BLUE ECONOMY
COOPERATIVE RESEARCH CENTRE

2023 - 2024

ANNUAL REPORT

Australian Government
Department of Industry, Science and Resources

Cooperative Research Centres Program

Contents

About Us

Established in 2019, the Blue Economy CRC-Co Ltd (ABN 64 634 684 549) is an independent not for profit company limited by guarantee and a Cooperative Research Centre under the Australian Governments CRC Program.

The Blue Economy CRC (BE CRC) currently brings together 43 industry, government and research participants from nine countries with expertise in aquaculture, marine renewable energy, maritime engineering, environmental assessment and policy and regulation.

Our vision is a sustainable blue economy underpinned by our innovative industries and trusted stewardship of our oceans.

Our purpose is to deliver world class, collaborative, industry focused research and training that underpins the growth of our participants in the blue economy through increased offshore renewable energy and sustainable seafood production.

Governance

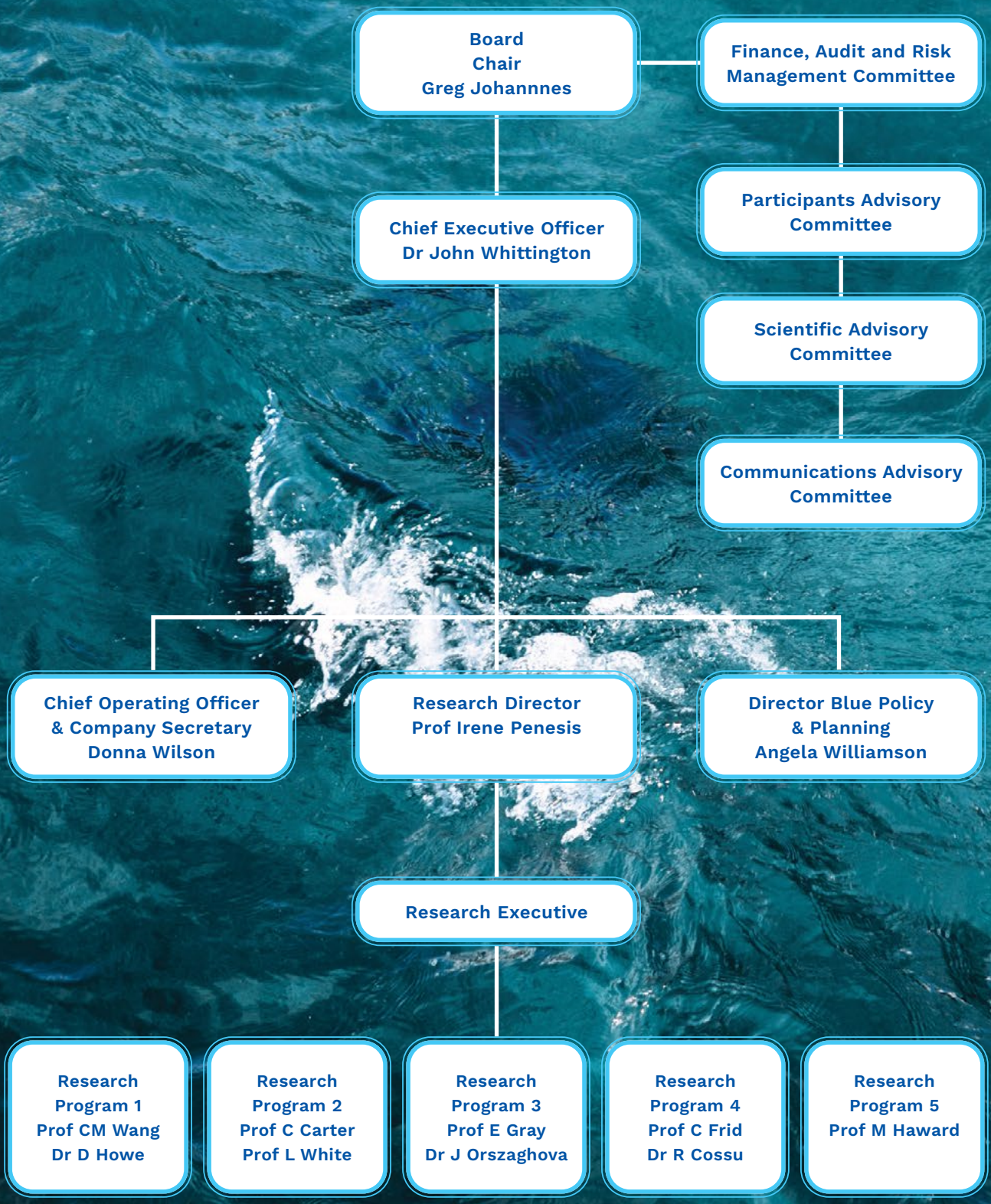
The Blue Economy CRC-Co Ltd is governed by a skills-based Board which comprises 6 independent Directors, one of whom acts as Chair.

The Board is supported by four subcommittees, each Chaired by a Director:

- Finance, Audit and Risk Management Committee whose purpose is to advise the Board in relation to financial management and performance, risk and audit.
- Scientific Advisory Committee whose purpose is to advise the Board in relation to the relevance, scientific rigour, funding and performance of research and development projects.
- Participants Advisory Committee (PAC) whose purpose is to advise the Board on strategic direction and priorities for participant engagement.
- Communications Advisory Committee (CAC) whose purpose is to advise the Board in relation to internal and external communication-related matters.

The Company is managed by an Executive team comprising Chief Executive Officer, Chief Operating Officer, Research Director and Director Blue Policy and Planning. The Research Director is supported by the Research Executive which is comprised of 9 part-time Program Leaders and Deputies from our Participant universities.

Organisational Structure



Our Participants

The Blue Economy CRC currently brings together 43 industry, government and research participants from nine countries with expertise in aquaculture, marine renewable energy, maritime engineering, environmental assessment and policy and regulation.

Chair's Report

This year marked the organisation's fifth year of activity. Having reached the half-way mark of our ten-year CRC contract with the Australian Government, the Board has taken the opportunity to reflect on where we've been and where we're going.

Back when we started in 2019, we had more than 40 participants drawn from at least nine different countries. While some of those participants have changed, the overall numbers remain broadly the same and our new participants have brought new perspectives, expertise and industry-led research opportunities in areas like seaweed mariculture and hydroacoustics.

That rich participant base has been bolstered this year by a series of strategic partnerships with organisations that have a purpose that complements ours and similar values. Australia's Ocean Impact Organisation, Belgium's Blauwe Cluster and New Zealand's Moananui bring new skills, perspectives and networks to our table.

When we look closely at this ecosystem of participants and partners, it's clear that the overarching challenges faced by the ocean industries we service have deepened since 2019.

Australia's marine ecosystems continue to shift in response to climate change, with unprecedented marine heatwaves a signature feature. Aquaculture's inexorable rise to supplant wild caught fisheries as the dominant source of seafood protein has accelerated in response to ever growing consumer demand. Australia and the world's appetite for new renewable energy solutions has grown. And the community's support for new development on land and sea seems to be even harder to earn.

The policy and legal frameworks in which we take on these challenges have also changed. Every Australian state has now developed a plan for hydrogen and Victoria has introduced targets for offshore wind. For its part, the Australian Government has now established rules around offshore electricity infrastructure and is declaring priority offshore wind areas. It is also well advanced in its work towards a Sustainable Ocean Plan.

In some cases, our CRC has contributed actively to the shape of that changing policy and regulatory landscape. This reinforces the importance of having significant research streams focused on issues like stewardship, governance and licence in the shared ocean space.

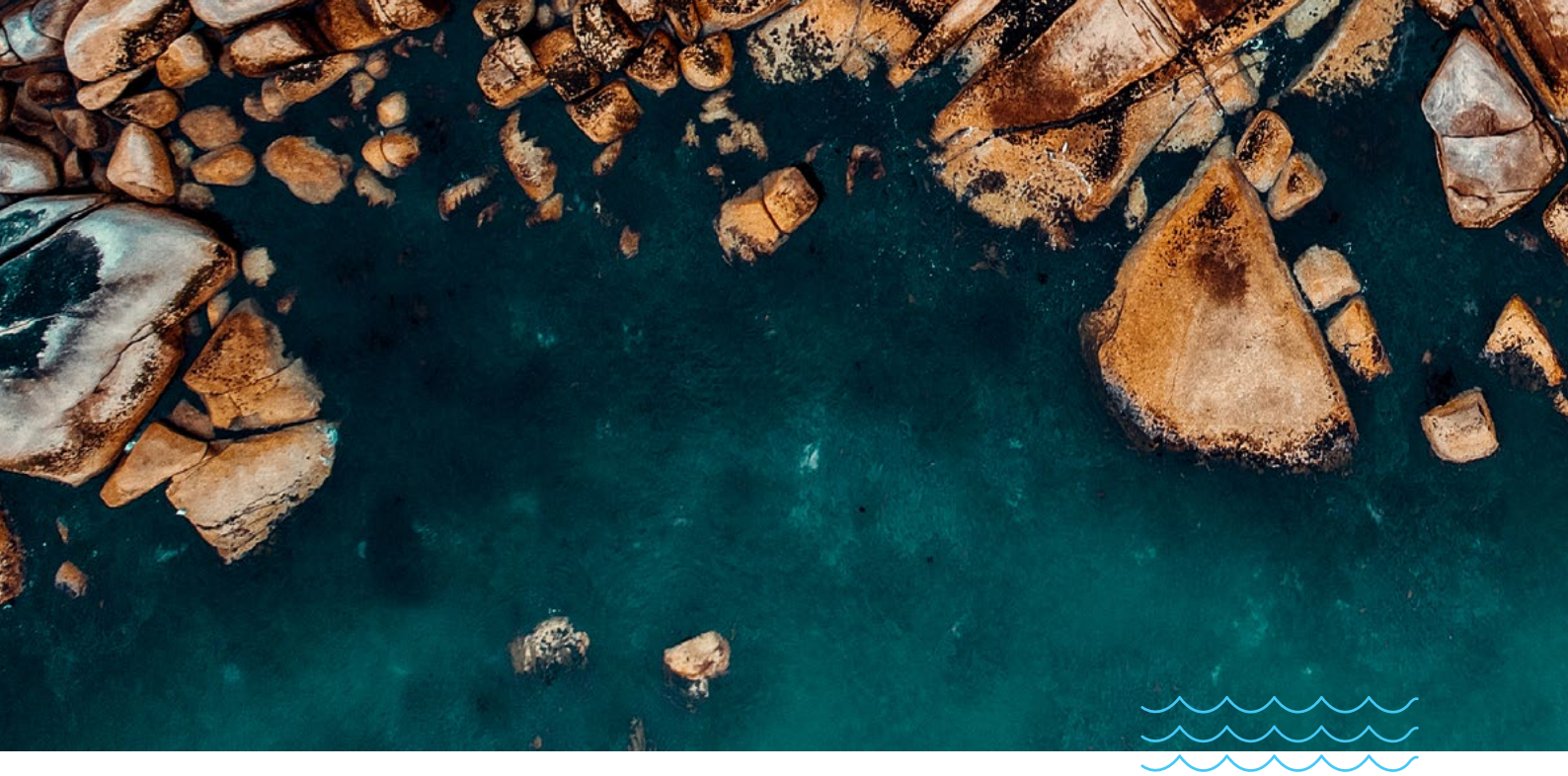
This environment of churn and change provided the context in which we reviewed our purpose, vision and strategic plan this year. This work also drew directly on what we've heard from our participants and other stakeholders at both the annual Participants Workshop in Kingscliff and the regular face to face discussions we have.

Not surprisingly, the basic value proposition underpinning our work remains absolutely valid. Our purpose continues to be to deliver world class, collaborative, industry focused research and training that underpins the growth of our participants in the blue economy through increased offshore renewable energy and sustainable seafood production.

Clarifying our way forward has enabled us to have a good look at the way we are governed, making changes in areas like our sub-committee structure to ensure our approach remains contemporary. Collectively this work will mean our focus is squarely on creating a lasting impact for our participants and the wider industries we serve. And it will ensure we can concentrate on the key, strategic initiatives that have the right scale to leave a legacy.

This sets us up for an exciting last five years as a CRC.

Greg Johannes
Chair



CEO's Report

Each year we reflect upon our research and training and importantly, the impact of that work. For us, impact occurs when our work is taken up and used by our Participants, industry and government to the benefit of the economy and society. In other words, when our work makes real changes in the real world.

Over the last five years the BE CRC has commissioned 63 Projects, of which 31 are now complete. The majority of those completed were short-term scoping projects. At the end of FY24 there were 32 projects underway. These are generally larger multidisciplinary collaborations with multiple partners. As highlighted in the project profiles, this research is creating a significant blue economy knowledge bank. To date, the work has generated 3 Australian and International patents, one provisional Australian patent and two registered trademarks.

FY24 has seen the development of new collaborations, including novel studies with Seafood Industry Australia and the Fisheries Research Development Corporation (FRDC) on the Futures of Seafood study and Decarbonisation of Australian Aquaculture project.

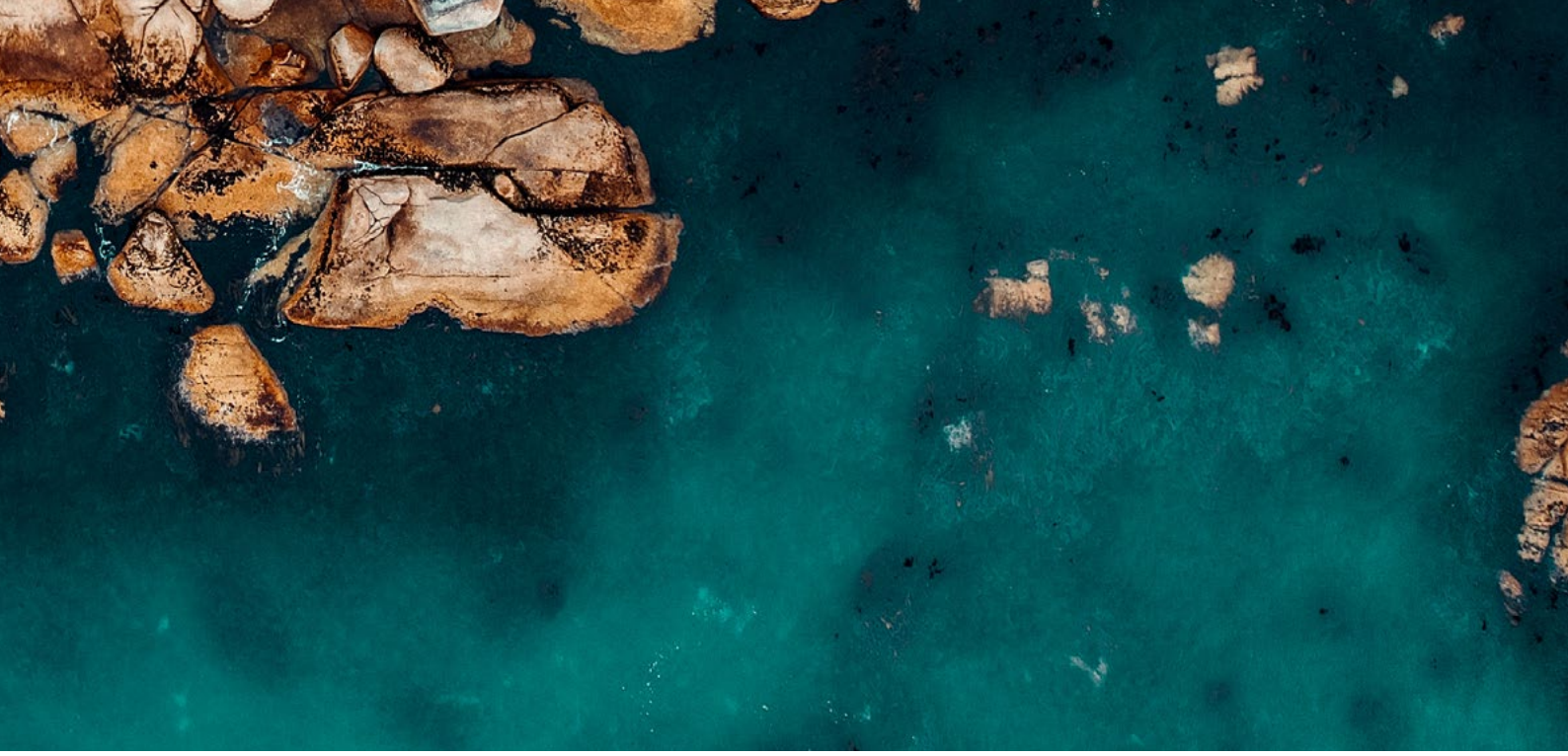
Our efforts to deliver the first aquaculture research trial in offshore Commonwealth waters have attracted significant additional funds and in-kind resources. This work builds upon years of BE CRC input into policy and regulatory reform and looking ahead, this will be a dominant part of our operations and our legacy. As is the work with our Participants and BOC on the design, consent, construction and operation of a commercial scaled DC hydrogen microgrid research facility.

This leading research infrastructure will also frame the next 5 years of the BE CRC's role in driving industry led net zero pathways and decarbonisation.

We used our annual Participants' Workshop to bring together 170 BE CRC Participants, strategic partners and friends in Kingscliff NSW to calibrate our research portfolio against emerging trends, insights and directions to ensure our efforts remain relevant, impactful, and capitalise on emerging opportunities. The annual workshop remains fundamental to maintaining the relationships required for successful collaboration across our network.

In FY24 we welcomed a new Participant, the Singaporean based company Aquaculture Centre of Excellence, whose leading floating offshore fish farming facilities offer a great opportunity to showcase large scale decarbonisation of aquaculture.

Transparency is a core principle of our work, and we have focussed on continuous communication of the outcomes of the BE CRC's research. Over the last 12 months we have hosted 9 webinars with over 2,400 registrants. Our research portfolio has generated 155 refereed publications, 38 in the last 12 months alone.



Our communications program continues to expand as new knowledge is produced. Our website contains up to date information on all our projects and their findings. In the last year there were 35,000 visitors to the website (+25% on FY23) making 309,000 visits (+ 200% on FY23). We have 8,265 subscribers to our email list (+18% on FY23) and our work is increasingly being reported in the media with 485 media mentions (excluding socials) this year (+160% on FY23) with a potential news reach of over 300 million. We have over 7,000 followers on social media and in FY24 published over 400 posts.

A key impact of the BE CRC is to support and train the next generation of innovators and blue economy leaders. Since inception, the BE CRC has 39 Higher Degree Research students enrolled in participating institutions, and 2 students have successfully completed their studies. We have commenced an important body of work led by University of Queensland Analysing Graduate Attributes and Employability of BE CRC RHD students.

This year we have welcomed five new staff: Donna Wilson (COO and Company Secretary), Nikki Radford (Administration Officer), Dr Simon Willcox (Project Lead, Blue Policy and Planning), Dr Shane Roberts (Project Lead, Futures of Seafood) and Dr Damon Howe (Deputy Program Leader, Offshore Engineering and Technology). We have farewelled three long-term members of our team who have left for new opportunities: Jon Brown (COO and Company Secretary), Dianne Schwagermann (Administration Officer) and Dr Nagi Abdussamie (Deputy Program Leader, Offshore Engineering and Technology).

As we look forward to the next five years, we know that undertaking industry relevant research at commercially meaningful scales, often in offshore environments, will be resource intensive and require increasingly complex collaborations with industry, government, investors, community and research providers. We are confident that our ability to assemble multi-disciplinary teams using the specialist capabilities of our Participants and others will continue to position us for creating real impact.

I trust you enjoy reading this year's Annual Report and share our excitement about the impact that the BE CRC through our team, Participants and strategic partners is creating.

Dr John Whittington
CEO

Research

The Blue Economy CRC has made significant progress towards meeting our objectives described in our Strategic Plan and agreed milestones. We continue to work closely with our 43 industry, government, and research Participants to understand their research and development (R&D) objectives and priorities, and the current state-of-play for our growing offshore industries. Now into our fifth year, we showcase our advances thus far and the research and development program underway that will drive bigger impact over the next five years.

During FY24, 37 projects were underway across the five research programs (see current projects) with a focus on our Participant's needs and demonstrating commercial impact. These projects had a combined cash and inkind value of $61.8M. Of these, 12 projects were commissioned and started in FY24 and 5 projects were completed (see past projects).

The selected project profiles presented in the following pages describe how the BE CRC's research is contributing to solving challenges our blue economy industries face and how their competitiveness, productivity and sustainability has been improved.

Research Highlights

- In an ocean wave energy project led by Marine Energy Research Australia (MERA) at The University of Western Australia, to design, construct, deploy, operate, and decommission the M4 wave energy converter, we have reached a significant milestone with completion of the construction of the prototype structure. The power take-off unit has been tested under simulated ocean-wave conditions and is now being integrated with the M4 structure. Deployment in the water off Albany is planned for late 2024.
- The Hydrogen Powering of Vessels project is contributing new insights to the maritime industry's transition to sustainable energy. In a significant milestone, the team released the Phase I report in November 2023, offering a thorough review of hydrogen's viability as a marine fuel in Australia. Now the project has turned its attention to three hydrogen-powered vessel project profiles; an aquaculture operations vessel supported by Huon Aquaculture, a ferry, and most recently through engagement with Southerly Ten, an offshore wind farm crew transfer vessel.

- A project led by the University of Queensland and Tassal have now completed the 3rd and final generation collar tie prototype that was installed at Tassal's exposed West of Wedge fish farm, with positive results following 6 months of testing. Deployment of this robust collar tie will lead to reduced breakages, fewer failures and overall reduced maintenance on-site and repair costs on offshore aquaculture sites. A national patent has been filed in Australia and efforts to commercialise both the innovative collar-tie and the newly developed wear-resistant nano-clay material are now underway. In addition, Akshay Krishna Ambika Harikumar completed and submitted (in May 2024) his PhD thesis.
- Sustainable seafood production remains a research priority. A scoping project led the University of Tasmania has focused on identifying which multispecies systems across regions from temperate to tropical, that can be viably and sustainably integrated for offshore seafood and marine production. Through stakeholder consultation with commercial operators to better understand the characteristics of species they grow, 100 candidate species for offshore aquaculture (ranked from 276 initial species) have been identified and categorised. The guidance will be provided in a Species Selection Handbook to be published following final feedback received at Seafood Directions in October 2024.
- Utilisation of seaweeds in offshore aquaculture is a rapidly evolving field in Australia and New Zealand and a strong focus for the BE CRC with several research activities underway. We have increased our active network with three more third-party organisations joining our research; AusKelp, South Coast Mariculture and Fremantle Seaweeds.
- The second and final year of the project (led by the University of Tasmania) developing and testing pilot-scale production systems for offshore kelp production is nearing completion. Systems to cultivate kelp have produced significant biomass of Undaria (wakame) in year 1 and Macrocystis (giant kelp) in year 2 at the Tinderbox site. The giant kelp (outplanted on ~500m linear) included different cultivars and will be harvested and measured in November. To determine ecosystem impacts of growing kelp, we have been monitoring a range of metrics around the kelp lease including fish, mammals, sea birds, plankton, seaweed and vertebrates as well as physical parameters including salinity, oxygen, nitrate, and current and wave energy. There is limited evidence for an impact thus far. This project will provide an integrative report covering the design of production systems, evidence for environmental impacts, the economic viability and regulatory framework required to cultivate kelp.
- Four successful data infrastructure stakeholder needs workshops were held over 2023 and 2024 to gather feedback and information from industry, researchers and end-users to help inform and support the design of the concept map and demonstration prototype of a data infrastructure platform for blue economy. The project team, led by BMT, are preparing the final infrastructure framework for on-going data stewardship for the BE CRC, to be published in a report in late 2024.

Highlights on research completed in FY24 (see past projects) are presented in the following project profiles and provided below.

- The first phase of a collaborative project co-led by Griffith University and The University of Queensland, and in partnership with the salmon industry and other participants, to design a cost-effective yet robust pen to support sustainable fish farming in deeper ocean areas has been completed. The SeaFisher pen design uses high-density polyethylene (HDPE) pipes to form the modular structure with overall dimensions of 120m L x 40m W x 20m D and a total enclosed water volume is 96,000 m3, designed to accommodate 1,440 tons of fin fish.

  The new lightweight design, with a single point mooring system and buoyancy chambers allows for movement of the structure in the water column. The intellectual property original design has reached national phase for the patent filing in Australia. This pending patent had been evaluated under the Patent Cooperation Treaty (PCT) and is currently pending review at a national level. A second patent is pending to protect the most recent advances in the design in particular defining in more depth the materials and connectors for the structure. This second patent has been filed for evaluation under the PCT. The next phase of the R&D which started in February 2024 includes scale-models to be tested at the Australian Maritime College and TCOMS wave basins to verify and validate the hydrodynamic properties of the structure and optimize the final design to ensure suitability to support offshore fin fish farming and operations.

- Opportunities to produce offshore oysters due to the lack of access to inshore sites has been a focus of Oysters Tasmania. The consistent demand for oysters nationally and globally presents a significant opportunity for Tasmanian oyster farmers who contribute approximately one third of the total Australian oyster production.

  Through a scoping study to assess the need and feasibility for offshore Pacific oyster aquaculture in Tasmania, opportunities for production in a number of unused oyster leases located in deeper, higher energy waters around Tasmania were identified. Industry indicated several barriers that require additional R&D to develop more exposed leases including equipment suitability, logistical concerns and a lack of knowledge around the primary productivity of the sites. This knowledge is needed to justify the financial investment needed to farm in these more exposed sites.

- A project led by ACS Australia, with aquaculture company Tassal, aimed to better understand the dynamics of feed pipes systems and develop robust system solutions for the Tasmanian salmon industry was completed. Findings from the research included understanding of the operating environment and operational challenges, computer simulations to predict the movement of fish pens subject to wave and current action and the development, testing under laboratory conditions, and on-site trails of systems for holding and organising feed pipe bundles.

New Research Projects

The newly commissioned projects build on our research portfolio, and partnerships with industry, government and research providers and deliver to national and international agendas focused on a sustainable blue economy.

Highlights on the projects that commenced in FY24 include the following.

Seafood Industry Australia (SIA) and the BE CRC have partnered to deliver a hallmark Futures of Seafood study.

This co-designed, multi-disciplinary and collaborative study is funded by FRDC, BE CRC, the Department of Agriculture, Fisheries and Forestry (DAFF), and Department Climate Change, Energy, Environment and Water (DCCEEW).

The BE CRC and SIA have assembled a multi-disciplinary team of experts across CSIRO, BDO, Atlantis Group, Eratos, Foodminds, and jurisdictional peak bodies to map, model and describe the spatial, economic and social impacts of the full suite of government policies and targets that impact the seafood industry. This study is scheduled for delivery in mid-2025.

The BE CRC was proud to join 12 other Cooperative Research Centres in a landmark report on our work on Australia's decarbonisation goals and transition to net zero. This landmark report shows while we still have significant progress to make, CRCs are already delivering tangible outcomes on our path to Net Zero.

The report forecasts that over 2017-2032 an increase of $1.7 billion to Australia's real economy as a result of industry-led decarbonisation research and innovation, an increase of $4.8 billion in Australia's economic output (GDP) and 3,705 job years to be delivered.

$1.7 billion
Added to Australia's real economy in 2017-2023

Increase of $4.8 billion
In Australia's economic output (GDP)

3,705 Jobs
To be delivered

- SIA and the BE CRC have joined forces to deliver the FRDC funded project Alternative energy solutions, supported by funding from the FRDC. The project will deliver a decarbonisation decision platform that supports the aquaculture industry build industry wide capacity, climate resilience, access a suite of tools, solutions to achieve net-zero goals.
- Following the progress of offshore wind developments in Australia, SAITEC, BMT and the University of Tasmania commenced the TASDEMO project to investigate deploying SAITEC's SATH floating offshore wind turbine technology in Australian waters – a first trial of its kind in the country. The project will evaluate the feasibility of developing a Floating Offshore Wind project in Australia, encompassing site development, deployment, operation, and decommissioning. This will significantly reduce risks for deploying future floating wind turbines exceeding 15MW. It will evaluate the technical and economic feasibility of deploying this technology in Australia, paving the way for future large-scale projects.
- The BE CRC continues to value its investment in the development of ocean wave energy. Notwithstanding Australia has the best wave energy resource in the world, wave energy does not feature in Australia's policy landscape, which is counter to global strides towards innovation and sustainability released in the International Energy Agency's Ocean Energy Systems (IEA-OES) Technology Programme annual report for 2023. Led by The University of Western Australia and partners, the project sets out to produce a comprehensive overview of the ocean wave energy sector in Australia. The research will provide an overview of Australia's ocean wave resource, market opportunities, applications and integration, developing a wave energy industry and an environmental and social analysis. The report, released in September 2024 at the *2024 International Conference on Ocean Energy*, included recommendations for developers, researchers and policymakers.
- As steps are taken towards the construction and commissioning of the BE CRC's DC hydrogen microgrid in Hobart, Griffith University and partners will commence 3-year research project that will focus on modelling the components of the microgrid and the entire energy system. The system is based on a 700-kW electrolyser and incorporating photovoltaics, hydrogen storage and a hydrogen turbine to generate electricity, as well as offtake for fuel-cell buses. The system model and physical microgrid will be employed to emulate operating scenarios relevant to industries in the Blue Economy (e.g. aquaculture), to explore approaches to managing energy flows within the microgrid under realistic conditions of variable energy input (e.g. from solar, simulated offshore wind, wave energy, etc.), also whilst satisfying the demand profile of a chosen industry-relevant energy system.

- A 2-year project developing methods to out-plant hatchery-reared Durvillaea (Bull Kelp) to grow-lines at-sea, fine tune hatchery methods and test the growth and performance of Durvillaea on grow lines at different sites in Tasmania has commenced. The outcomes of the project will contribute to the goal of growing commercially viable Durvillaea. This research led by the University of Tasmania, with Seasol and other partners, follows completed research where we developed successful reproducible hatchery methods and performed preliminary trials of outplanting.
- A new project led by The University of Western Australia (and partners) has started an investigation into the potential for seaweeds to attenuate hydrodynamic forces, which could lead to seaweed farms protecting vulnerable coastal and offshore ecosystems and assets.
- In an 18-month project, Climate Foundation, in collaboration with the University of Queensland, are modelling and validating the structural resilience and hydrodynamic behaviour of Climate Foundation's 0.1-hectare prototype platform deployed in the Western Pacific utilising field data collected at its offshore site and provide solutions to scale the platform to support a 1-hectare offshore mariculture production.
- One of the pillars of the BE CRC is to educate a new generation of engineers and scientists with detailed cross-disciplinary knowledge to work in future blue economy industries. Our latest project will create dialogues between universities, industry and our educational program to evaluate existing mutual benefits of large industry-university partnerships (like CRCs).

Two projects were commissioned in FY24 to start in FY25, these are:

- The BE CRC has assembled a multi-disciplinary research, operational and funding team to deliver the proposed Bass Strait multi-species Aquaculture Research Trial in Commonwealth Waters. The 3-year research trial (to be approved) aims to deliver a suite of research outputs to inform the introduction of aquaculture into Commonwealth waters. This includes: testing the capability of existing and new sustainable offshore/high-energy aquaculture farming systems for finfish (Tasmanian Atlantic salmon and kingfish); understanding interactions with wildlife and the environment; building awareness and monitoring community sentiment; and exploring governance models.
- Production assessment and species selection tools and models will be developed for quantifying aquaculture production in high-energy coastal waters, in a new 42-month project led by the University of Tasmania. Although primarily focused on salmon and leveraging off an existing benchmarking study on fish selectively bred for offshore conditions, the project will also model production of two other taxa, macroalgae and oysters. The research will have immediate benefits for the industry in Australia and New Zealand.

Progress Against Milestones

The Blue Economy CRC continues to make progress against its research output obligations, having now completed 18 of its contracted milestones, with a further 64 milestones currently in progress.

Research Program Advisory Committees

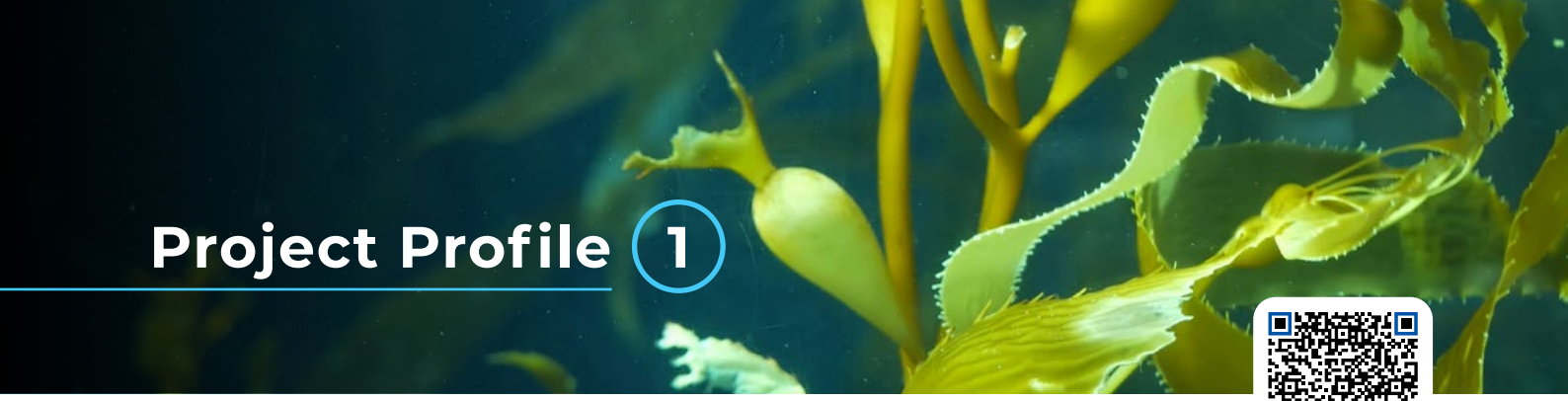
Meeting of the Research Program Advisory Committees (RPACs) continued during FY24. The RPACs are a group of external independent experts (including international members) who help guide and evaluate our research activity and review outcomes. Through these RPACs we have increased the research impact and continue to enhance the global recognition of the BE CRC.

Research Publications and Awards

The BE CRC continues to publish its findings on its website, in project reports, top-tier journal publications, books, industry-relevant magazines and presented at national and international conferences. Thirty-eight publications were accepted and published during FY24, resulting in 155 total publications since the start of the BE CRC. Our full list of publications, books, chapters and articles is available on our website.

Notable Award Mentions

- Professor CM Wang received an award at the OMAE2024 Conference in Singapore from June 9-15, 2024, for his contributions to the development of the Blue Economy Symposium, introduced by ASME (The American Society of Mechanical Engineers) in 2023 due to the sustainable development and growth of the blue economy globally and the leading work of the BE CRC.
- Dr Miguel Frohlich was the recipient of The University of Queensland Early to Mid-Career Researcher (EMCR) Industry Engagement Award for 2023 for his work on the Mapping and analysis of Blue Economy policy and legislative arrangements project.



Project Profile 1

Opportunities for Regenerative Aquaculture on the NSW South Coast

FIND OUT MORE

The Challenge

Regenerative ocean aquaculture is non-intensive, feed-free aquaculture that allows stock to grow on its own, using natural food sources and conditions. It aims to minimise environmental impacts and support environmental benefits, such as improving water quality and providing habitat for marine species, with techniques including shellfish and kelp farming methods. It can contribute to diverse and inclusive new economic opportunities for regional communities and consolidate skills and supply chains. However, new and emerging industries, like seaweed farming, often face roadblocks and risks as they navigate regulatory environments that were often not built with their activities in mind. Entry to new regions can come at a higher risk if community does not have sufficient knowledge of the activity and how it intersects with what matters to them.

The solution / outcome

Together, the University of Wollongong (UOW) and the BE CRC worked with industry, research, government and community to understand the status quo of the regenerative aquaculture industry on the NSW south coast. In particular, exploring how Indigenous, community and economic values can inform the emerging seaweed farming sector and evolving shellfish farming in waters off the NSW south coast.

The study team examined potential social and economic benefits and impacts associated with the growth of this industry and offered a region wide environmental impact assessment for proposed kelp and aquaculture farms.

The impact

To support the transition and responsible growth of a regenerative aquaculture industry in NSW South Coast, the research made a number of recommendations on the establishment of research trial sites, co-designed site selection and the development of a framework to support First Nation leadership in the regenerative aquaculture industry.

The study found a very high degree of in principle support for the development of this industry across the NSW South Coast with an average of 76% of survey participants responding positively to the question '*would you like to see regenerative aquaculture in your LGA?*' The study also found that regenerative aquaculture has a great potential to drive economic growth into the NSW South Coast through investment and job creation in a highly sustainable industry. The region is home to regenerative aquaculture industry pioneers who are charting a course for those that follow.

Finally, the study identified a strong interest across First Nation communities and organisations in being leaders in a regenerative aquaculture industry, particularly if it can be designed in a way that restores Sea Country.

What's next

Aboriginal communities along the NSW South Coast expressed strong interest in leading the development of a restorative aquaculture industry, identifying opportunities for leadership in abalone ranching, seaweed restoration and urchin harvesting and management.

Study co-leads are engaging with the Eden Local Aboriginal Land Council (LALC) on the 'Gudu restorative aquaculture proposal' combining ancient wisdom with modern technologies to deliver opportunities for Aboriginal and non-Aboriginal communities. The proposal brings the LALC together with industry, Government and research partners to deliver on the long held on the aspirations of South Coast Aboriginal people to be leaders of Sea Country management and active participants within the blue economy.

> *Regenerative aquaculture is currently constrained by a regulatory pathway to approval that places prohibitive levels of risk on individual proponents. With further collective effort across government, industry, research and the community, we see a strong and vibrant future for a regenerative aquaculture industry on the NSW south coast.*
>
> Associate Professor Michelle Voyer, University of Wollongong

Project Profile 2

MoorPower Scaled Demonstrator

FIND OUT MORE

The Challenge

The expansion of offshore aquaculture operations is presenting the industry with a growing energy challenge. Currently, these barges that operate in remote areas rely on diesel generators, which pose significant drawbacks:

Environmental Impact: The combustion of diesel fuel contributes to greenhouse gas emissions and air pollution, counteracting sustainability efforts.

Safety Concerns: The storage and transportation of diesel fuel in harsh marine environments create inherent risks.

Logistical Complexities: Delivering fuel to offshore locations can be expensive and challenging, especially in inclement weather.

The solution / outcome

Connected through the BE CRC, Carniege Clean Energy collaborated with aquaculture leaders Huon Aquaculture and Tassal Group to develop the MoorPower technology. Inspired by Carnegie Clean Energy's grid-scale CETO technology, MoorPower offers a solution for sustainable energy generation in offshore aquaculture applications.

MoorPower harnesses the natural motion of moored feed barges to generate clean energy. As the barge rises and falls with the wave motion, the attached belts pull on moorings, driving onboard generators. This approach converts wave energy into electricity, which is stored in onboard batteries until required for use.

Onboard generation reduces the risks of diesel and refuelling challenges, can be integrated with other offshore renewable energy systems (batteries and hydrogen for example) and abates carbon emissions, generating electricity day and night with the motion of the barge.

The impact

Carnegie Clean Energy's MoorPower technology is changing Australian industry by reducing carbon emissions, enhancing operational efficiency, and lowering costs. Its successful deployment and validation have demonstrated its potential to reduce reliance on diesel generators, improve sustainability, and reduce the risks associated with diesel operations. The BE CRC funding has been vital in accelerating this innovation and bringing together industries. Making MoorPower an example of how clean energy can transform offshore operations.

What's next

The successful validation of the MoorPower Demonstrator unlocks the potential to integrate the MoorPower Modules onto commercial Aquaculture feed barges. Carnegie Clean Energy will peruse the collaboration with project partners to continue the commercialisation pathway of the MoorPower technology. Leading to the future widespread adoption across the globe in offshore operations.

> *As population increases, wild harvest stocks decrease, and farming land and freshwater is restricted, aquaculture is providing a source of renewable protein farmed through sustainable practices. Partnerships like this ensure our industry continues to deliver the benefits of high-performance sustainable innovation, research and development (R&D) and change practices.*
>
> Mark Asman, Head of Aquaculture, Tassal Group

Image courtesy of Carnegie Clean Energy. MoorPower deployed at Carnegie's North Fremantle offshore test site.

Project Profile 3

FIND OUT MORE

Enabling Autonomous Technologies for Aquaculture in Challenging Environments

The Challenge

Environmental monitoring is a key component of aquaculture that ensures a safe and high-quality seafood product. One example of this is the monitoring of river flows into aquacultural leases; these flows can transport a variety of pathogens, adversely affecting the growth of oysters or being able to pass on to the end consumer resulting in illness. While directly measuring pathogens within waterways can be costly and labour-intensive, an indirect way of monitoring the risk is through salinity, which is able to approximate the relative portion of seawater to freshwater.

The solution / outcome

This project aimed to provide more effective ways of measuring salinity in deep-water oyster leases through a combination of autonomous systems. Stationary real-time autonomous systems provided an understanding of long-term water quality trends at three sites on the east coast of Tasmania. These systems measured water quality at the surface (1 m) and 5 m depth encompassing the growth zone for deep-water oysters.

The development of a portable autonomous vessel was completed to support stationary monitoring. This vessel can undertake missions in marine leases, spatially characterising water quality parameters, performing profile measurements to a depth of 25 m, and communicating data back to cloud-based services for real-time processing and visualisation. Finally, a water sampling carousel was developed for ground-truthing measurements collected by the autonomous vessel, allowing up to 4 samples to be collected during a mission for laboratory analysis.

In addition to salinity, a suite of water quality parameters was measured locally and by satellites to provide a long-term understanding of oysters' food availability within marine leases. Finally, data on the sea state, including wave and wind conditions, was collected, providing growers real-time information about whether conditions are suitable for boating operations.

The impact

Through real-time monitoring, autonomous vessel operations, and satellite data, growers have been provided a better understanding of how freshwater plumes affect their marine leases. Furthermore, the identification of seasonality of feed within their marine lease and depth of feed. The findings show that deep-water oyster farming can be conducted to greater depths, as annual feed rates can be two times greater at 5 m depth compared to surface concentrations.

These findings boost productivity and safety within the industry, which would not have been possible without the BE CRC assisting with funding instrumentation and linking small businesses with research partners.

What's next

The successful implementation of trials at three sites has led to a high demand for similar characterisation at additional deep-water marine leases. Current discussions are underway to scale up this monitoring work to develop a classification system for oysters within Tasmania, providing oyster growers with a system that can be used to estimate the viability of sites based on lease location and environmental conditions.

> *We have adjusted farming depth over an entire 40 Ha lease because of the knowledge we have gained from the probes. The BE CRC has helped add efficiency and profitability to our subtidal operation.*
>
> Giles Fisher, Freycinet Marine Farm

Deployment of real-time water quality monitoring instrumentation within Great Oyster Bay Tasmania in conduction with industry partners Freycinet Marine Farms.

Project Profile 4

FIND OUT MORE

Code of Practice for Aquaculture Vessels

The Challenge

Aquaculture is a potentially hazardous industry. Operating within this sector exposes individuals to harsh weather conditions, including winds, currents, and waves that lead to significant vessel motion. Additionally, technical, operational, and geographical challenges vary based on the farmed species and location. Given that most aquaculture vessels are categorised as small vessels, and with a lack of specific Work Health and Safety (WHS) procedures for aquaculture operations in Australia, there is a pressing need for comprehensive guidelines to address these multifaceted challenges in design, operation, and safety.

The solution / outcome

The Australian Code of Practice for Aquaculture Vessels has been formulated to provide guidance for the planning, building, surveying, and operation of aquaculture vessels in Australian waters.

This code serves as a resource for individuals engaged in the design, construction, production, ownership, or operation of aquaculture vessels.

Its central objective is to facilitate the certification, commencement, and safe operation of these vessels, thereby fostering the efficient and secure provision of aquaculture services. Specifically tailored to domestic commercial vessels exclusively operating within Australia's Exclusive Economic Zone, the code addresses the unique challenges associated with aquaculture operations.

The impact

The formulation of an offshore aquaculture service vessels Code of Practice aligns with ongoing efforts in the shipping industry. This Code of Practice underscores the necessity of producing a guideline with broad adoption across both the industry and government spheres. Accordingly, it draws significant contributions from all segments of the aquaculture industry.

The Code's objectives encompass improving design, enhancing safety measures, and elevating animal welfare.

What's next

The continuous refinement of the aquaculture Code of Practice is crucial for its relevance in the evolving industry. This involves increased workshops and stakeholder engagement for diverse perspectives, integration of biosecurity measures, active participation in various aquaculture operations (especially offshore), a focus on identifying and promoting best practices, and a heightened emphasis on Work Health and Safety (WHS) in offshore aquaculture. These steps ensure the code remains practical, reflects industry wisdom, addresses emerging challenges, and contributes to the overall improvement of efficiency, safety, and sustainability in aquaculture.

> *The Australian Code of Practice for Aquaculture Vessels has been formulated to provide guidance for the planning, building, surveying, and operation of aquaculture vessels in Australian waters.*
>
> Chris Shearer, Principal Engineer, Project Lead, BMT

Image courtesy of Tassal Group.

Project Profile 5

FIND OUT MORE

Experimental Platform for Aquaculture Production (EPAP)

The Challenge

Marine heat waves are likely to become more frequent and more intense into the future. Whilst salmonid species have genetic potential for continued production under climate change events, immediate attention is required to realise the genetic potential of Tasmanian Atlantic salmon. The Tasmanian Atlantic salmon industry has major production biology research challenges related to climate change, particularly how to select the best families for a future climate.

The solution / outcome

The principal aim of the EPAP project is to validate a translational approach to support industry in addressing future climate change impacts on Atlantic salmon production via their selective breeding program.

- The use of controlled environments in tanks benchmarked against current industry testing in sea pens, at both experimental and commercial scale.
- The use of populations with known genetics from the Tasmanian selective breeding program.
- The use of OMICS technology combined with standard nutritional physiology to understand underlying biological mechanisms and how they influence differences in performance.
- Focused validation and use of a translational approach to be adaptive to industry priorities and to rapidly transfer findings to industry.

The impact

Preliminary analysis from two large thermal tolerance experiments has shown that:

- Genetic analyses on the benchmarking of genetically equivalent populations held in experimental tank systems or in sea pens at commercial sites have shown strong genetic correlations (0.82) for body weight among families for two different size-cohorts. Furthermore, a strong genetic correlation (0.54) was observed between the experimental tank systems and commercial sites. These results are anticipated to offer insights into salmon performance under future climate conditions, thus informing breeding strategies for resilience and growth of the Tasmanian Atlantic salmon industry.
- Proteomics on relevant tissues (liver and muscle) identifies the underlying biological mechanisms that are critical in salmon performance in sub-optimal environmental conditions and then in recovery when returned to optimal conditions. Important systems include protein degradation and unsaturated fatty acid synthesis in liver tissue, and protein synthesis in white muscle.

EPAP-1 Atshaya Sundararajan (BECRC – EPAP PhD candidate) with an Atlantic salmon at the end of a simulated future summer and autumn production cycle.

What's next

The project is currently at a stage where additional performance and sustainability indicators can be considered. Industry has identified a priority interest in feed efficiency, and the relationships between feed efficiency and existing traits of interest for selective breeding and their relationship with feed efficiency. This will lay the foundations to expand the translational approach to offer insights on 'resilient and efficient salmon' and assess potential integration of these new characteristics into selective breeding strategies. The second phase of the project will consider how to best assess feed efficiency and further develop and refine OMICs technologies.

> *The success of this trial holds significant implications for SALTAS and the broader Tasmanian aquaculture industry. This initiative... aligns with the industry's vision for a sustainable and prosperous future in aquaculture.*
>
> Lewis Rands, Selective Breeding Program Manager, Saltas (Published in SMOLT Magazine)

Project Profile 6

Creating Opportunities for Bull Kelp Aquaculture

FIND OUT MORE

The Challenge

Bull kelp, (*Durvillaea spp.*) has strong market demand due to its high biomass, exceptionally high levels of alginates (up to 50% of dry weight) and presence of garden bio-stimulants which are used by the horticulture industry to enhance plant growth. However, the industry currently relies on collection of beach-cast bull kelp to meet demand, and it has not been successfully cultivated anywhere in the world. The amount of beach-cast bull kelp appears to be declining and consequently, there is a need to develop a sustainable bull kelp aquaculture industry. Additionally, bull kelp grows in wave-exposed environments and thus is likely to be suitable for offshore aquaculture.

The solution / outcome

There is currently a lack of basic information on the reproductive biology and early growth of bull kelp: both of which are critical to develop hatchery methods for aquaculture. Our initial work focussed on developing an understanding of reproduction, fertilisation and early growth and we have now optimised hatchery methods that can routinely supply bull kelp seedlings for cultivation in the ocean.

This progress on the important first step in bull kelp aquaculture reflected the BE CRC's support of the research team.

The impact

Global seaweed production is worth >AU$10 billion annually but Australia currently has a very limited seaweed aquaculture and largely relies on wild harvest and imports to meet industry needs.

The global alginate market was valued at ~USD$710M in 2022. This project is directly supporting the development of a new bull kelp aquaculture industry in Australia. This will allow companies such as BE CRC Participant Seasol, the main supplier of seaweed garden bio-stimulant products in Australia, access to a reliable source of bull kelp into the future. The funding of this project is supporting the development of the bull kelp aquaculture industry in Australia.

What's next

The critical next step in achieving a bull kelp aquaculture is to develop methods for at-sea production, which is the focus of the current project 2.24.001: 'Developing at-sea methods for the cultivation of bull kelp (Durvillaea spp.)'.

We are currently testing a range of substrates and methods of adhesion to attach hatchery reared bull kelp to grow lines at-sea. If successful it opens opportunities for farming bull kelp at commercial scales.

> *I am impressed with the skills and passion of the BECRC project team, and the team's progress discovering new hatchery methods.*
>
> Tony Arioli, Director of R&D, Seasol International

Project Profile 7

DC Microgrids for Offshore Applications

FIND OUT MORE

The Challenge

DC (Direct Current) as opposed to AC (Alternating Current) is a natural choice for connecting together renewable energy devices such as solar photovoltaics (PV), batteries, electrolysers and fuel cells, because these are 'DC inside'. Even wind and wave generators are normally connected through a DC stage. Simple DC microgrids are common in the maritime sector, in ships, for example, but employing them to integrate offshore renewable energy resources like wave and wind generators to supply electricity to an offshore industry or island is challenging. The problem is how to manage multiple time-varying sources to supply a time-varying load reliably while maintaining the microgrid itself in a stable state.

The solution / outcome

A DC microgrid was built at Griffith University to explore the issues arising in connecting PV, wave and wind generators (renewables), along with a battery, electrolyser to produce hydrogen and fuel cell to generate electricity from hydrogen, in a DC microgrid supplying a load of up to 12 kW.

Producing and storing hydrogen using excess power generated by the renewables provides longer-term resilience. The electrolyser is emulated by an electronic load. Hydrogen storage is simulated in software. The fuel cell is emulated electronically in the same way as the renewables and connected through a DC/DC converter. This configuration allows the resilience of the microgrid to be explored using any desired capacity for hydrogen storage, realised by any feasible technology, including pressurised gas, liquid hydrogen, metal hydrides and chemical carriers.

The DC microgrid was commissioned successfully and is operating with a simple control algorithm that deploys the battery, electrolyser and fuel cell as needed to maintain the DC bus voltage stable as the inputs and load change smoothly or suddenly. We are currently exploring more sophisticated control algorithms to achieve tighter control of the DC bus voltage.

The impact

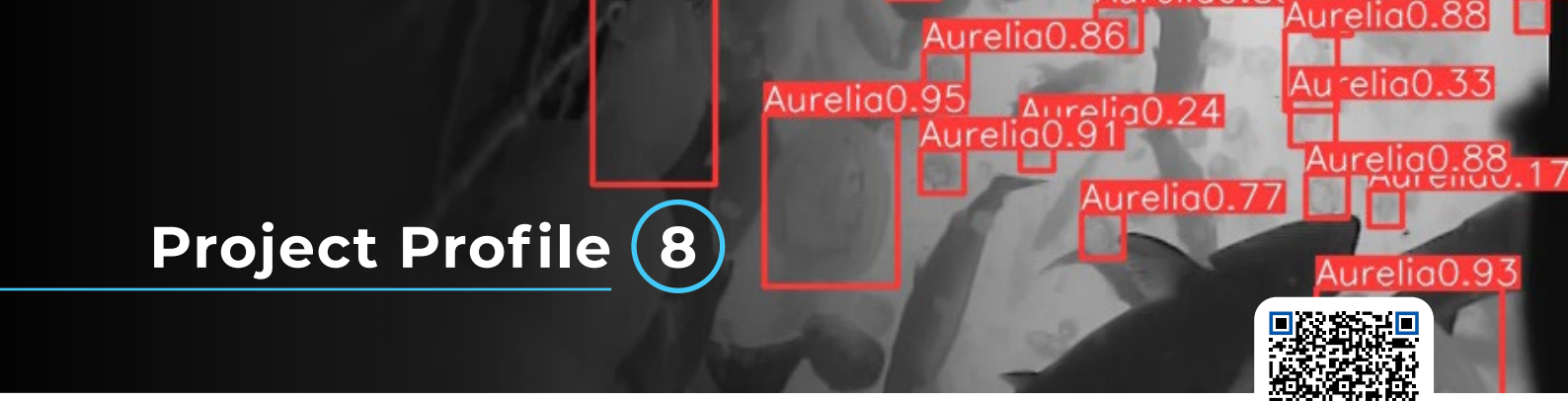
This is an enabling project, completed ahead of the BE CRC building a demonstration DC hydrogen microgrid. Findings from this project allowed us to gain experience and develop a powerful research platform with which the technical feasibility of hydrogen microgrids in the blue economy can be explored.

What's next

Building on learnings from this completed project, the project to build a demonstration DC hydrogen microgrid including a 700-kW electrolyser is underway. Research with the now completed 12-kWDC microgrid continues, examining scenarios in which DC hydrogen microgrids can be deployed to provide reliable electricity and hydrogen supply both offshore and onshore.

> *The laboratory scale DC microgrid provides an important mechanism to test and validate the integration of multiple power sources such as wind, PV and wave into a DC microgrid using both hydrogen and battery energy storage. This laboratory scale work will enable the stability, reliability and resilience of the DC microgrid to be proven prior to the ultimate ground breaking deployment of the larger scale DC architecture in an offshore environment.*
>
> Les Blackwell, CTO, Optimal Group

DC microgrid at Griffith University



Project Profile 8

FIND OUT MORE

Advanced Monitoring to Maximise Fish Welfare in Offshore Aquaculture

The Challenge

Fish farmed at sea are exposed to numerous environmental threats. These include various pathogens, toxins released from proliferations of microalgae, stinging jellyfish that cause skin lesions and damage gills and non-stinging jellyfish (including “comb” jellies and salps) that, when abundant, can occlude nets and deplete oxygen within pens, causing metabolic distress to fish.

Tasmania’s salmon aquaculture industry continuously observes fish using underwater cameras deployed within pens. These cameras stream video footage that is monitored by staff onshore to identify environmental threats, such as the presence of jellyfish in fish pens, or aspects of the behaviour of fish that may indicate problems with their health and welfare (such as increased ventilation rates). Fish farms sometimes contain dozens to hundreds of pens, so continuously monitoring so many pens is logistically challenging and expensive.

The solution / outcome

Our project is using machine learning (a form of artificial intelligence) to automate the monitoring of videos streamed from fish pens. Through workshops and discussions with our industry partners we identified two key aspects they considered priorities for monitoring;

- the presence of jellyfish in fish pens, and
- the front respiratory rate of fish, a key indicator of fish health.

Video libraries of jellyfish and fish in a range of environmental conditions were assembled over the first 1-2 years of the project. Machine learning models were trained to identify different types of jellyfish and to quantify the respiration rate of fish by assessing the rate at which the fish open and close their mouths to push water across their gills.

The impact

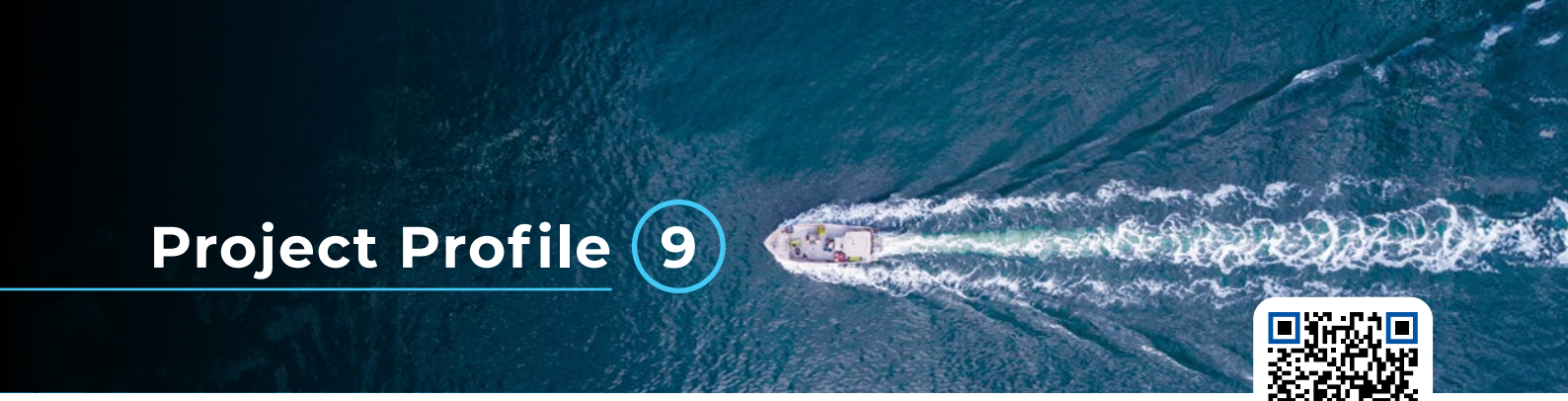
Automating monitoring of the videos streamed from fish pens using machine learning will enable industry to monitor pens more closely and cost-effectively. For example, automated monitoring of respiration rates will enable industry to identify which pens should be prioritised for checks and machine learning may be able to detect subtle increases in respiration rate, which may not be noticed by staff, thus enabling fish farmers to respond to potential health problems before they escalate. Incursions of jellyfish into pens may be detected earlier, enabling mitigation actions to be enacted sooner. Machine learning, therefore, is emerging as a key tool for ensuring the health and welfare of farmed fish, reducing stock losses and reducing production costs.

What’s next

Automated monitoring of fish essential for the industry as it moves offshore and into more high-energy environments, where access to farms and manual monitoring of fish will be less frequent and more costly. The machine learning models we are developing for Tasmania, are globally applicable and have the potential to revolutionise the way fish farmers monitor fish. Commercial development of the models is currently being investigated by the BE CRC.

> *Harnessing computer vision to automatically monitor farmed salmon and the environmental conditions in fish pens will greatly improve the welfare of farmed fish, by enabling fish farmers to detect and respond to problems before they escalate.*
>
> Provided by Professor Kylie Pitt, Griffith University

Automated detection of the moon jellyfish, Aurelia, in a salmon pen in Tasmania.



Project Profile 9

Marine Spatial Planning for a Sustainable Blue Economy

FIND OUT MORE

The Challenge

The regulatory and permitting regimes vary across the various states/territories and Commonwealth waters and between sectors. A unified framework would allow streamlining of project development/permitting, reduce costs through data sharing and simplify engagement with stakeholders.

The solution / outcome

Against the background of the Australian Government's commitment to develop a Sustainable Ocean Plan (SOP) for all of Australia, the BE CRC decided to consider how a Marine Spatial Planning (MSP) framework could address the challenges industry faced while supporting the SOP. The project has worked closely with State and Commonwealth governments, industry partners, peak bodies, NGOs and First Nations peoples to; consider the guiding principles for an Australian MSP process, to align the process with current regulatory requirements and marine management approaches in the States and Commonwealth and to identify tools needed (and develop them) to support implementation of an MSP process.

The impact

We are currently at the mid-point of the project. To date we have made significant progress in the development of tools to assess site suitability for different activities and hence aid selection, to access a wide variety of data from various data platforms and present them as easy to interpret data products and in refining approaches to cumulative impacts assessment – a key issue when considering multi-sectoral approaches.

We have engaged with 184 people from 62 industry, government and NGO organisations and 50 First Nations people from 26 organisations. These discussions have shown strong support for integrated management approaches and identified a set of key principles for an Australian MSP framework. These discussions have in turn spawned discussion of the issues and MSP more widely.

What's next

While we continue to develop and refine the tools to support MSP, the immediate task is to develop and operational MSP framework for Australia that works with and supports the SOP and existing regulatory approaches while delivering on the shared principles communicated to us by our collaborators.

> *Processes such as marine spatial planning can provide greater certainty to inform business planning and investment, and improved transparency in decision-making.*
>
> DCEEW Draft Sustainable Ocean Plan, August 2024.

Project Profile 10

Ethics, Values and Social Licence in the Blue Economy

FIND OUT MORE

The Challenge

As part of their core business, blue economy industries have a range of responsibilities to the environment and the community. Meeting these responsibilities requires having a clear understanding of the values applicable to the blue economy and the ethical risks and opportunities these values create. This project identified a need to provide industry operators, and other stakeholders, with more robust ethical guidance in order to better navigate the tension between benefits and risks in this complex space. Industry also required greater conceptual and practical knowledge of important mechanisms—such as 'social licence to operate' and 'integrity systems'—that impact the implementation of ethical values.

The solution / outcome

In order to support industry to embed ethical decision making into their operations, the project reviewed and evaluated the types of ethical values and principles that blue economy stakeholders practice and expect. These formed a set of six key principles that should underpin blue economy operations:

- Environmental Protection
- Stakeholder Participation
- Fairness
- Harm Prevention
- Beneficence
- Trustworthiness

Implementing these values requires an 'integrity system'—an inter-linked network of legal regulations, institutions, economic incentives, and ethical norms. The project provided industry with an overview of integrity system strengths and weaknesses and 'lessons learned' in the context of the Tasmanian salmon aquaculture industry.

Additionally, the project provided a clear explanation of the 'Social Licence to Operate' (SLO) and offered concrete best practice guidance on moving SLO from an ambiguous concept or a box-ticking exercise to an authentic process that will ensure operational legitimacy.

Practitioners can strengthen ethical conduct and legitimacy through:

- Effective communication and engagement
- Fit-for-purpose governance and regulatory systems
- Scientific engagement driven by trusted independent knowledge brokers
- More effective engagement with First Nations perspectives
- Engaging with social and cultural values
- Understanding the role, strengths and risks of different actors in the integrity system

The impact

This research is assisting practitioners in:

- guiding operations to better achieve benefits while avoiding ethical traps
- informing government policy, law and regulation
- helping justify and explain decisions and actions
- shaping expectations, ensuring that government, industry and community have shared standards

What's next

This research has broad applicability across Australia's marine economy, including to its developing offshore renewables industry. Lessons learned provide the opportunity to integrate ethical decision making, robust integrity systems and authentic social licence to operate practices into this emerging industry. The research team is engaging with offshore wind practitioners in developing guidance documents on ethical best practice for community engagement, and using the lessons learned on blue economy ethics, social acceptability and governance to inform the BE CRC Ocean Wave Energy Report.

> *The Ethics, Values and Social Licence in the blue economy project provides the framework, language, and concepts for understanding what is important to people about the blue economy and why. We are now applying these tools in how we work with community, industry, and governments.*
>
> John Whittington, CEO,
> Blue Economy CRC

Project Profile 11

Cultural Licence to Operate in the Blue Economy

FIND OUT MORE

The Challenge

The project addressed a significant and often re-occurring issue in many parts of the world, namely the need for Industry to move from their business as- usual way of approaching their engagements with First Nations towards the ultimate transformative goal — real beneficial relationships with First Nations. The cross-Tasman and Indigenous led nature of the project is also significant in that it provided a platform for Indigenous research methodologies and perspectives to be centred in the work. Research focus around the Cultural Licence to Operate (CLO) is lacking and this study aims to raise much needed attention and dialogue as we present a first preliminary version of the CLO framework.

The solution / outcome

Corporate responsibility strategies can ring hollow if they remain in the subjective greyness of it being informal, unwritten and self-regulated and do not focus on the steps to objectively reaching co-benefits. The study proposes the CLO framework to implement a shift away from any perceived subjectivity of a strategy to a more objective and committed approach for First Nations and Industry to come together to build and maintain the agreed delivery of co-benefits.

Pillars of the Cultural Licence to Operate framework

The CLO framework is based around seven key pillars that provide a guiding compass to the sense-making, trust-making and behaviours for Industry to boldly 'walk the talk' of respectfully and productively working alongside First Nations.

Approaching fairness from both sides

We developed an evidenced-based approach to characterising the fairness yardstick architecture by assessing views about the expected landscape of fairness and the readiness attitudes with building fair change initiatives.

> *We're flipping the script for industry to consider the competitive advantage of working directly alongside First Nations through changing the formula of corporate responsibility,*
>
> Dr Cass Hunter, CSIRO

The impact

Building the trajectory of partnership pathways with maximum co-benefits.

Tapping into the power inherent to business uncertainty requires a willingness to embrace unorthodox approaches, expand understanding of the risk factors, developing a value-focused strategy and investment in education and awareness. It can be an uphill climb, but putting in the time and work into partnership development can yield rich rewards.

What's next

The project made 5 key recommendations for shifting behaviours and approaches:

1. Investment to implement and test the Cultural Licence to Operate Framework
2. Convene diverse sectors to surface and address tension points
3. Investment to continuously clarify and disseminate expectations and capacity to meeting standards
4. Mandate leadership performance to meeting standards
5. Empower strategic foresight that optimises synergies

The report calls upon 'industry leaders to step up their ambition to drive the transformation needed to deliver the co-benefit goals and renewed awareness in our societies that if we make ethical and equitable choices, that respectfully move us forward together, we can make a positive difference for the future of Ocean Sustainable Development'.

Project Profile 12

Pre-conditions for the Development of Offshore Wind Energy in Australia

FIND OUT MORE

The Challenge

BE CRC research has highlighted the potential of offshore wind in Australia's future energy planning. Key preconditions for the development of offshore wind in Australia include addressing social acceptability, clear understanding of legal and policy settings, and the status and trends in logistics and supply chain operations.

The solution / outcome

The work to date has highlighted emerging interdependences between what are often seen, and addressed, as discrete elements. Site analysis, design, development, construction approval, ports and infrastructure provision, fabrication, marine on site construction and integration with grid, operation and maintenance, monitoring, and end of life decommission each have their own focus, key issues, risks, opportunities, and arrangements. Often these factors are considered in relative isolation, but each is dependent on and is influenced by the preceding elements, and hence creates a value chain. More effective engagement with First Nations perspectives

- Engaging with social and cultural values
- Understanding the role, strengths and risks of different actors in the integrity system

The impact

This BE CRC project focuses on a pre-competitive collaborative approach between the BE CRC and industry and government to support efficacy, integrity and good governance in the development of Australia's offshore wind industry. This approach enables learning and development as each element (and the value chain) is progressed as offshore wind projects develop in the declared offshore renewable energy zones in offshore Australia.

What's next

The first phase of the project identified key elements of social acceptability, law and policy settings, and supply chain operations. The second phase continues this work and seeks to explore the linkages between approval processes, supply chains, and integrity systems to enhance understanding of future development pathways.

This work includes a network analysis approach to map existing regulatory, environmental, and planning assessment and approval pathways for offshore wind projects that will help stakeholders better understand and navigate the complex Australian policy and regulatory framework for offshore wind.

An integrity system for offshore wind will be developed in phase 2 of the project. This will identify ways communities and industry partners can move towards shared values, expectations, and ethical standards, including by developing ethical best practice guidelines in key areas.

Work on supply chain capability and readiness will help identify potential issues I terms of localised supply chains and include scenarios of supply chain systems. This will enable the development of supply chain strategies and to provide direction and support to the Australian offshore wind industry.

> *Nexsphere is an offshore wind developer working on the proposed Bass Offshore Wind Energy (BOWE) wind farm. Nexsphere have been involved in the Preconditions for Offshore Wind Project as a third-party participant since 2021, contributing to each of the work packages. Nexsphere considers the project as vital to advancing offshore wind in Australia by providing industry relevant research, addressing emerging issues in the context of developing regulatory and management arrangements.*
>
> Anna Lewis, Environment Director, Nexsphere

Education and Training

Developing a workforce for the future blue economy is an integral part of the BE CRC strategy.

The BE CRC's education and training program provides a range of research opportunities, with fully- and co- funded Higher Degree by Research (Higher Degree Research) PhD and MPhil scholarships across its five Research Programs. The BE CRC is an ideal work environment for talented graduates to conduct commercially relevant research to tackle the technical challenges facing blue economy industries and develop detailed cross disciplinary knowledge.

Our PhD and MPhil Scholars have opportunities to develop their industry knowledge and relevance, through additional training and international networking opportunities associated with the BE CRC.

The BE CRC will deliver approximately 50 Higher Degree Research graduates over its lifetime.

Higher Degree Research Scholars

As of 30 June 2024, the BE CRC had 36 PhDs undertaking research scholarships of which 5 PhDs commenced their degrees during FY24.

We congratulate PhD Scholar Akshay Krishna Ambika Harikumar (The University of Queensland) who submitted his thesis in May 2024 (which is under examination) and MPhil Minghan (Tony) Bao (Macquarie University) who successfully completed his thesis in February 2024 and has transitioned into a PhD with the BE CRC. Several other scholars are expected to complete their degrees before the end of 2024.

Key Stats

37 Total PhD Scholars (BE CRC Lifetime)

2 Total MPhil Scholars (BE CRC Lifetime)

36 Current PhD Scholars (as of 30 June 2024)

1 Current MPhil Scholars (as of 30 June 2024)

5 PhD scholarships awarded in FY24

1 PhD Scholars completed (BE CRC Lifetime)

1 MPhil Scholars completed (BE CRC Lifetime)

PhD Scholars Present their Research at the 2024 Participants Workshop

Thirty-one of the BE CRC's Scholars attended the 2024 Participants Workshop held in Kingscliff, NSW from 4-6 June 2024.

The Scholars presented posters regarding their research, highlighting why they chose their research topic and their career aspirations post Higher Degree Research completion. Shay O'Hara-Smith was awarded the prize for the best poster for her research on the high value that people place on the visual amenity of the ocean, and the need to recognise this in the development of Blue Economy initiatives. Brianne Lyall was awarded the runner-up prize for her poster regarding her research on skeletal abnormalities in salmon.

Presentations were also heard from PhD Scholar's Akshay Krishna Ambika Harikumar (The University of Queensland), Leteisha Prescott (University of Tasmania) and Yuan Zhen (Richard) Cai (The University of Queensland) who have completed (or close to completed) their thesis.

Scholars learnt the techniques to communicating their research in visual form. There was also a round-table discussion about careers with the BE CRC industry participants and Research Executive, followed by a workshop led by Dr Remo Cossu (The University of Queensland) and his team collating data from the Higher Degree Research's to analyse and qualify the impact on graduate attributes that arise from the CRC's research activities for his recently started project.

Notable Achievements by Higher Degree Research Scholars

- Christine Lynggard Hansen (The University of Western Australia) – Royal Society of Western Australia 2023 Annual Symposium - Student Poster Competition winner (October 2023)
- Avy Sheina (Auckland University of Technology) – best presenter award at 5th IEEE International Conference on DC Microgrids (ICDCM) (November 2023)
- Leteisha Prescott (University of Tasmania) – received a series of student awards and travel bursaries (Finnish National Agency for Education, Australian NZ Marine Biology Society, Company of Biologists) that contributed to a CRC post-PhD submission research internship on unlocking the potential of exercise in rainbow trout at the University of Turku.
- Thein Than Tun (AUT) – JMSE 2024 travel award to present our research work at OMAE 2024 and participate in the OMAE 2024 Outreach for Engineers Forum.

Details of current PhD and MPhil Scholars, as of 30 June 2024

Student	Project Title	Host Institution	PhD Profile
Akshay Harikumar (PhD)	Developing a robust collar tie	The University of Queensland (UQ)	Visit Profile
Neil Salam (PhD)	DC Microgrids for offshore applications	Griffith University (GU)	Visit Profile
Yuan Zhen (Richard) Cai (PhD)	Mooring Tensioner for WECs - MoTWEC	The University of Queensland (UQ)	Visit Profile
Aaron Hibberd (PhD)	Investigating thresholds in the metabolic response of sediment to organic enrichment	University of Tasmania (UTAS)	Visit Profile
Avik Nandy (PhD)	Use of multispectral imagery to enhance aquaculture operations	The University of Queensland (UQ)	Visit Profile
Leteisha Prescott (PhD)	The effects of sustained swimming on long-term changes to Chinook salmon form and composition	University of Tasmania (UTAS)	Visit Profile
Amara Steven (PhD)	Responses to risk: Blue Economy explorations using behavioural economics	University of Tasmania (UTAS)	Visit Profile
Shujian Ma (PhD)	Wave driven compressed air energy storage	University of Tasmania (UTAS)	Visit Profile
Kelly Hoareau (PhD)	Science, technology, and decision-making in the Blue Economy: addressing knowledge gaps	University of Tasmania (UTAS)	Visit Profile
Brett Bolte (PhD)	Exploiting filter feeding bivalves as a natural sampling platform	Griffith University (GU)	Visit Profile
Thien Than Tun (PhD)	Energy-optimal control scheme for mobile robotic platforms in offshore aquaculture	Auckland University of Technology (AUT)	Visit Profile
Nazhmiddin Nasyrlayev (PhD)	Integrated numerical modelling approach for design of offshore aquaculture structures	University of Tasmania (UTAS)	Visit Profile
Chandima Jeewanthi Hapu Achchige (PhD)	Integrating sustainability strategy within environmental management accounting and control	Griffith University (GU)	Visit Profile
Robin Cappaert (PhD)	Influences on composition and ecology of biofouling communities associated with salmon aquaculture	University of Tasmania (UTAS)	Visit Profile
Alana Knight (PhD)	Social licence reporting to support Blue Economy development and expansion in Australia	Griffith University (GU)	Visit Profile
Alamgir Hossain (PhD)	DC microgrids for offshore applications	University of Tasmania (UTAS)	Visit Profile
Bawantha Indrajith (PhD)	Optimum control strategy for the energy management in low-voltage hydrogen based DC micro-grids	University of Technology Sydney (UTS)	Visit Profile
Brianne Lyall (PhD)	Skeletal development in Chinook salmon, with an emphasis on intermuscular (pin) bones abnormalities	University of Tasmania (UTAS)	Visit Profile

Student	Project Title	Host Institution	PhD Profile
Avy Sheina (PhD)	Fault protection and control mechanisms of DC microgrid	Auckland University of Technology (AUT)	Visit Profile
Hasith Jayasinghe (PhD)	Energy storage and demand side management in offshore hydrogen based DC microgrids with controllable loads	University of Technology Sydney (UTS)	Visit Profile
Elianna Zoura (PhD)	The effect of organic enrichment on animal–sediment interactions	Auckland University of Technology (AUT)	Visit Profile
Jillian Conrad (PhD)	An ecosystem-based Blue Economy on Sea Country	Griffith University (GU)	Visit Profile
Shay O'Hara-Smith (PhD)	Ocean ethics: making the case. Aesthetics, intrinsic value, and naturalistic intuitions	Griffith University (GU)	Visit Profile
Huan Sheng (Vincent) Yap (PhD)	Creating opportunities for Bull Kelp aquaculture	University of Tasmania (UTAS)	Visit Profile
Quynh Vo (PhD)	Advanced monitoring of salmon welfare in offshore aquaculture in Tasmania	Griffith University (GU)	Visit Profile
Benhur Joseph Raju (PhD)	Assessing the scale effects on the performance of a multi-body floating wave energy converter	University of Tasmania (UTAS)	Visit Profile
Minghan (Tony) Bao (PhD)	Developing risk-based methodology for co-locating offshore aquaculture and renewable energy systems	Macquarie University (Macq U)	Visit Profile
Trudi Hogg (PhD)	Trust in automation: Investigating the correlation between seafarers' risk perception and their trust in automated maritime systems on ships	University of Tasmania (UTAS)	Visit Profile
Jessica Roach (PhD)	Creating opportunities for Bull Kelp aquaculture	Auckland University of Technology (AUT)	Visit Profile
Atshaya Sundararajan (PhD)	Translational Research on Atlantic Salmon Performance Using OMICS Technologies	University of Tasmania (UTAS)	Visit Profile
Christine Lynggard Hansen (PhD)	Design wave analysis on floating structures: Identifying extreme response drivers for complex structures	The University of Western Australia (UWA)	Visit Profile
Ali Motamedi-Nezhad (PhD)	Numerical study of offshore kelp platform nutrient supply systems using artificial upwelling	University of Tasmania (UTAS)	Visit Profile
Reza Abbasi (PhD)	Physical and numerical modelling of a wave energy converter	The University of Queensland (UQ)	Visit Profile
Fida Ali (PhD)	Spatial MCDM tool for offshore wind and solar energy systems	Griffith University (GU)	Visit Profile
Chenxuan Huang (PhD)	Offshore seaweed and RE farms: solutions for integration and co-location	The University of Queensland (UQ)	Visit Profile
Teresa Thorwarth (PhD)	Hydrodynamic energy attenuation by seaweed aquaculture	The University of Western Australia (UWA)	Visit Profile

Financial Report

Blue Economy CRC-Co Ltd
ACN 634 684 549

Financial Report for the period
1 July 2023 to 30 June 2024

Contents

Directors Report

Blue Economy CRC-Co Ltd
For the year ended 30 June 2024

The Directors of Blue Economy CRC-Co Limited ("the Company") present their report, together with the financial statements of the entity for the period 1 July 2023 to 30 June 2024 and the Independent Audit Report.

Directors details

The following persons were Directors ofthe Company during the whole financial year up to the date ofthis report:

Greg Johannes	(Appointed 5 July 2019)
Gunilla Burrowes	(Appointed 5 July 2019)
Greg Vickery	(Appointed 5 July 2019)
Rhys Edwards	(Appointed 5 July 2019)
Nick Elliott	(Appointed 5 July 2019)
Maia Schweizer	(Appointed 28 February 2023)

Objectives

To undertake the principal activities the Company draws together the knowledge, skills and experience of 46 past and present Participant organisations from industry, research and government, based around Australia and internationally.
The Company's short-term objectives are to:

- Develop an industry led research portfolio with a network of Participants and third-party stakeholders from research, industry, and government;
- Coordinate Participant cash and in-kind contributions together with funding from the Australian Government and other third-party project contributors to undertake the research and training activities and commercialise the outcomes of research;
- Implement the Company's Higher Degree by Research Education Program to support the development oftrained workforce for the future.

The Company's long-term objective is to deliver world class, collaborative, industry focused research and training that underpins the growth of Australia's Blue Economy through increased offshore renewable energy and sustainable seafood production.

Strategy for achieving the objectives

To achieve these objectives, the Company is undertaking research and training across five research programs consistent with our Research Road Maps:

Program 1: Offshore Engineering & Technology

Provides engineering solutions that create healthy aquaculture growing conditions that use the latest technologies for construction, installation, automation, monitoring and maintenance of offshore infrastructure.

Program 2: Seafood & Marine Products

Developing innovative offshore aquaculture systems to provide solutions in animal and plant husbandry and feed design.

Program 3: Offshore Renewable Energy Systems

Developing and testing marine renewable energy devices suited to offshore conditions that support energy export and storage to support aquaculture and other sectors, remote islands and communities and on-grid generation.

Program 4: Environment & Ecosystems

Delivering innovative solutions for modelling and monitoring to understand the environmental impacts of new offshore developments.

Program 5: Sustainable Offshore Developments

Creating new fit for purpose policies and regulatory instruments and sustainable business development and commercialisation models.

Principal activities

The principal activity of the Company during the course of the financial year was the administration of the Blue Economy Cooperative Research Centre.

There were no significant changes in the nature of the activities of the Company during the year.

Performance measures

The Company's principal obligations arise from CRC Grant Agreement CRCX000001 (previously 20180101), as amended, between the Company and the Commonwealth Government. The Company delivers these obligations by developing and undertaking projects whose outputs contribute to meeting the contracted milestones. The Company has developed software-based systems to track progress towards meeting milestones.

Meetings of Directors

During the financial year, 7 meetings of directors were held. Attendances by each director were as follows:

Directors Meetings

	Number eligible to attend	Number attended
Greg Johannes	7	7
Gregory Vickery	7	7
Gunilla Burrowes	7	7
Maia Schweizer	7	7
Nicholas Elliott	7	7
Rhys Edwards	7	7

Information on Directors

Name: Greg Johannes

Title: Chair of the Board

Qualifications: BA (Hons)

Experience and Expertise: Greg Johannes has more than 20 years of leadership experience in the Australian public, private, not-for-profit and research sectors. His roles have included Head of the State Service and Secretary of the Department of Premier and Cabinet in Tasmania. In 2015 he was made a National Fellow of the Institute of Public Administration Australia for his outstanding contribution to the public sector in Australia over many years.

Greg has a deep interest in the oceans and extensive governance experience in the marine science sector. Last year he completed a four-year term as Independent Chair of the Australian Antarctic Program Partnership, he was a long-serving board member for both the Antarctic Climate and Ecosystems CRC and the Institute for Marine and Antarctic Studies, and is a former member (ex-officio) of the Australian Antarctic Science Council.
Greg also runs a boutique consulting company helping boards and CEOs address complex development and organisational issues.

Special Responsibilities: Chair of the Participants Advisory Committee

Name: Gunilla Burrowes

Title: Board Director

Qualifications: BE (Elec), MPhil, PhD & GAICD

Experience and Expertise: Dr Gunilla Burrowes has over 30 years of corporate experience across academia and industry and is passionate about innovation, entrepreneurship, technology commercialisation and improving diversity and inclusion in the workplace.

Gunilla is a pillar of the Newcastle innovation ecosystem, having co-founded her own tech company, BlueZone Group in 2000. She is the inaugural Chair of Eighteen04 (an inspirational co-working and incubator space for companies scaling in the clean tech and smart city area)

and an instigator of Hunter iF project (an open consortium of leading organisations in the Hunter that supports the growing startup ecosystem in the region). She is a member of the Hunter Angels and has been an Angel Investor for over 10 years.

Along with Gunilla's industrial expertise and her pro-active fostering of innovation across the region, she's also co-founder of a consultancy, Gender Matters that advises organisations on gender equity and has a unique approach to mitigating cognitive bias in decision-making. She is a Graduate of the Australian Institute of Company Directors and is on numerous company boards.

Special Responsibilities: Chair of the Communications Advisory Committee

Name: Greg Vickery AO

Title: Board Director

Qualifications: BA/LLB (UQ), Grad Dip Dispute Resolution (Bond Uni) and FAICD

Experience and Expertise: Greg Vickery is an experienced company lawyer and director based in Brisbane. Graduating in Lae from the University of Queensland Greg was a partner of the firm now known as Norton Rose Fullbright for 40 years and has continued his role with the firm as a part-time consultant.

He is a member of the prestigious international Standing Commission of Red Cross & Red Crescent and chairs the Law Council of Australia's Business and Human Rights Committee. He is a former President of the Queensland Law Society and the Australian Red Cross Society and was for ten years a member of the national Corporations and Markets Advisory Committee.

He is currently also a director of Burrell Stockbroking & Wealth Management and chairs the Business & Human Rights Committee of the Law Council of Australia. He was previously the Chair of the prestigious international Standing Commission of Red Cross & Red Crescent and President of the Queensland Law Society. He was for several years the Honorary Consul for Indonesia in Queensland.

Greg is a Fellow of the Australian Institute of company Directors and in 2001 became a member of the Order of Australia (AO) for his governance and leadership of international humanitarian organisations.

Special Responsibilities: Member of the Finance, Audit & Risk Management Committee

Name: Dr Nick Elliott

Title: Board Director

Qualifications: BSc (Hons), PhD

Experience and Expertise: Dr Nick Elliott has extensive marine and aquaculture research and industry knowledge, experience and achievements built through his 33-year career at CSIRO. He is internationally recognised for his research leadership, education and management. A PhD graduate from the University of Tasmania his research experience has included biomonitoring of heavy metals, genetics applied to fisheries, and the application of genetics, physiology and innovative technologies to advance aquaculture production.

His vision and leadership resulted in the internationally recognised selective breeding team at CSIRO, as well as collaborative innovative research in biotags and opportunities for industry expansion offshore. Nick has co-supervised over 15 post-graduate students and mentored many careers. His mission is to continue to see the transformation of the Australian aquaculture sector through collaborative research and education, and is committed to the use and integration of rapidly advancing technologies.

Nick brings abundant knowledge of aquaculture and research management to the Board, including over 10 years on the Tasmanian Fisheries Research Advisory Board.

Special Responsibilities: Chair of the Scientific Advisory Committee

Name: Rhys Edwards

Title: Board Director

Qualifications: B.Ec (Hons), MSc. Comparative Social Research

Experience and Expertise: Rhys Edwards is the principal of RDME Consulting a boutique consulting firm working with governments, universities and the private sector.

Rhys is an experienced organisational leader having worked at the highest levels of the public sector including six years as Secretary of the Department of Premier and Cabinet in Tasmania. He has a strong background in governance, leadership, economic development, innovation and major project facilitation.

Rhys is Chair of UTAS Innovation Ventures, a university owned commercialisation company, a Director of Aurora Energy, a large renewable energy retailer, an honorary senior research fellow at Melbourne University, a moderator for the Cranlana Centre for Ethical Leadership, a Fellow of the Australian Institute of Company Directors, a Salzburg Global Fellow and Rhodes Scholar.

Rhys enjoys working with clients at the intersection of government, education, social enterprise and the private sector to create new models for change and growth.

Special Responsibilities: Chair of the Finance, Audit & Risk Management Committee

Name: Maia Schweizer

Title: Board Director

Qualifications: BA (Hons), MSc, DPhil

Experience and Expertise: Dr Maia Schweizer has worked in energy and infrastructure for 15 years, moving from oil and gas to renewable electricity and green hydrogen.

After training as a geobiologist and ultimately receiving a DPhil from the University of Oxford, Maia began her career as a consultant with McKinsey and Company, serving clients across six continents in capital-intensive industries on strategy, organisation and operational performance. She has held executive roles in project development and operations at Origin Energy and Fortescue Future Industries, and served as CEO of CleanCo Queensland, a low-emissions energy company. Maia is currently the Chief Commercial Officer of SunDrive and member of New South Wales Electrification and Energy Systems Network Advisory Board.

Maia's passion is tackling difficult climate change challenges while ensuring the benefits of solving them flow through to communities.

Company Secretary

Donna Wilson BCom, MBA, CA & GAICD

Donna Wilson commenced with the Blue Economy CRC Co Ltd on 8 January 2024 in the role of Chief Operating Officer and Company Secretary. Donna brings over 25 years of experience in finance and executive level roles working across a diverse range

of industries and organisation types, including public practice at KPMG, ASX listed companies at the CFO level and in statutory government authorities.

Donna holds a Masters of Business Administration in Corporate Governance and a Bachelor of Commerce. She is also a member of Chartered Accountants Australia and New Zealand and is a graduate member of the Australian Institute of Company Directors.

Members' Guarantee

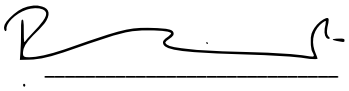
The Company is incorporated under the Corporations Act 2001 and is a company limited by guarantee. If the Company is wound up, the constitution states that each member is required to contribute a maximum of $10 each towards paying any outstanding debts and liabilities of the Company. At 30 June 2024 the Company has 6 members (30 June 2023 : 6 members).

Auditor's Independence Declaration

A copy of the Auditor's Independence Declaration for the period ended 30 June 2024 is included in this financial report and forms part of the Directors' Report.

Signed in accordance with a resolution of the Board of Directors.

Greg Johannes
Chair, Blue Economy CRC-Co Ltd



Rhys Edwards
Director, Blue Economy CRC-Co Ltd

Dated this 25th day of October 2024

Auditor's Independence Declaration

Newton & Henry
Makes the difference

Auditor's Independence Declaration under Subdivision 60-C section 60-40 of the Australian Charities and Not-for-profits Commission Act 2012

To the Directors of Blue Economy CRC-Co Ltd

As auditor of Blue Economy CRC-Co Ltd for the year ended 30 June 2024, I declare that, to the best of my knowledge and belief, there have been:

- no contraventions of the auditor independence requirements of section 60-40 of the *Australian Charities and Not-for-Profits Commission Act 2012* in relation to the audit; and
- no contraventions of any applicable code of professional conduct in relation to the audit.

Newton & Henry

Newton & Henry

Andrew Gray
Partner

Launceston

25 October 2024

Liability limited by a scheme approved under Professional Standards Legislation.

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Statement of Profit or Loss

Blue Economy CRC-Co Ltd
For the year ended 30 June 2024

	NOTES	2024	2023
Funding & Program Revenue			
Funding & Program Revenue	12	12,288,956	11,966,922
Total Funding & Program Revenue		**12,288,956**	**11,966,922**
Other Revenue			
FBT Employee Contribution		-	1,164
Interest Income		135,908	13,025
Other Income		131	20,490
Total Other Revenue		**136,039**	**34,679**
Total Revenue		**12,424,995**	**12,001,601**
Expenditure			
Consulting & Legal Fees		150,653	159,114
Depreciation & Amortisation Expense		163,974	33,485
Directors Fees		214,467	196,215
Employee Benefit Expense		1,273,282	1,060,416
Finance Fees		266,529	121,308
General Administration		402,739	316,338
Marketing & Communications		266,759	199,877
Research & Development Expenditure		9,065,264	9,441,287
Travel		483,204	440,046
Loss on Disposal of Assets		2,086	-
Total Expenditure		**12,288,957**	**11,968,086**
Net Surplus / (Deficit) for the year		**136,038**	**33,515**

The accompanying notes form part of these financial statements.

Statement of Financial Position

Blue Economy CRC-Co Ltd
As at 30 June 2024

	NOTES	30 JUNE 2024	30 JUNE 2023
Assets			
Current Assets			
Cash and Cash Equivalents	3	4,244,996	1,939,045
Financial Assets	5	-	2,000,000
GST Receivable		385,158	121,913
Other Current Assets	7	4,306,100	1,307,625
Trade and Other Receivables	4	725,865	1,033,663
Total Current Assets		**9,662,118**	**6,402,246**
Non-Current Assets			
Property, Plant & Equipment	6	10,346,028	3,248,034
Total Non-Current Assets		**10,346,028**	**3,248,034**
Total Assets		**20,008,146**	**9,650,280**
Liabilities			
Current Liabilities			
Deferred Revenue	11	12,851,896	5,503,898
Lease Liability	10	600,860	505,986
Provisions	8	66,658	74,562
Trade and Other Payables	9	3,017,800	1,702,580
Total Current Liabilities		**16,537,215**	**7,787,027**
Non-Current Liabilities			
Lease Liability	10	1,860,663	1,719,023
Deferred Revenue	11	1,330,000	-
Total Non-Current Liabilities		**3,190,663**	**1,719,023**
Total Liabilities		**19,727,878**	**9,506,050**
Net Assets		**280,268**	**144,230**
Accumulated Funds			
Surplus / (Deficit) for the year		280,268	144,230
Balance at end of year		**280,268**	**144,230**

The accompanying notes form part of these financial statements.

Statement of Cash Flows

Blue Economy CRC-Co Ltd
For the year ended 30 June 2024

	NOTES	2024	2023
Statement of Cash Flows			
Operating Activities			
Receipts from grants, participants and project partners		23,402,227	12,029,290
Payments to suppliers and employees		(15,197,907)	(12,416,017)
GST refunds/(payments) on operating items		(745,847)	35,157
Interest received		135,908	13,025
Other Income		131	-
Net Cash Flows from Operating Activities		**7,594,511**	**(338,545)**
Investing Activities			
Payment for property, plant and equipment		(7,169,085)	(642,677)
GST refunds on capital items		651,735	58,425
Receipts from Term Deposit		2,000,000	-
Net Cash Flows from Investing Activities		**(4,517,350)**	**(584,252)**
Financing Activities			
Payment of lease liability		(771,210)	(154,561)
Net Cash Flows from Financing Activities		**(771,210)**	**(154,561)**
Net Cash Flows		2,305,950	(1,077,359)
Cash and Cash Equivalents			
Cash and cash equivalents at beginning of period		1,939,045	3,016,404
Net change in cash for period		2,305,950	(1,077,359)
Cash and cash equivalents at end of period		4,244,996	1,939,045

The accompanying notes form part of these financial statements.

Statement of Movements in Equity

Blue Economy CRC-Co Ltd
For the year ended 30 June 2024

	2024	2023
Equity		
Opening Balance - Accumulated Funds	144,230	110,715
Increases		
Surplus for the Period	136,038	33,515
Total Increases	**136,038**	**33,515**
Closing Balance - Accumulated Funds	**280,268**	**144,230**

The accompanying notes form part of these financial statements.

Notes to the Financial Statements

Blue Economy CRC-Co Ltd
For the year ended 30 June 2024

1. General Information

(i) Basis of Preparation

Blue Economy CRC-Co Ltd is a not-for-profit company limited by guarantee, incorporated and domiciled in Australia.

These general purpose financial reports have been prepared in accordance with the recognition and measurement principles of all applicable Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board, the Australian Charities and Not-for-profits Commission Act 2012 and the Corporations Act 2001, as appropriate for not-for-profit entities.

The presentation currency used in these financial statement is Australian dollars ($). Amounts in these financial statements are stated in Australian dollars unless otherwise noted.

2. Summary of Material Accounting Policies

(a) Receivables

Trade receivables are initially recognised at fair value and subsequently measured at amortised cost using the effective interest method, less any allowance for expected credit losses. Trade receivables are generally due for settlement within 30 days.

The Company has applied the simplified approach to measuring expected credit losses, which uses a lifetime expected loss allowance. To measure the expected credit losses, trade receivables have been grouped based on days overdue.

Other receivables are recognised at amortised cost, less any allowance for expected credit losses.

(b) Property, Plant & Equipment

All classes of property, plant and equipment are measured on the cost basis and are therefore carried at cost less accumulated depreciation and any accumulated impairment losses. Cost includes expenditure that is directly attributable to the acquisition of the item.

The method of depreciation and the depreciation rate is used a follows:

Furniture and Computer Equipment - Straight Line Method at 30% - 50%

Computer Software - Diminishing Value 67%

Fitout - Straight Line Method over the remaining life of the lease

Right of Use Asset - Hydrogen Equipment - Diminishing Value Method over a self-assessed 20-year effective life

Gains and losses on disposals are determined by comparing proceeds with the carrying amount. These gains or losses are recognised in profit or loss in the period in which they arise.

(c) Revenue Recognition

Revenue comprises revenue from government grants, cash and in-kind contributions from Participants and third-party project contributors. Revenue from major products and services is shown in Note 12.

Revenue is measured by reference to the fair value of consideration received or receivable by the Company for goods supplied and services provided.

Revenue is recognised when the amount of revenue can be measured reliably collection is probable, the costs incurred or to be incurred can be measured reliably, and when the criteria of each for the Company's different activities have been met. Details of the activity-specific recognition criteria are described below.

(d) Government Grants

The Company's operations are supported by Australian Government grant funding.

If sufficiently specific conditions are attached to a grant which must be satisfied before the Company is eligible to receive the contribution, recognition of the grant as revenue is deferred until those conditions are satisfied.

Where a grant is received on the condition that specific services are performed, revenue is recognised as services are performed and at period end a liability is recognised until the service is delivered.

Revenue that is not subject to conditions is recognised when the Company obtains control of the funds, economic benefits are probable and the amount can be measured reliably. Where a grant may be required to to be repaid if certain conditions are not satisfied, a liability is recognised at period end to the extent that conditions remain unsatisfied.

Where the Company receives a contribution of an asset from a government or other part for no or nominal consideration, the asset is recognised at fair value and a corresponding amount of revenue is recognised.

(ii) Cash Contributions Received from Participants and Third-Party Project Contributors

Income arising from Participant cash contributions received is recognised as Deferred Revenue on receipt and revenue is recognised as expenses are incurred under the terms of the Participants Agreement.

Income received from Participants and third-parties for specific research projects is recorded as Deferred Revenue an receipt and subsequently recognised as income in the statement of Profit & Loss as services are performed in accordance with the Project Agreement.

(iii) In-Kind Contributions

The Company has not elected to bring in-kind contributions to account in the financial statements, which is allowed as a policy choice under AASB 1058. Additional disclosures in relation to in-kind contributions received during the financial year are included at note 15.

(iv) Gifts and Donations

Gifts and donations received that do not create enforceable rights and performance obligations are recognised as revenue on receipt.

(v) Interest Revenue

Interest revenue is recognised using the effective interest rate method. It includes the amortisation of any discount or premium.

(e) Trade and Other Payables

Trade and other payables are recognised when the Company becomes obliged to make future payments resulting from the purchase of goods and services. The amounts are unsecured and paid within 30 days of recognition.

(f) Impairment

At each reporting date the Company reviews the carrying amounts of assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such impairment exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss if any. The recoverable amount is assessed as the higher of the value less costs to sell or the assets value in use being the depreciated replacement cost.

(g) Leases

The Company recognises a right-of-use asset and a lease liability at the lease commencement date excluding short term leases and lease for which the underlying asset is of low value. An asset is considered low-value when it is expected to cost less than $10,000. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred and an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, less any lease incentives received.

The right-of-use asset is subsequently depreciated using the Diminishing Value method from the date the asset becomes available for use to the earlier of the end of the useful life of the right-of-use asset or the end of the lease term. The estimated useful lives of right-of-use assets are determined on the same basis as those of property and equipment. In addition, the right-of-use asset is periodically reduced by impairment losses, if any, and adjusted or certain re-measurements of the lease liability.

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using the interest rate implicit in the lease or if that rate cannot be readily determines, the Company's incremental borrowing rate. Generally, the Company uses its incremental borrowing rate as the discount rate.

The lease liability is measured at amortised cost using the effective interest method. It is remeasured when there is a change in future lease payments arising from a change in an index or rate, if there is a change in the Company's estimate of the amount expected to be payable under a residual value guarantee, or if the Company changes its assessment of whether it will exercise a purchase, extension or termination option.

When the lease liability is remeasured this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset or is recorded in the statement of Profit or Loss if the carrying amount of the right-of-use asset has been reduced to zero.

(h) Income Taxes

The Company is charitable organisation under Subdivision 50-B of the Income Tax Assessment Act 1997, Division 176 of a New Tax System (Goods and Services Tax) Act 1999 and section 123E of the Fringe Benefits Tax Assessment Act 1986.

The Company is exempt from the income tax and therefore no provision for income tax is made in the financial statements.

(i) Financial Assets and Liabilities

Financial assets and financial liabilities are recognised in the Statement of Financial Position when the Company becomes party to the contractual provisions of the financial instrument.

Financial instruments are subsequently measured at fair value, amortised cost using the effective interest method, or cost.

A financial asset is derecognised when the contractual rights to the cash flows from the financial assets expire or are transferred and no longer controlled by the Company.

A financial liability is removed from the Statement of Financial Position when the obligation specified in the contract is discharged or cancelled or expires.

Financial assets and financial liabilities classified as held for trading are measured at fair value though profit or loss.

Financial assets not measured at fair value comprise, held-to-maturity investments being non-derivative financial assets with fixed or determinable payments and fixed maturity that will be held to maturity. These are measured at amortised cost using the effective interest method.

(j) Research and Development Expenditure

Research and development expenditure is recognised as an expense in the period incurred. At the financial year end, the research and development costs will be reviewed and any costs eligible for asset recognition under AASB 138 Intangible Assets will be capitalised.

Intangible assets arising from the development activities are recognised when the resources are available to complete the assets and future economic benefits from the use or sale of assets is probable. In assessing whether Intellectual Property falls within the scope of AASB 138, it will be assessed against a set of criteria and then allocated into one of two phases, the research phase or the development phase.

An intangible asset arising from the development will be recognised if, and only if, the recognition criteria is met. The cost of an internally generated intangible asset is the sum of expenditure from the date when the intangible asset first meets the recognition criteria, expenses previously recognised will not be able to be reinstated to this cost base.

(k) Employee Benefits

Short term employee benefits are employee benefits (other than termination benefits and equity compensation benefits) which fall due wholly within 12 months after the end of the period in which the employee services are rendered. They comprise wages, salaries, social security obligations, short-term compensation absences and bonuses payable within 12 months.

Short term employee benefits are measured at the (undiscounted) amounts expected to be paid when the obligation is settled.

Other long-term employee benefits include deferred compensation and bonuses payable 12 months or more after the end of the period in which the employee service are rendered.

Other long-term employee benefits are measured at the present value of the expected future payments to be made to other employees.

Superannuation Guarantee Contribution

All employees of the Company receive superannuation contribution entitlements, for which the Company pays the fixed superannuation guarantee contribution (currently 11.5 % of the employee's ordinary time earnings) to the employee's superannuation fund of choice. All contributions are recognised as an expense when they become payable.

	2024	2023
3. Cash and Cash Equivalents		
Business Transaction Account	2,625,005	1,939,045
Business Online Saver	1,619,990	-
Total Cash and Cash Equivalents	**4,244,996**	**1,939,045**

	2024	2023
4. Trade and Other Receivables		
Current		
Accounts Receivable	725,865	927,663
Accrued Revenue	-	106,000
Total Trade and Other Receivables	**725,865**	**1,033,663**

	2024	2023
5. Financial Assets		
Current		
CBA Term Deposit	-	2,000,000
Total Financial Assets	**-**	**2,000,000**

	2024	2023
6. Property, Plant and Equipment		
Capital Works in Progress		
Hydrogen Equipment - Project and Installation Costs	2,313,735	882,520
Blue Economy Zone - Equipment	5,080,000	-
Total Capital Works in Progress	**7,393,735**	**882,520**
Leasehold Improvements		
Leasehold Improvements at Cost	126,865	126,865
Accumulated Depreciation of Leasehold Improvements	(40,102)	(24,243)
Total Leasehold Improvements	**86,764**	**102,622**
Plant and Equipment		
Plant and Equipment at Cost	49,374	43,239
Accumulated Depreciation of Plant and Equipment	(29,523)	(26,535)
Total Plant and Equipment	**19,851**	**16,704**
Right of Use Asset		
Hydrogen Equipment	2,999,250	2,256,750
Hydrogen Equipment - Accumulated Amortisation	(153,572)	(10,562)
Total Right of Use Asset	**2,845,678**	**2,246,188**
Total Property, Plant and Equipment	**10,346,028**	**3,248,034**

Property, Plant & Equipment Reconciliation

Year ended 30 June 2024

	Plant & Equipment	Capital WIP	Leasehold Improvements	Right of Use Asset	Total
Opening balance	16,704	882,520	102,622	2,246,188	3,248,034
Additions	10,339	6,511,215	-	742,500	7,264,054
Disposals	2,086	-	-	-	2,086
Depreciation	5,106	-	15,858	-	20,964
Amortisation RoU Asset	-	-	-	143,010	143,010
Closing Balance	19,851	7,393,735	86,764	2,845,678	10,346,028

7. Other Assets

	2024	2023
Current		
Prepayments	4,306,100	1,307,625
Total Other Assets	**4,306,100**	**1,307,625**

8. Provisions

	2024	2023
Annual Leave Liability	66,658	74,562
Total Provisions	**66,658**	**74,562**

9. Trade and Other Payables

	2024	2023
Current		
Accounts Payable	487,732	791,341
Accrued Expenses	2,379,578	822,673
Credit Cards	29,022	22,929
Accrued Employment Expenses	121,469	65,637
Total Trade and Other Payables	**3,017,800**	**1,702,580**

	2024	2023
10. Lease Liability		
Current		
Hydrogen Equipment < 12 months	820,627	550,080
Hydrogen Equipment Lease Liability - Unexpired Interest	(219,767)	(44,094)
Total Current	**600,860**	**505,986**
Non-Current		
Hydrogen Equipment < 5 years	2,119,954	1,794,951
Hydrogen Equipment Lease Liability - Non-current - Unexpired Interest	(259,291)	(75,928)
Total Non-Current	**1,860,663**	**1,719,023**
Total Lease Liability	**2,461,523**	**2,225,009**

	2024	2023
11. Deferred Revenue		
Current		
Government Contributions		
CRC Program Grant Received in Advance	3,666,795	147,541
Total Government Contributions	**3,666,795**	**147,541**
Participant and Project Contributions		
Participant & Project Contributions Received in Advance	9,185,101	5,356,357
Total Participant and Project Contributions	**9,185,101**	**5,356,357**
Total Current	**12,851,896**	**5,503,898**
Non-Current		
Unearned Revenue	1,330,000	-
Total Non-Current	**1,330,000**	**-**
Total Deferred Revenue	**14,181,896**	**5,503,898**

	2024	2023
12. Results from Operating Activities		
Funding & Program Revenue		
CRC Program Grant	7,188,090	9,556,525
Participant & Project Contributions	5,100,867	2,410,397
Total Funding & Program Revenue	**12,288,956**	**11,966,922**
Other Revenue		
FBT Employee Contribution	-	1,164
Interest Income	135,908	13,025
Other Income	131	20,490
Total Other Revenue	**136,039**	**34,679**
Net Realised Revenue	12,424,995	12,001,601
Reconciliation of Net Result		
Government Contributions Expended	3,944,734	3,594,536
Participant and Project Contributions Expended	8,344,223	8,373,550
Net Result	136,038	33,515

13. Financial Risk Management Objectives and Policies

The Company's principal financial instruments comprise receivables, payables, cash and short-term deposits. These activities expose the Company to a variety of financial risks: market risk (including interest rate risk), credit risk and liquidity risk.

Surplus funds are invested in short and long-term deposits with the one of the four major Australian banks at the best negotiated rate with maturities selected to match future expenditure needs.

Ageing analyses and monitoring of specific credit allowances are undertaken to manage credit risk, liquidity risk is monitored through regular analysis of cash flows over a variety of periods that draw on the business budgets and forecasts.

The Company has implemented a risk management process and a number of operational Key Performance Indicators and provides the Board and Management with an assessment of performance against agreed objectives.

Risk Exposure and Responses

Interest Rate Risk

The Company's exposure to market interest rates related primarily to the short and long-term deposits held.

Liquidity Risk

The Company manages liquidity risk by monitoring cash flow and maturity profiles of financial assets and liabilities.

14. Key Management Personnel

Key management personnel comprise executive directors and other persons having authority and responsibility for planning, directing and controlling the activities of Blue Economy CRC-Co Ltd.

Name of Each Key Management Personnel:	Position:
John Whittington	Chief Executive Officer
Greg Johannes	Board Chair
Greg Vickery	Board Director
Gunilla Burrowes	Board Director
Nick Elliott	Board Director
Rhys Edwards	Board Director
Maia Schweizer	Board Director
Irene Penesis	Research Director
Angela Williamson	Director, Blue Policy and Planning
Donna Wilson	Chief Operating Officer and Company Secretary

	2024	2023
Amounts paid or payable to key management personnel are as follows:		
Short-term employee benefits	1,497,984	1,228,346
Post Employment benefits	-	-

15. In-Kind Contributions

Participants and third parties make contributions to the various CRC projects in accordance with project agreements through a mix of cash and in-kind contributions. In-kind contributions can comprise both staff in-kind contributions as well as other in-kind contributions. Staff in-kind contributions include the allocation of staff time to the CRC and projects, whereas other in-kind contributions include the allocation of non-staff resources such as access to the use of equipment, property or office space.

As noted in note 1.(d)(iii) the Company has not elected to bring in-kind contributions to account in the financial statements. However, the agreed value of in-kind participant contributions made to the CRC and its projects are as follows:

	2024	2023
In-kind Contributions		
Staff in-kind contributions	8,470,000	10,060,000
Other in-kind contributions	6,475,760	6,806,798
Other in-kind contributions prior year adjustments	-	4,471,600

	2024	2023
16. Unrecognised Contractual Commitments		
Payable within 1 year	13,554,442	6,139,908
Payable outside 1 year	16,959,887	6,239,279
Total Unrecognised Contractual Commitments	**30,514,329**	**12,379,187**

Unrecognised contractual commitments represent future amounts owing to Project Parties for research in accordance with Project Agreements or other contractual arrangements for which milestones have not yet been met.

	2024	2023
17. Remuneration of Auditors for:		
Auditing or reviewing the financial statements	11,000	7,500

18. Subsequent Events

No matter or circumstance has occurred subsequent to year end that has significantly affected, or may significantly affect, the operations of the Company, the results of those operations or the state of affairs of the Company or economic entity in subsequent financial years.

19. Economic Dependency & Continuance of Operations

The Company depends upon continued support from Participants and the Commonwealth of Australia for its ongoing operations. During the period ending 30 June 2024 approximately 45% (2023: 39%) of the Company's cash contributions of $19,636,954 (2023: $10,331,092) was sourced from Participants and third-party project contributors and 55% (2023: 61%) from the Commonwealth of Australia.

The Commonwealth of Australia's Cooperative Research Centres Program Grant Agreement with the Company concludes on 30 June 2029.

As at 30 June 2024, the Company's Current Assets totalled $9,662,118 and its Current Liabilities totalled $16,537,215. As Current Liabilities include $12,815,896 of Deferred Revenue, Management does not believe there is any concern regarding the Company's ability to meet its short-term debts as and when they fall due, as Deferred Revenue will be recognised as income as contracted services are performed and milestones are achieved. Deferred Revenue received is reflected in Cash and Cash Equivalents, Other Current Assets (prepayments) and Property, Plant and Equipment balances as at 30 June 2024.

20. Cash Flow Information

Reconciliation of net cash flows from operating activities to operating profit.

	2024	2023
Cash Flow Reconciliation		
Profit for the year	136,039	33,515
Interest on RoU Lease	263,106	122,821
Depreciation & Amortisation	163,974	33,485
Changes in Assets & Liabilities		
(Increase)/Decrease in Trade & Other Receivables	307,798	498,626
(Increase)/Decrease in Other Current Assets	(2,998,475)	(19,365)
Increase/(Decrease) in GST Payable	(263,244)	(68,034)
Increase/(Decrease) in Trade & Other Payables	1,315,220	557,742
Increase/(Decrease) in Provisions	(7,904)	32,494
Increase/(Decrease) in Other Current Liabilities	-	-
Increase/(Decrease) in Deferred Revenue	8,677,997	(1,529,830)
Cashflows from Operations	**7,594,511**	**(338,545)**

21. Entity Details

The registered office and the principal place of business of the Company is:

Building "N"

Maritime Way

Newnham, TAS 7248

Directors Declaration

Blue Economy CRC-Co Ltd
For the year ended 30 June 2024

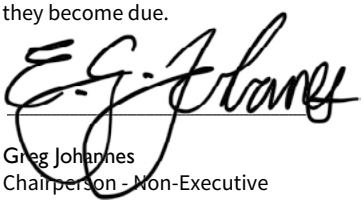
In accordance with the resolution of the directors of Blue Economy CRC-Co Ltd, the directors declare that:

1. The financial statements and notes are in accordance with the Corporations Act 2001 and the Australian Not-for-Profit and Charities Commission Act 2012 and:

(a) Comply with Australian Accounting Standards applicable to the Company and Division 60 of the Australian Charities & Not-For-Profits Commission Regulations 2013; and

(b) Give a true and fair view of the financial position of the Company as at 30 June 2024 and of its performance for the year ended on that date in accordance with the accounting policies described in Note 1 to the financial statements.

2. In the directors' opinion there are reasonable grounds to believe that the Company will be able to pay its debts as and when they become due.



Greg Johannes
Chairperson - Non-Executive

25 October 2024

Date

Rhys Edwards
Director - Non-Executive

25 October 2024

Date

Independent Audit Report

Newton & Henry
Makes the difference

Independent Audit Report to the members of Blue Economy CRC-Co Limited

Opinion

We have audited the financial report of Blue Economy CRC-Co Limited (the registered entity), which comprises the Statement of Financial Position as at 30 June 2024, the Statement of Profit or Loss, the Statement of Changes in Equity and the Statement of Cash Flows for the year then ended, notes to the financial statements including a summary of material accounting policies and the Directors' declaration.

In our opinion, the accompanying financial report of Blue Economy CRC-Co Limited is in accordance with Division 60 of the *Australian Charities and Not-for-profits Commission Act 2012*, including:

(i) giving a true and fair view of the registered entity's financial position as at 30 June 2024 and of its financial performance for the year then ended; and

(ii) complying with Australian Accounting Standards – Simplified Disclosures and Division 60 of the *Australian Charities and Not-for-profits Commission Regulations 2022.*

Basis for Opinion

We conducted our audit in accordance with *Australian Auditing Standards*. Our responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Report* section of our report. We are independent of the registered entity in accordance with the auditor independence requirements of the *Australian Charities and Not-for-profits Commission Act 2012* and the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants (including Independence Standards)* (the Code) that are relevant to our audit of the financial report in Australia. We have also fulfilled our other ethical responsibilities in accordance with the Code.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Information

The Directors are responsible for other information. The Other Information obtained at the date of this Auditor's Report is information in the Director's Report.

Our opinion on the financial report does not cover the Other Information and accordingly we do not express any form of assurance conclusion thereon.

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In connection with our audit of the financial report, our responsibility is to read the Other Information and, in doing so, consider whether the Other Information is materially inconsistent with the financial report, or our knowledge obtained in the audit, or otherwise appears to be materially misstated.

If, based on the work we have performed on the Other Information obtained prior to the date of this auditor's report, we conclude that there is material misstatement of this Other Information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of Directors for the Financial Report

The Directors of the registered entity are responsible for the preparation of the financial report that gives a true and fair view in accordance with Australian Accounting Standards – Simplified Disclosures and the *Australian Charities and Not-for-profits Commission Act* 2012 and for such internal control as the Directors determine is necessary to enable the preparation of the financial report that gives a true and fair view and is free from material misstatement, whether due to fraud or error.

In preparing the financial report, the Directors are responsible for assessing the registered entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Directors either intend to liquidate the registered entity or to cease operations, or have no realistic alternative but to do so.

The Directors are responsible for overseeing the registered entity's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Report

Our objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial report.

As part of an audit in accordance with the Australian Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit

procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the registered entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Directors.

- Conclude on the appropriateness of the Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the registered entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the registered entity to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial report, including the disclosures, and whether the financial report represents the underlying transactions and events in a manner that achieves fair presentation.

- We communicate with the Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the Directors with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

Newton & Henry

Newton & Henry

Andrew Gray
Partner

Launceston
25 October 2024

BLUE ECONOMY
COOPERATIVE RESEARCH CENTRE

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Australian Government
Department of Industry, Science and Resources

Cooperative Research Centres Program

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