# FLOATECH

## D6.1. Data Management Plan

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FLOATECH
THE FUTURE OF FLOATING WIND TURBINES

## Document track details

| Project acronym | FLOATECH |
|---|---|
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| V 0.1 | Laura De Nale, Euronovia | 28/04/2021 | First draft |
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| V 0.3 | Laura De Nale, Euronovia | 09/06/2021 | Updated draft after contribution from all WP leaders |
| V0.4 | Members of the Executive Board | 21/06/2021 | Quality review |
| V 1.0 | Laura De Nale, Euronovia | 21/06/2021 | Final version |
| V2.0 | Laura De Nale, Euronovia / Alessandro Bianchini, UniFi | 30/06/2022 | Update of the document at the end of the first reporting period (M18), after contribution from all WP leaders |

## Background: about the FLOATECH project

The FLOATECH project is a Research and Innovation Action funded by the European Union's H2020 programme aiming to increase the technical maturity and the cost competitiveness of floating offshore wind (FOW) energy. This is particularly important because, due to the limitations of available installation sites onshore, offshore wind is becoming crucial to ensure the further growth of the wind energy sector.

The project is implemented by a European consortium of 5 public research institutions with relevant skills in the field of offshore floating wind energy and 3 industrial partners, two of which have been involved in the most recent developments of floating wind systems.

The approach of FLOATECH can be broken down into three actions:

- The development, implementation and validation of a user-friendly and efficient design engineering tool (named QBlade-Ocean) performing simulations of floating offshore wind turbines with an unseen combination of aerodynamic and hydrodynamic fidelity. The advanced modelling theories will lead to a reduction of the uncertainties in the design process and an increase of turbine efficiency.

- The development of two innovative control techniques (i.e. Active Wave-based feed-forward Control and the Active Wake Mixing) for Floating Wind Turbines and floaters, combining wave prediction and anticipation of induced platform motions. This is expected to improve the performance of each machine and to minimize wake effects in floating wind farms, leading to a net increase in the annual energy production of the farm.

- The economic analysis of these concepts to demonstrate qualitatively and quantitatively the impact of the developed technologies on the Levelized Cost of Energy (LCOE) of FOW technology.

In addition to the technological and economic impacts, the project is expected to have several impacts at societal, environmental and political levels, such as: public acceptance, due to no noise and visibility issues of FOWT; very low impact on biodiversity and wildlife habitat because no piles are needed be to installed into the seabed; the use of less material and space thanks to an environmentally friendly design; the promotion of the installation of FOW in transitional water depths (30-50 meters), as the costs for FOW at those locations will become more competitive compared to the fixed bottom foundations.

*Table of contents*

## *List of acronyms and abbreviations*

| Acronym / Abbreviation | Meaning / Full text |
| --- | --- |
| FOW | Floating Offshore Wind |
| FOWT | Floating Offshore Wind Turbine |
| LCOE | Levelized Cost of Energy |
| WP | Work Package |
| DMP | Data Management Plan |
| IPR | Intellectual Property Rights |
| DOI | Digital Object Identifier |
| OA | Open Access |

# EXECUTIVE SUMMARY

This deliverable is the second version of the Data Management Plan (DMP) of the FLOATECH project, submitted at month 18.

The aim of the document is to provide an update of the first DMP submitted at M6, including new datasets that have been collected or generated, as well as an updated list of data that is expected to be collected, generated or processed within the framework of the project. At this scope, the following information is included in this DMP:

- Descriptions of the datasets that are/will be collected, processed, and/or generated,

- Methodologies and standards that will be adopted for the data management,

- Level of accessibility/confidentiality of the data,

- Methods to curate and preserve the data during and after the end of the project,

- Methods to enable third parties to access, mine, exploit, reproduce and disseminate the research data.

This DMP has been drafted following the guidelines on FAIR data management in Horizon 2020[1]. It also complies with the requirements of the article 29 of the Grant Agreement, specifically, in terms of obligation to disseminate results (art. 29.1 of GA), open access to scientific publications (art. 29.2 of GA) and open access to research data (art. 29.3 of GA). It also respects the IPR protection framework applicable to the project, potential conflicts of commercialization and dissemination of own results, as defined in the section 8 of the project Consortium Agreement signed by the beneficiaries.

This document will be further updated at the end of the project (M36 – December 2023).

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[1] h2020-hi-oa-data-mgt_en.pdf (europa.eu)

# 1. DATA SUMMARY

## 1.1. PURPOSE OF DATA COLLECTION / GENERATION

FLOATECH will collect and produce several datasets during the lifetime of the project. The nature of the data will be both quantitative and qualitative and will be analysed from a range of perspectives for project development and scientific purposes.

As participants in the Open Research Data Pilot, the FLOATECH partners will carefully study the possibility and pertinence to make data findable, accessible, interoperable and reusable (FAIR) to the maximum extent possible without jeopardizing the project objectives and property rights of the Partners producing the data.

The completion of the work plans associated to the 5 technical Work-Packages (WPs) of FLOATECH will generate new and original scientific and technical data. Some of these data will be created by a group of participants as a result of collaborative work, while others will be created by one specific partner in individual work. Data will also be collected in scientific publications or patents, and will serve as reference cases, results or knowledge for new research developments.

The data collection, selection, classification and preservation is a critical action, which will be maintained and carefully monitored all along the execution of the project. It will enable to exchange relevant technical information among the beneficiaries and therefore increase the efficiency of the collaborative research work for the achievement of the objectives of the project. The preservation of the data after the completion of the project will permit to continue some research by providing useful and re-usable information to the partners engaged in the long-term development of similar technologies. Technical specifications of instruments, components or processes, lessons learned from observations and experimental operation will serve for conceptual improvements and future testing procedures without repeating the same work.

We will share public results with communities of professors, students, researchers, engineers, managers and policy makers, during and after the end of the project. This will contribute to increase the impact of the project in the short, mid and long-term.

## 1.2. CATEGORIES, TYPES, FORMATS AND SIZES OF DATA GENERATED OR COLLECTED

All the data generated or collected during the FLOATECH project lifetime will be made available as electronic files (numerical files).

In general, the data will be classified into 3 categories, each of them contains sub-categories of datasets.

- Text-based data
    - Publication, article
    - Report, scientific survey

- o   Experimental result (structured text)

- o   Numerical simulation result (structured text)

- o   Datasheet

- o   Technical specification of instrument/process

- Software data

    - o   Script

    - o   Executable code

    - o   Source code

- Archives (compressed datasets)

Despite the different characteristics of the data generated and collected, data will be either directly generated during the test or obtained by means of test data processing and analysis. So, the types and formats of data generated/collected in FLOATECH are those typical of experimental data delivered by instruments or data acquisition systems usually implemented in any experimental facility.

More information on the types, format and size of data are available in Annex 1.

## 1.3.   ORIGIN OF THE DATA AND RE-USE OF EXISTING DATA

Due to the scarcity of experimental data on floating wind turbines (due to cost and complexity of experiments on these machines), use will be made of already existing datasets, in particular those generated within Task 30 of the International Energy Agency (IEA) on Offshore Code Comparison Collaboration (OC4, OC5, OC6). These datasets are worldwide recognized as the reference sources simulation codes' validation in floating wind. This will then contribute to the soundness of the verification and validation processes of the new software QBlade-Ocean. To have full access to these experimental datasets, two of the Consortium Members (i.e. TUB, leader of WP1, and UNIFI, leader of WP2) joined the IEA Task.

Also, a literature review will be carried out as part of WP5 to gather information about LCOE models for offshore floating wind turbines developed in previous works. First, publicly available results of previous EU funded projects addressing the same subject will be examined, in order to capitalise on the EU funding efforts. More specifically, publicly available results of the recent projects LIFE50+ and COREWIND will be studied in depth. In addition, results of the 'IEA Task 26 - The Cost of Wind Energy'[2] will be used since these provide datasets about costs of offshore wind farms commissioned in recent years, in several countries. These data are likely to be useful as reference in case of uncertainty about any specific wind

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[2] *"IEA Wind Task 26 – Offshore Wind Farm Baseline Documentation"* and *"IEA Wind TCP Task 26: Offshore Wind Energy International Comparative Analysis report".*

farm costs. Finally, a PhD thesis on the LCOE of floating wind turbines, developed in the recent past in collaboration with Seapower[3], will be also used as a starting reference for WP5 activities.

In addition to these data, an important and vast set of experimental and numerical data will be generated within FLOATECH. More specifically:

- **WP1** revolves around the development and numerical validation of higher-order aerodynamic and hydrodynamic models within QBlade-Ocean along with the public dissemination of the code. In order to simulate specific turbines, the user requires input files which specify the turbine definition within QBlade Ocean including aerodynamic, structural, hydrodynamic and controller parameters. These are provided with the release of QBlade for a range of standard turbine geometries investigated in the OC4/5/6 campaigns in order to allow simple simulation setup for all users and to provide template parameters for turbine design and analysis.

- **WP2** will deliver the majority of numerical simulation results on different test cases (both in terms of study cases and metocean conditions), including the detailed comparison of QBlade-Ocean with the open-access code OpenFAST and the commercial one DeepLines®, to evaluate not only the correct implementation of the code, but also the uncertainty reduction gained in comparison to other pieces of software.

- **WP3** will produce a feed forward wave-based controller, as well as a full set validation data from experimental campaigns undertaken in ECN hydrodynamic facility and on its Software in the Loop test bench. A set of wave field data retrieved at the SEM-REV test site from the floating wind turbine Floatgen will also be delivered through this WP3.

- **WP4** will deliver both numerical as well as experimental data for different research cases. This will include comparisons between different wake mixing controller as well as platform design. Simulations will be done in QBlade as well as SOWFA for comparison. The developed controller code will also be shared.

- **WP5** will build LCOE models for floating wind turbines implementing the control techniques that will be developed during the project. Specific information about costs of wind turbines developed during the project will be gathered with the support of the industrial partners directly involved in the work package and the partners involved in WP3 and WP4.

## 1.3.1. Access right to existing data

The FLOATECH project partners have already agreed on the access rights to existing data within the consortium, ruled by the terms of section 9 of the Consortium Agreement.

(9.3- Access rights for implementation) "Access rights to results […] needed for the performance of the own work of a Party under the Project shall be granted on a royalty-free basis […]."

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[3] "Life cycle economic assessment of floating offshore wind farms" developed by Maienza, C.

(9.4- Access rights for exploitation) "Access rights to results if needed for exploitation of a Party's own results shall be granted on fair and reasonable conditions. Access rights to results for internal research activities shall be granted on a royalty-free basis".

Specific terms have been agreed for the access to software (section 9.8.3 of the CA)

"Access rights to software that is results shall comprise access to the object code; and, where normal use of such an object code requires an application programming interface (hereafter API), access to the object code and such an API; and, if a Party can show that the execution of its tasks under the Project or the exploitation of its own results is technically or legally impossible without access to the source code, access to the source code to the extent necessary."

## 1.4. DATA UTILITY

In general, the audience who might use data generated or collected in the FLOATECH project are:

- The FLOATECH Consortium;
- European Commission services, European Agencies, EU and national policy makers;
- Research institutions, universities, institutes, training centers across the Europe and worldwide;
- Floating offshore wind and renewable energies related industries;
- Other floating offshore wind related EU projects;
- Private and public investment sector.

Open research data from FLOATECH will be useful to other researchers to underpin scientific publications by referring to the FLOATECH results or by incorporating the FLOATECH results in comparative analysis with their own project results.

## 2. FAIR DATA

## 2.1. MAKING DATA FINDABLE, INCLUDING PROVISIONS FOR METADATA

The consortium agreed to deposit the data and publications generated by the project in the Zenodo repository, where a project community has been created: https://zenodo.org/communities/floatech/. In addition to this official project data repository, partners generating the data may also store this data in a repository located at their institution.

The Zenodo repository complies with the principles of FAIR data, offering several useful features to make data findable:

- (meta)data are assigned a globally unique and persistent identifier: DOI is issued to every published record on Zenodo. If a Digital Object Identifier (DOI) has been already assigned, this will be kept to unambiguously cite the data.

- Data are described with rich metadata: Zenodo's metadata is compliant with DataCite's Metadata Schema minimum and recommended terms, with a few additional enrichments.

- Version numbers are automatically provided by Zenodo for each new upload of the same entry.

- Keywords will be provided for each dataset to optimize the possibility of data re-use and facilitate the discoverability of the data in the Zenodo repository.

- (meta)data are registered or indexed in a searchable resource: metadata of each record is indexed and searchable directly in Zenodo's search engine immediately after publishing.

## 2.2.  MAKING DATA OPENLY ACCESSIBLE

According to article 29.3 of the Grant agreement, FLOATECH partners must:

a) deposit in a research data repository and take measures to make it possible for third parties to access, mine, exploit, reproduce and disseminate — free of charge for any user — the following:

(i) the data, including associated metadata, needed to validate the results presented in scientific publications, as soon as possible;

(ii) other data, including associated metadata, as specified and within the deadlines laid down in the 'data management plan';

b) provide information — via the repository — about tools and instruments at the disposal of the beneficiaries and necessary for validating the results (and — where possible — provide the tools and instruments themselves).

According to the article 26 of the GA, the partners who have generated the research outputs are the owners of the generated data and have right to disseminate their results as long as there is no legitimate purpose or need to protect them.

Whenever feasible open access (OA) scientific publications will be chosen to disseminate public data, and whenever possible the data/metadata required to validate the published results will be linked to the publication. The access policy that will be implemented for publications will give priority to the Green model with the requirement to fix the embargo to 6 months after the first date of publication, as required by the EC. However, when not applicable, the publication policy of the consortium will be to pay the fees to make the scientific publications immediately available in open access for free. The costs related to paying this "Gold" open access have been integrated to the budget of the project.

In addition, the consortium will consider to submit papers to the Open Research Europe, the new open access publishing platform for the publication of research stemming from Horizon 2020 funding. Open Research Europe requires open access to research data supporting articles under the principle 'as open as possible, as closed as necessary', according to the policy of Horizon 2020. All articles submitted to this platform should include citations to repositories that host the data underlying the results, together with any information needed to replicate, validate, and/or reuse the results/ study and analysis of the data –

as part of the Data Availability Statement. This includes details of any software, instrument or other tool used to process results and, where relevant, the raw data.

It is important to note that, according to the article 29.3 of the GA, the consortium does not have to ensure open access to all research data: exceptions are allowed according to the relevant policy of Horizon 2020. This refers, for example, to the obligation to protect results if providing open access would jeopardise the achievement of the main objective of the H2020 project from which the research data derives, confidentiality and security obligations, the obligation to protect personal data, and other legitimate constraints.

In this case, the non-public data can still be uploaded on Zenodo under a "closed", "restricted" or "embargoed" access:

- Sharing files under restricted access will still be possible with the consent of the depositor or author of the data.

- The files under the closed access will be protected against any unauthorised access at all levels.

- For the files under embargo status, the end data of the embargo will be compulsorily provided. The allowed 6-month embargo period for the publications and underlying data will be respected. The access to the embargoed data will be automatically opened after the end of the embargo period.

After the end of the project, uploaded data will be preserved in the repository regardless the access mode. The responsible partner(s) reserve the possibility to make the "closed" and "restricted" data openly accessible after the end of the project on the consent of the relevant partners if their confidentiality considerations change.

Confidential data will be protected by means of patents and commercially used by the partners owning the IPR, or via agreements signed by the IPR owners with third parties.

The list of the datasets that have been preliminary identified by the project consortium is available in Annex 1. For each dataset, information about accessibility is provided: for the time being, all datasets planned to be used or generated by the project are expected to be made available in open access, except for two datasets: one dataset produced under WP2 with restricted access and one dataset produced under WP3 that will be made available after embargo (see Annex 1 for more details).

## 2.3.  MAKING DATA INTEROPERABLE

Data interoperability refers to the possibility for data exchange and re-use between researchers, institutions, organisations, countries, etc.). In order to make the research outputs and underlying data generated within the FLOATECH project interoperable, the consortium will use data in the standard formats and prioritize the available (open) software, whenever possible. The consortium will also respect the common standards officially applied to the various formats that will be used for the data.

In addition, the Zenodo repository is organized and managed in order to make data interoperable, to the maximum extent, in agreement with the FAIR data rules and recommendations.

Since most, if not all, of the data/metadata that will be collected/generated in FLOATECH will be delivered or calculated on the basis of data recorded by data acquisition systems, the data/metadata format will be those provided by commercial instruments commonly used in R&D centres. In some cases, data/data sets will probably require some additional information about the boundary conditions of the experiments and any other complementary information that may be required for an efficient use of the data/data sets by users who were not directly involved in their generation.

Input files and settings used both for QBlade-Ocean and OpenFAST will be publicly released, so that any researcher in the world could double-check them, thanks to the open nature of both codes. To facilitate this, particular attention will be paid in correctly relating the information with both standard vocabularies (to allow inter-disciplinary interoperability) and to vocabularies specific of the two codes, so to make them ready to use.

## 2.4. INCREASE DATA RE-USE (THROUGH CLARIFYING LICENSES)

Most of the data being produced by the project will be shared and made accessible for verification and re-use, according to the provisions foreseen in the CA, while distribution of specific data will remain limited until the relevant new know-how acquired in the project is protected in order not to endanger the interests of the industrial partners and to not jeopardize the protection of the project's results.

All the openly accessible data and corresponding metadata will be available for re-use, including after the end of the project in order to avoid possible conflicts or duplication/overlapping of activities with other projects.

Moreover, the FLOATECH research data uploaded on Zenodo, excepting the data uploaded under closed, embargoed or restricted access, will be in open access under the Creative Common Licenses: Attribution, ShareAlike, Non-Commercial, and No Derivatives. For the FLOATECH data, only three first license types are planned to be applied:

| Chosen Licenses | Icon | Meaning | Abbreviation |
|---|---|---|---|
|  |  | **Attribution:** Permits all uses of the original work, as long as it is attributed to the original author. | BY |
| |  | **Non-commercial:** License does not permit any commercial use of the original work. | NC |
| |  | **Share Alike:** Any derivative work should use the same license as the original work. | SA |

The quality of the data collected/generated in FLOATECH is assured by the fact that they will be either directly provided by measurement equipment with guaranteed accuracy (subject to periodic calibration) or the result of processing primary data delivered by calibrated sensors.

# 3.    ALLOCATION OF RESOURCES

As already mentioned above, the research data collected, generated and/or processed by the project will be uploaded and preserved during and after the end of the project in the Zenodo repository. The repository allows uploading data free of charge with the size limited to up to 50 GB per record. The data will be stored indefinitely (minimum 5 years). Currently there are no costs for preserving data in this repository and, thus, no costs have been foreseen to these matters by the project. If any unforeseen costs related to the open access of research data occur, it is possible to be charged on the Program given its eligibility status for reimbursement, according to the articles 6 and 6.2 of GA.

Moreover, each partner has devoted its own human resources to respect the prescriptions set out by the deliverable D6.1 "Data Management Plan". Each Work Package Leader is responsible for the supervision of the management of the data within the FLOATECH project, including data verification before uploading. The Zenodo community of the project has been created by Euronovia, who will make sure WP leaders know how to upload the datasets used or generated within their Work Package on Zenodo.

The costs of data storage and of the personnel assigned to the data management have been foreseen in the initial project budget estimation by some of the partners.

# 4.    DATA SECURITY

The public repository Zenodo has been selected as a long-term secure storage of the FLOATECH project research outputs given its features fulfilling technical and legal data security requirements and long-term preservation. Please consult the terms at http://about.zenodo.org/infrastructure/ and repository's features at https://help.zenodo.org/features/.

Also, as required by the article 18 of the GA, all the records and data will be preserved internally by the consortium during five years after the project.

In particular, the project data will also be stored internally on TubCloud, that is a repository managed by the project coordinator, Technische Universität Berlin (TUB) to safely manage, store, and share the data and documents related to the project.

Meanwhile, most of the consortium partners have their own provisions in place for data security within organizations.

The openly accessible, restricted and closed data shared through the repository will be preserved after the end of the project.

# 5.     ETHICAL ASPECTS

The FLOATECH project partners are to comply with article 34 concerning ethics and research integrity principles in the GA.

- Ethical principles (including the highest standards of research integrity)
- Applicable international, EU, and national law

In the FLOATECH project, no ethical or legal issues that can have an impact on data sharing have been identified at the current stage.

Concerning personal data, if any dataset that will be collected and/or generated in the FLOATECH project deals with data privacy issues, the responsible partner will ensure to be compliant with the EU General Data Protection Regulation (GDPR).

# 6.     OTHER ISSUES

At the current stage, consortium partners have reported no obligation to comply with additional specific national, funder, sectorial, departmental, or institutional data management policies.

# ANNEX 1 - PROJECT DATA AND RELATED MANAGEMENT PLAN

This Annex provides the list of datasets expected to be collected and generated by the partners of FLOATECH during the duration of the project, grouped by Work Package.

In order to collect this information, a template was prepared by Euronovia at the start of the project, following the Guidelines on FAIR Data Management in Horizon 2020[4] and it was sent to each work package leader who filled it in with the help of the other partners involved.

According to the answers received, 15 datasets have been currently identified by the FLOATECH partners, available below.

This list will be reviewed and updated, as appropriate, in the final version of this deliverable, planned to be submitted at M36.

## *Dataset information template*

| Work Package | Which WP is this dataset related to? |
|---|---|
| Dataset Name | The name of the dataset should be easy to search and find |
| Dataset description | - Please, write a brief description of the dataset that will be generated/ collected and the methodology that will be applied to generate the data<br>- What is the purpose of the data collection/generation and its relation to the objectives of the project?<br>- If the data is collected, please explain its origin |
| Type of data | Dataset, software, tool, etc. |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☐ Click or tap here to enter text. |
| Volume | Expected Size: Click or tap here to enter text. GB☐ MB☐<br>Number of files: Click or tap here to enter text. |
| Authors | Who are the persons responsible for the dataset generation/collection? |
| IPR Owner | Which project participant(s) own the intellectual property right? |
| Accessibility | Open Access ☐<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐<br>- Specify what methods or tools are needed to access the data<br>- IMPORTANT: If it is not in open access, please explain why |
| Re-usability | - Specify how the data will be licenced to permit the widest reuse possible (Standard for Open Access in Zenodo: CC Attribution 4.0 International)<br>- Specify when the data will be made available for re-use. If applicable, specify why and for what period a data embargo is needed<br>- Specify whether the data produced and/or used in the project is useable by third parties, in particular after the end of the project?<br>- If the re-use of some data is restricted, explain why |
| Data security | Where the data will be stored, in addition to Zenodo? For how long? |

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[4] h2020-hi-oa-data-mgt_en.pdf (europa.eu)

| Other | Refer to other national/funder/sectorial/departmental procedures for data management that you are using (if any) |
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## *Datasets used or generated within FLOATECH (first reporting period)*

| Work Package | WP2 |
|---|---|
| Dataset Name | Aero-hydro-elastic model definition - DTU 10MW RWT Hexafloat |
| DOI | https://doi.org/10.5281/zenodo.6397314 |
| Dataset description | QBlade definition of the DTU 10MW RWT mounted on the Hexafloat floater Model definition was validated against the model used by SAIPEM in their aero-servo-hydro-elastic definition in the DeepLines Wind software. |
| Type of data | Turbine definition file containing information about the geometric and aerodynamic turbine properties (*.trb) Polar data describing the aerodynamic properties on the respective blade stations (*.afl and *.plr) Structural definitions of blade, tower, RNA and floater (*.str) |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐ Other ☒ *.trb/*.afl/*.plr/*.str |
| Volume | Size: Order GB ☐ MB ☒ Number of files: 30 |
| Authors | TUB |
| IPR Owner | TUB, SAIPEM |
| Accessibility | Open Access ☐ Embargoed access ☐ Restricted access ☒ Closed access ☐ |
| Re-usability | Restricted Access in Zenodo: any user may request access to the dataset. Due to IP concerns from SAIPEM, the dataset will only be made available for research focused requests. |
| Data security | In addition to Zenodo, the data will be stored in the TUB cloud for the duration of the project. |

| Work Package | WP2 |
|---|---|
| Dataset Name | Aero-hydro-elastic model definition - SOFTWIND 10 MW FOWT |
| DOI | https://doi.org/10.5281/zenodo.6397359 |
| Dataset description | QBlade definition of the DTU 10MW RWT mounted on the SOFTWIND floater Model definition was validated against an OpenFAST model developed at UniFi, a DeepLines Wind model developed at SAIPEM and experimental data carried out in the wave basin from ECN. |
| Type of data | Turbine definition file containing information about the geometric and aerodynamic turbine properties (*.trb) Polar data describing the aerodynamic properties on the respective blade stations (*.afl and *.plr) Structural definitions of blade, tower, RNA and floater (*.str) |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐ Other ☒ *.trb/*.afl/*.plr/*.str |
| Volume | Size: Order GB ☐ MB ☒ Number of files: 32 |

| Authors | TUB |
|---|---|
| IPR Owner | TUB |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | Open Access in Zenodo: CC Attribution 4.0 International |
| Data security | In addition to Zenodo, the data will be stored in the TUB cloud for the duration of the project. |

| Work Package | WP2 |
|---|---|
| Dataset Name | Aero-hydro-elastic model definition - OC5 5MW MSWT |
| DOI | https://doi.org/10.5281/zenodo.6397353 |
| Dataset description | QBlade definition of the MARIN Stock Wind Turbine (MSWT) mounted on the OC5 floating wind turbine structure<br>Model definition was validated against an OpenFAST model developed at UniFi and experimental results carried out by a consortium lead by UMaine in the MARIN offshore basin. |
| Type of data | Turbine definition file containing information about the geometric and aerodynamic turbine properties (*.trb)<br>Polar data describing the aerodynamic properties on the respective blade stations (*.afl and *.plr)<br>Structural definitions of blade, tower, RNA and floater (*.str) |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ *.trb/*.afl/*.plr/*.str |
| Volume | Size: Order GB ☐ MB ☒<br>Number of files: 17 |
| Authors | TUB |
| IPR Owner | TUB |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | Open Access in Zenodo: CC Attribution 4.0 International |
| Data security | In addition to Zenodo data will be stored in the TUB cloud for the duration of the project. |

## Datasets planned to be used or generated within FLOATECH

| Work Package | WP1 |
|---|---|
| Dataset Name | QBlade Ocean Software and Reference Models |
| Dataset description | - Files necessary for the installation & execution of QBlade Ocean<br>- Validation Models<br>- User manual and technical reports |
| Type of data | - Execution as necessary on multiple platforms<br>- Supplementary libraries for execution<br>- Source code for self compilation<br>- Documentation files |

| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ (Numerous) |
|---|---|
| Volume | Expected Size: Order(GB) GB☐ MB☒<br>Number of files: >10^2 |
| Authors | TU Berlin (QBlade Development Team) |
| IPR Owner | TU Berlin, ECN, TUDelft |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐<br>- Compilation-specific libraries are required<br>- Qt Library necessary for compilation (Qt Creator- Freeware) |
| Re-usability | - Software and code shall be distributed as per the Academic Public License (APL)<br>- Data will be made available upon completion of WP1. Preliminary results and trial releases shall occur previously to final date of WP1.<br>- Data and software will be fully accessible to public users |
| Data security | Static (in house) version stored on TUB Cloud repository<br>QBlade CE version and source code publicly accessible through qblade.org webpage |

| Work Package | WP2 |
|---|---|
| **Dataset Name** | **FLOATECH verification met-ocean data** |
| Dataset description | - Met-ocean conditions used in verification<br>- The purpose of the data is to make the validation fully reproducible by others |
| Type of data | Dataset |
| Data format | XLSX ☒ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☐ Click or tap here to enter text. |
| Volume | Expected Size: unkown GB☒ MB☐<br>Number of files: 100+ |
| Authors | To be defined |
| IPR Owner | Open access data |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | Open Access in Zenodo: CC Attribution 4.0 International |
| Data security | In addition to Zenodo data will be stored in the TUB cloud for the duration of the project. |

| Work Package | WP2 |
|---|---|
| **Dataset Name** | **FLOATECH validation results** |
| Dataset description | - Selection of results from numerical models (open -source and commercial). For experimental datasets full timeseries can be provided. For code-to-code comparisons in stochastic conditions only aggregated results: PSDs, data statistics (max, min, mean, std)<br>- The purpose of the data is to make the validation fully reproducible by others |
| Type of data | Dataset |

| | |
|---|---|
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ Click or tap here to enter text. |
| Volume | Expected Size: unkown GB☒ MB☐<br>Number of files: unknown |
| Authors | UniFi, TUB, ECN, Seapower, SAIPEM |
| IPR Owner | UniFi, TUB, ECN, Seapower, SAIPEM |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | Zenodo: CC Attribution 4.0 International |
| Data security | In addition to Zenodo data will be stored in the TUB cloud for the duration of the project. |
| Other | Google drive academic storage service |

| Work Package | WP3 |
|---|---|
| Dataset Name | Wave tank tests of Feedforward wave-based control with SIL approach |
| Dataset description | - Experimental setup description<br>- Loads cases description<br>- Hydrodynamic data: motions, velocities, accelerations, forces and free surface elevation time series<br>- Aerodynamic data: turbulent wind maps and wind velocity, turbine rpm and loads time series<br>- Videos of selected runs |
| Type of data | Dataset |
| Data format | XLSX ☒ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ MAT file |
| Volume | Expected Size: 100 GB☒ MB☐<br>Number of files: 500 |
| Authors | Félicien Bonnefoy & Vincent Leroy |
| IPR Owner | Ecole Centrale de Nantes |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | - Open Access in Zenodo: CC Attribution 4.0 International<br>- Data will be available to third parties three months after the end of the project<br>- Data will be available for reuse at the end of the project |
| Data security | Data will be stored on ECN internal server. |

| Work Package | WP3 |
|---|---|
| Dataset Name | Feedforward wave-based controller |
| Dataset description | Control system developed during the PhD |
| Type of data | Matlab code |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐ |

| | |
|---|---|
| | Other ☒ .m |
| Volume | Expected Size: 10 GB☐ MB☒<br>Number of files: Very difficult to estimate now |
| Authors | Jan-Willem van Wingerden & Amr Hegazy |
| IPR Owner | TU Delft |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐<br><br>Matlab code will be required in conjunction with an appropriate simulation package to run the closed loop control. |
| Re-usability | All algorithms will be made available for reuse by publishing on our Github |
| Data security | Besides Zenodo the software will also be stored on the 4.TU server as part of the requirement of the TU Delft PhD program |

| Work Package | WP3 |
|---|---|
| Dataset Name | In situ wave data from X-band radar measurement |
| Dataset description | - Experimental setup description<br>- Hydrodynamic data:<br>  - Sea surface evolution in time from X-band radar measurement,<br>  - Determinisitic measurements from in situ wave buoy,<br>  - Velocity profile in the water column |
| Type of data | Dataset |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ binary files (e.g. MAT files, Netcdf files) |
| Volume | Expected Size: Upper limit: 100 GB☒ MB☐<br>Number of files: Upper limit: 500 |
| Authors | Yves Perignon, Peter Naaijen |
| IPR Owner | Ecole Centrale de Nantes, Next Ocean |
| Accessibility | Open Access ☐<br>Embargoed access ☒<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | - Embargoed Access in Zenodo<br>- Data will be available to third parties up to two years after the end of the project: this period is aimed at ensuring that the research is adequately published before opening the dataset.<br>- Data will be available for reuse two years after the end of the project |
| Data security | Complementary storage of the dataset will be performed on SEANOE, with warranty of lifelong storage |
| Other | SEANOE (SEA scieNtific Open data Edition) is a publisher of scientific data in the field of marine sciences. This is the repository of choice for our Research Insfrastructure. |

| Work Package | WP4 |
| --- | --- |
| Dataset Name | High-Fidelity Simulation Results |
| Dataset description | These datasets contain the simulation results from either SOWFA or Qblade. The data will contain information (velocity, pressure etc.) off the wake behind the turbine as well as turbine data. Its primary purpose is to evaluate wake mixing strategies. |
| Type of data | Data is primarily given in txt files and processed using Matlab code |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ .txt and .mat |
| Volume | Expected Size: 100 GB☒ MB☐<br>Number of files: Very difficult to estimate now |
| Authors | Jan-Willem van Wingerden & Daniel van den Berg |
| IPR Owner | TU Delft |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐<br><br>Matlab code will be required (and provided) to process the data. |
| Re-usability | All data sets will be open access (CC 4.0) available after publication of the paper/document in which the data is used. Each data set will get its own DOI to make them citable and persistently available. |
| Data security | Besides Zenodo the data will also be stored on the 4.TU server as part of the requirement of the TU Delft PhD program |

| Work Package | WP4 |
| --- | --- |
| Dataset Name | Wind Tunnel Experiments |
| Dataset description | Similar to the simulation results this dataset will contain all information used in any publication showing wind tunnel results. |
| Type of data | Data is primarily given in txt files and processed using Matlab code |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☒ .txt |
| Volume | Expected Size: 100 GB☒ MB☐<br>Number of files: Very difficult to estimate now |
| Authors | Jan-Willem van Wingerden & Daniel van den Berg |
| IPR Owner | TU Delft |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐<br><br>Matlab code will be required (and provided) to process the data. |
| Re-usability | All data sets will be open access (CC 4.0) available after publication of the paper/document in which the data is used. Each data set will get its own DOI to make them citable and persistently available. |
| Data security | Besides Zenodo the data will also be stored on the 4.TU server as part of the requirement of the TU Delft PhD program |

| Work Package | WP4 |
|---|---|
| Dataset Name | Control, estimation and optimization software |
| Dataset description | Software developed during the PhD |
| Type of data | Matlab code |
| Data format | XLSX ☐ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐ <br> Other ☒ .m |
| Volume | Expected Size: 10 GB☐ MB☒ <br> Number of files: Very difficult to estimate now |
| Authors | Jan-Willem van Wingerden & Daniel van den Berg |
| IPR Owner | TU Delft |
| Accessibility | Open Access ☒ <br> Embargoed access ☐ <br> Restricted access ☐ <br> Closed access ☐ <br><br> Matlab code will be required in conjunction with an appropriate simulation package to run the closed loop control. |
| Re-usability | All algorithms will be made available for reuse by publishing on our Github |
| Data security | Besides Zenodo the software will also be stored on the 4.TU server as part of the requirement of the TU Delft PhD program |


| Work Package | WP5 |
|---|---|
| Dataset Name | LCOE of floating wind turbines - Reference works |
| Dataset description | - DATA COLLECTED <br><br> - ORIGIN: <br> Deliverable D6.1 of the COREWIND project (project website) <br> Deliverables D2.2, D2.8, D2.9 of the LIFE50+ project (project website); <br> Report "IEA Wind Task 26 – Offshore Wind Farm Baseline Documentation"; (project website, www.nrel.gov/docs/fy16osti/66262.pdf) <br> Report "IEA Wind TCP Task 26 - Offshore Wind Energy International Comparative Analysis"; (NREL website, https://www.nrel.gov/docs/fy19osti/71558.pdf) <br> PhD Thesis "Life cycle economic assessment of floating offshore wind farms", developed by Maienza, C. in collaboration with Seapower. <br><br> - PURPOSE: These works, providing LCOE models and costs for floating offshore wind turbines, will be used in the WP5 as reference and starting point for the activities. |
| Type of data | Report |
| Data format | XLSX ☐ DOC ☒ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐ <br> Other ☐ Click or tap here to enter text. |
| Volume | Expected Size: 60 GB☐ MB☒ <br> Number of files: 7 |
| Authors | // |
| IPR Owner | // |
| Accessibility | Open Access ☒ <br> Embargoed access ☐ |

| | |
|---|---|
| | Restricted access ☐ |
| | Closed access ☐ |
| Re-usability | Open access data |
| Data security | In addition to Zenodo data will be stored in the TUB cloud for the duration of the project. |
| Other | Google drive Seapower storage |

| Work Package | WP5 |
|---|---|
| Dataset Name | FLOATECH - LCOE Tool |
| Dataset description | - DATA GENERATED<br><br>- DESCRIPTION: Tool for LCOE evaluation of floating wind turbines implementing control techniques developed in the project.<br><br>- PURPOSE: To provide a parameterised tool capable of evaluating LCOE of floating wind turbines characterised by different sizes, components and power control strategies. |
| Type of data | Tool |
| Data format | XLSX ☒ DOC ☐ PDF ☐ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☐ Click or tap here to enter text. |
| Volume | Expected Size: 1 GB☐ MB☒<br>Number of files: 1 |
| Authors | TUB, UNIFI, Seapower, SAIPEM, IDEOL |
| IPR Owner | TUB, UNIFI, Seapower, SAIPEM, IDEOL |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | Open Access in Zenodo: CC Attribution 4.0 International |
| Data security | In addition to Zenodo data will be stored in the TUB cloud for the duration of the project. |
| Other | Google drive Seapower storage |

| Work Package | WP5 |
|---|---|
| Dataset Name | FLOATECH – LCOE and market value evaluation |
| Dataset description | - DATA GENERATED<br><br>- DESCRIPTION: Report on LCOE evaluation of the floating wind turbines considered during the project, describing the assumptions made for each parameter and the methodology applied.<br><br>- PURPOSE: To provide LCOE results and a detailed description of the methodology applied to evaluate LCOE in order to make the methodology fully reproducible. |
| Type of data | Report |
| Data format | XLSX ☐ DOC ☐ PDF ☒ PPT ☐ JPEG ☐ OPJ ☐ TIFF ☐<br>Other ☐ Click or tap here to enter text. |
| Volume | Expected Size: 2 GB☐ MB☒ |

| | Number of files: 1 |
|---|---|
| Authors | TUB, UNIFI, Seapower, SAIPEM, IDEOL |
| IPR Owner | TUB, UNIFI, Seapower, SAIPEM, IDEOL |
| Accessibility | Open Access ☒<br>Embargoed access ☐<br>Restricted access ☐<br>Closed access ☐ |
| Re-usability | Open Access in Zenodo: CC Attribution 4.0 International |
| Data security | In addition to Zenodo data will be stored in the TUB cloud for the duration of the project. |
| Other | Google drive Seapower storage |