

SHORT SUMMARY

5.20.003 Logistics Challenges to Offshore/High Energy Co-location of Aquaculture & Energy Industries

INTRODUCTION

The scoping project identifies and maps the BE supply chains and explores the logistics challenges to the offshore/high energy co-located aquaculture and energy supply chain. It provides emerging solutions to the challenges and charters further directions for the development of co-located activities in offshore/high energy environment.

KEY POINTS

- △ This project is a scoping project undertaken within BECRC Research Program Theme Five(RP5): Sustainable offshore developments.
- △ The outcomes of this project are related to the following BE CRC milestones RP5.2:
 - » Report on the mapping of marine and offshore energy and aquaculture supply chains (RP5.2.1)
 - » Identify and report on challenges and potential for an integrated co-location approach (RP5.2.2)
- △ A team of 15 researchers and from 8 organisations contributed to this project.

THE CHALLENGE

The BE CRC program is interested in exploring the potential viability for establishing an offshore co-located multi-use platform involving aquaculture and renewable energy businesses. The inherent challenge is that from an industry and conceptual perspective this is still in an emergent phase. Such an offshore platform can be explored via multiple lenses such as regulatory, environmental impact, and technological. This scoping study examines the issue through a logistics and supply chain lens as it is a means of examining the development and viability of the offshore platform through a systems approach.

The challenge of the logistics and supply chain lens is the paucity of available academic and industry research, and industry practitioners only recently considering offshore opportunities with some being in the prototyping phase. An additional challenge is that any outcomes of the scoping project are likely to be at the conceptual level rather than specifying actual industry activities.

THE OPPORTUNITY

The major opportunity of the scoping project is in examining the development of an offshore co-located multi-use platform offshore from the perspective of logistics and supply chain, which is a key management activity in other industries that enables an integrative approach from producers to consumers, is widely recognised as a source of competitive advantage, and enables a staged approach that remains agile and relevant to the offshore business as it progresses from a single linear supply chain to an integrated value chain focused industry. The other opportunity is in academic researchers being able to closely interact with industry participants to test ideas that are mainly at the conceptual level. The interaction with industry keeps the focus on the research remaining relevant and useful in providing various scenarios.

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OUR RESEARCH

Objectives

Develop a general framework for mapping supply chains within the BE, including a process mapping approach and data collection tools.

- △ Identify the current challenges and opportunities in offshore/high energy aquaculture and energy supply chains.
- △ Identify current and emerging infrastructure/operations/people/technological solutions of adopting integrated and coordinated approaches by multiple firms in offshore/high energy aquaculture and energy supply chains.

Chart directions to prepare industry sectors for potential logistics challenges to the offshore/high energy co-location of offshore aquaculture and energy business development.

Objectives

- △ A qualitative research approach was employed in the scoping project by four steps, i.e. conducting a comprehensive literature review; development of the SCOR model-based supply chains and identification of logistical challenges; validation of the SCOR model and further exploration of logistical challenges through meetings with industry professionals; and refinement of the supply chains through industry partners and subject experts and, synthesising findings on logistical challenges.

RESULTS

- △ The Supply Chain Operations Reference (SCOR) model was used as a framework to map five supply chains within the Blue Economy i.e. Tasmanian salmon, oyster and mussels supply chains; offshore renewable energy supply chains; and the future co-located high energy offshore supply chains.
- △ Opportunities and synergies for offshore/high energy co-located aquaculture and renewable energy businesses are multifunctional use of space and resources; the importance of developing a positive public image; synergetic energy production; and creating economies of scale via industry collaborations to enable cost savings.
- △ Key logistics challenges to offshore/high energy co-located aquaculture and renewable energy industries are related to procurement and supply chain disruption, transporting and handling in offshore locations; operational safety risks in exposed offshore locations; maintenance and operations scheduling; remote monitoring and process automation; and quality assurance of BE supply chains. Other general challenges include showstoppers barriers to legal approvals for commissioning of the co-located projects; financial viability; conflicting stakeholder interests and negative interferences between the co-located activities.
- △ Emerging solutions to challenges include global sourcing strategies that integrate suppliers and optimise procurement that decrease supply chain disruption; robust platform and cage design to cope with operational safety issues; maintenance scheduling and optimisation to solving multi-activity scheduling; and cutting edge monitoring and automation solutions to ensure safety, sustainability and continuous operations.
- △ This research proposes a four-stage conceptual approach that may guide future directions and solutions for the development of a future focused medium to long term journey to establishing an offshore co-located platform accommodating both aquaculture and energy businesses.

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OUTCOMES

As a result of the research, the following new additions to knowledge are suggested:

- △ There is a paucity of research, globally and Australian, that take a systems approach to developing co-located multi-use offshore platforms. Adopting a logistics and supply chain lens to the research is a useful means to begin exploring a systems approach to ensure the many relevant issues are examined.
- △ The SCOR model was determined to be a valid and appropriate framework for comprehensively exploring many facets of the potential offshore supply chain, and being a useful framework that is sufficiently agile to continually apply as the offshore supply chains develop and grow.
- △ Before achieving a value chain approach that is critical to the success of many other industries, the BE will first need to establish logistical and supply chain solutions that will greatly assist in the integration of the offshore, onshore and export activities.
- △ This research has implications for the industry when considering the development of co-located offshore/high energy activities particularly in site selection, financial viability research, effective spatial planning, and technological innovation.
- △ The industry professionals in the research indicated an interest in a greater understanding of how synergies could be achieved when moving operations offshore. Finding solutions that are 'outside the square' and looking towards solutions already implemented by other industries such as offshore oil and gas, was suggested as valuable activities of the BE CRC.

NEXT STEPS

The following are potential short-term to medium term steps for developing a pathway towards the establishment of a functional blue economy.

The four-stage conceptual approach developed in this research creates a systems approach via the lens of logistics and supply chain management that would serve as the mechanism for creating a foundation on which the offshore industry could be built. To achieve this will require greater research efforts at the conceptual level to build a more comprehensive and robust framework including wider industry engagement, investigation of the various systems and sub-systems to be adopted to establish a foundation for offshore operations, and a mapping of the potential industry players that should be included within the new BE.

Organising a series of workshops involving interested industry participants and researchers to explore initially in an unfettered environment that encourages 'thinking outside the square' related to identifying potential synergistic opportunities in an offshore industry. This could be entitled 'Blue sky thinking for the Blue Economy'. Identification of potential operators, support businesses and interests will be an initial requirement from onshore, nearshore and offshore perspectives. This will enable the beginning of potential supply chains to be mapped. The SCOR model will be pivotal in assisting full coverage of all relevant issues occurs.

The additional research and industry workshops will conceptually advance the current proposed four stage approach by inserting practical considerations that will result in a framework and broad timelines that can become a rallying point for many of the outcomes from the BE CRC five research themes to become added and in doing so, constantly refine the pathway in an agile approach.

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PROJECT TEAM

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PROJECT REPORTS/PUBLICATIONS

Chen, P, Fernando, I, Gunarathne, N, Cahoon, S, Wu, Y, Adams, L, Abdussamie, N, Bhaskar, P, Lee, K, Balk, D, Thornton, S, Dutton, I, Shepherd, T, McGookin, B & Corden-McKinley, B (2020). Logistics challenges to offshore/high energy co-location of aquaculture & energy industries, P.5.20.003 – Final Project Report. Launceston: Blue Economy Cooperative Research Centre.