

Offshore Future Energy Forum

25 - 26 November 2021



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The Offshore Future Energy Forum took place on 25 and 26 November 2021 in New Plymouth, Aotearoa New Zealand. It was hosted by Ara Ake and Venture Taranaki in partnership with sponsors BlueFloat Energy, Energy Estate, Elemental Group, Aotearoa Wave and Tidal Energy Association (AWATEA), New Zealand Wind Energy Association, and Western Institute of Technology at Taranaki (WITT).

The purpose of the forum was to enable open conversation sharing progress since the 2020 Offshore Wind Forum, and provide a global update. It also involved a deeper dive into the range of offshore energy and associated opportunities.

The 2021 Forum followed on from the Offshore Wind Forum held by Venture Taranaki and supported by Ara Ake and WITT in New Plymouth in 2020. It provided a valuable opportunity to open discussion about New Zealand's offshore wind potential.

The Forum brought together twenty-nine New Zealand and international speakers, with a diverse range of expertise to present ideas about the future development and research opportunities in the blue economy field. Topics included offshore wind renewable energy, legislative frameworks, green hydrogen, energy storage, ocean wave energy and iwi perspectives. Over 140 online and in-person attendees participated in the event.

The themes from the forum centred on New Zealand's drive to decarbonise its economy, its large offshore marine energy resource, the availability of overseas and indigenous technology to transform this energy, the established skills and infrastructure that can assist global know-how and capital to enable increased local energy production and exports, as well as other advanced products/manufacturing, via Power to X. To progress these opportunities and ultimately transition to a low emissions future, there must be supporting regulations and legislation.

Eighteen deep-dive workshop presentations were delivered and organised in eight sessions:

Part 1: Overview

Part 2: International offshore wind perspectives

Part 3: Iwi Perspective

Part 4: Power to X

Part 5: Panel Discussion – offshore wind opportunities and challenges

Part 6: Wave and Tidal

Part 7: Marine Storage

Part 8: Panel Discussion – marine tidal and wave technologies opportunities and challenges

The following sections summarise the key themes and messages from the workshop presentations.

HON DR MEGAN WOODS: MINISTER OF ENERGY & RESOURCES KEYNOTE ADDRESS

Given the New Zealand Government's commitment to meet the net-zero carbon 2050 target and 100% renewable electricity generation by 2030, the emerging offshore energy industry is viewed as an opportunity to help meet these ambitious but feasible goals. The government recognises the need for regulatory and legislative certainty and clarity to enable offshore wind sector development and investment while at the same time protecting New Zealand's valuable resources and communities, such as fisheries, marine ecosystems and tangata whenua. Minister Woods announced that work on the regulatory settings related to offshore renewable energy would begin in the second half of 2022.

PART 1: OVERVIEW

The Aotearoa Circle presented their Low Carbon Energy Roadmap, a precursor to the Energy Strategy for Aotearoa New Zealand. The Aotearoa Circle is a unique partnership of public and private sector leaders unified and committed to the pursuit of sustainable prosperity and reversing the decline of the nation's natural resources. It is emphasised in the Roadmap that if Aotearoa New Zealand considers the energy sector as a whole system and understands the interconnectedness whilst keeping the energy trilemma at the forefront, there is an opportunity to become a world leader in decarbonising the sector in new ways creating new industry and skills. *(Chris Jewell – Co-Chair, Low Carbon Energy Roadmap, The Aotearoa Circle).*

An update since the [Offshore Wind Forum 2020](#) highlighted developments in the offshore wind space and the increasing opportunity to accelerating investment in offshore renewable energy development. The focus should be on providing electricity for New Zealand as well as enabling Power to X or cable exports as the industry matures. *(Nick Jackson – Director, Elemental Group).*

Decarbonisation provides an opportunity for offshore wind as the vehicle fleet and process heat are electrified, resulting in material growth in the electricity market. New Zealand has developed the Offshore Wind Working Group within the New Zealand Wind Energy Association to raise awareness of offshore wind and to develop tools for the industry. *(Giacomo Caleffi – Chair, New Zealand Offshore Wind Working Group).*

The energy system is on the verge of unprecedented change driven by decentralisation, digitisation and decarbonisation. The Government's response to this is driven by balancing the Energy Trilemma of security, equity and sustainability. This is being progressed through the vehicle of the Emissions Reduction Plan for Energy and Industry together with the draft Infrastructure Strategy for New Zealand. Offshore wind coupled with Power to X and green hydrogen are seen to be technologies that can help address this challenge, whilst creating highly skilled regional job opportunities. *(Philippa Fox – Acting Deputy Chief Executive, Building, Resources and Markets).*

The pathway to increased renewables to meet electricity demand growth from electric transport and process heat electrification will require the national grid to be enhanced. The goal is to build a grid that will enable energy sector decarbonisation, with industry wide collaboration. There was some discussion (through questions) on the grid's capacity to support Power to X levels of electricity flow for the manufacture of export orientated products. *(Andrew Renton – Senior Principal Engineer, Transpower).*

PART 2: INTERNATIONAL OFFSHORE WIND PERSPECTIVES

Australia passed the *Offshore Electricity Infrastructure Bill 2021* on 25 November 2021 to regulate all forms of offshore renewable energy development that will support the expanding investment and accelerate the development of commercial projects. The Bill encompasses a licensing scheme for offshore energy infrastructure, safety and protection zones, environmental management scheme, and worker safety through the modified application of the *Work Health and Safety Act 2011*. (Stephanie Thornton, Australian Ocean Energy Group).

The Global Wind Energy Council released the [Global Offshore Wind Report](#) in October 2021. The report notes that currently the UK has the largest offshore wind market. In terms of total installed capacity, the UK and China are similar sizes.

2000GW are required globally to meet the carbon neutrality target and sustain a Paris-compliant pathway. Aotearoa New Zealand is noted as having the fundamentals for offshore wind and is seen as a prominent player in the transition. (Alastair Dutton – Chair, Global Wind Energy Council).

International governments are focused on the low levelised cost of energy (LCOE), economic development, and job opportunities. While offshore wind developments are much more complex than onshore projects, they bring significant opportunities to local communities. Experience from the UK shows that the growth pathway is intermittent with periods of development activity followed by periods of inactivity.

Initial UK industry operating standards were low, and these have improved as the industry has matured. New Zealand can learn from this experience. Preparing the workforce through training initiatives should be implemented early on in the development of an offshore wind industry. (Katharine York – Operations & Maintenance Centre of Excellence Manager, Catapult UK).

Developers ParkWind EU (Pieterjan Vanbuggenhout), BlueFloat Energy (Jarek Pole), and Oceanex (Andy Evans) outlined their experiences with offshore wind in Europe and Australia. They consider New Zealand as an attractive location due to its high-quality wind resource. Collaboration around infrastructure will be important for offshore wind success and this includes the early development of a local supply chain.

BlueFloat Energy announced its consortium with Energy Estate and Elemental Group to develop wind farms in New Zealand and Australia while at the same time releasing their joint report [Haumoana: Offshore wind capacity building in New Zealand](#). This highlights the untapped offshore wind development potential and how New Zealand can benefit locally from supply chain and employment opportunities.

PART 3: IWI PERSPECTIVE

Dion Tuuta (Chief Executive, Te Atiawa) provided an introduction into how iwi can be involved in open and ongoing dialogue about the transition to a low emissions future for Aotearoa New Zealand. Iwi are passionate about an equitable transition, and the social lens is now changing where iwi are in the economic development phase, and long-term resilience and equity for whanau are at the forefront. There is a clear desire to meaningfully participate by understanding what it will take to decarbonise our nation, but genuine and long-term relationships must be formed to do this.

PART 4: POWER TO X

Power to X is the conversion of electricity to energy stored in molecules such as hydrogen, methanol, ammonia, and carbon fuels. These are relevant for sectors such as heavy transport, chemical feedstocks, and aviation fuels, as well as other advanced manufacturing opportunities. This conversion creates the opportunity for energy storage and carriage in New Zealand and for energy and other exports. For offshore wind, these would be large scale developments. Venture Taranaki announced the release of its future-focused concept paper, [Power to X](#), that highlights an ambitious role for Taranaki and New Zealand in this space given the context of a global acceleration to a low emissions landscape (*Justine Gilliland – Chief Executive, Venture Taranaki and Toby Stevenson – Director, Sapere*).

In Australia, the value of abundant renewable offshore energy can be spread much further if Power to X applications are considered. There are many Power to X projects being deployed globally through a variety of applications, and in Australia, mobility, gas, and ammonia are the most common themes. (*Thom Cameron – Hydrogen and Chemicals Technology Director, Aurecon*).

PART 5: PANEL DISCUSSION - OFFSHORE WIND OPPORTUNITIES AND CHALLENGES

There is a need to decarbonise the New Zealand energy system, while simultaneously developing the markets and there is also a need to develop transition plans for offshore wind personnel, including training and developing supply chains. Currently, the Taranaki region appears to be the most suitable location for initial offshore wind development due to its high-quality wind resource, the existing engineering skillsets, and the location of the Taranaki deep water port. (*Jen Natoli – E tū, Brett Rogers – Elemental Group, Andrew Clennett – Hiringa Energy, Ross Dingle – Port Taranaki, Kyle Hall – Western Institute of Technology at Taranaki*).

PART 6: WAVE AND TIDAL

In order to meet climate change obligations and energy sector decarbonisation, offshore energy systems can play a role. Climate change monitoring of the ocean is still in its infancy and further research is required (*Matt de Boer – Senior Analyst, Climate Change Commission*).

Offshore energy systems would enable further data gathering for consenting, construction, and operations. The best sites for harvesting wave energy identified Southland, West Coast, Taranaki, and Waikato using GIS mapping techniques (*Danielle Bertram – Civil Engineering Lecturer, University of Waikato*).

Current technologies for offshore tidal and wave energy have 250 concepts in research and various stages of development around the world (*Martin Knoche – Co-Chair, AWATEA*). They suit remote coastal communities which require power and/or freshwater. They are characterised by having very high uptime and when wave systems are coupled with wind systems, energy production uptime can reach 90%.

An overview of Australasian trials include wind, tidal and wave. In order to be successful, those companies involved need to focus on market pull, rather than technology push (*Stephanie Thornton – Cluster Manager, Australia Ocean Energy Group*). Overviews of the Azura Wave Technology (*Armin Howard – Group Operations Manager*), Aotea Environmental Monitoring (*Dr Vladislav Sorokin*) and Environmental River Patrol Aotearoa (*Millan Ruka – Ruka Energy*) prototypes were presented as illustrations of working ocean energy devices.

PART 7: MARINE STORAGE

EnergyBank presented their 50MW deep-water gravity storage concept. It is an ocean-based gravity battery, which is connected to the grid via an undersea cable and moves iron-ore aggregate masses between the ocean surface and floor. It stores energy as gravitational potential, then releases it by lowering the weights in water depths of 2,000m (*Tim Hawkey – Co-Founder, EnergyBank*).

PART 8: PANEL DISCUSSION - MARINE TIDAL AND WAVE TECHNOLOGIES OPPORTUNITIES AND CHALLENGES

One of the challenges impacting the research and development of marine tidal and wave technologies is the lack of regulatory framework, however the Government has announced a regulatory review commencing mid-2022 which should enable a clear strategy to shape and support the research. By taking a whole systems approach integrating the complete value chain, whilst also taking a mātauranga Māori perspective, it will support the technologies to get more traction.

When the technologies are established, there will be an increase in employment opportunities, an increase of electricity produced from renewable energy, and ultimately the transition to a low emissions energy future will be supported. (*Dr Craig Stevens – NIWA, Martin Knoche – AWATEA, Matt de Boer – Climate Change Commission, Millan Ruka – Ruka Energy, Stephanie Thornton – Australian Ocean Energy Group*).

PRESENTATIONS & VIDEO RECORDINGS

Presentations and video recordings from the Offshore Future Energy Forum are available on the [Ara Ake website](#).

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