

Status Report for DDMF – August 25, 2014

Period: February 1, 2014 – June 30, 2014

Project: Global Wind Energy Shipping and Logistics
– 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 aim, scope and deliverables:

- *Type of research project: A 4-year Ph.d. 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 Ph.d. thesis, and 4 industry reports*

The 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. *Requirements for companies to participate in wind energy shipping and logistics tasks*
- E. *How to regain a leadership position in the global wind energy shipping and logistics market place?*

Project organization

The research project is per end of June, 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	Niels Rytter, Associate Professor, Ph.d., AAU (lead advisor) Lars Bo Henriksen, Professor, Ph.d., AAU (co-advisor)
Project administrator	AAU, Department of Mechanical and Manufacturing Engineering administration, Martin Heide Jørgensen, Head of Department
Project team	Thomas Poulsen, Ph.D. Fellow, MBA, AAU (full time) Gang Chen, Assistant Professor, Ph.d., AAU (part time)

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

- TP entered into a Ph.d. position per February 1, 2014 after 1 year as Research Assistant.
- TP Salary negotiations took place during February 2014 and beyond; the negotiations were finalized in April, 2014 (to become in line with original budget approved by DDMF)
- Reference Group changes include DHL Global Forwarding taking the place of Blue Water Shipping (BWS never showed up at previous meetings), activation of Siemens Wind Power, and new members being offshoreenergy.dk (joined the meeting on March 20, 2014) and Per Aarsleff (joining the coming September meeting).
- Several people changes within the Reference Group companies have taken place as well.
- The academic 2-month plan covering the entire 3-year "formal" Ph.d. span of the research project was approved internally within AAU in June, 2014 and shared with DDMF by email on June 12, 2014.

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
<p>Project and Stakeholder Management</p>	<p>2nd Advisory Board / Reference Group meeting took place at DONG Energy 20th March 2014 including a subsequent “go-home” meeting</p> <p>Project’s 2 month plan completed and approved by AAU doctoral school</p> <p>Collaboration was progressed with researchers (Ph.d. students) from other institutions in DK working on similar projects, particularly the ReCoE project of SDU and Rasmus Lema, AAU.</p> <p>TP, GC and NR participated in the ReCoE project meeting at SDU June, 2014.</p> <p>Start-up 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 BWS, Esbjerg on AAU M.Sc student projects</p>	<p>3rd Advisory Board / Reference Group meeting to take place at offshoreEnergy.dk in Esbjerg, 2nd September 2014 including a subsequent “go-home” meeting</p> <p>Project steering to be continued</p> <p>Ph.d. 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 and research design to be developed and documented in more detail</p> <p>Progress collaboration with Michigan State University, SDU, and AAU researchers and others. Initiate joint article writing to initiate 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, and Blue Water Shipping on different topics related to wind energy shipping and logistics</p>
<p>Travels</p>	<p>China and South Korea trip completed by end February/early March</p> <p>Offshore wind China strategic sales alliance collaboration with Danish Trade Council in Beijing in February and meetings in Denmark in March, and June</p> <p>Aalborg dissemination meeting (offshore Nordjylland/Hub North) early April</p> <p>Glasgow UK global offshore wind conference early June</p> <p>Siemens Wind Power factory tours (February and March)</p> <p>Denmark travels for meetings with particularly Reference Group stake-holders</p>	<p>Follow-up trip to China/South Korea contemplated for end October/early November, 2014</p> <p>Further collaboration with Danish Trade Council Beijing expected at OWIB conference in September in Esbjerg and during China Wind Conference in Beijing in October, 2014</p> <p>Dissemination planned during Danish Maritime Days at AAU CPH global wind energy shipping and logistics event to be conducted on October 10, 2014</p> <p>Siemens Wind Power factory tour in July, 2014 (completed at the time of writing this report)</p> <p>Denmark travels primarily for key “speed boats” launched from project “mother vessel” with companies/organizations such as Danish Wind Industry Association, Blue Water Shipping, DONG Energy, Siemens Wind Power, and</p>

	(Siemens Wind Power, DONG Energy, DHL, offshoreenergy.dk, others)	possibly DHL Global Forwarding
Wind Energy Market Sizing and Outlook	<p>Further dialogue with key developers, utilities, and OEMs about future plans for WTG and BOP in terms of size/weight/mass. It is expected that whereas the major part of this effort has been completed, some concurrent work will continue to be done here throughout the entire lifespan of the Ph.d. research project.</p> <p>Latest BTM part of Navigant research for 2013 purchased and compared to other data sources and industry reports.</p>	<p>Timing of different new WTG and ensuing BOP structures to be estimated up to 2020, by 2030, and 2050 in order to craft predictions about the future.</p> <p>Triangulated market research data to support these projections going forward.</p>
Wind Energy Supply Chain Configurations	<p>European and Asian case study work has provided some empirical evidence for this, however, true case study efforts need to be initiated for specific offshore wind farms in Asia and further studies are also required in Europe.</p> <p>Development of wind energy life-cycle model has been initiated as a result of exploratory empirical evidence gathering efforts. Indications are that the wind farm life-cycle contains 5 or 6 distinctively different supply chains.</p> <p>Supply chains are changing and new definitions of contracts beyond full EPC are emerging such as TCI.</p>	<p>Several configurations are to be explored basis initial hypothesis of contract forms (single contracting and multi-contracting) by developers, role of EPCs, and future configurations.</p> <p>Partner strategies (insource, outsource, JV, M&A) will become critical.</p>
Wind Energy Supply Chain Costs	Several existing academic and industry cost studies are being reviewed. None of these cost studies have a full or complete focus on shipping and logistics costs as a share of LCoE.	More accurate estimates of entire wind farm life-cycle cost structure and impact of different "action levers" will be crafted. Translation into specific shipping and logistics related specific topics is required in order to obtain an accurate cost picture at least for outbound installation & commissioning and operations & maintenance phases as decided in the first Reference Group meeting.
Required Wind Energy Logistics and Shipping Capabilities	Gaps in interview structure so far are being plugged and scope extended to also include for example BOP OEMs, crane providers, and O&M.	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	Based on the DDMF funded report by BTM part of Navigant made for Danish Shipowners' Association and released in January, 2014, the scale and scope of different supply chain constituencies is being further analyzed within the different sub-	The shipping and logistics players are presently being contracted for individual "slivers" of work within the supply chain related to a single shipment or individual project. We will undertake a more thorough analysis of the extent of multi-project contracting in the future

	supply chains. In terms of Danish companies, our initial findings reveal that we do have several leading ports (Esbjerg, Aalborg, LORC, Grenaa) involved in wind, a few MPV operators (J Poulsen Shipping, Thorco), a few forwarders (DSV Baltship, Cargo Services), other shipping companies (A2SEA, Maersk Line, Esvagt), and other companies like trucking/cranage operators. In addition, we have a number of foreign companies operating in Denmark with branch offices and subsidiaries. Initial indications are that companies from other countries such as Germany, UK, Norway, China, South Korea, and Japan are increasingly outperforming the Danish players. However, at the same time, the Danish companies enjoy a strong goodwill in emerging markets like China and may be able to take advantage of e.g. the developing offshore wind market there.	and also look into cluster formation trends presently on-going. Here, JV/M&A/partner strategies will be investigated further
Case studies	<p>Further data collection in DK and NL as follow-up to 1st Europe case study postponed - Anholt offshore wind farm.</p> <p>Initiation of 2nd European case study and data collection together with SDU researchers in Denmark/Germany postponed – Dansk/Tysk Offshore wind farm</p> <p>2 Asia case studies prepared - 1 trip to China and South Korea completed winter 2014, however 2nd travel to China postponed.</p>	<p>More deep-dive case studies across several wind farms may be possible both within DONG Energy and Siemens Wind Power.</p> <p>A thorough case study of the Anholt offshore wind farm including the O&M phase may be good.</p> <p>Asian case studies will depend on consent from the developer and most likely path to follow is the collaboration with the Danish Trade Council in Beijing. In addition, collaboration with individual companies may provide some access across several wind farms.</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	<p>Presentation at conference about technological pathways to low carbon conference organized by Deutsches Institut für Entwicklungspolitik (DIE) completed in Bonn on April 7-8, 2014</p> <p>EDSI conference forum in Kolding on June 29 – July 2, 2014: Participation in doctoral consortium, paper submission, and presentation during conference.</p>	LogMS2013 paper to be converted into peer-reviewed journal paper and submitted to special issue journal with deadline January 15, 2015 (International Journal of Energy Sector Management)

Academic and project Publications	<p>First year industry report developed (10 pages)</p> <p>Crafting and submission of EDSI conference paper entitled "Changing business models and strategies in global wind energy shipping, logistics, and supply chain management"</p>	<p>Second year industry report to be developed early 2015</p> <p>EurOMa conference to be attended in 2015 with full conference paper hopefully able to qualify for presentation</p>
Press in various media	<ul style="list-style-type: none"> - Interview and project update in the DDMF annual report 2013 - Interview in ShippingWatch.dk - Copy of ShippingWatch.dk interview published also in EnergiWatch.dk - Port of Esbjerg magazine Hav&Kaj interview and statement in another article in the same magazine - Interview in the magazine Søfart 	<p>Interview with the member magazine entitled "ON/OFF" of offshoreenergy.dk completed and will be published by the end of August, 2014</p> <p>A special edition of the offshoreenergy.dk newsletter may be published based on the "gå-hjem" møde hosted by offshoreenergy.dk in Esbjerg on September 2, 2014</p>
Ph.D courses	<p>Introduction to Ph.d. – AAU (1 point)</p> <p>EDSI conference – SDU (doctoral consortium/paper writing/paper presentation) 3 points</p>	<p>Contemplated Ph.d. courses for autumn, 2014 include "basic pedagogy" (AAU CPH, 2 ECTS), "how to design and defend your Ph.d." (EDEN Brussels, 4 ECTS), and "case studies in business and management research" (EDEN Helsinki, 5 ECTS)</p>
Lecturing / Supervision	<p>1 lecture Manufacturing & Transportation Logistics (GSD) including written exam for 12 students and re-exam for 4 students</p> <p>Supervisor Blue Water Shipping project (GSD2)</p> <p>1 Censorship GSD3 project</p>	<p>Supervisor for 2-3 student projects in DONG Energy/Siemens Wind Power/Blue Water Shipping including some related project work hours rendered directly by Thomas Poulsen to assist in projects/dissemination.</p> <p>Supervisor GSD Master Thesis project (Lufthansa)</p>

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				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
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	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	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	x	x	x	x	x				
Workshops, seminars, and speeches at conferences					x	x	x	x	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	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				

In addition, we feel that a more detailed “rolling 12 months” tool is required and when reviewing the more detailed plan entries from the 2-month Ph.d. plan in an updated format for the remainder of 2014, the following milestones and status can be detected:

Activity/milestone	Comments	Status	Duration/timing/dates																			
			Feb	Mar	Apr	Maj	Jun	Jul	Aug	Sep	Okt	Nov	Dec									
Year 1																						
Ph.d. Stipend award	Slight delay	YES	5																			
South Korea GGA delegation with Prime Minister to prepare case study	Also included field trip to China for case study preparation	YES	22-	12																		
Roundtable workshop in continuation of China Offshore Wind SSA	In CPH w Danish Trade Council Beijing and offshoreenergy.dk	YES		13																		
2-month PHD plan meeting	In Aalborg (NGR/LBH/TP)	YES		14																		
2nd Reference Group meeting	Industry steering team mandated by DDMF, Gentofte	YES		20																		
DWIA Annual Meeting	With networking event and SWP 6 MW factory tour	YES		26																		
Ph.d. Course (1 ECTS)	Intro course, Aalborg	YES		31																		
Submission of 2-month plan		YES		31																		
Development of research methodology and theoretical framework	Including activity plan and interview protocols	STARTED			1-30																	
Sign up for 2014-early 2015 Ph.d. Courses		STARTED			1-30																	
Technological Pathways to Low Carbon conference	With Rasmus Lema, paper 2 context, Bonn, Germany	YES			7-8																	
Anholt case follow up	Dutch players, Holland	NO			xx																	
Planning of China case study trip		NO				1-11																
China case study trip	TP and GC	NO				12-23																
Write paper 1		STARTED					1-															
Global offshore wind conference	Glasgow	YES					11-12															
DanTysk, Anholt case study trips	Esbjerg, Fredericia, Brande, Hamburg	NO					1-30															
ReCoE seminar and EDSI conference in Kolding	With NGR/GC, arranged by SDU	YES					26-27															
EDSI doctoral consortium, conference, paper presentation, and SWP visit	Arranged by SDU at Koldinghus hotel, Kolding	YES					28-	2														
OWIB conference in Esbjerg	Arranged by EEU and offshoreenergy.dk	STARTED																				
Follow-up case study trip Anholt	Grenaa area	NO																				
Follow-up case study trip DanTysk	Esbjerg, Fredericia, Brande, Hamburg	NO																				
DONG Energy extended student project	Start up of roadmap 5 - shipping and logistics	STARTED																				
Siemens Wind Power extended student project		STARTED																				
3rd Reference Group meeting	Industry steering team mandated by DDMF, Esbjerg	STARTED																				
Planning of China and South Korea case study trip		STARTED																				
Danish Maritime Days	Event planned for October 10, 2014 at 9 am at AAU CPH	STARTED																				
PHD course (4 ECTS)	How to design and defend your PhD, Brussels	STARTED																				
China and South Korea case study trip		STARTED																				
China wind power conference	Beijing, China	STARTED																				
PhD course (6 ECTS)	Case studies in business and management research, Helsinki	STARTED																				
Submission of 11-month plan		NO																				xx
																						31

Activities related to phase 1 have been launched according to plan, and regarding the planned 3 case studies during the whole project period, not only a first European case study is now done, but a second is also being planned and 1 or 2 more Asian studies have been prepared through

connections to various companies and organizations in particular China (and South Korea/Singapore/HK). The above mentioned milestone plan for 2014 reflects that we have decided to concentrate more on the academic planning and TP research skill building activities over the summer and advance the case study work less rapidly by delaying some travel activities. This will give us a chance to better align the case study planning and gap analysis from the interview mass already on hand from the exploratory work done by TP since 2009.

Regarding publications targets for end of this year, these are in progress for being achieved with the EDSI2014 conference paper submitted and presented and 1 or 2 publications for conferences / peer reviewed journals being worked on.

The 2nd Reference Group meeting was held on March 20, 2014 at the venue of DONG Energy in Gentofte, Copenhagen. With the expansion of the Reference Group as discussed above, the Reference Group forum has developed into an extremely valuable cross-industry discussion group where companies from different parts of the value chain meet up to discuss shipping and logistics related matters. Because of the many different constituencies and vantage points in this forum, the Reference Group is in itself and in its' own right becoming almost a case study of its' own with extreme relevance to the Ph.d. research project overall. This is an excellent example of how a practical formality/"housekeeping" requirement from DDMF has been translated into a value generating and project enhancing feature of great significance to all involved. And where TP and the Ph.d. research project is in the center of the effort rendered including the very important "gå-hjem" meetings at each Reference Group gathering, open to the public.

The project leader (NR) judges that project team, first of all TP, and next GC, during the last 5 months with a dedicated and professional work effort, have delivered good progress for the project's 2nd year.

Actual costs compared to project budget and deviations explained

With this report follows an overview of accumulated project spending regarding travel costs for the first 12 months (February 2013-January 2014) and the last 5 months (February–June 2014) periods for all costs compared to the original budget (February 1, 2013 – July 2014), see also enclosed Appendix A.

For the period February 1, 2013-January 31, 2014 follows the following observations:

- All costs related to TP, NR, GC salaries, equipment, office costs etc. are for this period covered by AAU (including spending not originally budgeted). Travelling expenses for non-academic activities were at DKK 47.337 compared to the original DDMF approved travelling budget of 45.500 DKK.
- From this amount, unplanned expenses for recruiting and running the Reference Group (travels, meetings, beverages, lunch etc.) were at DKK 8.954.

- Besides this, AAU has absorbed an additional DKK 28.727 of travel expenses to cover academic related travels not originally budgeted.

For this period AAU would like to invoice DDMF DKK 45.500 in line with contractual and budget agreement, despite realized costs being equal to DKK 47.337.

For the period February 1-June 30, 2014 follows the following observations:

- Spending on salaries for TP, GC and NR is DKK 208.449 per end of this period, which is a bit lower than expected. However, the project team is likely to consume more hours in the next half year period.
- Travel expenses (non-academic conferences and activities) are DKK 61.371 which leaves sufficient room for further travels for rest of year 2 period according to budget.
- Additional OH, such as office, equipment costs etc., is fully covered by AAU.
- It should also be mentioned that out of the DKK 61.371 spent on travels first 5 months, unplanned reference group related costs are equal to DKK 3.624.

For this period AAU would like to invoice DDMF DKK 269.821 (DKK 208.449+61.371).

Comments to total period spending:

Out of the additional travel budget for all 4 years at a total of DKK 256.500, -, DKK 108.708 (47.337 + 61.371) have been consumed per end of this period. As AAU will cover DKK 1.837 of excess spending year 1 as well as the originally unplanned academic events and related travels, the traveling budget left for remaining 2 years 7 months is DKK 149.629.

Reference Group time and cost:

The project has since its' start developed a unique Reference Group set-up offering significant value to a range of key stakeholders for the project. However it has so far required - and will continue to require - more staff time, but also economic resources than expected compared to the original budget. For the first 1 year and 5 months period, Reference Group related costs have accumulated to DKK 12.578 (8.954 + 3.624), and it is the estimate of the team that the continued nurturing and running of the Reference Group for the remaining 2 years and 7 months will amount to some DKK 37.428, or a total of DKK 50.000 for all 4 years. As the Reference Group has proven to be of immense value and due to the fact that the Reference Group costs were not envisaged by the time of crafting the budget application in 2012 including the revision in 2013, it is recommended by AAU that DDMF considers to grant the already spent DKK 12.578 and the extra DKK 37.428.000 (total of DKK 50.000) in addition to the already granted DKK 2.050.000,00 for the entire project. If agreeable to DDMF, AAU would adjust the budget and include such invoicing going forward.

Besides above, the project team so far expects to keep project activities within the agreed budget in terms of salaries and travel costs. In connection with the academic planning including

detailed case study design, a planning and budgeting validation exercise is currently on-going for the remainder of the project and an update will be provided to DDMF in the next half-year report.

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.	TP is considered the most critical team member for project success, and results depend much on his availability as a resource. TP formally entered into a Ph.d. Fellow position by 1 st February, 2014, however, it is critical that he stays in this position and continues to do his job well there.
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, inclusive to the recently added Ph.d. co-advisor (LBH), and make sure the project is prioritized internally in competition with other tasks, and this through managing own "home" organization requirements.
Lack of project steering	Project steering meetings between all team members are held at AAU on a monthly basis and DDMF is updated on progress on an on-going basis. In addition, DDMF has a standing invitation to join any and all Reference Group meetings.
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 project team will - on an ongoing basis - try to ensure that scope is well managed and narrowed if required to be able to meet project end deliverables. Also, the project team will use the Reference Group input in this respect (the first Reference Group meeting already debated and agreed a further sub-scoping of the project). Finally, the project team tries - on an ongoing basis - to manage the balance between the project's practical and academic deliverables. The academic deliverables have increasingly received attention from the team as TP must satisfy these to achieve the academic Ph.d. 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?	At all project steering meetings and on an ongoing basis, we strive for tight coordination across project parts
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 Ph.d. 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. AAU has assigned a second advisor (Lars Bo Henriksen) to the Ph.d. project which ensures a broader set of perceptions of potential conflicting matters.
Strategy changes or major reorganizations in partner companies	The Reference Group member organizations are most critical, however, members can be exchanged (was just done). Case study member organizations will also be critical for research at tactical level going forward.
Lack of backup of relevant stakeholders	Project is broken down into major steps and 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.

**Signatures and dates
Copenhagen, August 25, 2014**

Project leader, Niels Rytter, Associate Professor, Ph.d., Aalborg University

Thomas Poulsen, Ph.d. Fellow, MBA, Aalborg University

Gang Chen, Assistant Professor, Ph.d., Aalborg University