PO173

End of Life
Options, Opportunities and Risks

Emilie Reeve
The Renewables Consulting Group

Abstract

As the global offshore wind market increases with considerable pace, the present focus is around installing more turbines. However, results from our analysis demonstrates that greater thought is required when considering the end of an offshore wind farm's lifetime. As the first set of turbines start to be decommissioned at unexpectedly high costs, it is clear that in order for the industry to see a true cost reduction, there is a need to start considering the various end of life options and how to reduce these costs.

At present most projects are consented based on the wind farm being decommissioned at the end of life, in accordance to current regulations. However, with a better understanding of the impact of decommissioning on the marine environment and the associated costs, it raises the question as to whether current regulation requires a review to account for other alternative end of life options.

Our research assesses the main end of life options for decommissioning, repowering, extended asset lifetime and site reuse with other technologies. Providing an overview of the current regulation, technical risks and opportunities, as well as commercial aspects (including insurance risks and costs) associated to each option.

End of Life Options

Considering the end of life options, currently available technology and associated costs we assess that:

Decommissioning

The current approach of decommissioning, to reverse engineer installation, can be excessively expensive, is subject to strict regulation and currently requires bespoke made technology to decommission the foundations.

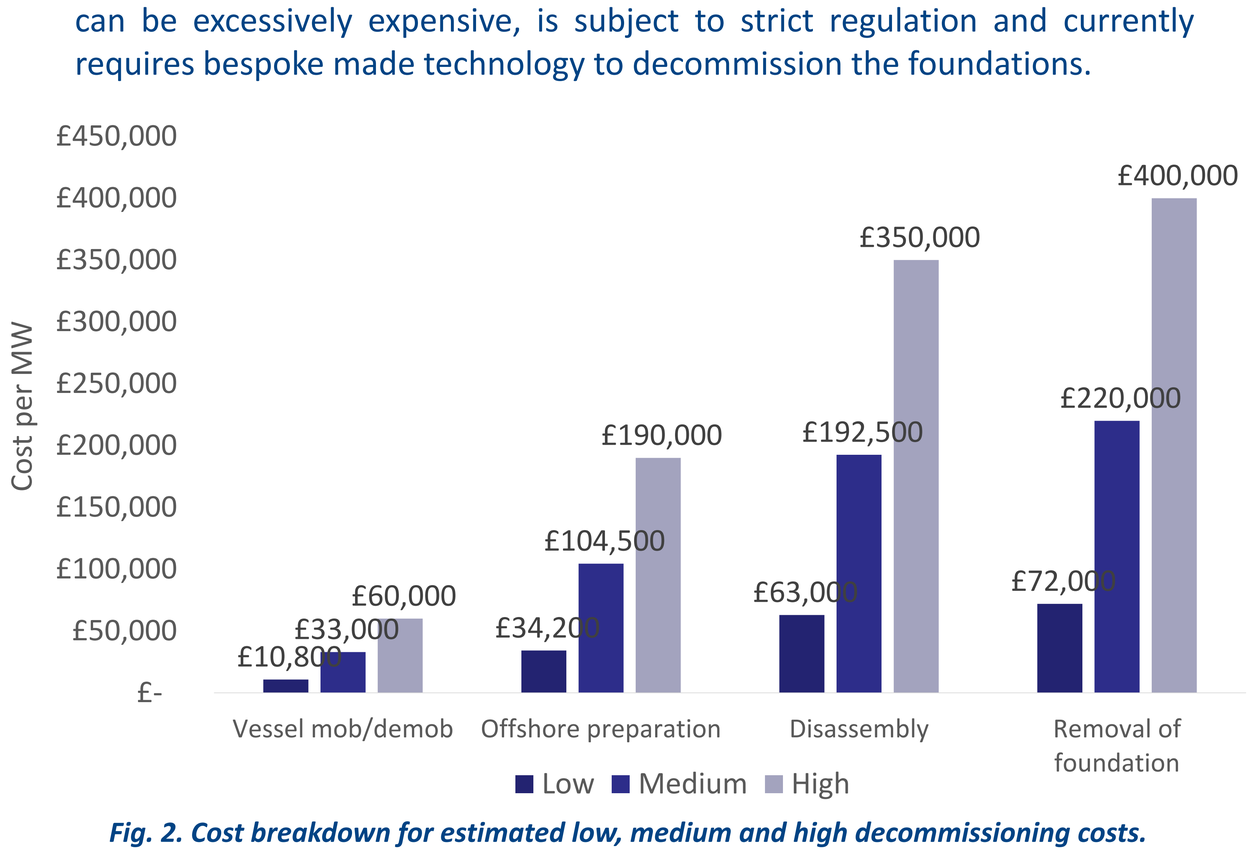

Fig. 2. Cost breakdown for estimated low, medium and high decommissioning costs.

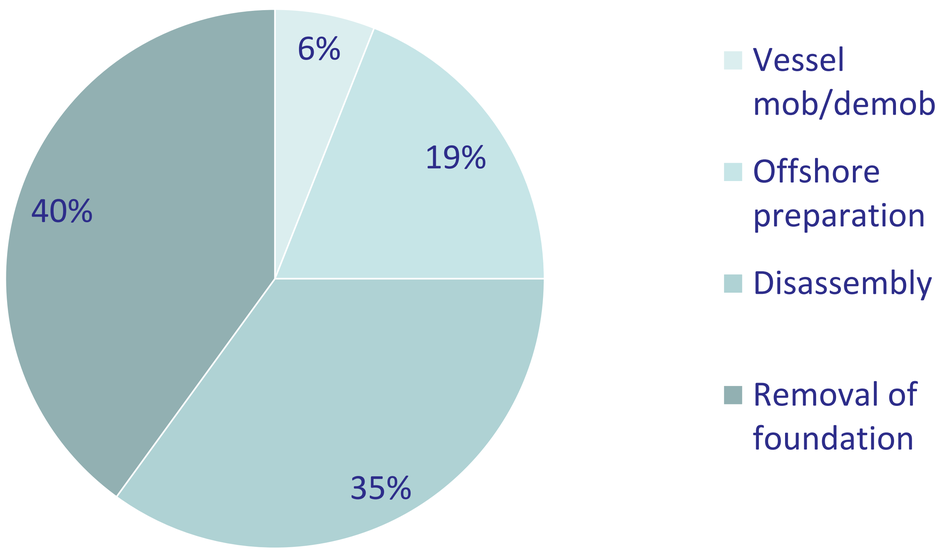

Fig. 1. Cost breakdown for estimated low (£180k/MW), medium (£550k/MW) and high (£1M/MW) decommissioning costs (Source: Climate Change Capital).

It is estimated that the costs of decommissioning are likely to be on the order of 60%-70% of the cost of installation for which a large proportion of this is associated with the removal of the foundation and the heavy lift vessels required to undertake this task. There is the opportunity to reduce the cost and risks of decommissioning with focused technology innovation and updated regulations based on state of the art thinking. However, as the number of turbines reaching their lifetime increases, quick action will be needed.

Repowering

Repowering was once considered a promising option but holds many risks, most significantly the unknown integrity of the foundation to support a new turbine. It is considered that insurers may consider this unknown to be too high a risk to insure or will require high premiums. Furthermore, there is the risk that turbines or components of that size will no longer be in manufacture as the industry rapidly moves to larger turbines. Repowering is not considered to be as attractive as some of the other end of life options.

Alternative asset use

Alternative asset use such as high altitude wind has the possibility to utilize the existing assets whilst potentially having minimal impact on the current structure. However a number of the alternative energy technologies may still require greater demonstration to prove their commercial viability and provide confidence to insurers and financers. Moreover, considerable revisions will be needed for regulations and leases in order to account for this type of change. Alternative asset use is a viable option but will likely take some time before this is a realistic option for developers.

Extended asset lifetime

The option of extending the asset lifetime is a very promising option and is already being explored by developers. However the commercial viability of extending the asset lifetime needs to be considered taking into account the additional O&M costs which will likely increase as the asset continues to age.

Conclusions

This study concludes that when considering the current costs associated with decommissioning, the risks of repowering and the current viability of alternative asset use. The most promising end of life option at present may be to extend the asset lifetime.

With current regulation only accounting for decommissioning, there is a very urgent need to review and revise current national and global regulations to ensure that all end of life options are have been considered. Allowing the use of alternative end of life options may not only help reduce the cost of offshore wind but also reduce the risk to the environment.