

Status Report for DDMF – July 15, 2015

Period: July 1, 2014 – December 31, 2014

**Project: Global Wind Energy Shipping and Logistics PhD research project
– Project no. 2012-97**

Partners: Aalborg University

This status report will elaborate on the following:

- Project summary
- Project organization
- Project status compared to milestone plan
- Actual costs compared to project budget and deviations explained
- Project risk analysis
- Signatures and dates

Project summary

Referring to the application (dated August 17, 2012 + January 24, 2013), the project has the following goal, scope, and deliverables:

- *Type of research project: A 4-year PhD research project jointly funded by Den Danske Maritime Fond and Aalborg University commencing on February 1, 2013 and to be completed January 31, 2017*
- *Research objective: To understand the global wind energy shipping and logistics market up to 2050 with an aim towards mapping out the revenue potential for different shipping and logistics entrants as well as determine capabilities required to gain leadership in this market*
- *Research angle: How the Danish maritime sector and supporting industries used to have the undisputed leading edge and how they can prevent losing this vantage position completely to other emerging global players*
- *Geography: Global project scope including Denmark, Europe, China, Asia, USA, the Americas, and the rest of the world. With Denmark being “the cradle” of the global wind industry and China being the largest market in the world at this time from all perspectives, a special focus will be put on these two countries.*
- *Output: 3 conference/journal articles, 1 PhD thesis, and 4 industry reports*

The PhD project is planned with the following content / main tasks to be completed:

- A. *Wind energy market sizing and outlook: Market development in phases up to 2020, 2030, and 2050 including technological development*

- B. *Wind energy supply chains: Configurations, set-up, and structure*
- C. *End-to-end wind energy supply chain costs: Break-down and quantification of costs and revenue potential for shipping / logistics services*
- D. *Analysis of constituencies who participate in wind energy shipping and logistics tasks including review of what it takes to compete in this market*
- E. *Winning strategies and business models with a focus on market consolidation/M&A for shipping and logistics companies who wish to serve the global wind energy market*

Project organization

The research project is per end of December, 2014 organized as per table below:

Project sponsors	Den Danske Maritime Fond Aalborg University, Department of Mechanical and Manufacturing Engineering
Industry Reference Group	Reference Group members: Danish Shipowners' Association, DONG Energy, Siemens Wind Power, Port of Esbjerg, DHL Global Forwarding, Combi-Lift/J Poulsen Shipping, BTM part of Navigant, Per Aarsleff, offshoreenergy.dk
Project leader and Ph.d. advisor	Lars Bo Henriksen, Professor, PhD, AAU (lead-advisor)
Project administrator	AAU, Department of Mechanical and Manufacturing Engineering administration, Martin Heide Jørgensen, Head of Department
Project team	Thomas Poulsen, PhD Fellow, MBA, AAU (full time) Gang Chen, Assistant Professor, PhD, AAU (part time)

During the half year period, the following organizational issues have been settled:

- The lead advisor of the project Niels G. M. Rytter was removed and Lars Bo Henriksen took over as lead advisor.
- Continued TP salary negotiations took place during July 2014 and beyond; the negotiations were not finalized (to become in line with original budget approved by DDMF)
- The Reference Group remained unchanged.
- Several people changes within the Reference Group companies have taken place.

Project status compared to project milestone plan

The project plan consists of 5 areas or phases to be dealt with over the 4 year period (see activity and time plans included in this document). The table below presents an overview of recent progress and predicted next steps for not only the five areas but also in terms of project and stakeholder management activities as well as a status on progress towards completion of the promised DDMF final deliverables.

Project phase / area	Completed tasks	Next steps
Project and Stakeholder Management	<p>3rd Advisory Board / Reference Group meeting took place at offshoreenergy.dk on 2nd September 2014 including a subsequent “go-home” meeting. Key conclusion of the meeting was that TP’s research must look at the future (not just the past) and also have a political dimension to ensure societal impact.</p> <p>Collaboration was progressed with researchers (PhD students) from other institutions in DK working on similar projects, particularly the ReCoE project of SDU and Rasmus Lema, AAU.</p> <p>TP participated in the ECOWindS project meeting at SDU in November and the ReCoE project meeting at SDU in December, 2014.</p> <p>Participation in launch and follow-up meeting of the offshoreenergy.dk Cost Reduction Forum</p> <p>Continuation of collaboration with Michigan State University, Boston University, SDU, Tsinghua University, Dalian Maritime University, and Korean Maritime Institute</p> <p>Start-up of collaboration with DTU Risø Wind in December, 2014</p> <p>Start up of collaboration with DONG Energy Wind Power and offshoreenergy.dk on AAU M.Sc student projects</p> <p>Meetings with PhD network partners such as Maersk Broker, A. P. Møller-Mærsk,</p>	<p>4th Advisory Board / Reference Group meeting to take place at Per Aarsleff in Hvidovre, 17th March, 2015 including a subsequent “go-home” meeting</p> <p>Project steering to be continued</p> <p>PhD project 11 month plan to be drafted in detail and approved by AAU doctoral school</p> <p>Scientific focus and research questions, main theoretical models, research design to be further developed and documented based on the data collection efforts (case studies, travels) and academic publications to be done</p> <p>Progress collaboration with Michigan State University, SDU, DTU, and AAU researchers and others. Initiate further joint article writing to progress academic coverage of our topic and joint research efforts where relevant, such as case study work.</p> <p>Several M.Sc. student projects being evaluated with Siemens Wind Power, DONG Energy, offshoreenergy.dk, LIFTRA, and Blue Water Shipping on different topics related to wind energy shipping and logistics</p>
Travels	<p>China trip completed by end October, 2014 including attendance of the China Wind Power conference. Attendance of seminar with Danish Trade Council Beijing for China Offshore Wind Strategic Sales Alliance</p> <p>OWIB meeting in Esbjerg (September, 2014)</p> <p>Siemens Wind Power factory tour (July, 2014) and visit to Herning HIP warehouse (September, 2014)</p>	<p>In-depth case study trip to China/South Korea contemplated for March-May time frame, 2015</p> <p>Further collaboration with Danish Trade Council Beijing expected in China for SSA OWC during spring, 2015</p> <p>Dissemination planned during EWEA Offshore 2015 in Bella Center (March, 2015) and NEDSI 2015 in Boston (March, 2015)</p> <p>Denmark travels primarily for key “speed boats” launched from project “mother vessel” with</p>

	<p>Hamburg/Husum Wind Power conference in Hamburg, September, 2014</p> <p>Denmark travels for meetings with particularly Reference Group stake-holders (Siemens Wind Power, DONG Energy, Per Aarsleff, DHL, offshoreenergy.dk, others) and key “speed boats” in the form of student projects (DONG Energy Wind Power, Blue Water Shipping, LIFTRA, and offshoreenergy.dk)</p> <p>Internal AAU meetings on wind research and EU Commission lobbying (November, 2014)</p>	<p>companies/organizations such as DONG Energy, Siemens Wind Power, and offshoreenergy.dk</p> <p>EU Commission lobbying planned for H2020 funding calls 2016 and 2017</p>
Wind Energy Market Sizing and Outlook	Continued dialogue with key developers, utilities, and OEMs about future plans for WTG and BOP in terms of size/weight/mass. The major part of this effort has been completed, however, some concurrent work will continue throughout the entire lifespan of the PhD research project.	Potential DONG Energy project about 2030 market developments.
Wind Energy Supply Chain Configurations	Detailed case study on logistics R&D started with DONG Energy Wind Power in collaboration with Master students. Combination of interviews (in progress) and survey planned.	Case study student projects contemplated with LIFTRA, Siemens Wind Power, and offshoreenergy.dk.
Wind Energy Supply Chain Costs	Industry-led cost reduction case study started together with Master student and offshoreenergy.dk (CRF)	Key LCoE reduction efforts contemplated via Ram Narasimhan journal paper article, continued support of ECOWindS project, and support of offshoreenergy.dk industry driven CRF project.
Required Wind Energy Logistics and Shipping Capabilities	Continued use of semi-structured interviews used to get familiar with areas of incomplete knowledge within the supply chain.	Further dealings with industry through Reference Group, case studies, and other interaction to continue to update this part of the knowledge in the research project.
Future role and capabilities of the Blue DK	An extensive 1-day seminar was conducted on October 10, 2015 as part of the Danish Maritime Days. Opened by Secretary General of DMD Flemming Jacobs and MEP Bendt Bendtsen, the seminar was led by TP and had a total of 3 panel tracks, each with 3 panelists. The theme of the 3 panels were supply chain bottlenecks, radical innovation in the field of shipping/logistics, and the rise of the Chinese offshore wind dragon	<p>Participation in the MEGAVIND project as part of the DWIA organizational set-up</p> <p>Further EU collaboration and PhD project visibility</p>

	Participation in Danish Maritime Authority seminar in Esbjerg on HSSEQ (October, 2014)	
Case studies	<p>Further data collection in DK and NL as follow-up to 1st Europe case study was postponed for the Anholt offshore wind farm. The reason was internal AAU disagreement on the budget of the Ph.d. project</p> <p>Initiation of 2nd European case study and data collection together with SDU researchers in Denmark/Germany postponed for the DanTysk Offshore wind farm. Again for budgetary reasons</p> <p>China case work with COSCO was finally “opened” up and agreed by COSCO Guangzhou during the October, 2014 trip</p> <p>Initial dialogue with Statkraft about Dogger Bank case study (October, 2014)</p>	<p>Work with Boston University Professor Lee to open up the South Korea case study</p> <p>Exploit opening of China case study with COSCO by attending case study trip during spring, 2015</p> <p>Ensure that the trail of European case studies are kept “hot” (Anholt, DanTysk) before the opportunity is lost</p> <p>Pursue Statoil/Statkraft Dogger Bank case study opportunity</p> <p>Design M&A case study</p>

The table below presents an overview of recent progress and predicted next steps for particularly the academic/dissemination related activities and a status on progress towards completion of these.

Project phase / area	Completed tasks	Next steps
Academic Conferences	EDSI conference forum in Kolding on June 29 – July 2, 2014: Participation in doctoral consortium, paper submission, and presentation during conference.	LogMS2013 conference paper to be converted into peer-reviewed journal paper and submitted to academic journal. Co-authors Niels G M Rytter and Gang Chen responsible for next steps of the paper
Academic and project Publications	<p>Correction and submission of EDSI conference paper as book chapter entitled “Changing business models and strategies in global wind energy shipping, logistics, and supply chain management”. Original conference paper co-author Niels G M Rytter withdrew from the book chapter submission</p> <p>Preparation of IJESM special issue journal paper draft “Reducing cost of energy in the offshore wind industry: The promise and potential of supply chain management” with Ram Narasimhan of Michigan State University</p>	<p>Second year industry report to be developed</p> <p>NEDSI and SMS conferences to be attended in 2015 with different academic contributions</p>
Press in various media	<ul style="list-style-type: none"> - Interview in offshoreenergy.dk magazine ON/OFF Q3, 2014 in September, 2014 - ShippingWatch.dk advance PR and Maritime Danmark 4 page article November, 	Additional press pursued on a continuous basis

	2014 covering the DMD event on October 10, 2015	
Ph.D courses	DMD conference on October 10, 2014 (3 ECTS) EIASM EDEN design and defend your PhD (4 ECTS) completed in October, 2014	Contemplated PhD courses for spring, 2015 include Philosophy of Science (AU, January, 2015), EIASM EDEN cross-border M&A (March, 2015), qualitative methodology course (RUC, March, 2015), and journal paper writing course (CBS, June, 2015)
Lecturing / Supervision	Supervisor 1 GSD2 student (DONG Energy Wind Power case study) Co-supervisor 1 GSD4 Master thesis project (Lufthansa Cargo) Co-supervisor 1 student offshoreenergy.dk Cost Reduction Forum initiative	Supervisor for 2 student projects in DONG Energy, 1 student project in Siemens Wind Power, 1 student project in offshoreenergy.dk, and 1 student project in LIFTRA Spring lecture for GSD education at AAU in Copenhagen with focus on project cargo and wind energy shipping/logistics

Referring to the original project plan included milestones displayed below, it is our estimate that the project scope remains intact by now and is well on track compared to planned progress.

Activity	Year/Quarter																							
	2013				2014				2015				2016				2017							
	M3	M6	M9	M12	M15	M18	M21	M24	M27	M30	M33	M36	M39	M42	M45	M48	M51	M54	M57	M60				
Project management, administration and reporting to DMF	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
Research assistant, +30 more ECTS points completed and Ph.d. scholarship preparation	x	x	x	x																				
Formal Ph.d training/education, dissemination/lecturing at university					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
Preparation, get in place, launch of project, and setup of Reference Group	x	x																						
Phase 1 - market sizing and outlook																								
Work with available market data to quantify wind market size 2020, 2030, 2050		x	x																					
Work with OEM's, utilities, and available market data and technology/R+D			x	x																				
Phase 2 - wind energy supply chains																								
Current supply chain designs, strategies and business models					x	x																		
Future supply chains						x	x																	
Phase 3 - end-to-end wind energy supply chain costs																								
Generic supply chain cost estimates based on averages					x	x																		
Detailed supply chain cost component analysis for sub-processes						x	x																	
Phase 4 - requirements for market participation																								
Types of players involved in the shipping and logistics tasks							x	x																
Definitions of supply chain tasks, roles, and responsibilities now and future								x	x															
Case studies throughout phases 1 through 4																								
Case A - full supply chain analysis research questions 1, 2, 3, and 4 (DK)		x	x		x	x	x	x	x															
Case B - full supply chain analysis research questions 1, 2, 3, and 4 (PRC)					x	x	x	x	x	x														
Cross case analysis/conclusions and mit-term seminar									x	x														
Phase 5 - how The Blue Denmark can maintain or regain leadership																								
Blue Denmark survey									x	x	x	x	x											
Wrap-up of Blue Denmark study work and matching to cross case analysis													x	x	x									
Final seminar																				x				
Attendance of conferences, industry fora, and events	x		x		x		x		x		x		x		x		x		x					
Industry interviews and site visits as relevant	x	x	x		x	x	x		x	x	x		x	x	x		x	x	x					
Workshops, seminars, and speeches at conferences					x	x	x		x	x	x		x	x	x		x	x	x					
Publication of 4 articles for academic conferences / journals									x	x			x	x			x	x						
4 industry reports for Den Danske Maritime Fond					x	x							x	x			x	x						
Stay abroad at foreign academic institution																								
Ph.d thesis finalization																				x				

Activities related to phase 1 have been launched according to plan, and regarding the planned 3 case studies during the whole project period, internal AAU discussions pertaining to the PhD project budget have caused delays and alterations to the original plans. As such, the Asian case study efforts have been slowed down and the continued Anholt case study efforts in Europe

delayed along with the initiation of the DanTysk case. Instead, student project case studies have been started with offshoreenergy.dk (CRF) and DONG Energy Wind Power (logistics R&D).

Regarding publications targets for end of this year, these are in progress for being achieved with the EDSI2014 conference paper conversion to a book chapter and the Ram Narasimhan and Rasmus Lema journal articles being worked on.

The 3rd Reference Group meeting was held on September 2, 2014 at the venue of offshoreenergy.dk in Esbjerg. The Reference Group forum continues to shape itself as a case study in its' own right with extreme relevance to the Ph.d. research project overall. The public "gå-hjem" meetings at each Reference Group gathering continue to be of great value to the PhD and to the community interested in shipping and logistics. This time, it was conducted at the premises of Blue Water Shipping in Esbjerg.

Internal disagreements led to a change of PhD supervisor. A new supervisor has taken over and the project now proceeds according to the updated plan.

Actual costs compared to project budget and deviations explained

Due to complexity in the financial setup the financial statement will be reported separately.

Project Risk analysis

Below is an overview of main factors posing a risk to the project not meeting its deliverables for the rest of project period as well as current strategies for their mitigation.

Potential Main Risks	Strategy of Mitigation
Loss of key resources / persons from project team due to unforeseen circumstances, particularly TP.	Continued challenges within AAU led to the removal of previous lead advisor, Niels G M Rytter. Additional mitigation of TP working conditions including clarification of PhD project budget, adjustment of TP salary to meet PhD project budget, and change of TP office location are the top 3 challenges faced
Some project team members also have other assignments / obligations - do they drag attention, time and resources away from the project?	During the coming years, AAU should - according to plan - allocate more time / hours for own team members to be part of the project, including lead advisor LBH. In this way, AAU should make sure the project is prioritized internally in competition with other tasks, and this through managing own "AAU home organization" requirements.
Lack of project steering	Project steering meetings between all team members are usually held at AAU on a monthly basis and DDMF is updated on progress on an ongoing basis. The internal AAU team meetings did not take place during the period of August through

	December, 2014 due to internal organizational challenges and the departure of the lead advisor from the PhD project. DDMF has a standing invitation to join any and all Reference Group meetings and/or call bilateral meetings as needed (such a meeting took place with TP on December 5, 2014)
Wind energy loses strategic importance as an energy source across the world	This can potentially be a risk, but more in the long term and project ambition is to assist the industry in reducing levelized cost of energy to make wind more competitive.
Scope too wide or unrealistic?	The first Reference Group meeting already debated and agreed a further sub-scoping of the project. The project team tries - on an ongoing basis - to manage the balance between the project's practical and academic deliverables. Since the start of the PhD position on February 1, 2014, the academic deliverables have increasingly received attention from the team as TP must satisfy these to achieve the academic PhD degree in the coming years.
Access to companies and empirical evidence not available?	TP is in close dialogue with relevant companies and market intelligence businesses to get access to data. Also use of generic modeling and averages will ease access to data and information from companies along with use of NDA's, confidentiality agreements, etc.
Individual project parts / phases are not sufficiently linked, and synergies lacking across work efforts?	Tight coordination across project parts is something the PhD project strives for at all times.
Project team members have different aims and interests and these can potentially develop in to conflicts between team members, e.g. also between advisors and TP as the PhD fellow.	This is a risk in any project where several persons form up a project team or have to collaborate on tasks. The risk is mitigated through clarifying tasks roles and responsibilities upfront and ensuring an ongoing constructive dialogue among team members about project aims and personal interests in the project. A conflict with the former PhD lead advisor was resolved by removing him from the project and making Lars Bo Henriksen the lead advisor instead.
Strategy changes or major reorganizations in partner companies	The Reference Group member organizations are most critical, however, members can be exchanged. Case study member organizations will also be critical for research at tactical level going forward.
Lack of backup of relevant stakeholders	The PhD project is broken down into major steps. The PhD project deliverables are both short and long term. Significant effort is done to develop

	good presentation materials (PPTs) and reach out to important stakeholders in the appropriate sequence as the project progresses with visible results and when found relevant.
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**Signatures and dates
Aalborg and Copenhagen, July 15, 2015**

Lead advisor, Lars Bo Henriksen, Professor, PhD, Aalborg University

Thomas Poulsen, PhD Fellow, MBA, Aalborg University