

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

Project acronym LIFES50+ Grant agreement 640741

Collaborative project

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Contributors Organization

Definitions & Abbreviations

AST Administrative Support Team
PC Project Coordinator
PM Project Manager
WPL Work Package Leader









This deliverable contains the minutes and conclusions from the LIFES50+ initial Kick-off meeting, held in Trondheim on June 10th and June 11th 2015 at MARINTEK premises with all project beneficiaries represented. The initial General Assembly was part of the kick-off meeting and the results from this assembly are also included.

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1 Introduction

This deliverable contains the minutes and conclusions from the LIFES50+ initial Kick-off meeting, held in Trondheim on June 10th and June 11th 2015 at MARINTEK premises with all project beneficiaries represented. The initial General Assembly was part of the kick-off meeting and the results from this assembly are also included.

2 Initial kick-off meeting – Minutes of Meeting

List of participants and Agenda are included in Annex A.

DAY 1:

1) Introduction and guided tour of MARINTEK (Petter Andreas Berthelsen)

The kick-off meeting was initiated by lunch and a guided tour of the MARINTEK facilities.

2) Welcome (Petter Andreas Berthelsen, MARINTEK)

General introductions to today's work.

3) Partner Introduction (all partners)

Each partner gave a 5 minutes presentation of their organisation. These presentations included work package involvement and contact details.

4) LIFES 50+ Background and Management (Petter Andreas Berthelsen, MARINTEK)

- A general introduction of the project background
- The project's governance structure
- The project's IP Management Group
 - o MARINTEK
 - o Iberdrola (legal advisor)
 - More members can be proposed by the Coordinator and approved by the Steering Committee
- The project's current External Advisor Group:
 - o Statoil (NO)
 - o NREL (US)
 - Other members should be added by the aid of the project's consortium
- Management Principles:
 - o Good communication is essential
 - o Promote collective responsibility
 - o Defined roles and tasks for all partners
 - o Embrace the challenge and see the opportunity





All presentations, together with the minutes of meeting will be distributed by e-mail and available at the project-internal website (upon release of the website).

Actions Agreed:

| Responsible (participant/organisation) | Action | Due |
|--|--|-----|
| MARINTEK | Distribute all presentations given during the kick-off meeting | M1 |

5) LIFES 50+ Technical Overview (Thomas Sauder, MARINTEK)

- Review of the project concept
- Overview of the work packages and their interrelationship
- Overview of the 4 FOWT-concepts involved in the project
- Technical challenges
- Next steps

6) Administrative Information (Jan Arthur Norbeck, MARINTEK)

- Contract, key issues
 - o Roles and responsibilities
- Reporting
 - o Three Periodic Reports (M16, M28, M40) from WP-leaders
 - Deadline of delivery is 60 days
 - WP-leaders are asked to deliver their input 30 days after end of the period
 - o Form Cs (M16, M28, M40) from all project beneficiaries
 - To be delivered through the EU participant portal
 - o Monthly status reports from WP-leaders are suggested from M6 and onwards
 - Technical progress
 - Deviations and mitigation measures taken
 - No deviations, hardly no work needed to complete the monthly report
- Financial provisions
 - o All partners receive pre-financing by pro rata based on budget
 - Definition of eligible costs is found the Grant Agreement or by request to the Project Officer
- Control sanctions
 - o Definition of liquidated damages is found in the Grant Agreement
- Key dates and deadlines for now
 - o Grant Agreement entry into force on May 20th 2015
 - o Project start-up date is June 1st 2015 (M1)
- Deliverables
 - o Review process:





- WP leaders and lead partner should appoint two peer reviewers (from inside the project consortium) 2 months before submission deadline
- Advanced draft of full deliverable to be sent to peer reviewers and to Coordinator for feedback and final approval 1 month before submission deadline
- Final version of the deliverable should be submitted by uploading the deliverable to the internal website in the respective WP folder 2 working days before the submission deadline
- Project Coordinator will submit the deliverable to the EC (through the EU participant portal) on the last work day of the due-month
- Project logo (comments from consortium)
 - O Where is the substructure?
 - Not included as part of the point is to design and validate different substructures
 - o A little bit of green could be included
 - o Maybe use capital letters for the text (as the project name is in capital letters)

Questions raised:

• Could the deliverable template include a line for "company internal document reference number"?

Actions Agreed:

| Responsible (participant/organisation) | Action | Due |
|--|---|-----|
| MARINTEK | Provide reporting templates for periodic reports and monthly status reports | M6 |
| MARINTEK | Provide templates for deliverables | M3 |
| MARINTEK | Develop a plan for dealing with delays, both in terms of deliverables and project as a whole regarding request for extensions | M2 |

7) IP and Exploitation of Project Results (Pablo Gómez, Iberdrola)

- IP and Exploitation of project results are covered by the Grant Agreement and the Consortium Agreement
- Intellectual Property Management
 - o IP Management Group (IPG)
 - MARINTEK
 - Iberdrola
 - Additional members may be proposed by the project coordinator and approved by the Steering Committee
 - o Access rights to Background
- IPR Request
 - o IPR generated during the project
 - o Patent Application Process
 - Each beneficiary must examine the possibility of protecting its results and must adequately protect them





- Any joint owners shall agree on all protection measures and the division of related costs in advance
- Patents are a mechanism for both protecting results AND to ensure that no-one else prohibits usage of the results by filing a "counter-patent".

| Responsible (participant/organisation) | Action | Due |
|--|--|-----|
| Iberdrola/MARINTEK | Define the difference between a University and a research institute, for practical application of the rules for joint ownership agreement of IPR | M2 |
| MARINTEK | Produce D9.4 IPR Guidelines | M2 |





8) INEA and the Grant Agreement (Jonas Hedberg, INEA)

- INEA, Horizon 2020 and the Energy Challenge
- Grant Management
 - o The GA is the Key reference document
 - o The budget in the GA does not imply automatic approval of costs
- Amendments (that may be accepted)
 - Update of tasks and deliverables on the DoA
 - o Propose new more innovative actions
 - Addition of third parties
 - o Reallocation of tasks
 - No amendments which are deemed as diminishing the original value of the project will be accepted
- Dissemination and communication
 - o The key issue for INEA
 - Obligation to disseminate and communicate to multiple audiences
 - o Community support shall be highlighted and European emblem displayed
 - Inform INEA before engaging in any communication activity expected to have a major media impact
- What INEA expects
 - o Know your Grant Agreement!
 - o High-quality deliverables on time
 - Regular feedback to Project Officer
 - o Communication (stakeholders, website)





9) Questions and General Discussion (led by Petter Andreas Berthelsen, MARINTEK)

No particular questions were raised.

10) General Assembly – Election of Steering Committee

See Section 3.

DAY 2:

1) Welcome (Petter Andreas Berthelsen, MARINTEK)

General introductions to today's work.

2) WP1 Presentation (Germán Pérez, TECNA)

Presentation of WP1 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

Regarding identification of sites:

- We Will identify three sites and do basic/conceptual design for each site
 - o In order to be able to compare the designs more thoroughly
 - The details of the designs must be derived from the analyses that are supposed to be conducted for each design (WP2, M16)
 - LCOE analyses require a certain amount of information from the designs, etc.
 - O The detail-requirements to the designs will have to be adapted to the resources available to the designers

| Responsible (participant/organisation) | Action | Due |
|--|--|-----|
| TECNA/IREC/IBER | Define what is expected for each design in terms of details (basic/conceptual/draft/complete/etc.) | |
| | | |





3) WP2 Presentation (Gabriela Benveniste, IREC)

Presentation of WP2 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

4) WP3 Presentation (Maxime Thys, MARINTEK)

Presentation of WP3 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

Regarding the experiments:

• How do we deal with discrepancies between results from the ocean basin tests and the wind tunnel tests?

| Responsible (participant/organisation) | Action | Due |
|--|---|------|
| All manufacturers | Provide any initial information to the responsible for designing/planning the experiments | ASAP |
| | | |





5) WP4 Presentation (Henrik Bredmose, DTU)

Presentation of WP4 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

Actions Agreed:

| Responsible (participant/organisation) | Action | Due |
|--|---|-----|
| All manufacturers | Send description of models and their qualification to DTU | |
| | | |

6) WP5 Presentation (Christof Wehmeyer, RAMBOLL)

Presentation of WP5 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

Timing on WP5 is dependent on the timing of the WPs delivering results to WP5.

| Responsible (participant/organisation) | Action | Due |
|--|---|------|
| All WP Leaders | Send WP-schedule to RAMBOLL regarding delivery of results | ASAP |
| | | |





7) WP6 Presentation (Rachel Beedie, ORE Catapult)

Presentation of WP6 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

8) WP7 Presentation (Kolja Müller, USTUTT)

Presentation of WP7 objectives, tasks, participants, relationship with other WPs, deliverables and schedule.

9) WP Meetings 1-7 (Led by WP-leaders)

Each work package had a WP-specific meeting lead by the WP leader. The minutes from these meetings were prepared by each WP-leader and are included in Annex B. WPs 5, 6, 8 and 9 did not have WP-specific meetings.

10) Questions and general discussion (Petter Andreas Berthelsen, MARINTEK)

DTU: Do we need a global meeting structure?

MRTK: Each WP will organise their own meeting structure.

11) Closing Summary

The kick-off meeting was concluded as successful with well-prepared partners. All partners were encouraged to continue the positive dialogue witnessed during the two days in Trondheim.

Regarding deliverables there is a 6 month grace period before the strict deliverable plan (regarding peer-review, etc.) is enforced.

All partners are encouraged to read the Grant Agreement and submit the Financial Information Form and the Consortium Agreement signature page.

| Responsible (participant/organisation) | Action | Due |
|--|--|------|
| All Partners | Submit required documents | ASAP |
| MARINTEK | Prepare a doodle poll for first Project Management Team meeting in August | M1 |





3 Minutes from General Assembly

The general assembly was the last item of the agenda on Day 1 of the Kick-off meeting.

The General Assembly, consisting of one representative from each Beneficiary, appointed the following members to the LIFES 50+ Steering Committee:

| Name | Company | Type of organisation |
|---------------------------|----------------------|-------------------------|
| Petter Andreas Berthelsen | MARINTEK | Project Coordinator |
| Kimon Argyriadis | DNV-GL | Classification Society |
| Germán Perez | Tecnalia | Research Partner |
| Thomas Buhl | DTU | Research Partner |
| Juan Amate López | Iberdrola | Industry/Design Partner |
| Kolbjørn Høyland | Dr. Tech. Olav Olsen | Industry/Design Partner |

The election and resulting composition of the LIFES 50+ Steering Committee is in compliance with the Grant Agreement and the Consortium Agreement.

No other items were on the agenda of the General Assembly.





4 Annex A: List of participants and Agenda

Participants

| Name | Company | Day 1 | Day 2 |
|---------------------------|---|-------|-------|
| Gabriela Benveniste | IREC | Х | Х |
| Miguel Cruz | IREC | Х | Х |
| Håkon Andersen | Dr.techn.Olav Olsen AS | Х | Х |
| Trond Landbø | Dr.techn.Olav Olsen AS | Х | Х |
| Rachel Beedie | ORE Catapult | Х | Х |
| Paul McKeever | ORE Catapult | Х | Х |
| Goren Aguirre | TECNALIA | Х | Х |
| German Perez | TECNALIA | Х | Х |
| Denis Matha | Stuttgart Wind Energy - University of Stuttgart | Х | Х |
| Kolja Müller | Stuttgart Wind Energy - University of Stuttgart | Х | Х |
| Christof Wehmeyer | Ramboll | Х | Х |
| Bruno G Geschier | IDEOL | Х | Х |
| Véronique Soulé | IDEOL | Х | Х |
| Juan Amate | Iberdrola | Х | Х |
| Pablo Gómez | Iberdrola | Х | Х |
| Luca Vita | DNV GL | Х | Х |
| Julia Barmwater | DNV GL | Х | Х |
| Marit Kvittem | DNV GL | Х | |
| Alberto Zasso | POLIMI - Politecnico di Milano | Х | Х |
| Marco Belloli | POLIMI - Politecnico di Milano | Х | Х |
| Henrik Bredmose | DTU | Х | Х |
| Robert Mikkelsen | DTU | | Х |
| Michael Borg | DTU | Х | Х |
| Jonas Hedberg | INEA | Х | Х |
| Petter Andreas Berthelsen | MARINTEK | Х | Х |
| Dag Atle Nesheim | MARINTEK | Х | Х |
| Thomas Sauder | MARINTEK | Х | Х |
| Maxime Thys | MARINTEK | Х | Х |
| Jan Norbeck | MARINTEK | Х | Х |
| Matthias Peter Nowak | MARINTEK | Х | Х |
| Øyvind Hellan | MARINTEK | Х | |





Agenda

<u>Day 1 – Wednesday 10th June 2015 – Room: Havrommet, MARINTEK</u>

| Time | Topic | Presenter |
|-------------|--|-------------------------------|
| 11:30-14:00 | Registration, light welcome lunch and guide | d tour at MARINTEK facilities |
| 14:00-14:05 | Welcome and introduction | Petter Andreas Berthelsen |
| 14:00-15:00 | Partner Introductions | Partner representatives |
| 15:00-15:20 | LIFES50+ background and management | Petter Andreas Berthelsen |
| 15:20-15:45 | LIFES50+ technical overview (WP9) | Thomas Sauder |
| 15:45-16:00 | Tea/Coffee | |
| 16:00-16:30 | Administrative information (WP 9) | Jan Norbeck |
| 16:30-16:40 | IP and Exploitation of project result (WP 9) | Iberdrola |
| 16:40-17:00 | INEA and the Grant Agreement | Jonas Hedberg |
| 17:00-17.20 | Question and general discussion | Open to the floor |
| 17:20-17:35 | General Assembly | |
| | Election of Steering Committee | Petter Andreas Berthelsen |

<u>Day 2 – Thursday 11th June 2015 –Room: Havrommet, MARINTEK</u>

| Time | Topic | | Presenter |
|-------------|---------------------------------|--------------|--------------------|
| 09:00-09:10 | Welcome*** | | Petter Andreas/Jan |
| 09:10-09:30 | WP 1 Presentation | TECNA | |
| 09:30-09:50 | WP 2 Presentation | | IREC |
| 09:50-10:10 | WP 3 Presentation | | MAR |
| 10:10-10:30 | WP 4 Presentation | | DTU |
| 10:30-10:40 | Tea/Coffee | | |
| 10:40-11:00 | WP 5 Presentation | | RAMBOLL |
| 11:00-11:20 | WP 6 Presentation | | ORE-Catapult |
| 11:20-11:40 | WP 7 Presentation | | USTUTT |
| 11:40-12:10 | Lunch | | |
| 12:00-15:45 | WP Meetings 1-7 | | Led by WP partners |
| 15:45-15:55 | Question and general discussion | | Open to the floor |
| 15:55-16:00 | Closing summary | | Petter Andreas |





5 Annex B: Minutes from WP-specific meetings

5.1 WP1:

1. T1.1 Definition of the target locations: business cases. Discussion about task approach and organization:

| Key points | Speaker (name/organisation) | Agreed |
|--|--|--|
| WP1 schedule presentation. T1.1 presentation. Objectives and what to do. Detailed GANT for T1.1. Ideas on possible areas. | Goren Aguirre (TECNALIA) | |
| Discussion about possible areas and the criteria for the selection of the three locations. Government support, technical aspects, availability of data The factors can be weighted for the locations selection. | Juan Amate (IBERDROLA) Miguel Cruz (IREC) Germán Pérez (TECNALIA) | |
| It must be defined the scope of the work for the design. Are we going to design for three sites? Or only for one site and a sensitivity analysis? A commom approach must be defined to compare the solutions, after the site selection. | Henrik Bedmose (DTU) Håkon Andersen (Dr.techn.Olav Olsen AS) Trond Landbø (Dr.techn.Olav Olsen AS) Luca Vita (DNVGL) Juan Amate (IBERDROLA) Germán Pérez (TECNALIA) Goren Aguirre (TECNALIA) | As a first step, technology developers will propose sites of interests and three of them will be selected to provide information to WP7. |

2. Task 7.2 presentation and connection to T1.1

| Key points | Speaker (name/organisation) | Agreed |
|---|--|---|
| Task 7.2 presentation and connection to T1.1 Explanation about what is design data and the things that should be taken into account for the design. Some aspects seem to be too detailed for a first approach, like corrosion Discussion about the possibility to get soil conditions for the selected sites. Some information could be available for UK sites. Technology developers could define a range of different soil conditions. Discussion about designing for one or three sites and the amount of data to analise. First the sites will be identified and then it will be decided the best way for the design and comparison of the concepts. | Luca Vita (DNVGL) Juan Amate (IBERDROLA) Rachel Beedie (ORE Catapult) Germán Pérez (TECNALIA) Gabriela Beneviste (IREC) Michael Borg (DTU) Trond Landbø (Dr.techn.Olav Olsen AS) | Present developers agree on following DNV-GL standard |





3. T1.2 Wind turbine specification presentation

| | | ed |
|---|--------------------|----|
| Presentation of DTU activities related to the | | |
| wind turbine specification for the design and M | lichael Borg (DTU) | |
| support to technology developers | | |

4. Actions Agreed – summary

| Responsible (participant/organisation) | Action | Due |
|---|--|------------|
| Juan Amate (IBERDROLA), Joannes Berque (TECNALIA) | Ask technology developer for sites of interest and available data. | 22/06/2015 |
| Juan Amate (IBERDROLA), Joannes Berque (TECNALIA) | Net meeting for the sites selection. | 30/06/2015 |
| | | |

5.2 WP2

1. Item 1 for discussion

| Key points | Speaker (name/organisation) | Agreed |
|---|-----------------------------|--------|
| USTUTT: the contact person will be Kolje Mueller, so Denis Matha will not be included | D.Matha, USTUTT | Yes |
| Ramboll: the contact person will be Christoph Wehmeyer, thus removing Tim Fisher | Whemeyer, RAMBOLL | Yes |
| OOLSEN: the contact person will be Trond Landbø and Håkon Andersen, thus removing Dagfinn Sveen | Landbø, OOLESEN | Yes |

2. Item 2 for discussion

| Key points | Speaker (name/organisation) | Agreed |
|--|-----------------------------|--------|
| WP2 activities should now focus on Task 2.1 (led by Iberdrola) and specifically, subtask 2.1.1: "Definition of the General Frame for the analysis". | IREC | YES |
| | | |
| IREC will prepare a questionnaire with an initial proposal of elements to be included in the assessment including following issues: WP6-WP2 general framework for components identification: definition of the elements that | IREC | YES |





will be included in the concepts assessment for each of the 4 concepts (example, floating substructure elements, mooring, transmission cables, turbine, ..) define the 4 concepts elements, and get a common agreement on their names)

Lifetime considerations: 25 years (8MW turbine from Tecnalia is certified for 25 years). For concrete and substructures longer lifespan can be considered?

IREC, OOLSEN, TECNA

TBD

Preparation of D2.1: IREC is preparing a plan for the following 4 months including 1 month before submission review process

IREC, IBER

YES

ORE-CATAPULT and USTUTT suggest to strength the collaboration with WP2 during the first phase... participation in periodic calls?

ORE, USTUTT

YES

Should we include risk assessment in D2.1.1? Maybe a lean implementation based on literature can be used as an starting point.

ORE

YES

3. Item 3 for discussion

| Key points | Speaker (name/organisation) | Agreed |
|---|-----------------------------|--------|
| On-line meetings using Lync. | IREC | YES |
| Clarify interaction with WP4 for the optimization process (IREC) | IREC | TBD |
| 3 Different locations: to be discussed with WP1/WP2 at 14h00 | IREC | |
| Selection criteria? The best two? Marintek proposal at the beginning of the project? (one steel, another concrete, different approaches, etc.?) | IREC | TBD |

4. Item 5 for discussion

| Key points | Speaker (name/organisation) | Agreed |
|---|-----------------------------|--------|
| IREC will prepare a draft questionnaire for | IREC | Y |





| discussing the inclusion of the elements and life stages to be included in the analysis. Due | | |
|--|------|---|
| me stages to be included in the analysis. Due | | |
| date (25 th June 2015) | | |
| | | |
| IREC: submit a D 2.1 schedule proposal. Due | | |
| date (25 th June 2015) | IREC | Y |
| dute (25 til 5 dile 2015) | | _ |
| IREC, Iberdrola and Tecnalia will start litera- | | |
| | | |
| ture research regarding LCOE tools to be used | IREC | Y |
| as baseline in the project | | |
| | | |
| IREC and Tecnalia will start literature re- | | |
| search regarding LCA applied to offshore | | |
| wind farms | IREC | Y |
| WIIIU TAITIIS | | |
| | | |

5. Any other business

| Key points | Speaker (name/organisation) | Agreed |
|---|-----------------------------|--------|
| First conference-call: in 2 weeks: proposal for | | |
| 25 th June, at 10.00. The agenda of the meet- | | |
| ing and tasks to be prepared by each partner | | |
| will be sent on the 17 th June by IREC | | |
| | | |
| Task follow up every 2 weeks until submis- | | |
| sion of D2.1 (ex: every Thursday morning at | | |
| 10,00) | | |
| First conference call, in 2 market managed for | | |
| First conference-call: in 2 weeks: proposal for | | |
| 25 th June, at 10.00. The agenda of the meet- | | |
| ing and tasks to be prepared by each partner | | |
| will be sent on the 17 th June by IREC | | |
| | | |

6. Actions Agreed – summary

| Responsible (participant/organisation) | Action | Due |
|--|--|------------|
| IREC | IREC will prepare a draft questionnaire for discussing the inclusion of the elements and life stages to be included in the analysis. | 25/06/2015 |
| IREC | IREC: submit a D 2.1 schedule proposal. | 25/06/2015 |
| IREC | The agenda of the next meeting and tasks to be prepared by each partner | 17/06/2015 |
| All | Task follow up every 2 weeks until submission of D2.1 (ex: | |





every Thursday morning at 10,00

5.3 WP3

- 1. Contents of discussion
- POLIMI presented the current status of the design of the scaled rigid wind turbine to be used for the validation of Aerodyn. A similar approach will be used for the design and construction of the aero-elastic model.
 - DTU and POLIMI agreed on the reference document for the design of the wind turbine, which is "Description of the DTU 10 MW Reference Wind Turbine", DTU Wind Energy Report-I-0092, July 2013.
 - o POLIMI would like to compare BEM models with DTU.
 - o For the aero-elastic model of the scaled wind turbine, POLIMI would like to match also the full-scale derivative of the blade lift force per unit length. It is DTU's suggestion to make two designs, the first based on the overall thrust, the second based also on the derivative of the overall thrust as a function of the blades collective pitch (i.e. focused on matching also the overall aerodynamic damping characteristics of the turbine).
- The characteristics of airfoil sections.
 - POLIMI considers using CFD for the computation of the characteristics. DTU believes that it is quite difficult to use CFD for airfoil sections at low Reynolds numbers.
 Having as a key focus of the low Reynolds optimized airfoil a very linear lift characteristic, DTU suggested to consider in the design the Selig Profile SD7032.
 - o DTU showed some results of wind tunnel tests of an airfoil section where the foil characteristics are very different between Re=80 000 and Re=100 000.
 - Airfoil section characteristics could be obtained by testing in a wind tunnel. POLIMI could make the airfoil section and test it first in Milan (aerospace department), and afterwards at DTU. POLIMI confirms to make the low Reynolds airfoil section model characterization within its LIFES50+ budget.
 - Discussion between DTU and POLIMI about the level of turbulence to be used in the wind tunnel when testing an airfoil section. Airfoil sections are often tested in wind tunnels with a low level of turbulence while the turbulence will vary during the model tests in the boundary layer wind tunnel. POLIMI suggests to tests the airfoil sections with some level of turbulence, representative of the turbulence level in the BL tunnel.
- Discussion about the use and the validation of Aerodyn.
- POLIMI needs to know the working space for the HexaFloat.
- POLIMI needs to select the actuators for the controller of the wind turbine.





2. Actions Agreed – summary

| Responsible (participant/organisation) | Action | Due |
|--|--|------------------|
| POLIMI | Define a simplified case to compare POLIMI's and DTU's BEM models. | 31-07-15 |
| DTU | Inform POLIMI about the cost and model dimensions for wind tunnel tests of an airfoil section. | |
| POLIMI | Create a document describing the process used for the design of a scaled wind turbine and send to DTU for comments. | 24-07-15 |
| DTU | Provide eigen-modes of the wind turbine to POLIMI. | |
| POLIMI | Obtain the dimensions of the working space for the HexaFloat from the 4 Designers. POLIMI will get in touch directly with the 4 Designers at this purpose. | 03-07-15 |
| POLIMI | Write a document containing the characteristics/limitations of the controller of the wind turbine at model scale. Comments to be made by DTU and afterwards send it to all the participants of the LIFES50+ project. | To be decided |
| MAR | Description of how Aerodyn has to be validated (physical effects, test cases). To be sent to POLIMI. | 01-07-15 |
| POLIMI and MAR | Dive into Aerodyn. | Work in progress |

5.4 WP4

1. Opening of meeting

Henrik bid welcome, outlined the work package structure and the meeting agenda.

- 2. D4.4: Overview of consortium models
- The deliverable sets the scene for the work in WP4 and together with the gap analysis guides the research developments in the work package.
- The report will have the following structure:

Models

Qualification

Design Approach

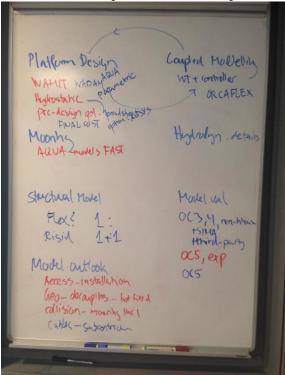
Development needs – gap analysis

• A questionnaire has been sent out to all partners. The key topics of the questionnaire was summarized on the white board.





- A round-the-table discussion of the topics was carried out with main emphasis on inputs from the 3 concept owners OOLSEN, TECNA and IBER.
- The discussion output is shown on the picture, next page.



| Responsible (participant/organisation) | Action | Due |
|--|---|-----|
| All | All partners fill out the questionnaire and send to DTU | M1 |
| DTU | DTU reads and ask for further specification | M1 |
| ALL | Partners reply | M2 |
| | | |

3. D4.1 Simple numerical models for upscaled design

Denis Matha gave an overview of the deliverable.

It is due in month 10

Planned Actions are:

Development, respectively improvement of combined time-domain and frequency domain numerical model "SLOW" based on reduced degrees of freedom multibody and linearized statespace modelling approach:





- Improvements in Hydrodynamic modelling: enabling arbitrary platform geometry input, i.e. by Morison equation extension, wave excitation force incorporation, McCamy Fuchs, etc...
- Improvements in WT model: single elastic blade representation, aerodynamic improvements, wind shear, etc.
- Development, respectively improvement of parametrized ANSYS AQWA based potential flow calculation method suitable for incorporation into optimization loop
- 4. Meeting structure
- Henrik emphasized the value of physical meetings and suggested the following meeting structure:
 - o 4 formal meetings per year
 - o 2 physical, 2 virtual
 - o Next virtual meeting: September 2015
 - Next physical meeting: December 2015 at DTU
- Partners not directly involved in WP4 asked how the interaction with WP4 can be made. Henrik replied that WP4 seeks an open structure with dialogue across the full LIFES50+. Joint WP meetings, or e.g. yearly LIFES50+ workshop may be part of that.

| Responsible (participant/organisation) | Action | Due |
|--|-----------------------------------|-----|
| DTU – Henrik | Doodle poll for September meeting | M3 |

5.5 WP7

1) General discussions

Presentation of WP7 objectives, tasks, participants, relationship with other WPs, deliverables and schedule. The focus was set on the early deliverables, reviewing subtasks and define goals, partner tasks and deadlines.

- Discussion on Design Basis deliverable D7.2
 - o Discussion was how many sites should be selected on how they should be selected:
 - Option 1: Choose on generic site based on real data and make a parametric variation of conditions like water depth and wind; problem could be that the sites are no real business cases
 - Option 2: Select 3 real sites that represent business cases; problem may be that the sites may be favourable for some concepts and the sites could also be too similar to have enough variation
 - For Design basis it is important to keep in mind that choosing 3 sites for 4 concepts means 12 different design basis. For DNV GL and USTUTT a thorough analysis of all of the results for these sites may be difficult and some solution needs to be agreed on
- A proposal for the organization of D7.2 and the other early Deliverables D7.1 and D7.3 was sent by USTUTT by email to WP1 and WP7 partners on 16.06.2015; on June 29th a net meeting will be held to finalize the organization.





• For organization of other deliverables and WP7 procedure see WP7 presentation.

| Responsible (participant/organisation) | Action | Due |
|--|--|------|
| USTUTT/DNV GL | Define Procedure for early WP7 Deliverables and interaction with WP1 DONE: sent by email to WP1 and WP7 partners on 16.06.2015 | DONE |
| USTUTT | Organize net meeting DONE: invitation sent for 29.06.2015, 16-17:00 | DONE |

