Collaboration Case Study

NB: The contents of this case study were provided in JCU’s substantive submission to the Review. The information provided is based on a forthcoming article in BHERT Magazine[^1^]

How algae researchers are working with business to transform the aquaculture industry in North Queensland

Key points

- JCU has a well-established research program with Melbourne-based MBD Energy that conducts R&D on a wide range of products and processes using algae including bioremediation, feedstocks and biofuels. Previous work also included carbon capture and storage technologies.
- Current work in commercial application includes:
  - Treatment of water to minimize environmental impacts of aquaculture (see below)
  - Municipal waste water remediation facilities, e.g. 80,000l plant at Townsville City Council’s Cleveland Bay Waste Water Purification plant.
- The aquaculture technologies have been rolled out in a number of large prawn farms in North Queensland and exported to China and Thailand with sites in Vietnam well into negotiation.
- The partnership has attracted $40m of private investment and $30m of Commonwealth and State Government funding, including Australian Biofuels Research Institute (ABRI), Australian Renewable Energy Agency (ARENA), CRC and Queensland Smart State.
- Central to the success of the partnership have been trust and clarity of expectations between the partners.
- For industry, they have had access to world-leading R&D that is responsive to needs and timeframes.
- For JCU, the partnership is valued as a critical pathway to impact, and as a significant enabler of core academic work of PhD research education and high quality peer reviewed publications through co-investment in infrastructure, clarity of problem driven research, career pathways and mobility of staff and students between sectors.
- Lessons learnt? Key lesson is the importance of building trust and understanding expectations with a long-term view. The multi-factor returns on patient capital are significant and compelling.

‘An exemplar of long term university and industry cooperation’

The employees of Pacific Reef Fisheries, a prawn farm in Ayr, North Queensland are not the only ones working today - the algae in the prawn ponds will continue their daily grind of absorbing the nitrogen and phosphorus in the wastewater. The enterprise represents a world-class sustainable aquaculture facility. Not only is this algae (seaweed) a potential export in its own right, the purified water can be returned back to the ocean without causing any damage to the Great Barrier Reef.

[^1^]: JCU gratefully acknowledges this information was prepared by the IRU for a forthcoming article in BHERT magazine
The Great Barrier Reef Marine Park Authority (GBRMPA) stipulates that for new prawn farms the level of nitrogen and phosphorus in the discharge water going back to the Great Barrier Reef waters must not be higher than the levels in the inlet water. This has meant that the North Queensland prawn industry has not expanded in the last ten years.

Now thanks to technology developed by Melbourne-based company MBD Energy in partnership with researchers at James Cook University, it is possible for Australia’s largest prawn farm business Pacific Reef Fisheries to meet this requirement. MBD is the first company in the world to commercialize algae as a water treatment option using this technology.

It all started in 2008 when MBD was seeking the research expertise to develop its technology. “We wanted to focus on Australia. We were sure that the research was out there,” says Mr Andrew Lawson, Managing Director of MBD Energy. “In the end, the Queensland State Government was crucial in linking us to the right partner.”

Professor Rocky de Nys at the College of Marine and Environmental Sciences at James Cook University had the necessary expertise. With an established track record of working with industry, Professor de Nys was the ideal match for MBD. Before long the first stage of the $250K trial project was underway. Since then more than $40 million of private equity and $30 million in government support have been invested.

Mr Lawson described working with such world-leading researchers as inspiring. Actually seeing the ideas work in practice was a benefit and motivation for MBD and JCU.

The key to this successful joint venture has been continuous open and honest communication. As Professor de Nys explains, “It is important for both sides to clearly communicate what they want to get out of the relationship. For instance from the academic side, publications and PhD completions are essential.”

Professor de Nys now leads a team of 30 researchers focusing on algae research. It is not just the connections with industry which have flourished. Professor de Nys estimates that as a result of this collaboration, around 20-30 academic papers are published each year in international journals significantly increasing industry knowledge and practice. “Having such work peer-reviewed and at the highest possible academic standard is of huge benefit to the wider industry.”

In its statement ‘Industry Driven Research’[2], the Innovative Research Universities (IRU) group, of which James Cook University is a member, calls for enhanced incentives for industry as the first step towards increasing industry driven research in Australia.

Asked about incentives, Mr Lawson describes the R&D tax incentive and other government programs to help a company in the pre-commercial stage as critical. Funding from government mitigates the risk for the industry partner - a crucial factor for SMEs. Another important point is having the research available in Australia. From the both the company and university’s perspective having the right systems in place to ensure Intellectual Property (IP) is protected is a priority. Professor de Nys highlighted the usefulness of working through the Advanced Manufacturing Co-operative Research Centre which provides the opportunity for top-up scholarships for students.

Both Mr Lawson and Professor de Nys consider the PhD completions as an important and highly valued outcome of the collaboration. Some of the PhD students went on to work with MBD. High-achieving international students are also attracted to JCU by the opportunities that the partnership offers.

So what are the plans for the future? Mr Lawson confirms that the partnership has been extended for a further 20 years to support the commercial rollout of projects.