



## Engineering and Upscaling of New Floating Renewable Wind Energy Platform

### **Deliverable D1.2**

#### Project Management Plan

|                     |   |
|---------------------|---|
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## EXECUTIVE SUMMARY

This document contains the Project Management Plan for the *SATHScale* project. The purpose of this plan is to ensure that project management and quality assurance are in accordance with the contractual requirements for monitoring the project. The main purpose of this deliverable is to document the Work Breakdown Structure (WBS) and the related elements that support the project's schedule:

- Project task durations, dependencies, and responsibilities,
- Project milestones,
- Project deliverables,
- Project management mechanisms, and
- Gantt Chart.

The project is structured to ensure balanced workload and unambiguous responsibility for tasks and deliverables, with each deliverable responsibility of the task leader unless otherwise explicit in the WP description.

A Gantt Chart is annexed to this document in order to better understand the schedule of the different Work Packages and their components. The inter-relationships among the different project tasks and components is presented both graphically and in WP tables. The project schedule will be managed through success criteria, milestones and periodic control mechanisms.

The actual schedule performance will be compared to planned performance in order to implement corrective action when actual performance deviates from planned or required performance.

Furthermore, Work Package and Tasks Leaders will be responsible for reporting on their activities at every Project Steering Committee meeting (every 3 months) in order to allow project progress to be tracked seamlessly. The actual Gantt Chart will then reflect progress achieved and agreement of the revised schedule, if necessary.

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## 1. INTRODUCTION

This document describes the *SATHScale* Project Management Plan. The purpose of this plan is to ensure that project management and quality assurance are in accordance with the contractual requirements for monitoring the project.

The Grant Agreement (GA) provides an in-depth description of the different Work Packages and components. However, the information is presented in such a way that hampers the appropriate management during project execution.

### 1.1 PURPOSE AND SCOPE

The purpose of the *SATHScale* Project Management Plan is to ensure that project management with the contractual requirements for monitoring the project, describing the Work Breakdown Structure (WBS) and the related elements that support the project's schedule:

- Project task durations, dependencies, and responsibilities,
- Project milestones,
- Project deliverables,
- Project management mechanisms, and
- Gantt Chart.

### 1.2 INTENDED AUDIENCE / CLASSIFICATION

The intended audience of the Project Management Plan (PMP) is all project stakeholders including the European Commission, senior leadership, and the project team.

### 1.3 APPLICATION DOCUMENTS

Inputs from the following documents were used as a source of information for preparing this document:

TABLE 1.1: APPLICATION DOCUMENTS

| REF   | Document                             |
|-------|--------------------------------------|
| AD-01 | Grant Agreement – 958938 - SATHScale |
|       |                                      |

### 1.4 DOCUMENT STRUCTURE

This deliverable is structured in the following chapters:

- Chapter 1: Introduction. Main purpose intended audience and structure of the document.



- Chapter 2: Work breakdown structure and schedule. Work plan structure and individual Work Package description.
- Chapter 3: Graphical presentation of tasks interdependencies. Inter-relationships among the different project tasks and components
- Chapter 4: Schedule management. Success criteria, milestones and periodic control mechanisms.
- Annex I: *SATHScale* Project Gantt Chart.

## 2. PROJECT STRUCTURE AND SCHEDULE

The overall plan of the project follows the tasks and activities and schedule as laid down in the GA. The main guiding point of all work and planning will be the Deliverables due to the Commission along the 3 years of *SATHScale* project.

As stated in the GA, the duration of the project is 36 months from the first day of the month after the entry in force of the GA, hence the effective start of the project is the November 1<sup>st</sup> of 2020.

### 2.1 WORK PACKAGES SUMMARY

The project is organized in six R&D work packages, and two more related to Management (WP1) and Dissemination and Exploitation (WP8), which encloses the whole work.

TABLE 2.1: WORK PACKAGE SUMMARY

| WP  | Work Package Title                            | Lead Part | PMs | Start | End |
|-----|---|-----------|-----|-------|-----|
| WP1 | Management and Coordination                   | SAITEC    | 45  | 1     | 36  |
| WP2 | Condition Monitoring Framework                | SAITEC    | 60  | 1     | 18  |
| WP3 | Condition-Base Maintenance Framework          | SAITEC    | 65  | 1     | 24  |
| WP4 | Lifetime Offshore Operation Logistics         | SAITEC    | 70  | 13    | 36  |
| WP5 | Design Optimization from real Experience Data | SAITEC    | 100 | 19    | 36  |
| WP6 | Industrialized Fabrication                    | SAITEC    | 70  | 1     | 24  |
| WP7 | Technology Internationalization               | SAITEC    | 65  | 7     | 36  |
| WP8 | Dissemination and Exploitation                | SAITEC    | 50  | 1     | 36  |
|     |   | TOTAL PMs | 525 |       |     |

### 2.2 WP1. MANAGEMENT AND COORDINATION

This work package has been designed to implement effective administrative and technical management procedures to implement the project and its successful execution.

TABLE 2.2: WORK BREAKDOWN STRUCTURE WP1

| Task N° | Task name   | Start | Due | %  |
|---------|---|-------|-----|----|
| 1.1     | Project Coordination (Administrative, Financial, Contractual) | 1     | 36  | 40 |
| 1.2     | Technical Coordination (incl. Deliverables and assets)        | 1     | 36  | 50 |
| 1.3     | Governance (incl. Risk Management & Ethics)                   | 1     | 36  | 50 |

### 2.3 WP2. CONDITION MONITORING FRAMEWORK

Global aim of this WP is to define a Condition Monitoring System (CMS), as one of the systems that appears repeatedly in international regulations, for certification of projects. It is about implementing a series of measures through sensors, data acquisition systems and communications, which allow monitoring of the prototype, with the aim of ensuring its

integrity, characterizing its operation, and preventing failures. It is closely linked to the operation and maintenance strategy, which will be the subject of another project task (T3.1).

**TABLE 2.3: WORK BREAKDOWN STRUCTURE WP2**

| Task N° | Task name                       | Start | Due | %   |
|---------|---------------------------------|-------|-----|-----|
| 2.1     | Condition Monitoring System     | 1     | 12  | 100 |
| 2.2     | Integrated Monitoring Programme | 13    | 18  | 0   |

## 2.4 WP3. CONDITION-BASE MAINTENANCE FRAMEWORK

Condition Based Maintenance (CBM) is a predictive maintenance technique focusing on performing a maintenance action based on the actual condition of a system. It is based on monitoring the underlying deterioration process of the equipment. As this deterioration reaches a predefined threshold level, a maintenance action is initiated. By predicting the Remaining Useful Life (RUL) of a unit using remote monitoring techniques, operational and technical maintenance costs can be reduced.

**TABLE 2.4: WORK BREAKDOWN STRUCTURE WP3**

| Task N° | Task name  | Start | Due | %  |
|---------|--|-------|-----|----|
| 3.1     | Description of a Prognosis Modelling Approach        | 1     | 12  | 80 |
| 3.2     | Develop a Condition-Based Maintenance (CBM) strategy | 13    | 24  | 0  |

## 2.5 WP4. LIFETIME OFFSHORE OPERATION LOGISTICS

In the design process it is important to take into consideration marine operations for all the deployment stages of a floating wind farm: manufacturing, installation, operation, maintenance, and decommissioning. In some cases, means and methods required can impose restrictions to the structure or the moorings design. On the other hand, availability of different types of vessels means a wide range of costs that have to be considered for the economic assessment of the device. Thus, it will be defined the operations needed for the devices deployment and the means required, and it will be defined rates and availability of those means in order to quantify the influence of the marine operations on the cost.

**TABLE 2.5: WORK BREAKDOWN STRUCTURE WP4**

| Task N° | Task name   | Start | Due | % |
|---------|---|-------|-----|---|
| 4.1     | Monitoring of safe offshore operations and logistics. | 13    | 24  | 0 |
| 4.2     | Recommendations and guidelines                        | 25    | 36  | 0 |

## 2.6 WP5. DESIGN OPTIMIZATION FROM REAL EXPERIENCE DATA

The optimization of the design with the actual load data vs the values obtained through conservative calculations. Important information about the design process, tools, models and different aspects of the design will be gathered and can be applied to the optimization of the technology in terms of cost and dynamic behaviour. This objective is broken down into a series of tasks aimed at the optimization design of the floating wind turbine, with the focus on the most innovative systems: the floating structure and the anchoring system based on the real data obtained from the 2MW demonstrator. The optimized design is approached from the perspective of risk analysis as an element of cost reduction and optimization of the structure.

**TABLE 2.6: WORK BREAKDOWN STRUCTURE WP5**

| Task Nº | Task name  | Start | Due | % |
|---------|--|-------|-----|---|
| 5.1     | Optimization of the Hydrodynamic behaviour and Structural Design | 19    | 24  | 0 |
| 5.2     | Optimization of the station keeping system                       | 25    | 30  | 0 |
| 5.3     | Numerical coupled model of the FOWT                              | 31    | 36  | 0 |

## 2.7 WP6. INDUSTRIALIZED FABRICATION

Manufacturing gets more challenging as the size of the substructure increases (upscaling to +10MW wind turbines) mainly due to footprint (dimensions and weights). It is also an important that yards exist that can facilitate these requirements. Industrialization will require adaptation of existing Infrastructures and existing procedures. It is needed to maximise work shore side, reducing impact of weather and offshore working.

With this in mind, SATH design is based on a modular division of the platform structure to allow a significant degree of pre-casting in order to get a high production rate through an industrial construction process, and by multiple reusing the moulds and formworks. The manufacturing process might well be a hybrid or composite concrete solution, using a mix of cast in situ and factory produced, precast elements.

**TABLE 2.7: WORK BREAKDOWN STRUCTURE WP6**

| Task Nº | Task name  | Start | Due | %  |
|---------|--|-------|-----|----|
| 6.1     | Development of an industrialized fabrication system for mass production. | 1     | *18 | 60 |
| 6.2     | Cost assessment of fabrication, installation, and maintenance            | 1     | 18  | 60 |
| 6.3     | Life Cycle Assessment  | 1     | 18  | 30 |
| 6.4     | Risk Analysis. Fabrication and commercialization risks                   | 1     | 24  | 10 |

*\*Initially this deliverable was set to be completed on Month 12.*

## 2.8 WP7. TECHNOLOGY INTERNATIONALIZATION

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International markets for offshore wind comprise the opportunity space to commercialize SATH technology, that intends to cover not only the floating offshore market, but also to compete with bottom-fixed solution that currently monopolized the market.

**TABLE 2.8: WORK BREAKDOWN STRUCTURE WP7**

| Task Nº | Task name   | Start | Due | %  |
|---------|---|-------|-----|----|
| 7.1     | Develop and implement a market-entry strategy               | 9     | 20  | 10 |
| 7.2     | Identify potential subsidiary locally established companies | 21    | 36  | 0  |

## 2.9 WP8. DISSEMINATION AND EXPLOITATION

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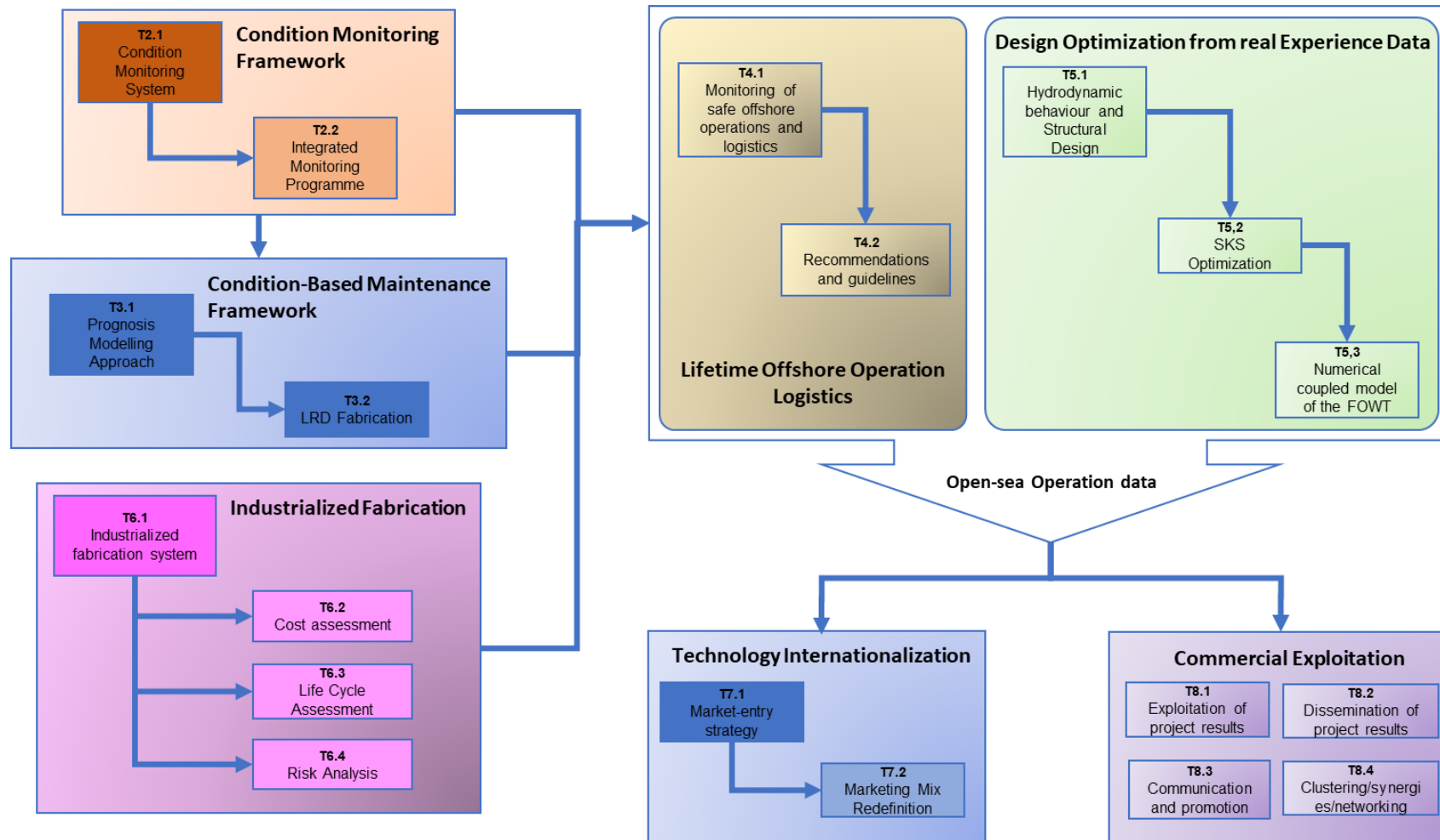
The objective of this work package is to prepare and put in place the required building blocks for commercialisation and to demonstrate the business case for the SATH floating platform. Ensure a maximum impact of the project (visible profile and that results from the research are properly disseminated to the public through project website, press-releases, newsletters and conference presentations/workshops).

**TABLE 2.9: WORK BREAKDOWN STRUCTURE WP8**

| Task Nº | Task name                        | Start | Due | %  |
|---------|----------------------------------|-------|-----|----|
| 8.1     | Exploitation of project results  | 1     | 36  | 40 |
| 8.2     | Dissemination of project results | 1     | 36  | 40 |
| 8.3     | Communication and promotion      | 1     | 36  | 40 |
| 8.4     | Clustering/synergies/networking  | 1     | 36  | 20 |

**GRAPHICAL PRESENTATION OF TASKS INTERDEPENDENCIES**

The next figure graphically summarises the inter-relationships among the different project tasks and components as presented in the sections before.



**FIGURE 0.1: TASK INTERDEPENDENCIES**



### 3. SCHEDULE MANAGEMENT

The project schedule will be managed through success criteria, milestones and periodic control mechanisms.

#### 3.1 DELIVERABLES & PROJECT SUCCESS CRITERIA

Deliverables are, at the end, the way in which project advances can be monitored. The conclusion of the work done within each WP and tasks are reflected in the deliverables. In some deliverables, several versions are planned, and will allow INEA having updated information and giving comments as the project development progresses, thus allowing redirections in the work in case needed. The following table shows the list of planned deliverables.

A set of success criteria have been defined per deliverable and Work Package as it is shown in the following table.

TABLE 3.1: LIST OF DELIVERABLES

| WP No | Del. No | Title  | Nature* | Diss. Level** | Due Date  | Status    |
|-------|---------|--|---------|---------------|-----------|-----------|
| WP1   | D1.1    | Project Quality and Risk Management Plan   | Report  | Public        | 31-01-21  | Approved  |
|       | D1.2    | Project Management Plan  | Report  | Public        | 31-10-21  | Submitted |
| WP2   | D2.1    | Description of the support structure monitoring system.                            | Report  | Confidential  | 30-04-21  | Approved  |
|       | D2.2    | Description of the system monitoring and supervision of the electrical connection. | Report  | Confidential  | 31-10-21  | Submitted |
|       | D2.3    | Integrated monitoring report   | Report  | Public        | 30-04-22  | Pending   |
| WP3   | D3.1    | Prognosis Modelling Approach   | Report  | Confidential  | 31-10-21  | Pending   |
|       | D3.2    | Condition-Based Maintenance Programme  | Report  | Confidential  | 31-10-22  | Pending   |
| WP4   | D4.1    | Offshore Logistics characterisation  | Report  | Confidential  | 31-10-22  | Pending   |
|       | D4.2    | Recommendations & guidelines for offshore operations                               | Report  | Public        | 31-10-23  | Pending   |
| WP5   | D5.1    | Concept optimization design  | Report  | Confidential  | 30-04-23  | Pending   |
|       | D5.2    | Cost assessment comparison   | Report  | Confidential  | 31-10-23  | Pending   |
| WP6   | D6.1    | Manufacturing definition and procedures  | Report  | Confidential  | *30-04-22 | Pending   |



|            |      |  |          |              |          |          |
|------------|------|--|----------|--------------|----------|----------|
|            | D6.2 | Economic assessment                                  | Report   | Confidential | 30-04-22 | Pending  |
|            | D6.3 | Life Cycle Assessment                                | Report   | Confidential | 30-04-22 | Pending  |
|            | D6.4 | Technology risk analysis                             | Report   | Confidential | 31-10-22 | Pending  |
| <b>WP7</b> | D7.1 | Initial Business development and commercial strategy | Report   | Confidential | 30-06-22 | Pending  |
|            | D7.2 | Final Business development and commercial strategy   | Report   | Confidential | 31-10-23 | Pending  |
| <b>WP8</b> | D8.1 | Dedicated project website                            | Websites | Public       | 28-02-21 | Approved |
|            | D8.2 | Plan for Dissemination and Communication v1          | Report   | Public       | 30-04-21 | Approved |
|            | D8.3 | Plan for Dissemination and Communication v2          | Report   | Public       | 30-04-22 | Pending  |
|            | D8.4 | Plan for Dissemination and Communication v3          | Report   | Public       | 30-04-23 | Pending  |
|            | D8.5 | Communication material v1                            | Report   | Public       | 30-04-21 | Approved |
|            | D8.6 | Communication material v2                            | Report   | Public       | 30-04-22 | Pending  |
|            | D8.7 | Communication material v3                            | Report   | Public       | 31-10-23 | Pending  |
|            | D8.8 | Policy Brief   | Report   | Public       | 31-10-23 | Pending  |

(\*) Rep = Report, Dem = Demonstrator, O = Other, Eth = Ethics, ORDP = Open Research Data Pilot

(\*\*) CO = Confidential, only for members of the consortium (including the Commission Services). PU = Public

### 3.2 MILESTONES

Important milestones have been identified for the project implementation and will be carefully monitored by the corresponding WP leaders and the Project Coordinator assisted by the Project Secretary. When the date of milestones review is achieved the results verification will be conducted against set objectives and a short report will be issued regarding the milestone's assessment. When a milestone is delayed or is not achieved, the impact on project course and WP will be assessed and a back-up plan will be proposed by the concerned WP leaders. Such issues will be reviewed first by the Project Technical Committee, who will report the milestones status to the Project Management Board.

The following table gives a list of milestones:

**TABLE 3.2: LIST OF MILESTONES**

| Nº | Name                                   | Delivery Date | Achieved  |
|----|--|---------------|-----------|
| 1  | CMS validation                         | 30-apr-22     |           |
| 2  | Integrated Condition-Based Maintenance | 31-oct-22     |           |
| 3  | Offshore logistics monitoring          | 31-oct-22     |           |
| 4  | Optimized design                       | 30-apr-23     |           |
| 5  | Industrialized procedures              | *30-Apr-22    |           |
| 6  | Internationalization strategy          | 31-oct-23     |           |
| 7  | Communication and dissemination Plan   | 30-apr-21     | Completed |



### 3.3 CONTROL MECHANISMS

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The project started on 1<sup>st</sup> November 2020 and the project ends 36 months later, on 31<sup>st</sup> October 2023. All the work plan is related to the starting day of the project.

The actual Gantt Chart will then reflect progress achieved and agreement of the revised schedule, if necessary.

The actual schedule performance will be compared to planned performance in order to implement corrective action when actual performance deviates from planned or required performance.

Work Package and Tasks Leaders will be responsible of reporting on their activities at every Project Steering Committee meeting (every 3 months) to allow project progress to be tracked seamlessly.

A Gantt Chart is annexed to this document to better understand the schedule of the different Work Packages and their components. The actual Gantt Chart will then reflect progress achieved and agreement of the revised schedule, if necessary.

**ANNEX I: SATHSCALE PROJECT GANTT CHART**

**FIGURE A.1: SATHSCALE PROJECT GANTT CHART**

