

ABSTRACT

IDENTIFICATION OF THE ECONOMIC IMPACT OF OFFSHORE WIND FARMS AT THE LOCAL LEVEL BASED ON CASE STUDIES OF BRITISH AND POLISH FARMS

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The development of offshore wind energy (OWE) constitutes one of the key pillars of the contemporary energy transition in Poland and Europe. Despite its high capital intensity, this sector plays a strategic role in reducing greenhouse gas emissions, strengthening energy security, and generating new development impulses in coastal regions. At the same time, it poses significant challenges related to the fair distribution of costs and benefits, particularly in economies that are only beginning to build their national offshore wind sector. The establishment of local supply chains and skills is of fundamental importance for the success of the energy transition in Poland, which remains at an early stage of offshore wind development.

The objective of this dissertation is to identify and examine the economic effects of offshore wind supply chain development at the local level, with particular emphasis on a comparative analysis between Poland and the United Kingdom. The dissertation takes the form of a cycle of six scientific articles that together provide a coherent analysis of the economic, spatial and social dimensions of offshore wind sector development. The research addresses issues such as the financial performance of renewable energy enterprises, stakeholder perceptions of offshore investments, the coexistence of wind energy with other maritime sectors in marine spatial planning, labour market development, and the spatial distribution of economic benefits.

The research questions concern: (1) factors determining the financial performance of energy producers; (2) the supply chain resources required to achieve offshore wind installation targets; (3) the value of spatial rent from offshore wind energy in Poland; (4) factors influencing local stakeholder perceptions of offshore wind energy; (5) the applicability of the Spatial Economic Benefit Analysis (SEBA) method for comparing the spatial distribution of supply chain value in countries at different stages of sectoral maturity - Poland and the United Kingdom; and (6) differences in the labour market structure of the offshore wind sector depending on its level of maturity within a given economy.

Based on a review of the literature and case studies, several hypotheses were formulated, assuming that: (1) the financial performance of energy producers differs depending

on the source of generated energy, with renewable energy producers achieving better results; (2) the achievement of European offshore wind installation targets requires the development of a dedicated supply chain; (3) spatial rent derived from offshore wind energy is higher than that from other marine economic activities; (4) local stakeholder acceptance depends on the balance between perceived benefits and risks resulting from offshore wind development; (5) economic benefits from offshore wind development are spatially uneven and tend to concentrate around existing industrial clusters of the maritime economy, due to the integration of investments with local industrial and competence bases; (6) the offshore wind labour market varies in terms of required skills and their spatial distribution, depending on the sector's level of maturity.

The applied research methodology was multidimensional. At the micro level, an analysis of the financial condition of renewable energy enterprises in the Baltic Sea region was conducted using panel data models. The study also included an analysis of spatial rent in the context of marine spatial planning and a stakeholder perception survey among representatives of the offshore wind sector in Poland. At the macroeconomic level, an original adaptation of the SEBA method was developed, enabling a comparison of the spatial distribution of economic benefits between Poland and the United Kingdom. This was complemented by a labour market analysis based on big data from the LinkedIn platform, allowing the identification of emerging professions and skills within the sector.

The findings confirmed most of the proposed hypotheses. The analysis of stakeholder perceptions indicates high expectations regarding anticipated economic benefits, accompanied by concerns about potential negative impacts. The results revealed a spatial concentration of economic benefits from offshore wind development. In the United Kingdom, these benefits are more strongly retained within the national economy and coastal regions, driven by effective industrial policy and the emergence of an industrial-service cluster in the southern North Sea area. In Poland, despite efforts to develop domestic supply chains, the benefits remain limited, and the market is still in the process of building its institutional and competence foundations. Nevertheless, a tendency towards the formation of a coastal cluster, analogous to that observed in the UK, is already visible.

This dissertation provides an original contribution to the literature by: (1) adapting and developing the SEBA method for analysing the offshore wind market at an early stage of its development; (2) integrating economic, spatial, and social approaches in the analysis of the offshore wind sector, including the estimation of spatial rent for offshore wind energy;

and (3) applying modern data acquisition tools such as web scraping and big data analysis in labour market research. The results also have practical implications, as they can support the design of public policies aimed at strengthening local supply chain development, marine spatial planning, and skills enhancement for the offshore wind sector. Ultimately, the study highlights the importance of maintaining a balance between economic efficiency, spatial management, and social acceptance as key pillars of an effective energy transition.

Keywords: *offshore wind energy, marine spatial planning, supply chain, spatial distribution, local content*