10 years). For each field that you will choose, please provide a brief description of the specific objectives to be pursued. Examples of the fields referred to the **Energy** topic:*

- *Increase of energy efficiency*
- *Use of RES*
- *Use of alternative fuels*
- *Retrofit of buildings*
- *Smart solutions / integration*
- *User behaviour / training of personnel*
- *New processes or services*
- *Further networking or engagement*
- *New ICT tools*
- *New funding schemes*
- *Innovative planning*
- *Innovative procurement procedures*
- *Research and development*
- *.....*

Solutions/actions proposed

What are the most promising solutions/actions that will help you achieve the fields of actions?
Try to list the solutions by setting for each their Priority (according to Priority levels 1, 2, 3).
For each solution (especially for those marked with priority level 1 and 2) please indicate:

- *What general field and specific objectives does it apply to?*

- *Who should be involved and how?*
- *Where should it be applied? (with reference to the pilot port area or also beyond)*
- *When should it be applied? (you may propose also more steps of implementation)*
- *How could funding be achieved?*
- *Which are the synergies and overlaps with other solutions/actions proposed?*

Evaluation of economic feasibility

Try to estimate the economic feasibility of each solution/action that you propose.
*No detailed business plan is required; however, the following basic information should be provided (you may also **use a table** for presenting such information in a more compact form):*
Costs (€):

- *Capital Cost Investment (purchase of equipment, installation costs, infrastructure costs, etc)*
- *Operation and Maintenance (O&M) costs (e.g. per year, regular maintenance, replacement of equipment after a set period of time, etc.):*
- *Other costs (if any)*

Economic benefits (€):

- *Yearly savings (€):*
- *Reduction of operational costs (€):*
- *Other (if any) (€): (e.g. indirect benefits due to better equipment operation that can prolong its lifetime, reduced maintenance intervals, etc.)*

Environmental benefits:

*Try to give an indicate qualitative overall mark: **Good, Average, Poor***

Summary table of actions

Please provide a summary table of the actions comprised in the main scenario as follows:

Nr	*Action/solution proposed*	*Priority*	*Field/Axis*	*Time frame*

*Please try to **summarise the results** expected at the end of the time-frame (5-19 years) in a couple of paragraphs, highlighting eventual risks and difficulties respect to the vision set at the beginning of this document.*

Alternative scenarios

Please present here one or more variants of the Summary table, describing possible alternative scenarios to be pursued in the short and mid-term (5-10 years).
Please specify the motivations of proposed alternatives, highlighting advantages/disadvantages respect to the reference scenario described at the previous paragraph.

TEMPLATE 9: PoWER LOCAL AGREEMENT

Name of Public Administration / Port Authority /SME/Association / etc. (hereinafter referred to as *short name*) – LEGAL NUMBER: *xxxxxx,* here represented by the Chairman *Name and Surname* authorized to sign this document

Name of Public Administration / Port Authority /SME/Association/etc. (hereinafter referred to as *short name*) – LEGAL NUMBER: *xxxxxx,* here represented by the Chairman *Name and Surname* authorized to sign this document

Copy as many times as the signatories are

PROVIDED THAT:

The project "PoWER Ports as driving Wheels of Entrepreneurial Realm" - project number: 109 Adriatic-Ionian Program Interreg VB (ADRION) 2014-2020, is a European project funded under the European territorial cooperation program ADRION (acronym of Adriatic -Ionian) and pertains to the thematic priority axis number 1: Innovative region

PoWER aims to support the Adriatic ports in a path that will lead them to become the **Innovation Hubs** of the local economic systems in which they are inserted, enabling them to become "transmission chains" of innovation also capable of connecting the various Adriatic territorial contexts and of facilitating the emergence and development of entrepreneurial potential. PoWER facilitates and encourages collaboration between the key players of the Innovation Supply Chain: cognitive institutions (Universities, Schools, Research centres), Companies and Public Administrations, so as to transform the complex problems that afflict the ports and the urban contexts in which they are inserted, into opportunities for research, collaboration and business generation

IT IS AGREED AS FOLLOWS:

Article 1 — OBJECT OF THE AGREEMENT

The signatories undertake to collaborate for the realization of the *Thematic (insert the topic)* Scenario, as outlined following the co-design process carried out within the framework of the Thematic Committee and described in the document "*Thematic (insert the topic)* Scenario — Port of *(insert the port's name)*", to be considered an integral part of this agreement.

Article 2 — COMMITMENT OF THE PARTIES

The signatories are committed to assume the operational program identified in the document " *Thematic (insert the topic)* Scenario — Port of *(insert the port's name)*" as a reference framework to support and promote the sustainable development of the port area in the short and mid-term. The objectives and actions to be implemented to make the program operational, the timing and the respective responsibilities are described in detail in the document "*Thematic (insert the topic)* Scenario — Port of *(insert the port's name)*".

Article 3 — DURATION OF THE AGREEMENT

The present agreement lasts until *XX/XX/XXXX*, with the possibility of extension.

Article 4 — ORGANIZATIONAL COMMITTEE

In order to promote the activation of the activities envisaged in the collaboration agreement, monitor their implementation and propose appropriate adjustments to improve the results, an Organizing Committee is set up chaired by a facilitator, who will act in the name and on behalf of the signatories and which should be identified by the signatories themselves at the time of signing this agreement. The office of facilitator of the Committee is annual. The Committee takes particular care in monitoring and evaluating the planned activities. The Committee prepares a report each semester to be sent to the written bodies, highlighting the initiatives taken, the strengths and critical points in the implementation of this agreement, the modifications or additions that are necessary.

*Date*_____ *Signatures*

Attachment: " *Thematic (insert the topic)* Scenario — Port of *(insert the port's name)*"

EXAMPLE 1: QUESTIONNAIRE FOR QUANTITATIVE ANALYSIS

Name of the organization (Pilot area/sub-area): Xxx

Address/Location: Xxx

Reference Person/Team of the area (Name, Surname, qualification and email): Xxx

1. What is the main activity of your organization?
2. Describe what are the most energy intensive operations in the Case study area.
3. Do you produce energy into identified case Study/Area? If yes, please specify energy production in the Case study such as gas fired boilers, coal fired boilers, biomass fired boiler, biogas plants etc. (both fossil and renewables).

ENERGY CONSUMPTION

4. Specify the Total energy supplied for the last 3 years

	Calorific Value	2015	2016	2017
Electricity (MWh/year)	N/A			
Natural Gas (Nm^3/year)				
Heavy Fuel Oil (ton/year)				
Diesel (ton/year)				
Coal (ton/year)				
Total consumed heat (MWh/year)				
…				

5. **Thermal Energy (2017)**

Monthly consumption of fuel

Total consumption (in MWh) and per sector[12] if available for at least 1 year (Please provide relevant bills)

	Sector 1	Sector 2	…	…	…	Totals
Sector name						
January						
February						
March						
April						
May						
June						
July						
August						

[12] Ports facilities (areas) related to case studies i.e. terminals, administrative buildings, warehouses etc. (if applicable)

September						
October						
November						
December						
Totals						

6. **Electricity Consumption (2017)**

Monthly consumption of electricity (in MWh) in total and per department if available for at least 1 year **(Please provide relevant electricity bills)**

	Sector 1	Sector 2	…	…	…	Totals
Sector name						
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Total						

7. Specify total Energy Cost in EURO – if available (i.e. electricity, liquid and solid fuels, heat purchased etc.)

Cost in euro	2015	2016	2017
Electricity			
Natural Gas			
Heavy Fuel Oil			
Diesel			
Coal			
…			
Purchased Heat			

8. Energy Carriers average Costs – if available

Energy Carrier	Unit of Measurement	2015	2016	2017
Electric Power Peak Demand	EUR / MW			
Electricity	EUR / MWh			
Natural Gas	EUR / Nm^3			
Heavy Fuel Oil	EUR / MWh			
Diesel	EUR / MWh			
Coal	EUR / MWh			
Heavy Fuel Oil	EUR / MWh			
Purchased Heat	EUR / MWh			

9. What is the share of energy costs in the total costs of the Case study (if available)?

KEY PERFORMANCE INDICATORS

10. Specify relevant variables (i.e. tons of production, number of people, square meters of area, meters of quays, etc.) of the case-study sub-area for the past three years (2015-2017)

Relevant variable	Unit of Measurement	2015	2016	2017
Case-study area	m^2			
Length of quay	m			
Container terminal area	m^2			
Office/Building floor area	m^2			
Number of containers	TEU			
Number of refrigerated containers	TEU			
Number of ships in/out	n.			
Tons of goods (processed/handled)	t			
Other…				

11. Key Performance Indicators calculation

In this part a set of 5 energy indicators is defined on annual basis. These indicators will be used to benchmark energy use and compare the performance of ports among each other.

Indicator 1: Total consumption of primary energy

Energy data should be collected as a whole and detailed by energy sources (electrical, diesel, gas etc.) as well as by energy consumer (port administration and container terminal operator).

Total energy consumption (tonne of oil equivalent[13]) per case-study area (toe/m^2)	
Total energy consumption (toe) per case-study lenght of quay (toe/m)	

Indicator 2: Energy consumption per tons of goods handled/processed

Total energy consumption (primary energy) per total TEUS (toe/TEU)	
Total energy consumption (primary energy) per total tons of goods handled/processed (toe/tons)	

Indicator 2: Energy consumption of refrigerated containers

This indicator is included because refrigerated (reefer) containers have strong impact on energy consumption.

Energy consumption (primary energy) by reefers per Total number of reefer TEUS (toe/reefer TEUs).	

Indicator 3: Energy consumption of internal fleet

[13] See conversion factors at the following link: https://en.wikipedia.org/wiki/Tonne_of_oil_equivalent

This indicator will help determine energy consumption of the internal fleet that includes trucks, bus or cars owned by the terminal operators within port boundaries.

Total energy consumption (primary energy) by internal fleet per terminal area (toe/m^2)	
Total energy consumption (primary energy) by ships per number of ships arrived (toe/n. of ships)	

Indicator 4: Energy consumption of office buildings

Every port activity consists of different services and processes. This indicator takes into account administrative and office activities consuming energy.

Total energy consumption (primary energy) by office buildings per terminal area (toe/m^2)	

Indicator 5: Energy consumption of lighting systems

This indicator will determine the total energy consumption for lighting of different port systems from individual buildings to terminals.

Total energy consumption (primary energy) by lighting system (port terminal area, excluding office buildings) per area (toe/m^2)	

EXAMPLE 2: QUESTIONNAIRE FOR QUALITATIVE ANALYSIS

Quailtative data collection
1. *Describe "Critical points"* - *What are the most energy intensive operations in the Case study area?* - *How old are the technical equipment?* - *Do you have a regular maintenance schedule for heating/cooling equipment?* - *Do you still use non-renewable sources to produce energy?* - *Is your office building old? Is it insulated?* - *…*
2. *Needs* - *Which area/sector needs more attention from energy point of view?* - *What kind of actions are urgent for improving energy efficiency?* - *What are energy efficiency priorities?* - *Does the area use enough local present renewable energy sources (e.g. geothermal, solar, tidal, wind energy etc.)?* - *In your opinion, which are the greatest barriers for the faster and/or further development (lack of know-how, financial barriers, regulatory barriers etc.)?* - *…*
3. *Opportunities* - *How the barriers described in "2" could be overcome?* - *According to your opinion, which are the most relevant fields (activities, operations, etc.) in terms of the highest energy savings potential that can be achieved in the short term?* - *Have you already implemented any energy strategy? If yes, describe your goals for the next years (and what you have done in the past)* - *In your opinion, what is the greatest potential for further development?* - *…*

EXAMPLE 3: QUESTIONNAIRE FOR BEHAVIOURAL ANALYSIS

1. What is your general attitude towards energy efficiency and energy saving issues?	
5. Are you aware of possible ways of improving energy efficiency and saving energy?	
2. In your opinion, which is the most effective aspect for incentivising people to decide to change their behaviour in energy management? (Please tick mark (√) to indicate one answer)	
Economical (increase/reduction of the energy bills)	
Environmental (impact of the energy consumption in terms of CO2 emission, VOC, etc.)	
Health aspects (impact of the pollution on the citizenship health)	
3. In your opinion, is it possible to achieve energy savings through behaviour change in your personal working situation?	
4. Do you practice any energy saving methods in your work area (e.g. turn of lights, heating, and equipment when possible)?	
5. In your opinion, which are bad behaviours regarding energy consumption that should be changed in your working situation?	
6. Is the energy management a topic of conversation with your colleagues? Do you discuss energy issues (energy use, savings, efficiency improvement) in meetings (briefly elaborate)?	
Yes. Why, from your point of view?	
No. Why, from your point of view?	
7. In your opinion, what are the most effective things that you could do to use less energy and improve energy efficiency in your work area?	

8. Is there something in particular that you may need for supporting effectively the behavioural change which you have identified in the question above?

9. Your behaviour in energy management is the same at home and at work?

- ☐ Yes
- ☐ No. If no:

How does your behaviour differ? .....

Where does this difference of behaviour come?.....

10. How is the level of at work, in the summer and in the winter time? Please, if possible, could you refer the average temperature in the summer and in the winter time?

- ☐ High. Summer average temperature:..... Winter average temperature:.....
- ☐ Medium. Summer average temperature:..... Winter average temperature:.....
- ☐ Low. Summer average temperature:..... Winter average temperature:.....

11. Please, could you identify a specific behaviour you would like to modify in your daily life in order to improve the energy efficiency of your office?

- ☐ Yes

Which one:.....

Why:

- ☐ Easy to do (focus on behaviour)
- ☐ Cheap to buy (focus on technology)
- ☐ Very effective (focus on result)
- ☐ I can't think of anything

12. Which are the aspects you focus on to improve the energy management?

- ☐ Energy saving (focus on the behaviour)
- ☐ Technologies to improve energy efficiency (focus on the tools)
- ☐ Both

EXAMPLE 4: LOCAL NEED

Need title: Supply of energy to ships during the docking phase in the port

Goal

Smart Growth:

- ❒ Enhancing access to, and use and quality of, information and communication technologies
- X Supporting the shift towards a low-carbon economy

Sustainable Growth:

- ❒ Preserving and protecting the environment and promoting resource efficiency (through RES implementation)
- X Promoting sustainable transport and improving network infrastructures

Inclusive Growth:

- ❒ Investing in education, training and lifelong learning
- ❒ Improving the efficiency of public administration (with special reference to Energy Efficiency management)

Sector of application concerned (with special reference to energy oriented aspects)

- X Mobility/transport
- ❒ Pubblic infrastructure (Lighting)
- ❒ Building
- X Energy production
- ❒ ICTs
- ❒ Industrial production process
- X Marine Environment
- X Blue Growth
- ❒ Other. Please, specify: .....

Need description:

During a 10-hour stay in the harbour, the diesel engines of a single ship can burn up to 20 tons of fuel and produce 60 tons of carbon dioxide. This is equivalent to the total emissions produced by 25 medium-sized European cars in a year. These emissions can be reduced by shore-to-ship power solutions. Driven by the recent legislative evolution in the environmental field, port authorities and ship owners in many parts of the world are trying to reduce emissions with a view to mitigating global climate impact. A valid alternative for the reduction of polluting agents is the electrification of the docks, in other words the construction of infrastructures designed to supply the electric power necessary for the operation of the auxiliaries of ships during their stay in port. However, these infrastructures require costly investments and an adequate energy distribution system, as well as the need to produce energy elsewhere.

As reported in the title of the NEED, it is therefore necessary to provide a valid technological solution for the electrification of the quays that allows overcoming technological and market barriers, evaluating the possible use of alternative energy sources for the production of electricity on site.

EXAMPLE 5: GLOCAL NEEDS LIST

Nr.	Title	Description
1	Supply of energy to ships during the docking phase in the port	During a 10-hour stay in the harbour, the diesel engines of a single ship can burn up to 20 tons of fuel and produce 60 tons of carbon dioxide. This is equivalent to the total emissions produced by 25 medium-sized European cars in a year. These emissions can be reduced by shore-to-ship power solutions. Driven by the recent legislative evolution in the environmental field, port authorities and ship owners in many parts of the world are trying to reduce emissions with a view to mitigating global climate impact. A valid alternative for the reduction of polluting agents is the electrification of the docks, in other words the construction of infrastructures designed to supply the electric power necessary for the operation of the auxiliaries of ships during their stay in port. However, these infrastructures require costly investments and an adequate energy distribution system, as well as the need to produce energy elsewhere. As reported in the title of the NEED, it is therefore necessary to provide a valid technological solution for the electrification of the quays that allows overcoming technological and market barriers, evaluating the possible use of alternative energy sources for the production of electricity on site.
2	Efficient distribution of LNG	During a 10-hour stay in the harbour, the diesel engines of a single ship can burn up to 20 tons of fuel and produce 60 tons of carbon dioxide. This is equivalent to the total emissions produced by 25 medium-sized European cars in a year. Driven by the recent legislative evolution in the environmental field, port authorities and ship owners in many parts of the world are trying to reduce emissions with a view to mitigating global climate impact. A valid alternative for the reduction of pollutants in the port area is the use of Liquefied Natural Gas (LNG) as a naval fuel (for dual-fuel engine ships) for the so-called "last mile" and for the mooring and docking phase in port. The European directives (TEN-T corridors) are urging the introduction of LNG storage systems located in strategic ports in the Mediterranean area and not. As reported in the title of this NEED, one of the problems encountered by the ports that are about to install these storage systems is the distribution of this fuel (currently carried out by tankers and trucks). Therefore it is required to provide a valid technical or logistic solution with good economic impact that allows to develop LNG distribution systems in the port areas, starting from the production/storage system up to the final user (cargo ships, but also ferries, cruise ships, buses and lorries), in order to spread LNG use towards sustainable mobility.
3	Energy data collection and analysis	By collecting, combining and aggregating (individual) data, a specific energy-environmental policy can be developed and implemented on a local scale (for example in a neighbourhood) or in the port area. Global and energy data can also facilitate the identification of any port development limitations and contribute to the definition of environmental priorities and actions, as well as facilitating the start-up of programs for the integrated development of urban and industrial areas by the public administration. As defined in the NEED title, it is required to provide an ICT solution for the collection and analysis of energy-environmental data with a "user-friendly" interface, that can be used by district managers and by public administration in order to monitor constantly energy consumptions,

		evaluating the data collected, highlighting any weaknesses and identifying possible improvement actions. This system should also help identify needs and opportunities in areas of interest for the eventual creation of small energy islands: co-management of (possible) production, distribution, sharing of energy.
4	Microclimate improvement	Port areas are heavily cemented and this causes the so-called "heat island" effect in the summer. To avoid this, it is necessary to develop solutions for the improvement of the microclimatic comfort of public / open spaces through, for example, the use of green islands of easy installation and maintenance (no plants on the ground, for which it is necessary to foresee reconstitution of the soil nutrients, once floors and cementitious elements have been removed), or the application of heat-reflecting paints, or other interventions that may help the improvement of the microclimate in the port area (as reported in this Need title). The solution must include low investment costs, ease of installation, simple and inexpensive maintenance, and effectiveness of the result. In this key, the project proposes and advocates the creation of a new concept, conceived in particular to satisfy social demand, characterized by a great architectural urban quality, understood in the most recent "eco-sustainable" key, i.e. adopting a design approach where the energy saving and respect for the environment are combined with low cost management and soil savings, and to reduce of management costs, precisely by virtue of the adoption of techniques of bioclimatic design, use of technologies and materials already tested for efficiency and savings in energy consumption, use of renewable sources for energy production.
5	Facilitation to virtuous behaviour	Behavioural changes at home or in the office can produce sensitive and measurable (through the use of smart meters) savings. Several pilot experiences suggest that with only behavioural changes, significant energy savings of 10-15% can be achieved in both offices and residential buildings. For this reason, it is important for workers and citizens to be educated and incentivized for the rational use of energy and energy resources. As indicated by this Need title, it is required to support the development of a widespread culture of energy conservation through, for example: – Training courses on the measures to be taken to improve, for example, the management of heating and lighting systems (better if clearly addressed to the sectors in which port operators operate, such as the tertiary sector, logistics, production processes, mobility); – Innovative learning methods (such as gamification) to involve workers and citizens in the process of energy efficiency of a given urban context (with particular reference to port areas); – Effective ideas for the promotion of awareness campaigns; – Incentives to facilitate the adoption of virtuous behaviour.
6	Spaces and/or logistics rationalization	Logistics is the "core business" of many companies in port areas. A lack of rationalization of spaces (for example of warehouses) and logistics can result in production and energy inefficiencies. What is required is an ICT methodology / a tool which, on the basis of the existing situation, is able to improve the organization of spaces (both for life inside buildings and for the production process) and to rationalize logistics in order to improve the production process and increase energy efficiency.
7	Methods and solutions for an effective	Compressed air & refrigeration systems for production machinery represent the major energy consumption centres for many manufacturing

	distribution of compressed air and refrigerant fluid to make production processes more efficient	companies, both in the port and non-port areas. It has been estimated that the optimization of compressed air systems would produce savings of up to 35% of electricity consumption. It often occurs that, due to leaks in the distribution system, compressed air and / or refrigerant fluid are not at the correct temperature and pressure for a correct functioning of the machinery, consequently worsening the production process. As expressed in the NEED title, it is required to develop methods of investigation of losses (e.g. through the use of thermal imaging cameras or other systems) and appropriate technological solutions (also ICT) to improve both the distribution of compressed air and refrigerant and the energy efficiency of the production process, in compliance with the operating parameters envisaged by the processes.
8	Methods for the complete renovation of existing HVAC systems	According to EU Commission data, the European building stock is generally inefficient, with 35% of buildings over 50 years old. These buildings, both public, residential and offices, are characterized by old and inefficient heating, ventilation and cooling systems. The extraordinary maintenance interventions necessary for the complete overhaul of these plants are burdensome in economic terms and necessarily entail a halt in production or the need to move people elsewhere. As reported in the NEED title, it is required to present a step-by-step methodology / process leading to the replacement (partial or total) of a dated civil installation, with the aim of containing costs and optimizing technological innovations on the basis of the given context. In this context, the use of another heating source (such as pellets, wood chips, methane, LPG) should also be considered.
9	Three year payback period	According to European Commission data, the European building stock is generally inefficient, with 35% of buildings over 50 and a very low annual restructuring rate. One of the barriers that prevent the energetic redevelopment of buildings (envelope, HVAC plant and lighting system) and on the production process is the return time of investments of this kind which, for example, relates to short rent that characterize our times, turns out to be too long. It is therefore necessary to present technologies for energy efficiency that offer a payback period of less than 3 years. The focus of this need is not so much on technology, which can be of any type, but on the times of return in the face of an increase in efficiency of the building / production process. Given the specific request, it is requested to detail the type of incentive (regional, national) that one intends to use.
10	Roofs to produce energy from the bound or dated buildings	The specific need described in the title stems from the need to increase the production of energy from Renewable Energy Sources in the port area: many abandoned warehouses could be widely exploited to produce, for example, electricity through the installation of photovoltaic systems in coverage. Many of the buildings in the port area date back to the early decades of 1900 (many of these buildings are bound). This implies at the same time the need to restructure the roofs of these buildings before being able to proceed with the installation of the plant: and this turns out to be an economic burden that no owner intends to support. It is therefore necessary to develop a structure that produces energy (electric or thermal) and can be supported on the walls with minimal interventions on the roof, so as not to require heavy infrastructural interventions on the building and / or not to compromise the coverage of a possible historic building.

11	Efficient lighting/equipment management	The current state of lighting/equipment infrastructure in ports is not at a satisfactory level from the point of view of electricity consumption and in terms of lighting quality. A large number of lighting fixtures still in operation today are in fact inefficient and obsolete (HP Hg lamps, HP sodium lamps, metal halide lamps), making maintenance very expensive. The lighting systems in the ports therefore represent a huge potential in terms of savings and functionality. Lighting/equipment management could achieve several good results, such as: reducing energy consumption, CO2 emissions, light pollution as well as maintenance costs and acquiring a "green" image. To this extent, it is therefore necessary to develop an integrated efficient solution to manage lighting system also replacing old lamps with cost-optimal solutions.
12	Lowering peak power and Excessive reactive electricity	From the analysis of electricity consumption and peak loads in ports, it is noted that the use of transporter cranes greatly influences the consumption of reactive electrical energy. In this context, the installation of electricity supply & demand mgmt. equipment and of peaks and reactive electricity compensation would significantly reduce electricity costs. In this context the NEED in question is located: it is necessary to develop solutions for a correct management of supply-demand of electricity with the aim of lowering the power peaks and the reactive load. In this context, solutions for the replacement of electric motors on cranes can also be adopted, as these engines are usually obsolete (they are over 50 years old).
13	Implementing RES production	Electricity consumption is quite high both for the buildings and the infrastructures of the port. Therefore, together with the adoption of energy saving measures, it is necessary to increase the share of renewable energy applications, with the aim of producing clean energy and minimizing the withdrawal of electricity from the grid. The focus should be on building-related technologies such as photovoltaic (PV), small wind turbines, geothermal energy, etc. In this context, the switch to some other heating source (such as pellets, wood chips, methane, LPG) should also be considered. The solution must take into account the necessary infrastructural works and capital investments, taking advantage, wherever possible, of regional and national (state) incentive programs to reduce installation costs.
14	Zero energy mobility for tourists	Some ports face the challenge of transferring passengers from cruise ships to the city centre, in addition to the problem of docking the ships themselves. As reported in the NEED title, it is required to develop energy efficient systems for the tourists' transport from the cruise terminal to the city centre, such as electric bikes connected to renewable energy production systems, electric or hybrid buses (e.g. Hydrogen fuel cell) with systems zero impact charge (with RES production systems).

EXAMPLE 6: SOLUTIONS ASSESSMENT MATRIX

Proposal ID	Title of the proposal	Item evaluated								Total score
		Relevance to the energy challenges of ports emerged in the needs analysis **Max. 30 scores**	**Replicability** Max. 20 scores	**Social impact** Max. 5 scores	**Cultural impact** Max. 5 scores	**Environmental impact** Max. 5 **scores**	**Economical sustainability** Max. 15 scores	**Timeframe for implementation** Max. 15 scores	**Clarity and synthesis of the proposal** Max. 5 score	

EXAMPLE 7: PoWER HORIZON QUESTIONNAIRE

1. General section

A. What are you most interested in? *(Please, select up to 3 topics.)*

- **ENERGY**
  - *Efficiency of buildings*
  - *Efficiency of industrial processes*
  - *Production of renewable energy*
- **SUSTAINABILITY**
  - *Circular economy*
  - *Innovative products*
  - *Waste management and recycling*
  - *Intelligent mobility*
- **BUSINESS**
  - *Investing and trading*
  - *Commerce*
  - *Crafts*
  - *Small and Medium industries*
  - *Large industries*
  - *Services (logistics, software, consultancies, etc.)*
  - *Restoration*
  - *Tourism and Leisure*
- **SCIENTIFIC RESEARCH**
  - *Theoretic or base research*
  - *Applied research*
  - *Private R&D investments*
- **ENTREPRENEURIAL INNOVATION**
  - *Start-ups*
  - *Internationalization*
  - *Digitalization (e.g. additive manufacturing)*
  - *Industrial design*
  - *Service design*
  - *Internal organization*
- **SOCIAL SCIENCES**
  - *Social innovation*
  - *Social inclusion and discrimination*
  - *Gender studies*
  - *Inclusive or participation processes*
  - *Facilitation for innovation*
  - *Surveys and data analytics*
- **CULTURAL PRODUCTION**
  - *Digital sector*
  - *Traditional sectors (e.g. theatre or cinema)*
  - *Heritage preservation*
  - *Design professions*
  - *Journalism, books and essay writers*
- **PUBLIC ADMINISTRATION**
  - *Economic development strategies*
  - *Public procurement: works*
  - *Public procurement: services*

B. How do you rate your average level of expertise on these topics? (choose just one option)

- **Leading expert**
- **Deep professional knowledge**
- **Some professional knowledge**

- **Deep amateur knowledge**
- **Common lay knowledge**

C. Briefly describe a FUTURE SCENARIO (25-30 years) for the Port of your country or your city as Innovation Hub. With "scenario" we intend a narrative story related to your personal vision of how the Port should be in the future, in order to be an Innovation Hub, also including related hopes and fears. It is required that you start your narration **from energy-related fields**, but then you are allowed to extend it also to **other fields** that you considered as relevant for the good realization of an Innovation Hub. Please condense your scenario within 3.000 characters (spaces included)

D. In your view, the described scenario can be related to which one of the following?

- **Great ambition, heroic challenge**
- **Decline, crisis**
- **Collapse**
- **Continuous growth**

E. Freely associate up to 5 keywords to classify the scenario you described

2. Specific section: detailed contribution

A. What are the *main forces* driving the scenario you described?

B. What are the main *obstacles and risks* to the scenario you described?

C. As a NON expert, which topics do you believe scientific research should focus on in order to trigger the evolution of Ports into Innovation Hubs? Suggestions for NON expert:

- **Sea-related sources of renewable energy:**
  - tidal and sea waves
  - hydrogen
  - off-shore wind power
  - on-shore micro-wind power
  - other RES
- **De-carbonization of products and processes:**
- **Circular economy issues;**
- **Ports logistics**
- **Energy efficiency in port's activities:**
  - more efficient processes
  - more efficient behaviours;
  - more efficient buildings;
  - more efficient infrastructures (e.g.: lighting)
- **Blue growth:**
  - Fishery and aquaculture
  - Green shipping
  - Exploitation of marine resources
  - Innovation in tourism
  - New solutions for environmental resilience
- **Robotics and automation for:**
  - increasing efficiency
  - increasing safety
  - increasing comfort
  - monitoring and improving the flows of goods
  - savings in time
  - savings in fuel
  - savings in personnel
- **Autonomous vehicles (land, air, sea):**
  - driverless trucks and vans for logistics

- for which other activity? _____
- drone planes
  - for cargo transport
  - for parcel delivery services
  - for which other service? _____
- drone ships

- **Internet of things and big data**
  - what do you think should be the main sources of data?
  - for what application?
- **Simulation and virtual reality**
- **Cybersecurity**
  - which are the more critical attacks you frighten?
- **Employment decrease**
- **New suites of skills**

D. As an expert, which topics do you believe scientific research should focus on?

E. As an expert, which results do you expect? Which possible implementations?

F. If you have additional comments, please indicate them here.

3. Who are you

A. What is your current employment status?

B. What is your attained highest level of education?

- **Secondary school**
- **High school**
- **Some college, but no degree**
- **Vocational**
- **Bachelor's degree or equivalent**
- **Masters, Graduate**
- **Doctoral degree**
- **Other (please specify)**

C. What is your age?

- **20 or younger**
- **21 to 30**
- **31 to 40**
- **41 to 50**
- **51 to 60**
- **61 to 70**
- **71 or over**

D. What is your gender?

E. What city & country were you born?

F. What city & country do you currently live in?