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**Abstract:
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**Title:
Rethinking management of O&M projects.**

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1. Introduction

Motivation for this study arises from the Offshore Wind Denmark –project¹ that focuses on, how development in business practices in offshore wind farms can contribute to the reduction of levelized cost of energy (LCOE). Remarkable cost reductions are needed in order to make electricity produced through this renewable source competitive. In this context it is especially important to focus on managing O&M projects. The activity in O&M projects are done in many disparate projects on both scheduled and unscheduled service often conducted by separated actors. A potential is thus present for reducing LCOE through coordination of these activities.

However, project management traditionally aim to isolate the project and hereby also the management of the project from the rest of the project environment and hereby obtain focus on the project task at hand (Andersen, 2008; Pinto, 2016). In recent years scholarly literature has highlighted the need for rethinking project management for a more open and flexible approach. In O&M context within offshore wind farms it is thus interesting to pose the research question: *How can project management enhance the contribution to competitiveness of offshore wind energy?*

2. Approach

The research is based on qualitative semi-structured interviews from June 2014 to May 2015 with actors operating within O&M activities in offshore wind farms. In the beginning of the qualitative research, a focus group interview was conducted with 11 enterprises invited due to their different roles in O&M activities within offshore wind farms. The participants were managers from various companies with different roles, e.g., a wind farm owner, a wind turbine producer, equipment suppliers, service providers of equipment and/or staffing. The focus group interview was transcribed to analyse the findings (Eisenhardt, 1989; Yin, 2009). Different roles and interests were distinguished in this material regarding utilities, wind turbine producers (OEMs) service providers offering manpower/ equipment/ components and service providers offering transportation/ maintenance solutions with logistic activities on ships, helicopters and jack ups. The maritime logistic facilities offshore are relatively capital intensive.

After the analyses of the material from the focus group interview, semi-structured open-ended interviews were conducted from October 2014 to March 2015 with actors from twenty additional companies participating in O&M activities in offshore wind farms, including wind farm owners, wind turbine producers and small and medium sized enterprises (SMEs) operating as suppliers and service providers to O&M activities. Furthermore, industry organisations connected to suppliers to wind farms were interviewed. Through this individual interview approach, more in-depth interviews could take place regarding the challenges and lessons learned for reducing LCOE at different offshore wind farm sites. The researchers were looking for rich information from the interviewees, and therefore, confidentiality was agreed upon with the participants. This confidentiality was

¹ Offshore Wind Denmark is a joint initiative between the Danish Wind Industry Association and Offshoreenergy.dk

important to the majority of the interviewees and mentioned by several of the interviewees as essential. Citations in this paper are thus anonymous to the reader.

Furthermore analyses were conducted after the researchers ended the interviews in March 2015. During the analyses, a deductive approach regarding the listed propositions was used to reveal the most interesting findings. The goal was to select the most interesting findings in relation to the gap revealed in existing literature streams.

In May 2015, a seminar was held for presentation of the preliminary findings in the research and for participants in the offshore wind farm industry to discuss the necessary steps to reduce LCOE. Overall, 60 participants from different O&M actors provided a foundation for comments on the findings and thus a discussion was able to unfold. The presentations and discussions afterwards were recorded for analysis, which could supplement the study of LCOE reduction.

3. Main body of abstract

In project management theory the notion of Complex Product Systems (CoPS). CoPS is defined as *‘high-value, capital goods systems, networks and infrastructural components, designed and produced by firms as one-offs or in small tailored batches to meet the requirements of large businesses or government customers’* (Brady & Hobday, 2012, p. 282). In the offshore wind farm sector, there are relatively small batches of wind turbines placed in a farm in different complex surroundings with different water depths, sea-beds, water flows, cabling and wind conditions. Thus, standards regarding wind farms are difficult to obtain and this calls for complex project program management in this CoPS context. The lifetime issue of reduction of cost of energy in the CoPS context makes project program management of offshore wind farms necessary and different from traditional project management practices. CoPS does not follow a lifecycle approach to innovation (Abernathy & Utterback, 1988) but instead remains in the early fluid phase, as CoPS essentially continue with new development in relatively small batches as a consequence of the different contexts of offshore wind farms. Project management therefore also needs to stay fluent and adaptive to the environment.

The more changes in project context the more coordination are needed (Pinto, 2016). However, coordination takes time and can cause a risk of defocus on the task at hand. This highlights the necessity to understand the frame for successful coordination to enable competitiveness in offshore wind farms. The findings reveal that project program management needs to frame coordination of:

- Pools of O&M knowledge and resources
- Flexible organising
- Synergies between enterprises in the project

It means that specific O&M knowledge and resources have to be frontloaded for use before the

project starts. This is contrary to traditional Stage Gate (Cooper, 2008) thinking where few resources are used in the beginning of a project. It means that flexibility through continuous organising and reorganising has to be coordinated and maintained through the project. This is contrary to traditional application of standard planning tools (PMI, 2013). Utilization and coordination of synergies needs to be the leading star through the whole project period. This is contrary to the traditional thinking of project management with the objective stated in the start through the project mandate (PMI, 2013). Rethinking and reconfiguration of the practical approach to project management has to be conducted for project management to become an efficient and effective developmental tool. More specifically it means:

- O&M experiences, projects, actors and suppliers have to be recorded and front loaded.
- Flexibility has to be maintained in project- programmes, objectives and roles.
- Utilizing synergies is the leading star the whole way through the project.

This creates a new frame for project management, which require continuous rethinking and reconfiguration in practice to enable innovation and competitiveness in the offshore wind sector.

4. Conclusion

Project management in the offshore wind industry context is different from the traditional approach to project management. Because of a high degree of complexity and uncertainty and the essential dependency between project activities, project management needs much more coordination than acknowledged in the traditional approach to project management. A high degree of efficient and effective communication is noted for project management to enable competitiveness within the offshore wind context.

5. Learning objectives

The research reveals the necessity of focus on project management coordination to reduce LCOE in offshore wind farms. It is necessary to frame this coordination for enhanced understanding and insight on project management impact on offshore wind farm O&M activities. Through this framing a contribution is made both to the actors in the offshore wind farm industry, to universities to adjust educational activities and to the governmental bodies for understanding and insight on required coordination activities among the existing resources.

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