



## Qualification of innovative floating substructures for 10MW wind turbines and water depths greater than 50m

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Definitions & Abbreviations

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AST	Administrative Support Team
CM	Contingency Measures
MM	Mitigation Measures
PC	Project Coordinator
PM	Project Manager
PMT	Project Management Team
WPL	Work Package Leader

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## Executive Summary

This deliverable contains the LIFES50+ Project Quality and Risk Management Plan. The plan ensures high quality project management, deliverables and dissemination material and compliance with the Grant Agreement, the Description of Action and the Consortium Agreement.

## Contents

1	Introduction .....	5
2	Project Quality in LIFES50+.....	5
2.1	External Advisory Group .....	5
2.2	Quality in Dissemination.....	5
2.3	Quality in Deliverables.....	8
2.4	Fulfilment of obligations defined in the LIFES50+ Grant Agreement. ....	11
3	LIFES50+ Risk Management Plan.....	18
3.1	Identification of Threats and assessment of initial Risk.....	18
3.2	Identification of Risk-Reducing Measures and assessment of efficiency .....	19
3.3	Risk-Reducing Measures – The Risk Management Plan .....	22
4	Conclusions .....	25
5	Annex A: Initial list of threats and foreseen risk levels .....	26



## 1 Introduction

This document describes the LIFES50+ Project Quality Plan and Risk Management Plan. These two will be treated as two different entities all though the Project Quality Plan plays an important part of the risk-mitigating measures described in the Risk Management Plan (related to reducing the risk of poor project quality).

## 2 Project Quality in LIFES50+

Project Quality in this deliverable is defined as quality in all results from the project, hereunder quality of formal deliverables and dissemination material as well as fulfilment of obligations defined in the LIFES50+ Grant Agreement.

### 2.1 External Advisory Group

The External Advisory Group (EAG) plays an important part in securing project quality in all three quality elements in LIFES50+ (dissemination, deliverables and fulfilment of obligations defined in the GA, related to industry relevance).

The External Advisory Group consists of representatives from entities formally not part of the consortium, but with relevant background for advising on the work performed during the project. The EAG will be gathered upon request from the Steering Committee or Project Management Team and participate to relevant workshops and meetings. This group provides additional assurance of industry relevance of project outcome. As of today the EAG consists of Statoil (NO) and NREL (USA).

The main responsibilities of the EAG include:

- Provision of strategic advice in the project
- Provision of technical advice and options on the implementation of the project work and outcome
- Provision of expert advice and guidance to the project on industrial and business aspects
- Help to promote the project outcomes through their professional networks

The EAG will have access to limited parts of the project as decided by the Steering Committee.

### 2.2 Quality in Dissemination

Deliverable D8.1 Dissemination Guidelines and Procedures (due M3) is dedicated to promoting high quality dissemination material in compliance with the LIFES50+ Grant Agreement, the Consortium Agreement and operational procedures defined for dissemination activities in LIFES50+. Below a summary of D8.1 is presented with focus on securing quality in dissemination.

Regarding dissemination quality in LIFES50+ there are three main elements to consider namely:

- Official LIFES50+ dissemination materials and dissemination tools
  - Logo
  - Templates





- Website
- Etc.
- The LIFES50+ Dissemination Committee
  - Responsible for compliance with dissemination guidelines and procedures
- A formal procedure for preparing, approving and publishing dissemination material in LIFES50+

### 2.2.1 Official LIFES50+ dissemination material and dissemination tools

MARINTEK has designed a project logo (D8.2), which will be used for all dissemination material. In addition templates (D8.3, due M3) will be provided for project deliverables, presentations, progress reports, minutes of meetings, etc. All Deliverables and presentations done by any beneficiary shall be written in the appropriate template.

The Project Logo and all project templates are available on the project-internal website (<http://www.Lifes50plus.eu/project>) through a dedicated folder for project dissemination tools. The official EU-emblem will also be available for download here.

The website [www.lifes50plus.eu](http://www.lifes50plus.eu) (D8.4, due M6) will contain objectives and a general introduction to the project, downloadable results per activity, press and event activities, workshop outcomes, overview of beneficiaries, etc. As a primary communication tool, the website address will feature in all the project's publications and newsletters. MARINTEK will design the website, and all beneficiaries must contribute to its content (articles, presentations, news etc.). Beneficiaries must also provide a link on their own organisation's website. The LIFES50+ website will remain online for another two years after the project ends.

A project flyer (D8.5, due M6) will serve as a tangible introduction to the project and will be distributed to all LIFES50+ beneficiaries and at internal and external project events. It will contain a short description of the project's objectives and mention the website. MARINTEK will coordinate the proposal, the design, proofreading, and printing. The Dissemination Committee shall provide input and review the text.

### 2.2.2 LIFES50+ Dissemination Committee

The Dissemination Committee was proposed by the Project Coordinator and approved by the Steering Committee on June 25<sup>th</sup>. The Committee will communicate via teleconference and e-mail as appropriate, only meeting if significant problems/conflicts arise.

The main responsibilities of the Dissemination Committee include:

- Provide guidance for the dissemination
- Review of dissemination material from beneficiaries, such as journal papers, conference presentations, press releases, etc.
- Dissemination of project results through different activities such as workshops, webinars, conferences, press releases, etc.
- Ensure compliance with the rules stated in the Grant Agreement regarding dissemination in projects funded through Horizon2020



The Dissemination Committee must be informed of, and approve all, public dissemination activities. They keep track of activities and ensure that all knowledge-sharing activities conform to the agreed guidelines.

Name	Company
Jo Stein Moen	MARINTEK
Lee Madigan	Ore-Catapult
Marie Bayard	IDEOL

Table 1 LIFES50+ Dissemination Committee

### 2.2.3 Procedure for preparation, approval and publishing of dissemination material in LIFES50+

Prior notice of any planned publication<sup>1</sup> shall be given to the Dissemination Committee via Petter Andreas Berthelsen ([PetterAndreas.Berthelsen@marintek.sintef.no](mailto:PetterAndreas.Berthelsen@marintek.sintef.no)) with copy to Jan Arthur Norbeck ([JanArthur.Norbeck@marintek.sintef.no](mailto:JanArthur.Norbeck@marintek.sintef.no)) at least 60 calendar days before the publication, who will inform the IP Management Group and concerned Parties at least 45 days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Project Coordinator ([PetterAndreas.Berthelsen@marinteik.sintef.no](mailto:PetterAndreas.Berthelsen@marinteik.sintef.no)), the Dissemination Committee ([Jo.Stein.Moen@marintek.sintef.no](mailto:Jo.Stein.Moen@marintek.sintef.no)) and to the Party or Parties proposing the dissemination within 15 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted.

Beneficiaries should notify the Project Manager ([JanArthur.Norbeck@marintek.sintef.no](mailto:JanArthur.Norbeck@marintek.sintef.no)) when the activity has been completed to facilitate tracking of dissemination activities in LIFES50+. The Administrative Support Team (AST) will upload presentations held and published articles (or summary, if not public) to the project website (<http://www.lifes50plus.eu>). The table below summarises the procedure for dissemination, hereunder notice of planned dissemination, approval by the DC and documentation of dissemination activities.

"T" defines the planned date of the publication.

When	Responsible	Action	Receiver
T – 60 days	Lead beneficiary (of publication)	Prior notice of planned publication	DC
T – 45 days	DC	Inform IP Management Group	IPG
T – 45 days	DC	Inform concerned Parties	All
T – 30 days	Concerned parties /IPG	Deadline for submitting objections	PC/DC/ Lead beneficiary
T + 10	Lead beneficiary (of publication)	Notification of dissemination	PM

<sup>1</sup> Beneficiaries intending to submit an abstract for a conference should inform and send a draft to the Dissemination Committee at the latest 1 month in advance. The Dissemination Committee will review and approve/reject the material within two weeks of submission.



### 2.3 Quality in Deliverables

Deliverable D9.2 Handbook Management Procedures (due M1) contains a section dedicated to promoting high quality deliverables in compliance with the LIFES50+ Grant Agreement, the Consortium Agreement and operational procedures defined for creation, approval and submission of deliverables in LIFES50+. Below a summary of this section in D9.2 is presented with focus on securing high quality deliverables.

Please note that the LIFES50+ review procedure will only take effect on deliverables due in M6 (November 2015) or later. This as deliverables due prior to M6 are mostly either results of preparatory actions (planning, project-internal) or project management guidelines.

The review procedure uses the official delivery month as a baseline and tracks backwards in time to identify deadlines for the different quality assurance activities (reviews). Table 2 depicts each step in the review procedure with reference to deadlines on basis of official delivery month.

About two and a half month prior to the deadline for official submission of a deliverable, the Project Manager will send the lead beneficiary a reminder, including a copy of Table 2.

The official delivery month (as defined in the LIFES50+ Description of Action) of the deliverable is represented by "T". Unless agreed otherwise the term "delivery month" means "received by the recipient at 12:00 CET on the last workday in the project month T", where month 1 is June 2015. The official deadline for a deliverable due in M10 would therefore be Thursday 31<sup>st</sup> of March at 12:00 CET.

<b>When</b>	<b>Responsible</b>	<b>Action</b>	<b>Receiver</b>
T - 2 months	WP leader/Lead beneficiary	Name peer reviewers for deliverable	PM
T - 1 month	Lead beneficiary	Submit advanced draft or full deliverable	PM/Peer Reviewers
T - 2 weeks	Peer Reviewers	Submit feedback on deliverable	Lead beneficiary
T - 1 week	PM	Submit feedback and final approval	Lead beneficiary
T - 2 workdays	WP leader/Lead beneficiary	Upload final version to project- internal website	<a href="http://www.lifes50plus.eu/project">http://www.lifes50plus.eu/project</a>
T	AST	Submission to European Committee	EC

**Table 2 LIFES50+ Deliverable review procedure**

The Lead beneficiary (responsible for the deliverable) is responsible for compliance with the review procedure. The WP-leader has an overall responsibility for all deliverables in his/her work package while the Project Coordinator has the overall responsibility for all deliverables in LIFES50+.



The PM and the Administrative Support Team will keep records of each deliverable, its assigned peer reviewers and the review process itself.

Below each activity is described in detail.

### **2.3.1 Appointment of Peer Reviewers for Deliverable**

Two months prior to the official delivery month (T – 2 months) the lead beneficiary (responsible for the deliverable), in collaboration with the relevant WP-leader, should appoint two peer reviewers for the deliverable in question. The appointment criteria are as follows:

1. The peer reviewers must be members of the consortium
2. The peer reviewers must not be involved in the writing of the deliverable
  - a. No task members from the task in which the deliverable is developed
3. The peer reviewers should be capable of performing a good review

### **2.3.2 Submission of Advanced Draft or Full Deliverable for Review**

One month prior to the official delivery month (T- 1 month) the lead beneficiary (responsible for the deliverable) must send an advanced draft, or ideally the full deliverable, to the peer reviewers and the PM. The lead beneficiary should also include the deadline date for submitting feedback. The receivers should confirm receipt, indicate whether or not the information sent is sufficient to perform a review and confirm that the deadline for submitting feedback will be kept.

The advanced draft or full deliverable must be sent in word-format so feedback can be incorporated directly into the deliverable.

### **2.3.3 Submission of Feedback from Peer Reviewers on Deliverable**

Two weeks prior to the official delivery month (T- 2 weeks) the peer reviewers should send feedback to the lead beneficiary. The lead beneficiary should confirm receipt of the feedback (confirmation of receipt to peer reviewers should also be copied to the Project Manager for documentation purposes).

Feedback should be given directly in the deliverable as comments or in the text by using "Track Changes". Any other feedback can be given in a separate document or by e-mail.

The peer reviewers' feedback should focus on technical aspects of the deliverable in addition to completeness and readability.





### 2.3.4 Submission of Feedback and final approval from PM on Deliverable

One week prior to the official delivery month (T- 1 week) the Project Manager should send feedback and final approval to the lead beneficiary.

Feedback should be given directly in the deliverable as comments or in the text by using "Track Changes". Any other feedback can be given in a separate document or by e-mail.

The PM's feedback should focus on adherence to the LIFES50+ Description of Action, formal aspects such as correct usage of the official project template, etc. This in addition to readability and if possible, technical aspects and completeness

### 2.3.5 Submission of Final Version of Deliverable

Two work days prior to the official deadline (T-2 workdays) the lead beneficiary should upload the final deliverable to the project-internal website and inform the Project Manager that the upload is complete. The deliverable should be uploaded to the "Deliverable Folder" found under each work package.

A list of checkpoints has been created to be ticked off by the lead beneficiary before finalising the deliverable. These checkpoints are incorporated into the deliverable template so the lead beneficiary must tick off the list. The list will be read and deleted by the AST before official submission of the deliverable to the EC.

Checkpoint	✓
Appearance should be generally appealing and according to the LIFES50+ template.	<input type="checkbox"/>
The executive summary should give a short and to the point description of deliverable.	<input type="checkbox"/>
All abbreviations should be explained in footnotes or in separate list.	<input type="checkbox"/>
All references should be identified and listed.	<input type="checkbox"/>
The deliverable must clearly identify all contributions from partners. It must justify the resources used.	<input type="checkbox"/>
The deliverable must clearly identify the contributions to the state of art. It must justify the scientific contributions.	<input type="checkbox"/>
Each QA check should be signed off in the <a href="#">Document information</a> on page 2.	<input type="checkbox"/>
A full spell check should be completed.	<input type="checkbox"/>

**Table 3 Checkpoints before finalisation of Deliverable**

The deliverable should be uploaded in word-format so the PM is able to make any final amendments. This however does not entail that the lead beneficiary should regard the deliverable as anything but final version.



### 2.3.6 Official Submission of Deliverable to EC

On the official due date of the deliverable (T, the last workday in the delivery month) the PM will make the official submission of the deliverable to EC in pdf-format. Submission will be done through the EC participant portal in accordance Horizon 2020 guidelines.

## 2.4 Fulfilment of obligations defined in the LIFES50+ Grant Agreement.

Deliverable D9.2 Handbook Management Procedures (due M1) have several sections dedicated to management procedures supporting the fulfilment of obligations defined in the LIFES50+ GA. Below a summary of these sections in D9.2 is presented with focus on securing high quality deliverables.

### 2.4.1 Management Structure

The LIFES50+ project has a diverse work programme with ambitious goals to be reached within relatively short project duration. The management structure should provide an efficient project management for the overall project, for each work package and for all the partners. This section presents an overview of the LIFES 50+ management structure including roles and responsibilities. A more detailed description of the LIFES 50+ management structure is found in the LIFES50+ Grant Agreement (Annex 1, part B, section 3.2) and the LIFES50+ Consortium Agreement (Section 6).

Figure 1 depicts the overall organisational structure of LIFES50+.

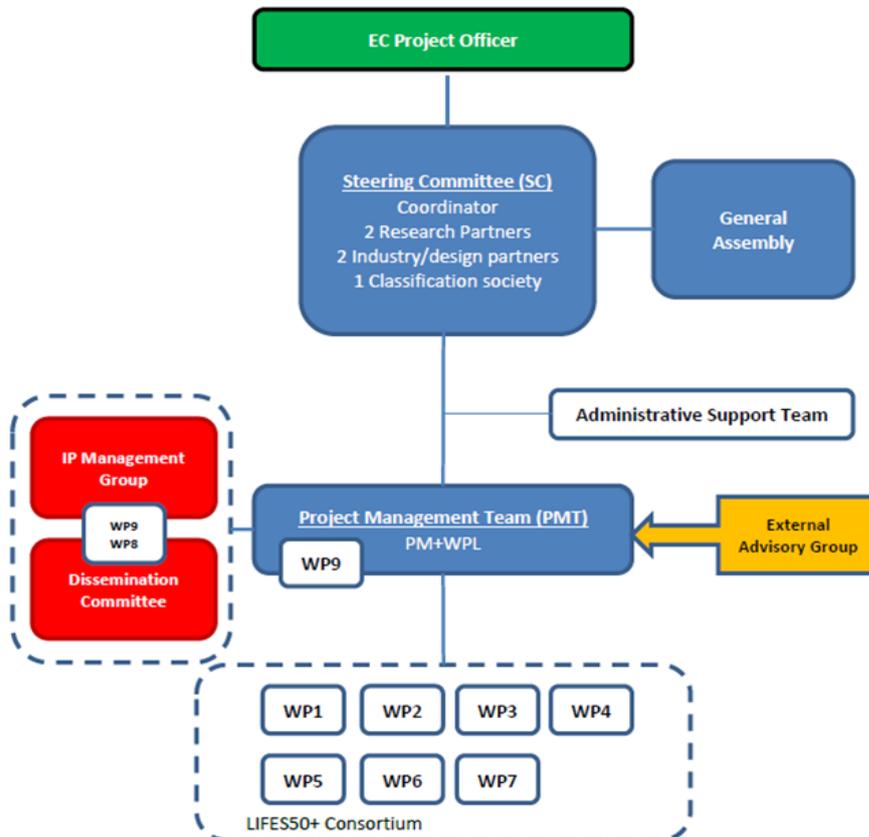


Figure 1 LIFES50+ Management structure



Table 4 depicts the different LIFES50+ management bodies, their composition and main responsibilities as well as to whom they report.

<b>Management Body</b>	<b>Short Name</b>	<b>Participants</b>	<b>Main Responsibility</b>	<b>Reports to</b>
<b>Project Coordinator</b>	PC	Petter Andreas Berthelsen (MARINTEK)	Overall administrative coordination and communication with EC	EC
<b>Project Manager</b>	PM	Jan Arthur Norbeck (MARINTEK)	Project Management of the entire project	PC SC
<b>Administrative Support Team</b>	AST	MARINTEK	Support the PC and the PM in administrative matters on a day to day basis	PC PM
<b>Project Management Team</b>	PMT	PM and WP-leaders (see LIFES 50+ DoA)	Technical coordination at project level	SC
<b>Steering Committee</b>	SC	MARINTEK DNV-GL Tecnalia DTU Iberdrola Dr. Tech. Olav Olsen	Major decisions regarding work plan, budget and contract amendments	EC
<b>WP-leaders</b>	WPL	One partner for each WP (see LIFES 50+ DoA)	Technical coordination of work at WP-level	PM
<b>Task Leaders</b>	TL	One partner for each Task (see LIFES 50+ DoA)	Technical coordination and Task level. Preparation of deliverables	WPL
<b>General Assembly</b>	GA	One representative from each beneficiary	Provide guidance to SC and PMT	PMT SC
<b>External Advisory Group</b>	EAG	NREL (US) Statoil (NO)	Ensure industrial relevance of the project	PMT SC
<b>Dissemination Group</b>	DC	MARINTEK Ore-Catapult IDEOL	Provide guidelines for the dissemination. Provide review and approval of all dissemination activities throughout the project	SC
<b>IP Management Group</b>	IPG	MARINTEK Iberdrola	IPR Management including documentation of IP generated, potential formal protection of IP, etc.	GA SC

Table 4 LIFES50+ Management Bodies

## 2.4.2 Decision Making Process

The following decision making process has been defined:

- The Work Package Leader will make technical decisions at work package level
- For technical decisions affecting other work packages, the Work Package Leaders will make these decisions after consulting the Project Management Team. The Project Coordinator will make final decisions on project level.
- Important decisions regarding the overall directions taken by the project will be made by the Steering Committee (SC). If deemed necessary, the SC may seek advice from the General Assembly (GA).

## 2.4.3 Intellectual Property and Exploitation

IP Management in LIFES50+ will be documented in deliverable D9.4 (due in M2). Documentation of exploitation (both potential and actual) will be initiated on basis of the IP Management procedures throughout the project and presented as part of the Final Report to the EC. Below we present an outline of the IP Management procedures.

These procedures are created to enable identification, documentation, tracking and protection of Intellectual Property derived from LIFES50+.

### 2.4.3.1 Keeping an inventory of potential IP per Task: The IP-i form

At the start-up of a Task, each Task Leader (TL) is requested to communicate the potential for new innovations that may lead to protectable IP and follow it up throughout the Task. Potential innovations in a Task should be documented in an IP-i form (Innovation Potential inventory form), see D9.4 Annex A for the IP-i form template. This template is also available in the project-internal website (<http://www.lifes50plus.eu/project>). Once completed the IP-i form should be sent to the IP Management Group via Jan Arthur Norbeck ([JanArthurNorbeck@marintek.sintef.no](mailto:JanArthurNorbeck@marintek.sintef.no)).

The completed IP-i form per Task is kept on file by the IP Management Group, with possibilities for updates by the Task Leaders as the Tasks proceed. Upon completion of a Task, the Task Leader should complete a final IP-i form, listing actual Intellectual Property derived from the Task. The final IP-i form is kept on file by the IP Management Group for documentation purposes.

### 2.4.3.2 Registering possible protectable IP: The PPI-d form

When a beneficiary (or a group of beneficiaries) identifies an actual innovation which should be investigated for possible protection, a PPI-d form (Possibly Protectable IP declaration) should be completed. The PPI-d form is found in D9.4 Annex B and is also available in the project-internal website.



Declaring a Possibly Protectable IP (filling in a PPI-d form) is in the hands of the beneficiaries and does not dependant on any initiative from the Task Leader. This in order to ensure that innovations cannot be suppressed by someone with a mere management function in the given Task.

A key issue in the PPI-d form is the ownership of the innovation. The partners need to manage the actual ownership issues themselves through a Joint Ownership Agreement.

Please note that the IPP-d form by no means qualifies as a formal protection of an IP. The full responsibility for protecting the IP (e.g. by means of a patent or similar) rests with the owner(s) of the IP.

The PPI-d form should be sent to the IP Management Group via Jan Arthur Norbeck ([JanArthurNorbeck@marintek.sintef.no](mailto:JanArthurNorbeck@marintek.sintef.no)) as the IP Management Group is obliged to keep an IP register. The IP Management Group will assess and follow up and potentially comment on each PPI-d form.

#### **2.4.3.3 Protecting Intellectual Property**

The following points describe the steps to be taken in the case of patenting or similar formal protection of IP.

1. Beneficiaries (owner(s) of Results) that intend to protect or file a patent<sup>2</sup> should declare their intent as soon as possible to the IP Management Group through the PPI-d form. In the case of a patent, they should submit a plan including a proposed shared Ownership for the case of joint ownership to the IP management Group as least 60 days before filing the patent(s)
2. The IP management Group presents the proposal to all the partners in the Consortium. They have 30 days to express their views and to object. Any conflict of interest can be arbitrated by the IP Management Group, but may require external assistance in some cases.

Note that patenting is only one form of protection and that other forms may be more appropriate in some cases.

Beneficiaries (owner(s) of Results) should establish ownership and protection during the project to ensure that IP rights are established beyond the project lifetime.

There is also an obligation to report patents filings that take place after the termination of the project to the EU.

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<sup>2</sup> There is an obligation to establish ownership, to use and to protect results. Ownership may be transferred, but transfers to third parties outside Horizon2020 needs to inform the Commission 45 days prior to the dissemination. In such cases the Commission may assume ownership (GA Articles 26-28 and 30).





#### 2.4.4 Reporting

This section presents the LIFES50+ reporting requirements, both in terms of internal progress reports and official EC reporting requirements.

The LIFES50+ Grant Agreement (Article 20) specifies the reporting requirements imposed on the Project Coordinator and each beneficiary as well as third parties. An outline is presented below.

The Project Coordinator is responsible for the official submission of these reports but each beneficiary is required to contribute accordingly. Regarding financial information the LIFES50+ GA (Article 20) defines each beneficiary's responsibility while The Project Manager will provide reporting templates for the technical progress in order to secure all relevant information being reported to the Project Manager by Work Package Leaders.

LIFES50+ is divided into the following reporting periods (RP):

- RP1: From M1 to M16 (June 2015 to September 2016)
- RP2: From M17 to M28 (October 2016 to September 2017)
- RP3 From M29 to M40 (October 2017 to September 2018)

##### 2.4.4.1 Periodic Reports – Requests for Interim Payments

The Project Coordinator must submit a periodic report within 60 days following the end of each reporting period.

The periodic report must include the following:

- Periodic technical report
  - Explanation of the work carried out by the beneficiaries
  - Overview of the progress towards the project objectives, including milestones and deliverables as defined in the LIFES50+ Description of Action as well as any exploitation and dissemination
  - Summary for publication by the Agency
  - The answers to the questionnaire, covering issues related to project implementation in the context of the Horizon 2020 KPIs and monitoring requirements
- Periodic financial report
  - Individual financial statement from each beneficiary and linked third party
  - Explanation of the use of resources and the information on subcontracting and in-kind contributions provided by third parties
  - Periodic summary financial statement



Each Work Package Leader is required to submit a periodic report regarding technical progress of the WP in question (on the periodic report template provided by the Project Manager) no later than 30 days following the end of each reporting period.

Each beneficiary is required to fill in form C through the EC participant portal no later than 30 days following the end of each reporting period. The form C for Reporting Period 3 counts as final financial report from each beneficiary.

#### **2.4.4.2 Final Report – Request for payment of the balance**

In addition to the periodic report for the last reporting period, the Project Coordinator must submit the final report within 60 days following the end of the last reporting period.

The final report must include the following:

- Final technical report with a summary for publication
  - Overview of the results and their exploitation and dissemination
  - Conclusions of the project
  - Socio-economic impact of the project
- Final financial report
  - Final summary financial statement
  - Certificate on the financial statements

Each Work Package Leader is required to submit a final report regarding the technical results of the WP in question (on the final report template provided by the Project Manager) no later than 30 days following the end of last reporting period.

#### **2.4.4.3 Monthly Status Reports by WP-leaders**

As proposed by the Project Manager and agreed by the beneficiaries during the LIFES50+ kick-off on June 10<sup>th</sup> 2015 each Work Package Leader will be required to submit a monthly status report from their respective work package to the Project Manager within 10 working days following the end of the month. A template will be provided by the Project Coordinator and made available on the project-internal website. In broad terms this status report will contain information on:

- Technical progress according to DoA
- Deviations
- Actions taken to mitigate deviations

The monthly status reports will be required from M6 (November 2015).



**2.4.4.4 Overview of reporting requirements for the different roles in LIFES50+**

Table 5 depicts the reporting requirements for each role in the LIFES50+ project.

<b>Role</b>	<b>Type of Report</b>	<b>When</b>	<b>Receiver</b>
Each beneficiary	Form C	M16+30days	EC
	Form C	M28+30days	EC
	Form C	M40+30days	EC
Each WP-leader	Periodic report	M16+30days	PM
	Periodic report	M28+30days	PM
	Periodic report	M40+30days	PM
	Final Report	M40+30days	PM
	Monthly status report	M6-M40 (+10days)	PM
Project Coordinator	Periodic report	M16+60days	EC
	Periodic report	M28+60days	EC
	Periodic report	M40+60days	EC
	Final report	M40+60days	EC

**Table 5 Overview of reporting requirements for the different roles in LIFES50+**

**2.4.4.5 Dissemination and IP Generated – Updates**

Any dissemination activities must be reported to the LIFES50+ Dissemination Committee according to deadlines defined in deliverable D8.1 Dissemination Guidelines and Procedures.

Any identified potential Intellectual Property must be reported by the beneficiaries to the IP Management Group continuously (or as soon as possible) according to the IPR Guidelines defined in D9.4.



### 3 LIFES50+ Risk Management Plan

The LIFES50+ Risk Management Plan entails identified threats to the project, their associated risk and measures implemented to reduce these risks.

#### 3.1 Identification of Threats and assessment of initial Risk

An initial threat assessment identified 20 threats. These were then assessed in terms of probability and impact, resulting in a prioritised list of threats on basis of their foreseen risk level (risk=probability x impact).

Probability and Impact for each threat were defined on a scale between 0 and 1 according to a low-medium-high conversion:

Classification	Numerical representation (range)
LOW	0 to 0,26
MEDIUM	0,27 to 0,59
HIGH	0,6 to 1

Table 6 Classification of probability and impact

The risk is calculated by multiplying the probability with the impact and the resulting risk levels correspond to the classification of Low/Medium/High as depicted in Table 6.

This initial list of threats and risk levels is presented in Annex A. The table below presents the threats with a risk-level of Medium or High.

Threat/Event	Original Probability	Original Impact	Original Risk
<b>Delayed Deliverables</b>	0,70	0,70	<b>0,49</b>
<b>Delayed input from one WP to another</b>	0,70	0,70	<b>0,49</b>
<b>Incomplete met-ocean, soil, etc. data leading to incomplete design basis</b>	0,60	0,60	<b>0,36</b>
<b>KPI used in the evaluation difficult to apply to some specific structures, leading to an unfair evaluation</b>	0,50	0,70	<b>0,35</b>
<b>Technology for the model-testing not mature enough to guarantee a TRL level of 5 of the tested substructures</b>	0,40	0,80	<b>0,32</b>
<b>Difficulties in generating an elevated state-of-the art document (for example regarding design or testing procedures) due to fear of disseminating business-critical information</b>	0,40	0,80	<b>0,32</b>
<b>Low industry relevance of the project results</b>	0,30	0,90	0,27
<b>Poor quality of dissemination material</b>	0,30	0,90	0,27
<b>Business-critical data released consortium-wide or made public by inadvertence</b>	0,30	0,90	0,27

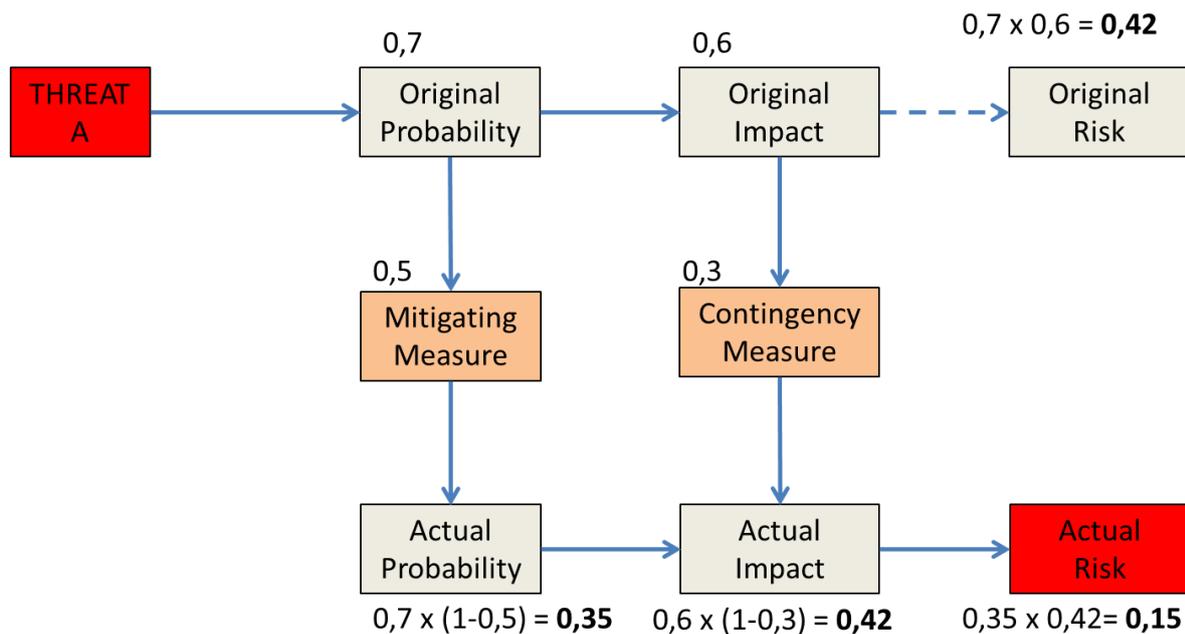
Table 7 Threats with a medium or high risk in LIFES50+



Periodic workshops involving the Project Management Team, the concept owners and the EAG will be conducted in order to secure that the list of potential threats is always kept up to date. Any new threats identified will be assessed in term of probability, impact and risk in accordance with the above initial list of identified threats. Similarly, these new threats (with risk levels of Medium or High) will be used as basis for the development and implementation of risk-reducing measures as described in Section 3.2.

### 3.2 Identification of Risk-Reducing Measures and assessment of efficiency

All threats defined with risk levels of Medium or High were further scrutinised in terms of potential risk-reducing measures, either reducing the probability (*mitigation measures*) or the impact (*contingency measures*) of the threat. Each measure is defined with what is called "effect". This refers to the measure's effectiveness in reducing either the probability or the impact of a threat. The effect corresponds to the classification of Low/Medium/High as depicted in Table 6. By multiplying each threat's original probability with the mitigation measure's effect and impact with the contingency measure's effect we get the threat's "actual probability" and "actual impact". "Actual" refers to the situation where measures have been implemented to reduce the threat's probability and impact. Ultimately we use the threat's actual probability and impact to calculate the threat's *actual risk level* and the percentile reduction of risk for each threat (see Figure 2).



Percentile reduction of the threat's risk:  $\frac{0,42-0,15}{0,42} * 100=65\%$

Figure 2 Depiction of determination of risk levels on basis of implemented mitigation measures



Low industry relevance of the project results	0,30	Involvement of EAG	0,70	0,09	0,90	
Poor quality of dissemination material	0,30	Dissemination Committee approval	0,70	0,09	0,90	
Business-critical data released consortium-wide or made public by inadvertence	0,30	Clear rules and procedures for exchange of information and dissemination to guarantee partners that business critical information will not be released.	0,80	0,06	0,90	IPG acting as peace-keeper

Table 8 below presents threats with an original risk-level of Medium or High, the identified risk reducing measures (either mitigation- or contingency measures) and their effect on the actual risk-levels.

	PROBABILITY				IMPACT				RISK		
	Original Probability	Mitigation Measures	Mitigation Effect	Actual Probability	Original Impact	Contingency Measures	Contingency Effect	Actual Impact	Original Risk	Actual Risk	% reduction of risk
<b>Threat/Event</b>											
Delayed Deliverables	0,70	Monthly status reports by WPL	0,30	0,49	0,70			0,70	0,49	<b>0,34</b>	30
Delayed input from one WP to another	0,70	Monthly status reports by WPL	0,60	0,28	0,70		0,40	0,70	0,49	<b>0,20</b>	60
Incomplete metocean, soil, etc data leading to incomplete design basis	0,60	Choice of sites may be based on completeness of data available	0,80	0,12	0,60	Best knowledge available used for the missing parameters.	0,20	0,48	0,36	<b>0,06</b>	84
KPI used in the evaluation difficult to apply to some specific structures, leading to an unfair evaluation	0,50	Indicators developed with in mind specificities of the sub-structures involved in the project and also of other substructures ( <a href="#">see link</a> )	0,70	0,15	0,70	External (qualitative) evaluation through EAG	0,20	0,56	0,35	<b>0,08</b>	76
Technology for the model-testing not mature enough to guarantee a TRL level of 5 of the tested substructures	0,40	Development and testing of the testing methodology to be started as early as possible during the project	0,70	0,12	0,80	Use of more established but in principle less accurate model testing techniques	0,40	0,48	0,32	<b>0,06</b>	82
Difficulties in generating an elevated state-of-the art document (for example regarding design or testing procedures) due to fear of disseminating business-critical information	0,40	Clear rules and procedures for exchange of information and dissemination to guarantee partners that business critical information will not be released, while useful generic information will be made public.	0,50	0,20	0,80			0,80	0,32	<b>0,16</b>	50
Low industry relevance of the project results	0,30	Involvement of EAG	0,70	0,09	0,90			0,90	0,27	<b>0,08</b>	70
Poor quality of dissemination material	0,30	Dissemination Committee approval	0,70	0,09	0,90			0,90	0,27	<b>0,08</b>	70
Business-critical data released consortium-wide or made public by inadvertence	0,30	Clear rules and procedures for exchange of information and dissemination to guarantee partners that business critical information will not be released.	0,80	0,06	0,90	IPG acting as peace-keeper	0,20	0,72	0,27	<b>0,04</b>	84

**Table 8 Threats and risk-reducing measures: Actual Risk Levels**

### 3.3 Risk-Reducing Measures – The Risk Management Plan

On basis of

Low industry relevance of the project results	0,30	Involvement of EAG	0,70	0,09	0,90	
Poor quality of dissemination material	0,30	Dissemination Committee approval	0,70	0,09	0,90	
Business-critical data released consortium-wide or made public by inadvertence	0,30	Clear rules and procedures for exchange of information and dissemination to guarantee partners that business critical information will not be released.	0,80	0,06	0,90	IPG acting as peace-keeper

Table 8 we present each risk-reducing measure in detail below. This description constitutes the LIFES50+ Risk Management Plan.

#### 3.3.1 Mitigation Measures (reducing probability)

The measures described here are implemented to reduce the probability of threats occurring. They will have an effect on the actual risk of each threat. These are pro-active measures by nature and will be operative throughout the project.

##### 3.3.1.1 Monthly status reports by WPL

The WP leaders are responsible for submitting a monthly status report to the Project Manager. This report includes notification of deviations, their impact and any measures taken to mitigate the impact of the deviation. Such deviations would include foreseen delays of formal deliverables, foreseen delays in progress according to the Description of Action (DoA), etc.

The monthly status report reduces probability of two threats, namely *delays on submission of formal deliverables and delays in input to other work packages*. This by involvement of the project management team at an early stage (even before the actual delays) and measures can be taken to put necessary pressure on beneficiaries or redirect resources.

The introduction of monthly status reports does put additional burden to the WP leaders but efforts have been made to ensure that the content of these reports are based on work already under the responsibility of the WP leaders (monitoring progress, identification of deviations from the DoA, etc). Compared to the effect this mitigating measure has on the reduction of probability of delays in deliverables and delays in input to other work package it is clear that this mitigation measure will be implemented.

##### 3.3.1.2 Development and testing of the testing methodology to be started as early as possible during the project

Even if the experimental activities occur in a later stage of the project, the participants of WP3 are encouraged to start developing and verifying their experimental techniques right after the project has started. This is to avoid any issue caused by immature model testing technology during the execution of the wind tunnel tests and ocean basin tests.



This measure is quite efficient, seen from a cost-benefit perspective. Indeed, at both experimental facilities, the personnel involved in the design of the experiments are not deeply involved in the most demanding phases of the start of the project (WP1 and WP2). So this measure does not cause too large a burden on individuals, nor capacity issues within the project. Since the budget for planning and executing the experiments will support this measure, it is important for the concerned partners to keep track of the incurred costs throughout the project.

### **3.3.1.3 Involvement of EAG**

The External Advisory Group consists of members from the industry. The group's primary objective is to secure the project's industry relevance by offering early feedback on any activity as deemed relevant by the LIFES50+ Steering Committee.

The EAG reduces the probability of two threats, namely *Low industry relevance* and *Decision criteria for selection of structures reaching Phase II based on subjective/commercial interests*.

The involvement of the EAG does come at a cost but costs will be kept as low as possible by utilisation of communication tools (such as phone, e-mail and internet-based meeting facilities) to keep travel expenses at a minimum. Compared to the high effect of this mitigating measure on reducing the probability of low industry relevance and subjective/commercial decision criteria it is clear that this mitigating measure will be implemented.

### **3.3.1.4 Dissemination Committee approval**

All material for dissemination must be approved by the Dissemination Committee. This to *ensure that the dissemination material has industry relevance and is of high quality*. See section 2.2.2 for details.

### **3.3.1.5 Choice of sites (used in the design basis) should account for the availability of the met-ocean and soil data.**

The selection of sites for the design basis is in principle meant to be based on their *degree of likelihood to represent good business cases for large offshore wind turbines*, either as of today, or in a near future. However, the "best" locations in terms of possible commercial impact may be sites for which reliable met-ocean data isn't available and must be assumed. Attention should be paid to the realism of those assumptions, and some priority should be given to sites for which reliable data exists

### **3.3.1.6 Clear rules and procedures for exchange of information and dissemination to guarantee partners that business critical information will not be released, while useful generic information will be made public.**

The LIFES50+ IPR Guidelines (as depicted in Deliverable D9.4) are crucial in terms of securing proper management of both background and results. Communication of these guidelines as well as control of compliance reduce the risk of *difficulties in generating an elevated state-of-the art document (for example regarding design or testing procedures) due to fear of disseminating business-critical information as well as business-critical data released consortium-wide or made public by inadvertence*.

### **3.3.1.7 Indicators developed with in mind specificities of the substructures involved in the project and also of other substructures<sup>3</sup>**

The KPI developed within WP2 should in principle be applicable for any type of large substructure for offshore wind in deep waters. In particular it should specifically be verified that they can *apply to the substructures developed within the project*, and also to some other concepts (a list of candidates is provided in the link in the footnote), and *lead to a fair comparison of those concepts*. The threat is that KPIs developed within this project could be developed in a too general or too specific way to be applied on all concepts scrutinized within this project, leading to difficult evaluation of each concept. This measure does not represent a cost strictly speaking, but more a state of mind or procedure when developing the KPIs.

### **3.3.2 Contingency Measures (reducing impact)**

The measures described here are implemented to reduce the impact of an occurred threat. They will have an effect of the actual risk of each threat. These are re-active measures by nature and will be initiated upon occurrence of threats.

#### **3.3.2.1 Best knowledge available used for the missing parameters.**

In cases of incomplete metocean, soil, etc. data leading to incomplete design basis, the concept owner will be asked to provide information from experience or from other relevant sites. The project may then propose to perform parametric studies to document the impact of different conditions (cost issues to be clarified). The resulting information will be put forward to the EAG for evaluation.

If missing information makes it difficult to qualify a given concept, this will be taken into consideration in the selection of candidate for testing/qualification as stated in Section 3.3.1.5.

#### **3.3.2.2 External (qualitative) evaluation through EAG**

In cases where the *evaluation method of the specific structures developed in LIFES50+ is deemed as unfair or incomplete*, the EAG will be asked to perform an objective evaluation (most likely qualitative) of the different structures as an addendum to the quantitative evaluation method developed in the project. Ideally the evaluation method should be approved by all relevant project participants before the evaluation commences but there may be cases where the EAG is invited as an independent evaluator to settle any disputes.

#### **3.3.2.3 Use of more established but in principle less accurate model testing techniques**

The model testing techniques are still under development. In case the development of real-time hybrid (Hardware-In-the-Loop) testing techniques to fails, the contingency measure will be to

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<sup>3</sup> <http://www.carbontrust.com/media/670664/floating-offshore-wind-market-technology-review.pdf>



- Reduce the complexity of the HIL-technology to such level that the execution of the experiments are feasible and can be carried out at an acceptable level of accuracy, or
- Apply traditional and well-established model testing techniques.

Inherent in this contingency plan is also an evaluation and documentation of the accuracy and validity of the final test results.

#### 3.3.2.4 PG acting as peace-keeper

In a worst case scenario where *business-critical data is released consortium-wide or made public by inadvertence* the IPG should immediately take action and act as peace-keeper and mediator between the parties involved. Their goal should be to reach a settlement outside the judicial system as such disputes are highly resource demanding for all involved parties. One should however not overestimate the potential effect of the IPG involvement but all measures should be taken to solve any such dispute at the lowest level possible.

#### 3.3.3 Concluding remarks regarding project risk

As seen in Table 8 the implemented risk-reducing measures have resulted in all threats, except one, are reduced to a low risk level (between 0 and 0,26). This is considered an acceptable level of risk as costs associated with reducing the risk level even further would outweigh the benefits of such a reduction.

The main threat caused by risk levels above low (medium) is the threat of delayed deliverables. This is partly because the risk-reducing measures related to such a threat are difficult to quantify. All project partners know and understand the importance of avoiding such delays and the project plan (Description of Action) is not over-ambitious in terms of the deliverable schedule. Nevertheless we know from experience that there could be delays and we should not underestimate the probability nor the impact of such delays.

## 4 Conclusions

The project quality and risk management plan presented in this deliverable is highly suited to ensure a successful initiation, operation and completion of the LIFES50+ project in terms of project management, high quality deliverables and dissemination material, IPR management and risk management. The plan is also in compliance with the Grant Agreement and the Consortium Agreement as well as the decisions made at the first General Assembly during the project kick-off. The plan will be communicated to all project partners and continuous compliance is monitored by the Coordinator.



## 5 Annex A: Initial list of threats and foreseen risk levels

Threat/Event	Original Probability	Original Impact	Original Risk
<b>Delayed Deliverables</b>	0,70	0,70	0,49
<b>Delayed input from one WP to another</b>	0,70	0,70	0,49
<b>Incomplete metocean, soil, etc. data leading to incomplete design basis</b>	0,60	0,60	0,36
<b>KPI used in the evaluation difficult to apply to some specific structures, leading to an unfair evaluation</b>	0,50	0,70	0,35
<b>Technology for the model-testing not mature enough to guarantee a TRL level of 5 of the tested substructures</b>	0,40	0,80	0,32
<b>Difficulties in generating an elevated state-of-the art document (for example regarding design or testing procedures) due to fear of disseminating business-critical information</b>	0,40	0,80	0,32
<b>Low industry relevance of the project results</b>	0,30	0,90	0,27
<b>Poor quality of dissemination material</b>	0,30	0,90	0,27
<b>Business-critical data released consortium-wide or made public by inadvertence</b>	0,30	0,90	0,27
<b>Industrialization phase involves too large modifications of the concepts, and raises questions on the evaluated/selected concept</b>	0,30	0,80	0,24
<b>Unclear design basis leading to inhomogeneous design reports, and evaluation/comparison issues</b>	0,30	0,80	0,24
<b>Numerical tools used by the designers not sufficiently verified/validated leading to inaccurate results and biased evaluation</b>	0,30	0,70	0,21
<b>Deliverables not approved by EC</b>	0,30	0,70	0,21
<b>Decision criteria for selection of structures reaching Phase II based on subjective/commercial interests</b>	0,30	0,70	0,21
<b>A cost-effective technology is not achieved for the selected sites</b>	0,20	0,90	0,18
<b>Unfeasible design when scaling prototypes from 5MW to 10MW</b>	0,20	0,90	0,18
<b>Tests facilities are not able to carry out the tests in the required time frame</b>	0,20	0,80	0,16
<b>Perceived risk of the technology(s) is too high and market uptake is slow to nil</b>	0,30	0,50	0,15
<b>One of the partners has to leave the consortium due to financial problems or other problems</b>	0,10	0,70	0,07

