

Project Outline

The Green Salmon Farm was a cross-disciplinary project carried out in direct correlation with a larger, “mother” project, titled the Investigation of the Novel challenges of an integrated Multi-Purpose Platform (INNO-MPP). Its focus lies in investigating the challenges a multi-purpose platform located offshore may pose. An algorithm developed under INNO-MPP enabled a more comprehensive and systematic way of identifying the synergies and the tensions amongst the systems located on and off the platform.

Cross-disciplinary tables capturing interactions between a variety of “systems” and “services” were used to find the synergies and the tensions between the two, for a specific case study proposed.

An example of a CDQ table used is shown below. This outlines the systems (top row) and the services (LHS column) interacting with each other. This is then used to yield the synergies and the tensions of different systems being in close proximity to each other by running the algorithm code in Matlab.

[illegible]

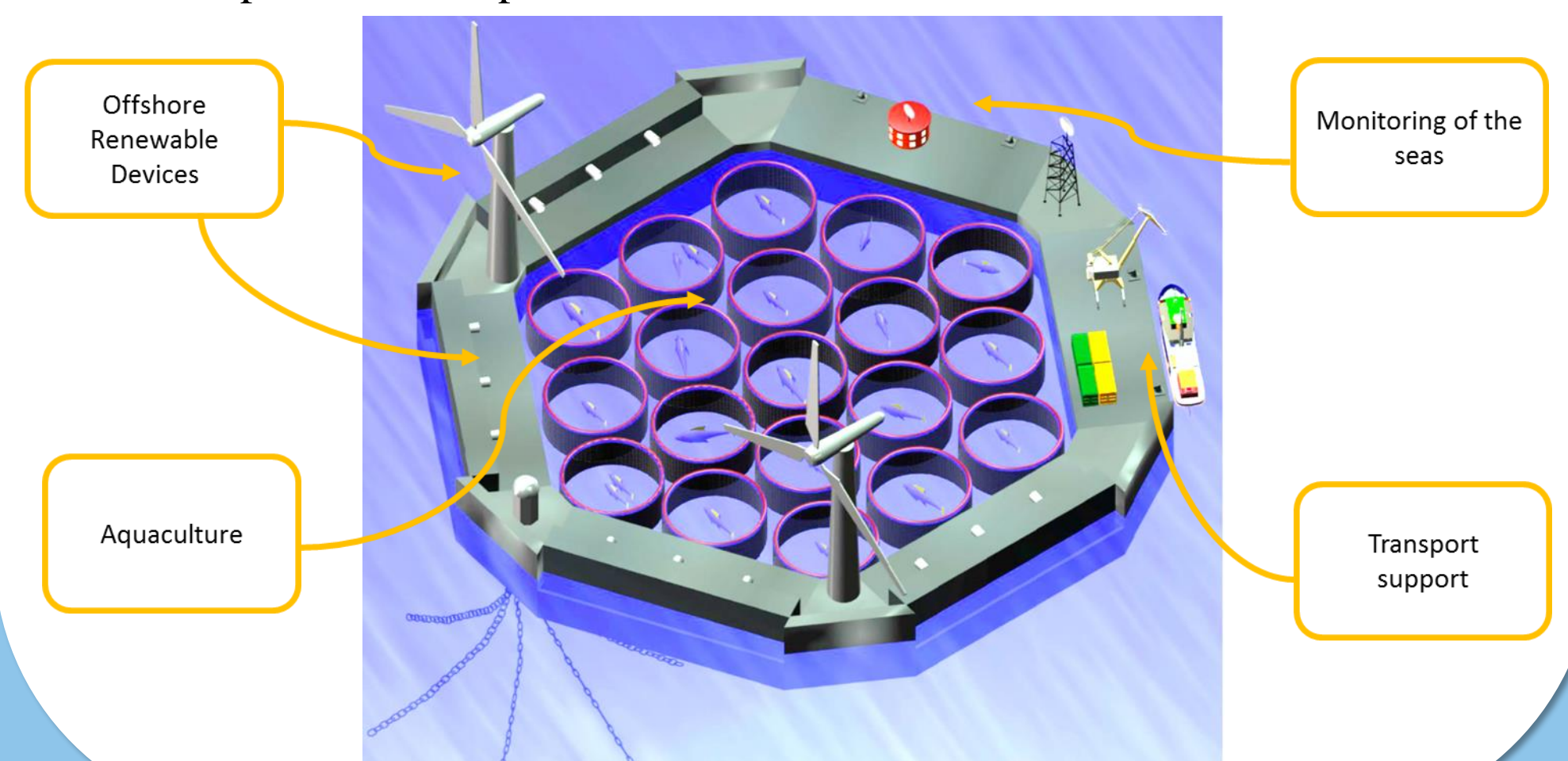
Background

With land based resources stretched to their limits, sustainable development of the blue economy has become a global priority. In developing economies, seafood is often the only affordable source of animal protein with aquaculture playing a significant role in maintaining global food security.

Fish farms are mostly powered by diesel generators for feeding operations, which raises the question of marine environmental pollution. The work carried out by the INNO-MPP proposes a novel concept for supplying renewable energy to an offshore aquaculture farm –by fitting renewables onto a feeding barge. The concept of such a MPP has several inherent advantages. The wind turbines, being small in mass, do not significantly alter the dynamic characteristics of the feed barge. Also the use of the feed barge eliminates the need for a separate support platform for the WTs. However, MPP development poses cross-disciplinary challenges, since they simultaneously aim to achieve several potentially conflicting objectives: to be techno-economically feasible, environmentally considered, socially beneficial, and compatible with maritime legislations.

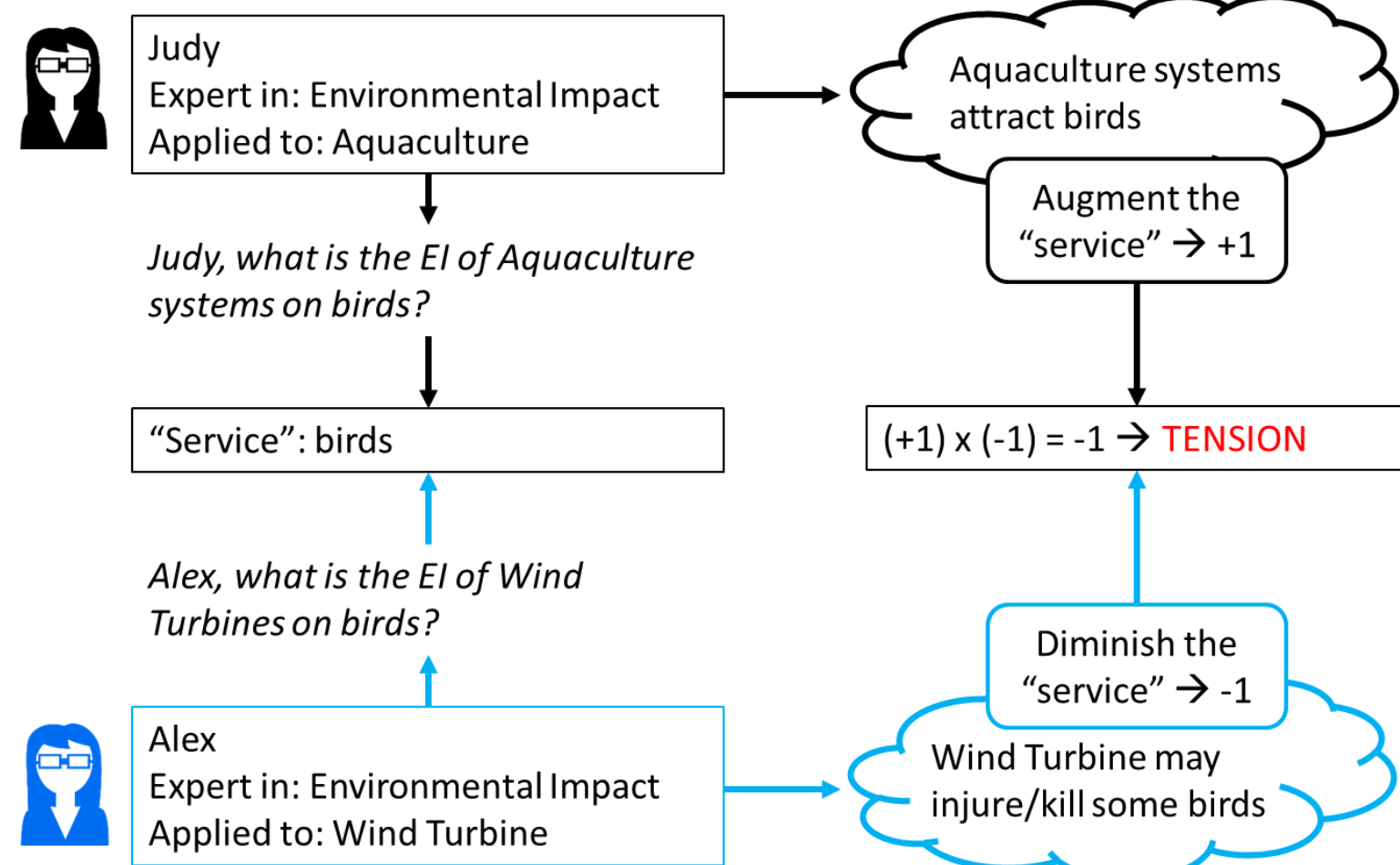
Essentially the idea for this Multi-Purpose Platform (MPP), integrating renewable energy devices and aquaculture facilities, is to find the synergies to share manufacturing, installation, operation and maintenance, and decommissioning costs. This has the potential to, save money, reduce the overall impact, and maximize the socio-economic benefits.

A conceptual artist impression of such an MPP is shown below.



“Ecosystem” Based Approach

In order to collect relevant data specific to our case study, that would explain the interactions captured, an “ecosystem” based approach was used to remove any unconscious bias and simplify the process for a third party involved. A very simple example of how this works in practice is shown below.



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Objectives

The main objectives of this mini-project include:

- Running an iteration of the cross-disciplinary questions tables for a specific case study in mind
- Modifications to the synergies and the tensions yielded
- Providing relevant and reliable references for every specific interaction occurring as a result of the systems interaction within a MPP

Outcome

New synergies and tensions yielded were further analysed and looked into by researchers from a variety of fields. This was then used to expand the material and resources available in the field of multi-purpose platforms. Recommendations for improvements of the algorithm and the collaboration process were made.