Murihiku Regeneration

# HIGH LEVEL ENERGY TRANSITION PLAN

October 2023

# CONTENTS





Murihiku Regeneration

# SECTION 1: BACKGROUND AND OVERVIEW

## 1.1 About Murihiku Regeneration

Murihiku Regeneration is an Iwi-led regional development construct acting in the national interest.

It is led by the Murihiku-Southland Upoko through Hokonui Rūnanga by the Hokonui Rūnanga Health and Social Services Trust.

Its purpose is to support its members, Murihiku Hapū, the wider community, Iwi-Māori, and Ngāi Tahu whānui through regenerative and intergenerational actions based around the four Ngāi Tahu pou (Figure 1).


*Figure 1: The four Ngāi Tahu pou.*

Education and training underpin the four pou by ensuring whānau have the capability needed to make the most of a de-carbonised economic environment.

## 1.2 The Energy Transition Workstream

Murihiku Regeneration runs a Energy Transition Programme focsed around the Murihiku-Southland's energy transition, climate and decarbonisation efforts.

The programme consists of three programmes of work to meet the opportunity demonstrated by Figure 2:

a. **Tiwai Future** – includes consideration of the smelter closure, clean-up, remediation, environmental impact, cultural impact and exploration of future/re-purposing opportunities. Being led through Awarua Rūnaka (remediation/community development) and supported by Hokonui Rūnanga.

b. **Green Energy Future –** Ngāi Tahu ki Murihiku is at the centre of developing large scale clean energy capability focused around green hydrogen that protects te taiao and supports growth and wellbeing for our region and country.

c. **Clean Energy Murihiku –** Co-ordinating work with Crown agencies and energy entities around the Just Transitions programme. This work includes a focus on creating a renewable energy and industrial zone in Southland, net zero Rakiura, infrastructure development and associated policy work.

We see the opportunity for Murihiku-Southland as follows (Figure 2):


*Figure 2: The decarbonisation opportunity for Te Waipounamu. Source: From 'The Decarbonisation Story', Te Rūnanga o Ngāi Tahu.*



Murihiku Regeneration

## 1.3 Our Energy Transition Goals

By 2030 we want to see the following (summarised in Figure 3):

- 100% renewable energy generation within the takiwā, as a net exporter of energy.
- The targeted decarbonisation of two key sectors, heavy transport (land and marine) and process heat.
- Murihiku-Southland as New Zealand's largest producer of green hydrogen.
- Rakiura well on a path to becoming net zero.
- Accelerating uptake through Regional Aviation and Heavy Transport – as the first region to achieve electric aviation and then being ready for hydrogen fuelled aircraft. Also setting up a viable carbon reducing refuelling network (hydrogen and electric) for heavy transport.
- Building an effective net zero workforce - the creation of new trades and professional jobs in science, technology, engineering, environmental management and planning, and adjacent sectors.

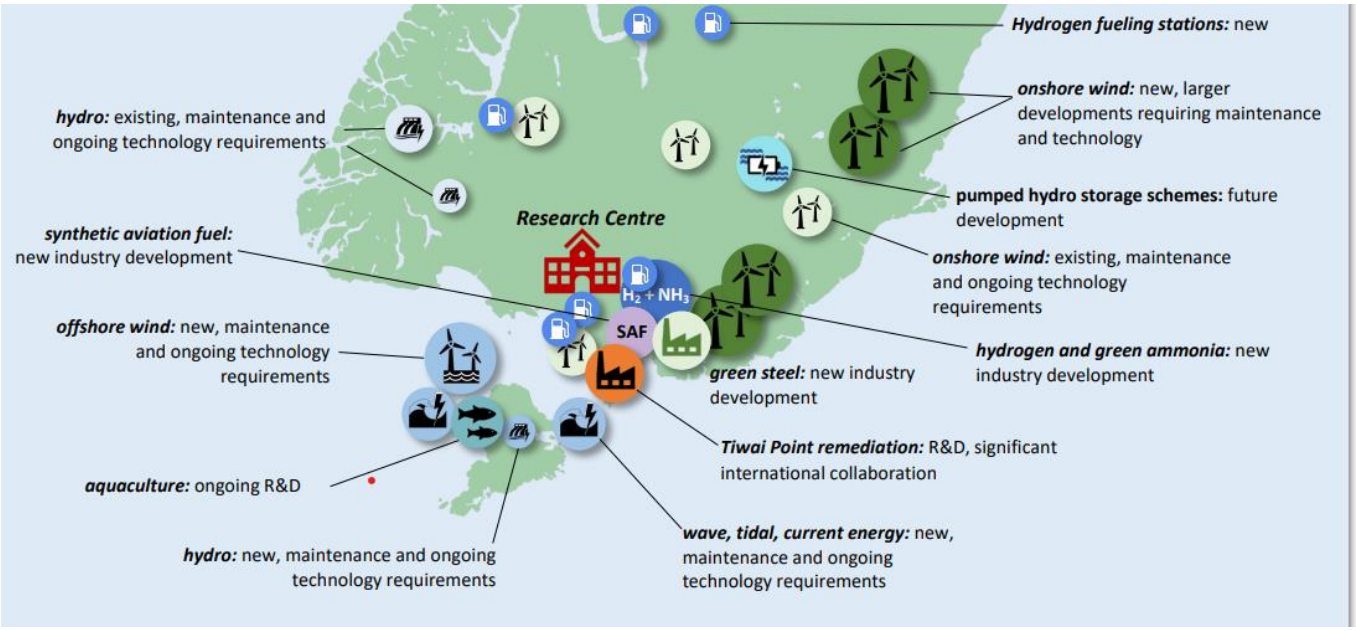


*Figure 3: Murihiku-Southland 2050; source Murihiku Regeneration Energy Plan.*



Murihiku Regeneration

## 1.4 Summary of Areas of Focus

The areas for focus to achieve these goals through our energy transitions programme for 2023-27 are as follows:

1. **Tiwai certainty to create a pathway to an energy trilogy[1] by 2030**

2. **Enabling necessary policy and regulation:**

    a. Implementing a Renewable Energy and Industry Zone (REZ) to provide certainty in 2024.
    b. Establishing a Regional Energy Leadership Group -enabling visible alignment and coordination on priorities.
    c. Establishing a regulatory and consenting 'taskforce' to support the energy supply-demand pipeline.

3. **Supporting innovation:**

    a. The creation of a renewable energy hub that supports the early adoption of aviation and heavy transport (land and marine) decarbonisation.
    b. A research, science and innovation programme focused on applied projects to support the delivery of advanced technology in cooperation with global technology leaders.
    c. Exploring scalable commercial $CO_2$ capture for SAF/e-methanol applications, including using biomass innovation.

4. **A Net Zero Rakiuru Plan by 2024 and implemented by 2030**

5. **Community and distributed energy innovation and action**

6. **A workforce plan to support future development**

[1] The Energy Trilogy consists of: Tiwai Smelter remaining until 2040, establishing a scaled green hydron production capability, and ensuring new renewable energy projects (sufficient to meet a growth scenario) are established, as regional priorities.

## 1.5 Sequencing the Energy Transition

Activation of the Energy Transition Plan will necessarily require sequencing and prioritisation. We see this occurring through three main phases of action – see Figure 4.

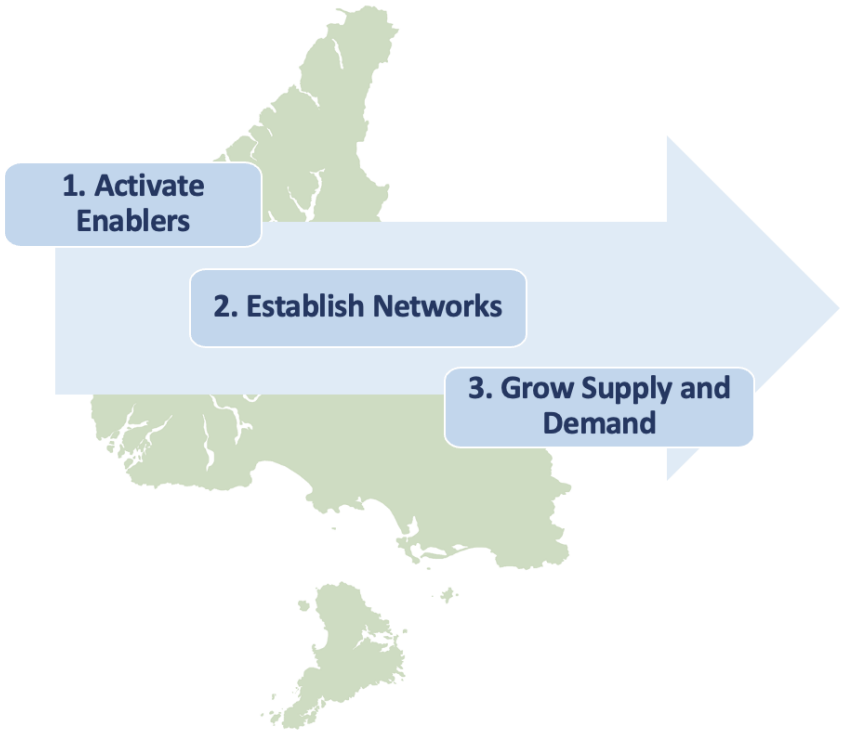


*Figure 4: The Murihiku Energy Transition Sequence, Source Murihiku Regeneration Energy Transition Plan.*



Murihiku Regeneration

# SECTION 2: DETAILED DESCRIPTIONS OF INITIATIVES

## 2.1 Providing Tiwai certainty in 2024 and a pathway to the energy transition trilogy by 2030

### 2.1.1 Certainty around a near-term closure or a long-term future

Given the importance of the Tiwai Aluminium Smelter to the current Aotearoa and Murihiku-Southland situation (13 percent of electricity consumption, 6.5% of Southland GDP[2]), Murihiku Regeneration has identified this decision point as critical to the regional energy transition pathway. Engagement with regional stakeholders (May 2023 Wānanga, and August 2023 Regional Leaders Workshop) reinforce this. Murihiku Regeneration has supported this focus area through the establishment of a Memorandum of Understanding (MOU) with Rio Tinto and its local subsidiary and maintains regular engagement.

### 2.1.2 Opportunity and pathway for new industries that enable large-scale development of green hydrogen and regional activation of the Power-to-X economy

Murihiku-Southland is arguably best placed to activate a large-scale green hydrogen-based economy to be in place in New Zealand by the early 2030's.

Green hydrogen is a critical factor for Murihiku as a clean fuel and fuel precursor, that enables domestic carbon abatement in heavy industry, heavy transport (both land and marine), and in aviation (both domestic and international). This opportunity is already evidenced by the developing HWR Group refuelling project and the proposed Southern Green Hydrogen (SGH) project. Both opportunities are catalytic, need significant support, and can be reinforced and expanded to build social licence and build a progressive commercial use case.

Murihiku Regeneration is party to, and is supporting the SGH Project development process, and is working closely with organisations like HWR, Fonterra, and Contact Energy Limited - all of whom are looking for green solutions in the region and nationally.

### 2.1.3 New generation projects to support a growth scenario.

Pending a decision on the future of the Tiwai Smelter, there are a range of plans and forecasts[3], which all point to the need for the development of a steady pipeline of new

[2] https://treasury.govt.nz and https://nzas.co.nz - Both estimate around $NZ400M to the Southland economy(2021) and around 0.12% to NZ GDP

[3] Murihiku-Southland Regional Energy Strategy 2023, Te Waihanga Infrastructure Report -2022, The Future is Electric Boston Consulting Group -2022.

Rnewable Energy (RE) supply projects to meet baseload and growth scenarios for the region and for NZ out to 2050.

The current Transpower and PowerNet Regional Development Plan[4] out for consultation, also recognises the near-term increase in interest, activity, and the need for investment, planning and coordination. Likewise, the Regional Energy Strategy clearly identifies a range of renewable energy opportunities around wind, solar, and water, which can be prioritised and sequenced to meet demand scenarios that is referenced by Figure 3. Murihiku Regeneration strongly believes there is a need to prioritise onshore wind projects.

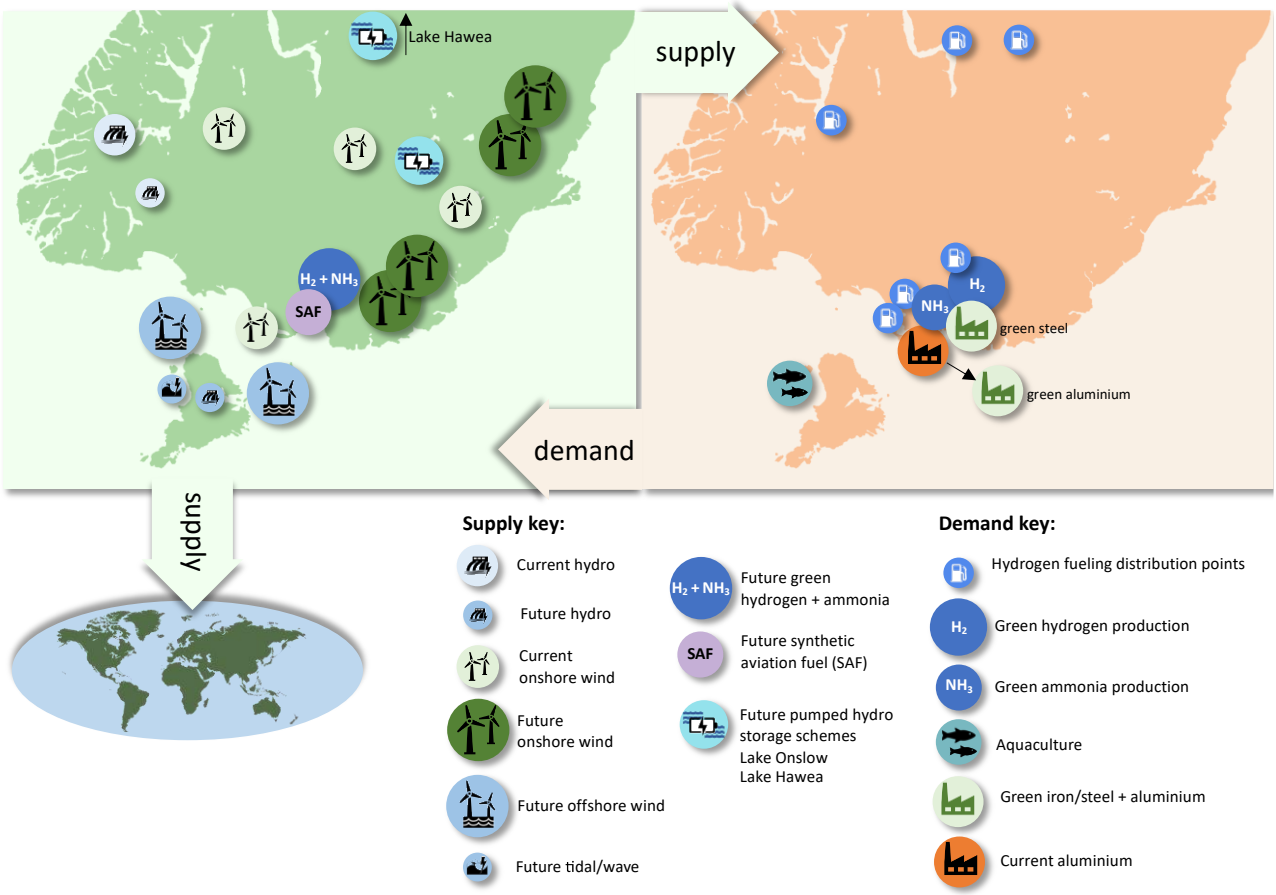


*Figure 5: Future supply/demand mix, source Murihiku Regeneration Green Energy Plan.*

[4] Murihiku-Southland Regional Development Plan 2023, www.transpower.co.nz/



Murihiku Regeneration

## 2.2 Enabling policy and regulation

### 2.2.1 Implementing a Murihiku-Southland Renewable Energy and Industry Zone (REIZ) in 2024:

*i. Establish NZs first REIZ in 2024 in Murihiku-Southland to provide certainty and catalyse regional development*

Murihiku Regeneration is strongly supportive of establishing NZs first Renewable Energy and Industrial Zone (REIZ) for Murihiku-Southland to advance the opportunities available and to countering the challenges that have emerged through the regional energy transition.

The constrained stage of the region's transition is reflected in both its energy strategy, and its challenges already recognised in the joint Transpower and PowerNet Redevelopment Plan.

*ii. What is a REIZ?*

A REIZ is a geographic area characterized by several features that support cost-effective renewable energy (RE) development, including high-quality RE resources, suitable topography, and strong developer interest.

A REIZ provides certainty and is enabled through a strong partnership between energy and industry participants, which is critical to its success. Developing a REIZ allows power system planners to overcome the difference in timescales associated with developing transmission and RE generation. For example, a utility-scale wind or solar plant takes 2 to 3 years or less to construct, while planning, permitting, and constructing new high-voltage transmission networks can take 10 years or more.

A similar challenge applies to industry, who need long-term planning for forward investment decisions. This misalignment creates a circular dilemma: wind and solar developers face difficulties securing financing without access to transmission, but before approving new transmission, regulators typically need a guarantee that new lines will be used and that costs will be recoverable.

The REIZ concept takes an alternative approach: planning new transmission to support direct development of a region's best areas for RE generation. More importantly, this process can provide a legal and regulatory framework for planning transmission development and upgrades that enable cost-effective RE deployment. Examples of a REIZ are NSW Energy Co Australia, and Texas US.

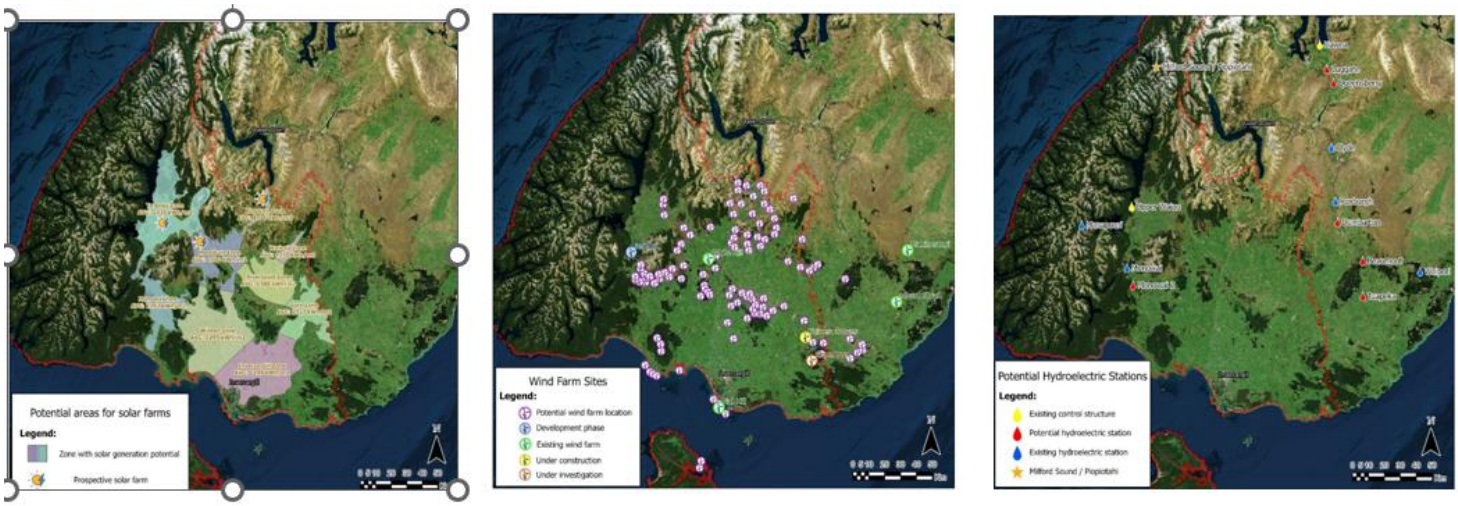


*Figure 6: Connecting up supply and demand opportunities through a Murihiku REZ; source Regional Energy Strategy, Great South.*

#### *iii. Proposed action*

Murihiku Regeneration, with the support of Te Rūnanga o Ngāi Tahu, will engage with decision makers and stakeholders – including Government policy makers, regional leaders (Mayoral Forum), and major energy stakeholders around the implementation of a renewable energy zone. We will signal this through the MBIE National Energy Strategy development process, the Just Transitions Programme and also the Transpower/PowerNet Regional Development Plan proposal.

### 2.2.2 Regional Energy Leadership: enabling visible alignment and coordination on priorities

#### *i. A critical enabler*

Regional leadership around the energy transition is seen as a critical enabler to ensure that the energy transition in Murihiku-Southland can be achieved. Through engagement with industry and government, we have noted a number of barriers holding back the development of clean energy sector in Murihiku-Southland and Aotearoa more generally. These include:

1. a lack of clear regional system leadership and connection for the various contributors;
2. resource consenting and planning uncertainty;
3. capital availability;
4. impact of first mover challenges; and
5. the price gap between renewable energy options and fossil fuels.

#### *ii. The opportunity*

The opportunity exists for a Regional Energy Co-ordination/Leadership Group to be established to overcome these barriers by undertaking:

1. **Co-ordination** between government, multiple entities and communities and efficient transmission of information (systems undergoing uncertainty and change need efficient communication);

2. **Brokering** infrastructure planning and investment solutions where multiple parties share in the benefit;

3. **Identifying policy and regulatory impediments** to delivering a transition that maximises the regional or national interest, and develop/propose solutions to these; and

4. **Prioritising national funding** that is directed at accelerating and/or stabilising the transition for local communities.

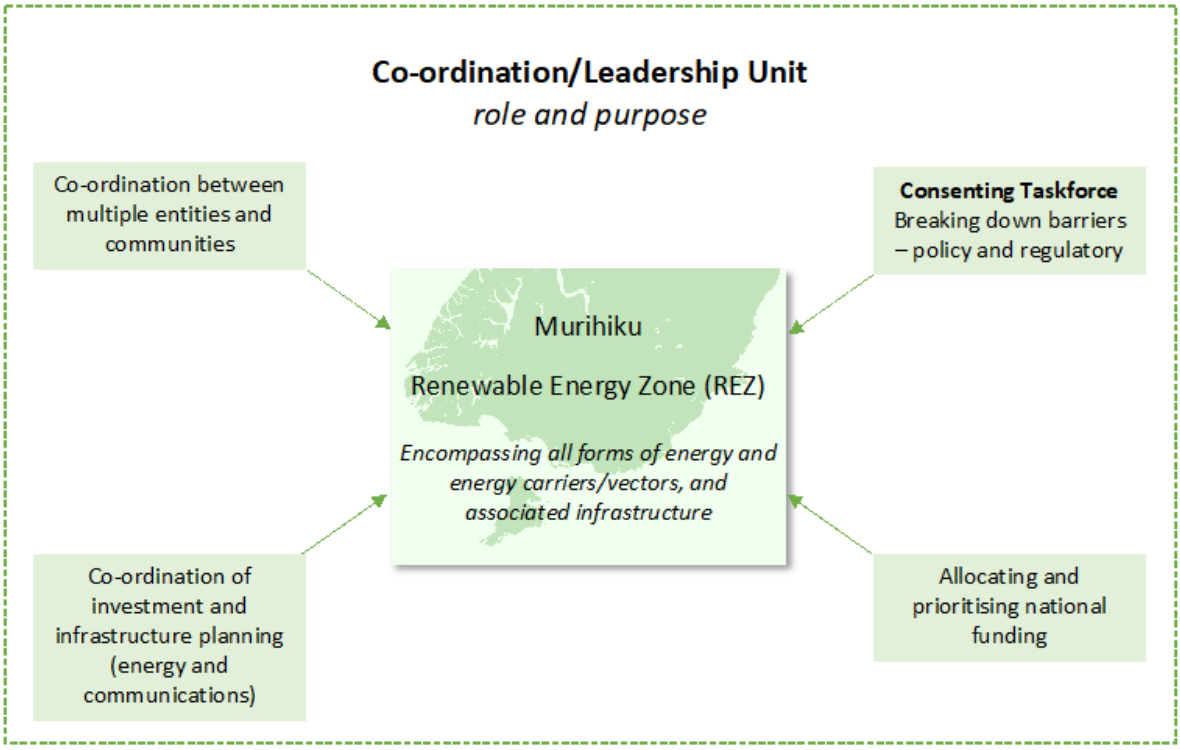


*Figure 7: Aspects of a Murihiku REIZ - source Murihiku Regeneration Green Energy Plan.*

### *iii. Proposed action*

Murihiku Regeneration, with mandated support[5] will seek to establish an informal Energy Transition Leaders Group to oversee the action items in this plan. The Group would have an agreed terms of reference, meet at least quartlerly and be responsible for visibly leading the energy transition action plan and work with market participants.

[5] Support from Mayors, Te Rūnanga o Ngāi Tahu and endorsement from MBIE to establish a regional leaders group.

### 2.2.3 Regulatory and consenting taskforce to support the energy supply-demand pipeline

#### *i. More consenting capacity needed*

Energy Transition initiatives relating to this plan will require significant resource management consenting and environmental planning capability at a level that is currently not available within Murihiku-Southland, and which is a limited resource with Aotearoa.

Pending a Tiwai decision to remain, the scale of new energy supply projects has been well evidenced in relevant reports already in the public domain. Various political parties have also identified the need to remove the planning and consenting barriers to speed up the consenting process.

Through our market engagements, we have confirmed that resource consents are a significant barrier (cost/time) to the critical path for major large scale renewable energy projects and will impact in both development delays and significant costs to a timely and effective transition.

This initiative is proposed to create a taskforce approach to consenting that is linked to the proposed REIZ, Renewable Energy Plan, and priority activation projects. The purpose of this initiative will be to reduce uncertainty, costs, and time required for a final investment decision and enable project implementation.

#### *ii. Proposed action*

Murihiku Regeneration will look to work with the Murihiku-Southland councils, using the REZ and Regional Leaders Group identified in this plan to identify, prioritise, and support a resourcing plan to ensure the timely introduction of new supply and demand projects that support the region's energy transition.

## 2.3 Supporting Innovation (and action)

### 2.3.1 Developing large-scale hydrogen production for domestic and export

The Southern Green Hydrogen (SGH) Project is a visible example of a potential Murihiku-Southland based large industrial development that could produce over 500,000 tonnes of green fuels annually by 2030 for domesitc and export use. The project, currently going through the feasibility stage, is led by Woodside New Energy, Meridan Energy, Mitsui & Co and Ngāi Tahu. It is an example of innovation and early adoption that will be a catylist for what is called 'power-to-x', or the ability for linked ecosystem upstream and down stream industries, innovations and projects to be established around it.

A project of this scale will require additonal energy supply projects, engineering and cosntruction capability and the need for workforce planning and social infrastructure to support this growth.

### 2.3.2 Development of a regional renewable energy aviation and heavy transport 'hub'

*i. Aviation: accelerate uptake of renewables*

Sustainable (decarbonised) aviation aviation is seen as a critical enabler that the Murihiku-Southland region could realisitically lead within New Zealand. This opportunity was highlighted at our recent 2023 Energy and Innovation wānanga[6] .

There are many known challenges and opportunities facing aviation around decarbonisation[7] and as a part of the Murihiku Energy Transition Plan, we fully support aviation becoming one of the key decarbonisation sectors visibily supported for the region.

The proposal developed by the Southern Airports Alliance for the 2026 Air New Zealand Commercial Demonstrator Project, supported by Murihiku Regeneration;[8] and the establishment of the New Zealand Hydrogen Aviation Consortium seek to remove 900,000 tonnes of carbon emissions each year by 2050.[9] These provide opportunities for decarbonising, enhancing green tourism and attracting research, innovation and creating jobs in the new economy.

---

[6] See www.murihikuregen.org.nz/events/energy-and-innovation-expo-2023

[7] These include fleet renewal, disruptive propulsion technologies (electric and hydrogen), operational efficiency, sustainable aviation fuel (SAF) usage and carbon offsetting; source McKinsey Report-Decarbonising Aviation , 16 June 2023.

[8] Southern Airports Alliance – Invercargill Airport, Queenstown Airport and Dunedin Airport -with a regional proposal for Air New Zealand and its 2026 Commercial Demonstrator EOI – for its next generation aircraft - www.airnewzealand.co.nz/initiatives/next-generation-aircraft-technology

[9] See www.christchurchairport.co.nz/latest-news - a consortium between Christchurch Airport, Airbus, Fortescue Future Industries, Fabrum NZ, Hiringa Energy and Airbus launched on 10 February 2023.

The ability for Murihiku-Southland to leverage from its leadership around a hydrogen heavy transport refuelling network for trucks and buses can enable the establishment of regionally connected renewable energy hubs that also supports aviation. This could support electric, hydrogen and hybrid aircraft (refuelling, servicing and support), and with the establishment of additional electricity supply, to also support synthetic aviation fuel (SAF) production.

SAF (or green kerosene) is an essential resource for New Zealand nationally and worldwide, as there is no technological alternative to kerosene for long haul flights. Murihiku-Southlandhas all of the ingredients (RE, biomass from the primary sector) to be a leading SAF producer for New Zealand.

### *ii. Develop a regional and South Island connected hydrogen refuelling network*

The HWR Group is leading the heavy transport industry through its dual fuel technology and has invested in ten dual fuel trucks and a refuelling station for Southland that is due to open in 2024 to support its large truck fleet.[10]

With the development of production line hydrogen fuel cell trucks, the ability for hydrogen as a fuel to abate diesel use and provide for significant decarbonisation benefits for all heavy transport fleets in the region is an opportunity. This benefit applies equally to the other terrestial heavy vehicles (buses, agricultural vehicles, Concrete and Rubbish Trucks as examples). It also applies to marine hydrogen, and hydrogen based fuels (methanol and ammonia) as a viable alternative to marine diesel.

### *iii. Regional green hydrogen consumption rebate*

The Government's proposed green hydrogen consumption rebate programme[11]was designed in 2023 together with Murihiku-Southland regional leaders and Iwi to build regional capability and supply chains to support the green hydrogen sector's growth. It was developed to support the Just Transtions regions (Southland and Taranaki) with the energy transition.

The policy for this rebate programme is still being developed, and the programme has yet to be deployed, however, it will likely face challenges around the commercial realities of implementing a hydrogen fuelling transtion. The relative size of the fund (too small), and the focus on end user operating costs, rather than also dealing with the cost of capital to introduce new hardware to support the transition to a hydrogen economy, will provide limiting factors to its success.

### *iv. Proposed action*

[10] www.hwr.co.nz/hydrogen

[11] See MBIE www.mbie.govt.nz/business-and-employment/economic-development/just-transition/regional-hydrogen-transition

Supporting the development of a refuelling network (hydrogen and electric) for Murihiku-Southland that can support hard to abate sectors – such as heavy transport and aviation, is seen as something critical to building social licence for decarbonisation. Murihiku Regeneration will work with partners to encourage a regional renewable energy hub concept.

### 2.3.3 A research, science and innovation programme focused on applied projects to support the delivery of power-X projects.

#### *i. Why the need for research, science and innovation?*

Rapid growth of renewable energy in the region will require an active research, science, and innovation (RSI) capability based around applied science and related project development. This will need to be powered by capability and capacity building of a new workforce, and pathway planning through our Te Ara Aukati Kore (Pathways Without Barriers Programme) - including He Ao Hou, Kia Tū, and Anamata Māia programmes[12].

Energy, coastal and offshore RSI is at the heart of many Murihiku Regeneration initiatives (*e.g.*, marine energy, Tiwai site remediation, mariculture). Our three major workstreams – Te Ara Aukati Kore (TAAK), Murihiku ki te Tonga (MKTT) and Energy Transitions are founded around this core need.

Murihiku Regeneration runs its yearly Education, Energy and Innovation wānanga to showcase challenges, opportunities and activation for the region[13].

Murihiku Regeneration will be looking to establish an RSI capability, different from others in Aotearoa starting with its Murihiku ki te Tonga Programme (MKTT). MKTT will have a strong focus on solving practical challenges through transdisciplinary[14] research that is tailored to supporting policy, development, and sustainable management of natural resources centred on a partnership between Ngāi Tahu, research institutes, business and project developers, and the Crown.

#### *ii. Oceans and energy*

Aotearoa has the fifth largest EEZ (4.084 million km$^2$) in the world. The Murihiku takiwā includes world-class natural resources, such as the wind and wave resource around Rakiura and Te Ara-a-Kiwa, the biodiversity of the Subantarctic Islands, and the globally unique southern fjords. The subantarctic winds and ocean currents that surround Murihiku govern the region's marine productivity, climate, and coastal dynamics.

Understanding these factors is essential for creating a sustainable and productive future renewable energy engine room. The development of a high value power-to-x hydrogen

[12] See www.murihikuregen.org.nz/our-mahi/te-ara-aukati-kore-education-training-and-capability for details on Kia Tū (Parthways), He Ao Hou (STEAM in schools) and Anamata Māia (Youth Skills Hub).
[13] See www.murihikuregeneration.org.nz/events - four wānanga have been run since estabblishment in 2020.
[14] As defined by Harvard University: "*Transdisciplinary Research is defined as research efforts conducted by investigators from different disciplines working jointly to create new conceptual, theoretical, methodological, and translational innovations that integrate and move beyond discipline-specific approaches to address a common problem*."

inclusive renewable energy ecosystem will both create a regional opportunity and the requirement to apply research findings and implement system improvements to real world applications. There will also be scope to design innovative practices, technologies and approaches as the ecosystem develops.

Murihiku Regeneration will be looking to develop its oceans strategy and bring together an RSI capability through its MKTT and Energy Transitions workstreams that enables international partnerships, collaboration, attracts funding, builds capability, and enhances the phased approach to our energy transition plan.

Examples of this type of work will be the exploration of hydrogen battery storage, SAF, marine kinetic energy (wave and tide delivery systems), farm side decarbonisation through wind, solar and biofuels, sustainable aquaculture, offshore wind projects, and the further development of green hydrogen (liquid, green ammonia, methanol and SAF), and heavy transport (marine and land).

### *iii. Proposed actions*

Murihiku Regeneration is actively involved in a number of workstreams where RSI sits as a critical enabler. We are already working with researchers and developers around the opportunities to embed further capability within the region.

We will be looking to expand our MKTT Programme and have a number of proposals (including Endeavour Science Proposals) being developed. A number of research expeditions will be led through the 2024-25 season to further build on the capability.

### 2.3.4 Exploring scalable commercial $CO_2$ capture for SAF/e-methanol applications, including using biomass innovation

#### *i. Why the need for research, science and innovation?*

There is a clear commercial market and need for scalable commercial $CO_2$ capture technologies and plants that can be used for SAF[15]. Murihiku -Southland is ideally placed to take advantage of this gap and opportunity.

Biomass fermentation is a mature and commercially viable technology, of critical value to the region, and used in locations such as in Germany, where it is widespread on farms and in cities. This produces a concentrated source of carbon for efficient fuel synthesis together with hydrogen and energy.

Direct Air Capture (DAC) technology is still a little bit too expensive/not efficient enough as a sole source of carbon for SAF. We see the goal for Murihiku Regeneration through commercial partnerships, is to improve DAC technology, so it can be deployed at scale, as DAC is one of the only mechanisms for actively mitigating climate change[16].

There is no technological barrier to replicating this exact set-up in Murihiku-Southland and to start making SAF. All the technology is mature and well known. A DAC unit wouldn't need to be installed to start with, although it would be advised to plan the facility so a DAC unit can be added later. Examples of similar commercial scale opportunities include a recent plant established in Chile. [17]

#### *ii. Proposed action*

Murihiku regeneration will engage with potential commercial participants to determine interest in a commercial scale regional pilot project.

[15] See https://flightnz0.airnewzealand.co.nz

[16] See https://www.wssenergy.com

[17] Southern Chile is doing already what we could be doing. Their commercial-scale SAF plant just opened in Punta Arenas. It was built with funding from German industry and government:
https://www.energate-messenger.com/news/229077/large-scale-plant-for-synthetic-fuel-starts-operation-in-chile
https://newsroom.porsche.com/en/2022/company/porsche-highly-innovative-fuels-hif-opening-efuels-pilot-plant-haru-oni-chile-synthetic-fuels-30732.html

### 2.3.5 Net Zero Rakiuru Plan by 2024 and implemented by 2030

#### *i. Why Rakiura-Stewart Island?*

Rakiura, its surrounding waters, and Te Ara-a-Kiwa (Foveaux Strait) have world-class resources for generation of renewable energy from wind and the sea (wave, current, tidal). The shallow bathymetry in the area favours installation of offshore wind, in particular to the west of Rakiura in the medium- to long-term. The available resources greatly exceed the energy needs of the Island, and potentially of Murihiku as a region (Figure 8).

Rakiura currently has a stand-alone electricity grid, with approximately 40km of transmission cables, powered by five diesel generators. These generators use about 360,000 litres of diesel a year, at a cost of approximately $1.4M in 2021.

Rakiura emits approximately 1,200 tonnes $CO_2e$ annually from electricity generation, onshore transport (approximately 500 light vehicles), and offshore electricity generation for salmon farming.

In conjunction with Southland District Council and leaders from the Rakiura community, a steering group has been established. The immediate goal in phase one of the project is to reduce the increasing economic hardship resulting from progressively increasing diesel costs, with Rakiura consumers paying in the order of 2.5 times for a unit of electricity, compared with the mainland.

Removing reliance on the diesel generators is consistent with both the journey to decarbonisation and the Island increasingly becoming a wild, natural tourist destination. Electricity provides approximately 33% of the Islands' energy needs so a second phase will seek full decarbonisation.

This project aligns with the need to support island and coastal communities in the NZ EEZ and also Pacific communities around the need for energy security.

#### *ii. The challenge*

Rakiura is almost entirely operated on fossil fuels (diesel, LPG, coal and wood), making energy supply a clear and urgent ***problem*** to address. As an island with no electrical connection to the mainland, it is the most challenging part of the Murihiku-Southland region to decarbonise. It also represents the perfect ***opportunity*** to demonstrate the complete decarbonisation of an entire community, to serve as a lighthouse project for net-zero transition elsewhere, and to showcase New Zealand RSI in clean energy to the world.

Following the decarbonisation of the island, the project provides the opportunity to unlock vast renewable energy resources located in and around Rakiura. This can only proceed based on:

- demonstrating the feasibility of renewable technologies (solar, onshore, and offshore wind, and marine kinetic energy), hydrogen batteries, micro-hydro and/or micro pumped hydro, and marine hydrogen refuelling;

- obtaining community, iwi, and local government support for the proposed development; and

- attracting private sector partners / developers to help fund large energy infrastructure (e.g., offshore wind, wave, offshore hydrogen production).

### *iii. Phased delivery project*

There have previously been multiple attempts to resolve the Island's energy supply and avoid the reliance on diesel (and coal/wood). The difficulties have included appropriate sites and access to them, technology choice, reasonable cost, and lack of clarity in who makes what decisions. There is a significant amount of information available from past work, though there will probably need to be some site-specific data gathered and improvements in technology available considered.

The proposed approach will include a first phase, probably based around a solar / wind solution. Desktop studies indicate that this can meet up to about 65 percent of demand and reduce the reliance on diesel by more than half. Being able to finalise an appropriate site could lead to even greater gains.

A second phase will build on the first phase by replacing the remaining diesel and considering how to cover low solar/wind periods, considering how to cover low solar/wind periods, store or use excess RE in times of abundance. Followed by decarbonise the remaining 65 percent of the total energy needs. These needs would include fuel for home and business heating, vehicle needs, meeting requirements for boats and offshore activities such as fish farming.

### *iv. Proposed action*

The Steering Group has already met several times and is soon to release an EOI, the key actions in this will be site review, identifying a technology choice, and developing an indicative business case.

Those Island leaders, who are members of the Steering Group have already been engaged with the Rakiura Community and will continue to do so on a regular basis and particularly at key decision points. The Island Community are keen to see progress.

Following the decision making relating to the Indicative Business Case the next steps are a building a specific detailed business case, engagement with potential funders, and implementation planning.

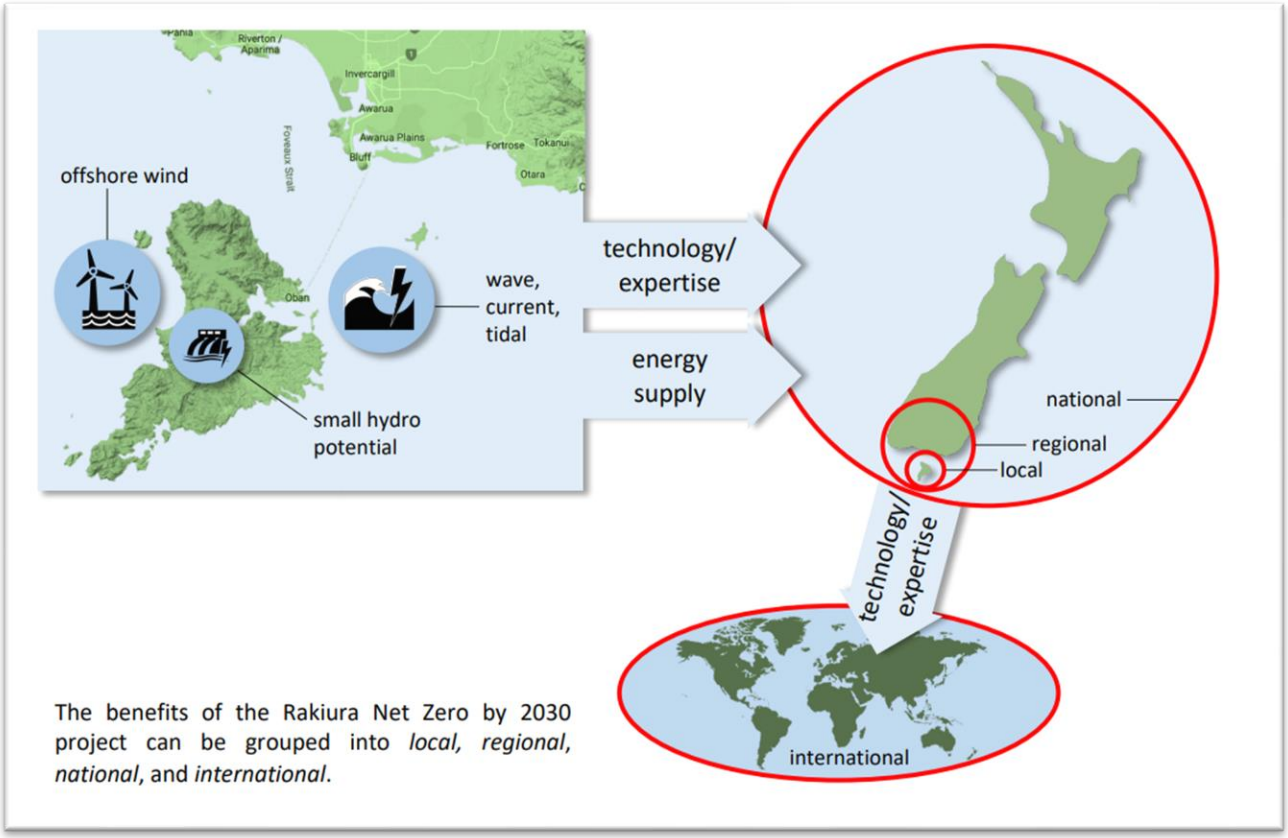


*Figure 8: Elements of a Potential Rakiura Net Zero 2030 Plan, Source Murihiku Regeneration Energy Transition Plan.*



Murihiku Regeneration

### 2.3.6 Community energy innovation and action

#### *i. Dealing with energy poverty and hardship*

A key focus for Murihiku Regeneration is to look at the opportunities around the regional energy transition to create *energy wellbeing* and counter *energy hardship.*[18] A 2021 MBIE report identified issues, barriers and opportunities to lift communities out of energy poverty and energy hardship. The MBIE Community

Recent projects, including a University of Canterbury project led through PSC to investigate high value, low cost solar schemes to improve access for communities to low cost power.

#### *ii. Distributed energy schemes*

We see a clear opportunity for Murihiku -Southalnd to lead around community distributed energy schemes and contribute to regional demand response to unlock productivity through flexible management systems. [19]

#### *iii. Energy Storage*

We will look beyond current chemical storage solutions *(primariliy lithium batteries)* in supporting electrification *and community storage.* We view these batteries at best as a short-term stepping stone to more environmentally friendly alternatives. It is our view that the region should also be looking at simpler, non-technical and non-pollution options that have much longer lifespans for energy storage of 50 years or greater and enabling community participation. Simpler energy storage systems should be explored and that is where we think research funding should be spending a larger portion of its resources in testing new/old energy storage options and enabling regulation and policy.

#### *iv. Proposed action*

Murihiku Regeneration will develop an energy wellbeing plan and look to support community distributed energy pilots to support rapid adoption of projects for the region. An endeavour research bid (to MBIE) will be made around enrgy storage solutions.

---

[18] MBIE Report "Defining Energy Hardship' 2021, which identified least 130,000 households experiencing energy hardship. Given recent cost of living challenges, this figure is likely larger. The more recent Electricity Price Review identified actions and is supported by a concept framework for energy wellbeing. https://www.mbie.govt.nz/building-and-energy/building-and-energy/defining-energy-hardship/. The MBIE Community Renewable Energy Fund also is a viable pathway for some of these projects to be undertaken in the region -see htttps://www.mbie.govt.nz/building-and -energy/energy-and-naturalresources/low-emissions-economy/energy-efficiency-in-new-zealand/community-renewable-energy-fund/

[19] Community distributed energy includes small scale generation (e.g. solar, wind and hydro) and the ability for it to contribute to demand response through the use of software packages to support the transtion. See www.transpower.co.nz/community-distributed-energy-resources/

### 2.3.7 Net zero workforce planning for priority technical trades

#### *i. Planning for demand and lack of workforce*

The energy sector as a critical part of the net zero workforce, will need to lead the transition into future focused technology and the development of a highly skilled workforce to enable a regenerative economy in Murihiku-Southland. The scale of energy projects required – globally, nationally and regionally, will potentially result in significant delays, bottlenecks and competition for workforce[20] as the reality bites around the scale of energy infrastructure needed to meet even baseline scenarios.[21]

#### *ii. The development of targeted workforce pathway plans*

The need for effective workforce strategies are well understood by the energy sector and related industries. Murihiku Regeneration has applied a social regeneration approach to future workforce planning as reflected in the TAAK workstream. We will take a targetted approach to workforce panning by indentifying the critical technical work required to support the energy transition and develop a workforce pathway plan out to 2030.

A whānau-centred brokering focus will ensure people are able to progress along a pathway. This ensures a practical focus on 'how' people will build relevant capability and that unforseen 'impediments' to progress are addressed.

#### *iii. Proposed action*

Murhiku Regeneration intends to work with regional stakeholders (relevant developers, sector leads, industry representatives) through our Kia Tū programme to develop a comprehensive workforce plan to support the transition to 2030. We will also engage with relevant government agencies – MSD, MBIE and Education.

This plan will provide a practical programme of work that is tailored to both future workforce (school leavers) and existing workforce (people seeking to transition between Industries). It will provide occupation and industry specific focus, maximising the flexibility available within education and training systems to ensure real-time alignment to Industry needs. This is vital given that these are new industries whose needs will be emergent during the process of transition.

[20] See The net zero workforce Power, Utilities & Renewables, Deloitte, www2.deloitte.com/content/dam/Deloitte/uk/documents/energy-resoruces/deloitte-uk-net-zero-workforce-power-utilities-renwables.pdf , 2023

[21] Murihiku-Southland Regional Energy Strategy, 2023