

# ***SHOCKS AND RESILIENCY: THE OFFSHORE WIND SUPPLY CHAIN***

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## **Overview**

Offshore wind projects take years to develop. The developers participate in subsidy and seabed lease auctions, take final investment decisions, and sign contracts with subcontractors. As these decisions are not taken simultaneously, it is possible for the market situation to change between the different stages of the development process. As shown recently by the Covid pandemic and the Russian invasion of Ukraine, market conditions can change significantly in a short period of time, which may affect the profitability of different actors in the supply chain, raising concerns about the resilience of the supply chain depending the commitments and dependencies in the supply chain made based on early assumptions. In this study we explore the implications of these changes in market conditions for the supply chain with a specific focus on the impact of changes in the price of electricity. We hypothesize that while the risk from market electricity price fluctuations is carried by developers directly, but that this also affects the supply chain indirectly as it is passed on. However, as we seek to describe the significance of this risk, we also need to situate it in the context with other types of risk including both project specific and sector-wide risks.

## **Methods**

We start with a systematic literature review of scientific literature, reports and media to establish the relevancy of the different supply chain risks for different actors to collect information on a broad base of actors in offshore wind energy. We split the supply chain into categories based on the types of components or services that they supply for offshore wind projects. This helps reveal which parts of the supply chain are exposed to electricity price variation as well as other shocks to the offshore wind sector. As the actors in the offshore wind sector often voice their opinions on the state of the industry, these can give insights across the different problems as well as the timeline of these. This may be supplemented with interviews with representatives of the offshore wind supply chain as part of an investigation of the resiliency of the sector to shocks. The questionnaire would be based on a preliminary analysis of the risk as they are discussed in literature and media by the actors in the sector. These interviews would be semi-structured.

## **Results**

The offshore wind sector has seen its input prices increase leading to an increase in costs while, there has also been an increase in the price of its output – electricity (BloombergNEF, 2022). However, as many projects are tied to specific output prices through what were initially intended as subsidy schemes, such as contracts-for-difference, they cannot necessarily take advantage of the current higher electricity prices. Similarly, the costs associated with, for example, seabed lease agreements are not adjusted downwards when the other costs increase. Preliminary results from the literature review show for example that at least the some of the costs are being carried by the supply chain (Edwardes-Evans, 2023) while others have noted that the merchant tails of some projects may be used to compensate for the increased costs (Utermöhlen, 2022).

## **Conclusions**

Our conclusions from the preliminary results are that the participants in the offshore wind sector see electricity price changes as a significant driver of profitability even for projects where the government has offered/mandated revenue stabilizing mechanisms. Without indexation of fees and/or subsidies and without placing limits on these mechanisms through other means e.g. through the use of one-sided contracts-for-difference, shocks that increase both input and output prices can increase risks and, thereby, the costs of renewable energy projects by front-loading the costs and backloading the revenue to the merchant tail.

## **References**

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