
Abstract:
Science and Research

Topic:
Procurement challenges

Title:
Reducing LCOE in offshore wind farms through project procurement - The challenge of project lifetime-thinking

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**Introduction**

Motivation for this study arises from the Offshore Wind Denmark –project\(^1\) 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 relevant to look into project procurement practices, as procurement in this project-context entails a vast amount of purchases with high technical demands and financial risk.

However, procurement as an acknowledged area in relation to projects has only recently been recognized (Lindstrom, 2015; Macbeth et al., 2012). This is also supported by a relatively scarce research in relation to the more comprehensive understanding of the project procurement activities (e.g. Ruparathna and Hewage, 2015). Therefore, the aim of this study is to shed light on procurement activities undertaken in a specific project context by posing the following research question: *What major procurement challenges can be identified in the offshore wind farm projects?*

**Approach**

For this study, an explorative research design was applied. As the objective was explorative, and aiming at uncovering the phenomena in-depth, where little knowledge exists in the extant literature, the qualitative study seemed an appropriate choice (Deshpande, 1983). The overall unit of analysis was an offshore wind farm network, including also the organizational levels.

Data collection for this study was carried out in two different areas and in two phases. In the first phase the unit of analysis was related to the installation phase of a wind farm project. At this stage six different companies dealing with the development and the installation phase of offshore wind farms were interviewed. In total 19 interviews were conducted during the period of January 2015 – July 2014. Based on these interviews the companies’ project procurement activities were identified based on the theoretical pre-understanding based on organizational buying behaviour and project procurement management (Johnston and Lewin, 1996; Sheth, 1996; Bunn, 1993; Sheth, 1973; Webster and Wind, 1972; Robinson et al., 1967; PMBOK®-Guide; 2013).

In the second phase of the data collection the area of operations and maintenance (O&M) was chosen in order to obtain a more comprehensive understanding of project procurement activities in the offshore wind farm context. This part of the research was based on qualitative semi-structured interviews during the period of June 2014 – March 2015. 20 semi-structured and open-ended interviews were conducted with actors carrying out 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. These interviews were in-depth interviews related to the challenges and lessons learned for reduction of LCOE from activities related to different offshore farms.

In total, 39 interviews with actors in 23 different companies (see Table 1) were conducted during the period January 2013 to March 2015. By interviewing actors from the main companies in the offshore wind farm project context high validity of the results was achieved.

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\(^1\) Offshore Wind Denmark is a joint initiative between the Danish Wind Industry Association and Offshoreenergy.dk funded by Growth Forum of Southern Denmark. It is a four-year project that started in December 2012 and it runs until the end of 2016.
<table>
<thead>
<tr>
<th>Phase I (January 2013 – July 2014)</th>
<th>Company</th>
<th>Number of companies</th>
<th>Number of interviews</th>
<th>Interviewees</th>
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<tbody>
<tr>
<td>Project Owner</td>
<td>1</td>
<td>3</td>
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<td>Senior Project Manager</td>
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<tr>
<td>1st Tier Supplier</td>
<td>1</td>
<td>2</td>
<td></td>
<td>Project Manager</td>
</tr>
<tr>
<td>2nd Tier Supplier</td>
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<td>Sales Director, Senior Project Manager, Senior Purchasing Manager, QHSE Manager</td>
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<td>3rd Tier Supplier</td>
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<td>3</td>
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<td>Key Account Manager, Technical Specialist</td>
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<tr>
<td>Phase II (October 2014 – March 2015)</td>
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<td>7</td>
<td>Site Manager, Logistics Manager, Development Manager</td>
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<td>Wind Turbine Producer (OEM)</td>
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<td>O&amp;M Manager</td>
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<tr>
<td>Independent Service Provider</td>
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<td>CEO, Manager</td>
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<tr>
<td>Total</td>
<td>23</td>
<td>39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The interviews conducted with the companies involved in the offshore wind farm projects

**Main body of abstract**

When studying procurement in the project context, it is relevant to look at it from the project management literature point of view. In that context this area has been acknowledged as one of the relevant project knowledge areas and is defined as follows: ‘*Project Procurement Management includes the processes to purchase or acquire the products, services or results needed from outside the project team to perform the work*’ (*PMBOK® Guide*). The processes are identified as follows:

1. Planning Procurement Management
2. Conducting Procurements
3. Controlling Procurements
4. Closing Procurements

Planning procurements is concerned with, which products or services a project will need to procure from an external source. Conducting procurement the process of obtaining supplier responses, selecting a supplier, and awarding a contract. In relation to this both the selection of the appropriate suppliers (Martinsuo and Ahola, 2010; Ruuska et al., 2013; Rwelamila and Edries, 2007) and managing relationships with project suppliers (Eriksson, 2015; Eriksson and Westerberg, 2011; Ojansivu et al. 2013; Olsen et al., 2005; Söderlund, 2011) play a crucial role.
Moreover, the project procurement management’s distinctive focus is to control that the supplier delivers what is stated in the contract within the project’s time limit. This is emphasized by the following statement: “This (controlling procurements) is the most time consuming of the procurement processes as far as the project management team is concerned as it covers monitoring the seller’s performance against the terms specified in the contract” (Team FME, 2014; p. 29).

An interesting issue arises if considering, when the project ends? Obviously, in the offshore wind farm context there can be identified several project starts and ends, e.g. in terms of development, construction, maintenance and operation and dismantling/repowering phases. However, even though there can be identified different project starts and ends, in this very context it is appropriate to look at the offshore wind farms over the lifetime of 20-25 years. Therefore, it is relevant to look at the project procurement practices by considering the lifetime of wind farms. This is also in line with the concern of reducing the LCOE that takes into account the whole lifetime of an offshore wind farm.

This aspect of lifetime can be detected in the literature in terms of life cycle costing (LCC) (Woodward, 2005; 1997). LCC is defined as an economic evaluation process that can assist in deciding between alternative investments by comparing all of the significant differential costs of ownership over a given time period (Johnson, 1990). In the project context it is recognized as a relevant area and is also winning terrain (e.g. Tysseland, 2008; Eriksson and Westerberg, 2011). At the same time it seems to be a complex issue to deal with, as stated by Ruparathna and Hewage (2015, p. 1): “Ad hoc statistics show that modern initiatives such as sustainability, life cycle costing, and standardization are getting integrated with procurement. However, there is no unified view in the construction industry on procurement as a project process”.

In relation to the generic management project procurement that emphasizes the importance of ensuring the supply of the requested items and services within the agreed project timetable and at the same time acknowledging the necessity to consider the project lifetime the following proposition can be defined:

**Considering project procurement practices over the whole project lifetime will contribute to the reduction of LCOE in offshore wind farms.**

**Conclusion**

Procurement in offshore wind farms is characterized by a relatively short-term focus on reducing LCOE. The urge for reducing the costs is often translated as the necessity for the suppliers to reduce prices. This may affect the quality of the supplied products negatively and increase the ultimate costs in the operation and maintenance phase.

Moreover, even though offshore wind farms have an expected lifetime of 20-25 years, the procurement practices focus to a great extend on meeting the project requirements in the installation phase. Therefore, an enhanced understanding of the whole project lifetime is needed.

**Learning objectives**

The study reveals the necessity of focusing on project procurement practices as one of the means to reduce LCOE in offshore wind farms. It is necessary for the buying companies to obtain a more holistic overview of the procurement, as the effects on it stretch over the whole lifetime of a wind
farm. In relation to this, a better collaboration within the project procurement teams and with the suppliers becomes pertinent.

References


